Carlsbad
Municipal Water District

Urban Water Management Plan
2020

Prepared by:

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June 2021

Carlsbad Municipal Water District 2020 Urban Water Management Plan

Final

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List of Abbreviations

AB	Assembly Bill
ACS	U.S. Census American Community Survey
Act	Urban Water Management Planning Act
AF	Acre-feet
AFY	Acre-feet per year
AMI	Advanced Metering Infrastructure
Annual Assessment	Annual Demand and Supply Reliability Assessment
AWWA	American Water Works Association
BMP	Best management practices
Carlsbad	City of Carlsbad
Carlsbad WRF	Carlsbad Water Reclamation Facility
CASGEM	California Groundwater Elevation Monitoring
CCF	Hundred cubic feet
cfs	Cubic feet per second
CII	Commercial, Industrial, and Institutional
CIP	Capital improvement program
City	City of Carlsbad
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
CMWD	Carlsbad Municipal Water District
DAC	Disadvantaged community
Delta	Sacramento-San Joaquin Delta
DMM	Demand Management Measure
DRA	Drought Risk Assessment
DWR	California Department of Water Resources
EI	Energy intensity
ESP	Emergency storage plan
EWA	Encina Wastewater Authority
EWPCF	Encina Water Pollution Control Facility
FTE	Full time employee
GHG	Greenhouse gas
GIS	Geographic Information System
GMP	Growth Management Plan
gpcd	Gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
Guidebook	2020 Urban Water Management Plans Guidebook for Urban Water Suppliers
IPR	Indirect potable reuse
IRWM	Integrated Regional Water Management
kWh	Kilowatt hour
LWWD	Leucadia Wastewater District
MG	million gallons
mg/L	Milligrams per liter
mgd	million gallons per day
MHI	Median household income
MWD	Metropolitan Water District of Southern California
MWELO	State of California’s Model Water Efficient Landscape Ordinance
NOAA	National Oceanic and Atmospheric Administration
NSDWRC	North San Diego Water Reuse Coalition

OMWD	Olivenhain Municipal Water District
Plan	Urban Water Management Plan
Poseidon	Poseidon Resources Corporation
QSA	Quantification Settlement Agreement
RAC	Regional Advisory Committee
RWMG	Regional Water Management Group
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SB	Senate Bill
SBX7-7	Senate Bill X7-7 (The Water Conservation Act of 2009)
SDAC	Severely disadvantaged community
SDCWA	San Diego County Water Authority
SEJPA	San Elijo Joint Powers Authority
SFID	Santa Fe Irrigation District
SLR	Sea level rise
SWP	State Water Project
TAP	Tri-Agency Pipeline
TDS	Total Dissolved Solids
UAW	Unaccounted-for water use
UWMP	Urban Water Management Plan
VID	Vista Irrigation District
VWD	Vallecitos Water District
WELO	Water Efficient Landscape Ordinance
WRF	Water Recycling Facility
WSCP	Water Shortage Contingency Plan

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Executive Summary

ES 1 Purpose and Organization

Preparation of an Urban Water Management Plan (UWMP) is required by the California Department of Water Resources (DWR) for all urban water suppliers within the State of California. Urban water suppliers are defined as organizations that provide water to more than 3,000 customers or that supply more than 3,000 acre-feet (AF) of water annually. UWMPs must comply with the California Water Code (CWC) and the Urban Water Management Planning Act (Act).

This report is the 2020 Urban Water Management Plan (2020 UWMP) for Carlsbad Municipal Water District (CMWD), which was adopted by CMWD's Board of Directors and submitted to DWR by July 1, 2021. This 2020 UWMP meets the requirements of state law. In addition, this report includes an analysis of long-term water supply and demand planning for CMWD. Table ES-1 includes a summary of each section of this 2020 UWMP.

Table ES-1: Organizational Overview of the 2020 UWMP

Section	Section Name	Information Contained within Section
Section 1	Introduction and Overview	• General legal requirements for 2020 UWMPs • Local planning efforts
Section 2	Plan Preparation	• Plan preparation • Agency coordination and outreach • Document overview
Section 3	System Description	• History of CMWD • General description of CMWD's service area • Hydrologic and climate characteristics • Current and projected population and demographic figures • Description of CMWD's water system • Overview of potential impacts of climate change
Section 4	System Water Use	• Overview of past water use • Information about existing water use in 2020 • System water losses • Water use projections through 2045 • Water demands for lower income households
Section 5	Baselines and Targets	• Information on water conservation mandates • Baseline gross per capita water use • Target method • Urban water use target for 2020 • 2020 target compliance
Section 6	Water Supplies	• Existing and projected supplies, including purchased and imported water, desalinated water, and recycled water • Description of planned future water projects • Climate change impacts on supplies • Energy intensity of water operations

Section	Section Name	Information Contained within Section
Section 7	Water Supply Reliability	• Constraints on each of CMWD's supplies • Projections for water supply and water demands under normal, single dry, and multiple dry year conditions • Drought risk assessment
Section 8	Water Shortage Contingency Planning	• Annual supply and demand reliability assessment procedures • Overview of CMWD's water shortage stages • Prohibitions that are enacted during water shortages • Methods for reducing water use • Catastrophic supply interruption plan • Shortage communication protocol
Section 9	Demand Management Measures	• Summary of CMWD's demand management measures implemented over the past five years • Summary of future DMM implementation
Section 10	Plan Adoption, Submittal, and Implementation	• Summary of the plan review and notification process • Overview of the UWMP adoption process • Implementation of the 2020 Plan

ES 2 CMWD's Service Area Background and Water Supplies

CMWD's service area is in northern San Diego County and is about 32 square miles. CMWD serves approximately 82% of the City of Carlsbad. Olivenhain Municipal Water District (OMWD) and Vallecitos Water District (VWD) serve the remaining southeastern portion. CMWD currently serves about 92,000 people and its population is expected to grow to almost 101,000 by 2045.

CMWD's weather is mild. CMWD averages 11 inches of rainfall each year and temperatures are, on average, 64 degrees in January and 75 degrees in August.

CMWD buys drinking water from the San Diego County Water Authority (SDCWA). This water includes desalinated seawater. CMWD also produces and sells recycled water. Recycled water is used for irrigation and this reduces the amount of drinking water that is used. The recycled water is produced by CMWD at the Carlsbad Water Reclamation Facility (WRF). CMWD purchases additional recycled water from VWD's Meadowlark Water Recycling Facility.

SDCWA sells water to CMWD and 23 other retail water agencies. SDCWA's receives its water supply from the Colorado River, Sacramento-San Joaquin Delta, and the Carlsbad desalination plant. It purchases portions of its water from the Metropolitan Water District of Southern California (MWD).

Moving forward, CMWD plans to increase local supply reliability by continuing to work with interested local water agencies (Olivenhain Municipal Water District, Vallecitos Water District (VWD), City of Poway, Santa Fe Irrigation District, and San Dieguito Water District) and the Encina Wastewater Authority (a joint powers authority) on a plan to reuse the water that is discharged into the ocean from the Encina Water Pollution Control Facility as treated drinking water. This program is referred to as the North County One Water Project. CMWD may also deliver more recycled water through its existing connections in the future. However, these demands are considered conceptual at this time and are not included in the supply forecast for this 2020 UWMP. In addition, CMWD is a member of the North San Diego Water Reuse Coalition (NSDWRC), which consists of nine agencies who are consistently planning for a regional recycled water system to maximize recycled water use.

CMWD entered into an agreement in April 2016 to buy an exact amount (2,500 AFY) of desalinated seawater from the SDCWA. This water is considered local supply and can be counted on for CMWD customers at all times that the plant is producing water. CMWD has groundwater rights and is continuing to monitor the benefits and costs of clarifying these rights and developing the water supply in the future. Table ES-2 provides a summary of CMWD's projected water supplies from the years 2025 through 2045.

Table ES-2: Summary of Projected Supplies (AFY)

Source	2025	2030	2035	2040	2045
SDCWA Purchases	13,802	14,155	14,586	15,019	15,545
Seawater Desalination	2,500	2,500	2,500	2,500	2,500
Recycled Water[1]	4,218	4,218	4,218	4,218	4,218
Total Water Supplies	**20,520**	**20,873**	**21,304**	**21,737**	**22,263**

[1] Recycled Water supplies include Carlsbad WRF anticipated supply plus recycled water purchased from VWD.

ES 3 CMWD's Current and Projected Demands

CMWD's past water demands have varied from year to year, which is mainly because of the annual variations in weather. All urban water suppliers throughout California were mandated by the Water Conservation Act of 2009 (also known as SBx7-7) to reduce per person drinking water demands by 20% by the year 2020. For 2020, CMWD was required to have a per person water use of 207 gallons per person per day, as included in the 2015 UWMP. CMWD's actual drinking water demands for 2020 were 135 gallons per person per day, which is below the 2020 target. Reduced demands in CMWD's service area are likely the result of ongoing water saving programs that have been implemented in response to SBx7-7. CMWD also reduces water waste by finding and fixing leaks.

Table ES-3 shows the baselines and targets for CMWD for compliance with SBx7-7. As shown in the table, CMWD elected to use a 10-year baselines, from the years 1999 through 2008, inclusive.

Table ES-3: SBx7-7 Baselines and Targets for CMWD

Baseline Period	Start Years	End Years	Average GPCD	2015 Target	2020 Target	2020 Actual
10-15 year	1999	2008	259	233	207	135

CMWD knows that ongoing conservation and increased recycled water use will reduce drinking water demands, further lowering overall gallons per person per day. Table ES-4 summarizes CMWD's baseline demands, conservation, recycled water use, and overall drinking water demand projections for years 2025 through 2045.

Table ES-4: Summary of Projected Demands (AFY)

		2025	2030	2035	2040	2045
A	Baseline Water Use[1]	22,754	23,027	23,599	24,221	24,755
B	Active and Passive Conservation[1]	2,234	2,154	2,295	2,484	2,492
C	Total Projected Demands[2] (A-B)	20,520	20,873	21,304	21,737	22,263
D	Existing Recycled Water Use[3]	4,218	4,218	4,218	4,218	4,218
E	Increase in Recycled Water Use[4]	--	--	--	--	--
F	Total Recycled Water (D+E)	4,218	4,218	4,218	4,218	4,218
G	Total Potable Water[5] (C-F)	16,302	16,655	17,086	17,519	18,045

[1] Baseline water use and active/passive conservation calculated via SDCWA 2020 UWMP demand forecast.

[2] Projected demands include potable and recycled water demands.

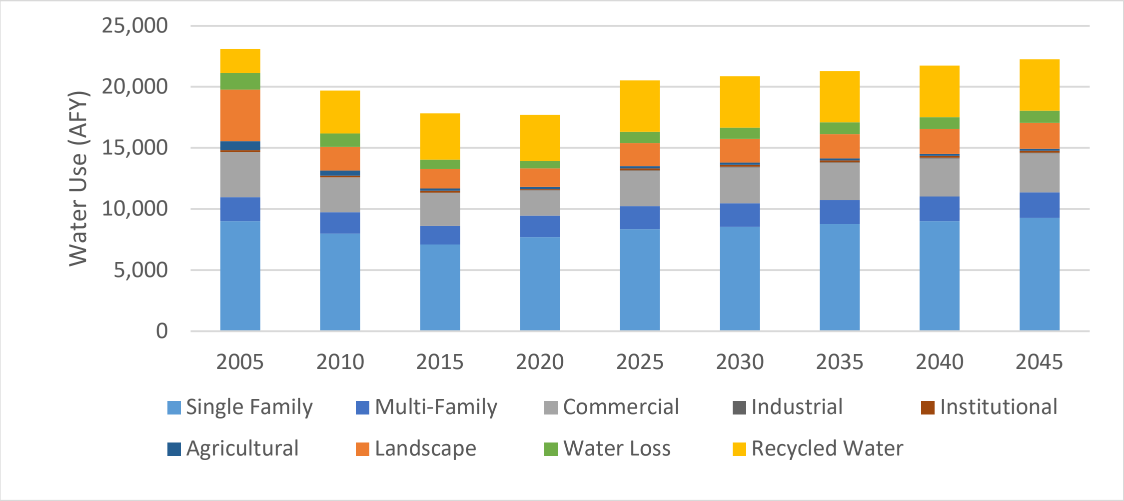
[3] Existing recycled water use projected forward is based on forecasted verifiable local supply of recycled water.

[4] Increased demand from expansion of recycled water system is expected to be complete by 2022, refer to *Section 6 System Supplies*. Future recycled water use will offset projected potable demands. Between 2025 and 2045, expansions of recycled water system are conceptual and have not been included in projected demands in order to be conservative about future demands on potable water. No additional feasible CMWD recycled water system projects are expected through 2045.

[5] Total Potable Water is the Projected Demands less Recycled Water Demand.

Figure ES-1 shows past and future water use, by use sector. Recycled water is also shown to provide an overall summary of CMWD's water supply. Future demands assume a normal rainfall year.

Figure ES-1: CMWD's Historical, Current, and Projected Water Use



ES 4 CMWD's Water Supply Reliability

One of the key requirements to include in a UWMP is a future supply reliability analysis that shows the supply-demand balance in normal, single-dry, and multiple-dry year rainfall conditions. Consistent with SDCWA's 2020 UWMP, CMWD projects that demands will increase as weather gets hotter and drier during the single-dry year and multiple-dry year scenarios. Recycled water supplies and CWMD's local desalinated seawater supply would remain steady in all rainfall scenarios because they are both drought-proof, local supplies. Changes in demands would change how much water CMWD buys from SDCWA. SDCWA and CMWD have coordinated on this UWMP and predict that water supply will be sufficient to meet the demand during a drought. In the rare case that SDCWA was not able to supply as much water to CMWD, CMWD would know in advance and would implement water saving measures from the Water Shortage Contingency Plan. This plan is detailed in this document. CMWD is confident that it will have the ability to provide water to customers during short or long droughts.

UWMPs and the Water Conservation Act of 2009: Conservation requirements for the UWMP are based on the Water Conservation Act of 2009 (SBX7-7). This act mandates a 20% reduction in water use from average (based on 10-15 year baseline), measured in GPCD (gallons per capita per day, based on gross water use), by 2020, with an interim target of 10% reduction by 2015. For more information, refer to: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

2015/2016 Emergency Regulations: Executive Order B-29-15 (April 2015; extended March 2016) imposed temporary mandatory conservation aimed at achieving 25% reduction statewide from 2013 levels during the current multi-year drought. Each water purveyor was assigned a conservation target by the state, measured in R-GCPD (residential gallons per capita per day, based on residential water use). CMWD's initial conservation target was 28%, but was reduced to 20% due to regional supply development. For more information, refer to: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

2016 Extended Emergency Regulations: In May 2016, the SWRCP adopted new emergency regulations (applies June 2016 – January 2017) that would allow water purveyors to identify their own temporary conservation targets based on their ability to meet demands during continuation of multiple dry year conditions into 2017, 2018, and 2019. For more information refer to: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

2018 Water Conservation Legislation: In 2018, California SB 606 and AB 1668 were enacted and expand authority to implement a water budget-based approach to conservation and water use efficiency. New urban water use standards are anticipated to be in place in 2023. For more information, refer to: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Making-Conservation-a-California-Way-of-Life

ES 5 Water Shortages and Demand Management

CMWD has two ordinances in place to help manage demands during potential water shortages. Ordinance No. 44: Drought Response Plan and Water Conservation Program is CMWD's Drought Ordinance, which creates CMWD's drought response levels and water saving steps that are enacted for each level. The higher the response level the greater water saving measures will be enforced. Ordinance No. 46: Water Schedules is an amendment to CMWD's Drought Ordinance, and revised Drought Response Levels 2 and 3 to allow for increased flexibility for CMWD in starting water limits during these drought levels.

CWMD also participates in various public outreach and education campaigns and water savings programs to increase water use efficiency and awareness. Staff attend community events and manage water savings booths, as well as, visit local schools to talk to students about water resources. Water savings resources are provided to customers at CMWD's Water Savings Tips website (http://www.carlsbadca.gov/services/depts/pw/utils/water/tips.asp), which provides links to water use calculators, WaterSmart landscaping guides, and videos on water savings. While the COVID-19 pandemic has limited staff's ability to perform in-person education, the website and social media information has expanded and improved. CMWD works with SDCWA on multiple water saving efforts, including but not limited to, rain barrel rebates and discounts, smart irrigation devices rebates, a grass replacement program, and landscape education.

Section 1

Introduction and Overview

This *2020 Urban Water Management Plan* (2020 UWMP) addresses the Carlsbad Municipal Water District (CMWD) and includes descriptions of CMWD's water supply sources, projected water demands, and supply reliability. The 2020 UWMP presents a comparison of projected water supplies to water demands during normal, single-dry, and five consecutive dry years. It also includes CMWD's Water Shortage Contingency Plan (WSCP). This chapter provides an introduction to the purpose of the 2020 UWMP and an overview of the Urban Water Management Planning Act.

1.1 Background and Purpose

Water planning has become increasingly critical as California prepares for longer droughts, expected long-term climate changes, and regulatory changes. Prior to the adoption of the Urban Water Management Planning Act (the Act), water suppliers were not required to conduct long-term water resources planning, which could leave agencies vulnerable to supply disruptions during periods of drought or other supply shortages. The Act was adopted to require a minimum level of resource assessment and planning by water suppliers in order to reduce susceptibility to supply shortages. Water resources planning at the local level also allows for local community involvement and consideration of unique circumstances and local conditions of the individual agency. This 2020 UWMP is an update to CMWD's 2015 UMWP.

1.2 Urban Water Management Planning Act

This 2020 UWMP has been prepared in accordance with the Act, as amended, California Water Code Division 6 Part 2.55 §10608 and Part 2.6, §10610 through 10657. The Act became part of the California Water Code with the passage of Assembly Bill 797 during the 1983–1984 regular session of the California legislature. It requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit a plan every five years to the California Department of Water Resources (DWR). The Act was amended in November 2009 with the adoption of Senate Bill (SB) x7-7. SBx7-7 sets a goal of achieving a 20% reduction in urban per capita water use statewide by 2020. This 2020 UWMP demonstrates consistency with the baselines and achievement of the targets established for SBx7-7 compliance in CMWD's 2015 Plan. In 2018, the State adopted new water conservation legislation Senate Bill (SB) 606 and Assembly Bill (AB) 1668. SB 606 and AB 1668 lay out a new long-term water conservation framework that includes both urban and agricultural sectors. Among the new requirements related to Urban Water Management Plans (UWMPs), this 2020 UWMP incorporates additional in-depth dry year reliability and drought risk assessments, as well as new elements to the WSCP. The Act states that urban water suppliers should make every effort to assure the appropriate level of reliability in water service is in place to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The Act describes the required contents of the 2020 UWMP, as well as how urban water suppliers should adopt the UWMP. This 2020 UWMP also describes demand management measures that CMWD has implemented, or is planning to implement, which could help address anticipated urban water use objectives that the California Water Code now requires suppliers to develop for certain sectors by 2023.

This 2020 UWMP has been developed in accordance with the DWR final *Urban Water Management Plan Guidebook 2020* (2020 Guidebook), which provides guidance to agencies on how to include the information required under the California Water Code (CWC), as amended. In accordance with the CWC, this Plan was adopted and submitted to DWR by July 1, 2021.

1.3 Relation to Other Planning Efforts

Urban Water Management Plans allow for integration of information from other planning documents, as well as regional planning efforts. This 2020 UWMP synthesizes information from CMWD's current planning documents and complements regional planning documents. Upon completion, the 2020 UWMP will help to inform other planning decisions, such as updates to the Carlsbad General Plan, and can be used to establish priorities in other planning efforts. Further, the information developed for this 2020 UWMP will be used to inform and enhance the San Diego County Water Authority's (SDCWA) *2020 Urban Water Management Plan*, which provides water reliability assessment for the region's water wholesaler. In addition, Appendix K demonstrates consistency with the Delta Plan's policy to reduce reliance on Sacramento-San Joaquin Delta (Delta) through the development of local supplies.

This 2020 UWMP aims to provide guidance on minimization of imported water supplies and maximization of local water supplies, which continues to be a priority for CMWD. CMWD has increased the use of recycled water, implemented water conservation measures, and participated in the planning and construction of a local seawater desalination project as steps to maximize the use of local water resources.

Relevant, related planning efforts include the following:

1. CMWD, *2019 Potable Water Master Plan* – Documents existing water system facilities and demands, identifies existing deficiencies in the system, confirms facility sizing, and recommends a future capital improvement program (CIP) based on updated water demand projections.
2. CMWD, *2019 Recycled Water Master Plan* – Evaluates the capabilities of the existing recycled water system, defines the most cost-effective system expansions through build-out conditions, and develops a recycled water CIP.
3. CMWD, *2019 Utilities Asset Management Master Plan* – Supports 2019 Potable Water Master Plan with condition assessment and CIP planning with respect to asset inventory and valuation.
4. CMWD, *2012 Phase III Recycled Water Project Feasibility Study* – Identifies customer demands and establishes the pipeline expansion segments, recycled water supply, and appurtenances necessary for Phase III.
5. North San Diego Water Reuse Coalition (NSDWRC), *2015 Regional Recycled Water Project Program Environmental Impact Report* – Identifies infrastructure between ten water and wastewater agencies interconnecting regional recycled water supply and distribution systems in order to maximize water reuse capacity. In the near term, this regional project potentially could supply additional non-potable demands of 18,808 acre-feet per year (AFY).
6. NSDWRC, *Regional Recycled Water Program: 2020 Project Feasibility Study* – Identifies near-term infrastructure between nine water and wastewater agencies interconnecting regional recycled water supply and distribution systems in order to maximize water reuse capacity. This project would result in a total of 2,450 AFY of new recycled water deliveries and 6,610 AFY of additional recycled water production at existing treatment plants.
7. SDCWA, *2020 Urban Water Management Plan* – Identifies regional water sources and volumes for SDCWA's service area, including supply reliability analysis of the wholesale (imported + desalinated seawater) supply.

8. San Diego Regional Water Management Group (RWMG), *2019 San Diego Integrated Regional Water Management Plan* – Regional effort to identify water resource issues, challenges, and solutions within western San Diego County, with emphasis on solutions that maximize collaboration and coordination among entities to best manage water resources.
9. City of Carlsbad (Carlsbad), *Climate Action Plan* – Carlsbad's CAP was adopted in 2015 and updated in 2020. It outlines measures, including in the areas of water and wastewater, the Carlsbad community will take to make progress towards meeting the State of California's 2050 GHG reduction goal.
10. City of Carlsbad, *General Plan* – Carlsbad's 2015 General Plan serves as a blueprint for future growth and development within the city. It includes a safety element that addresses seismic conditions and risk.
11. County of San Diego, *Multi-jurisdictional Hazard Mitigation Plan* – The Multi-jurisdictional Hazard Mitigation Plan is a countywide plan that identifies risks and ways to minimize damage by natural and manmade disasters.

1.4 Lay Description

The Executive Summary of this 2020 UWMP provides a lay description of the fundamental determinations of the UWMP, particularly regarding water service reliability, potential issues, and strategies for managing reliability risks.

Section 2

Plan Preparation

Section 2 Plan Preparation addresses CWMD's basis for preparing a UWMP and related information. It also provides a description of how this 2020 UWMP is organized, and identifies general details regarding CMWD and the data used for this plan.

2.1 Basis for Preparing a Plan and Agency Identification

This 2020 UWMP was prepared by CMWD. CMWD is a retail water agency that supplied 17,693 AF of water (potable and recycled) to 91, 694 people via 30,405 connections in 2020. Of these deliveries, 3,764 AF was recycled water, serving 965 recycled water connections, while the remaining 29,440 connections received a total of 13,929 AF potable water. Approximately 605 AF were lost as unmetered water. Unmetered water includes real losses, defined as physical water losses such as leaks, and apparent losses, which include "paper losses" or water lost through inaccurate measuring or recording.

This 2020 UWMP was prepared as an individual plan in coordination with appropriate agencies. This chapter provides descriptions of agency coordination, public participation, Plan adoption, and Plan organization. Table 2-1, Table 2-2, and Table 2-3 provide information on CMWD as a retail water agency and its water system, and how data will be reported throughout the 2020 UWMP.

Table 2-1: Public Water System

DWR Table 2-1 Retail: Public Water Systems			
Public Water System Number	**Public Water System Name**	**Number of Municipal Connections 2020**	**Volume of Water Supplied 2020 (AFY)**
CA3710005	Carlsbad Municipal Water District	29,440	13,929
NOTES: This table only reflects potable water connections and deliveries. CMWD's recycled water system has 965 connections and supplied 3,764 AF in 2020.			

Table 2-2: Plan Identification

DWR Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable*
☑	**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: CMWD is a member agency of the San Diego County Water Authority.			

Table 2-3: Supplier Identification

DWR Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
Units of measure used in UWMP*	
Unit	AF
** **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	

2.2 Agency Coordination

The Act requires CMWD to coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable. While preparing the 2020 UWMP, CMWD attended workshops conducted by DWR to discuss the requirements of the Act and attended meetings with SDCWA, CMWD's wholesale water supplier. SDCWA's *2020 Urban Water Management Plan* should be consulted for details regarding CMWD's wholesale water supplies. Table 2-4 identifies SDCWA as CMWD's wholesale water supplier, with whom CMWD has coordinated on its supply and demand evaluations.

Table 2-4: Water Supplier Information Exchange

DWR 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
San Diego County Water Authority

CMWD worked closely with the City of Carlsbad's Community and Economic Development Department in the preparation and review of 2020 UWMP elements. In preparing the recycled water elements of this 2020 UWMP, CMWD consulted with the agencies responsible for the existing and potential sources of recycled water in northern San Diego County, including Vallecitos Water District (VWD), Leucadia Wastewater District (LWWD), Encina Wastewater Authority (EWA), City of Escondido, City of Oceanside, Olivenhain Municipal Water District (OMWD), Rincon del Diablo Municipal Water District (Rincon), San Elijo Joint Powers Authority (SEJPA), and Santa Fe Irrigation District (SFID). Table 2-5 provides a summary of CMWD's coordination with the appropriate agencies.

Table 2-5: Coordination with Appropriate Agencies

Organization/Agency Name	Level of Participation	
	Sent 60-Day Notice of 2020 UWMP update and Public Hearing	Contacted for Assistance
City of Carlsbad	X	X
City of Encinitas	X	
City of Escondido	X	
City of Oceanside	X	
City of San Diego	X	
City of San Marcos	X	
City of Vista	X	
County of San Diego	X	
Encina Wastewater Authority	X	X
Leucadia Wastewater District	X	X
Metropolitan Water District of Southern California	X	
Olivenhain Municipal Water District	X	
Rincon del Diablo Municipal Water District	X	
San Diego Association of Governments	X	X
San Diego County Water Authority	X	X
San Diego Local Area Formation Commission	X	
San Elijo Joint Powers Authority	X	
Santa Fe Irrigation District	X	
Vallecitos Water District	X	X
City of San Marcos Planning Department	X	
San Diego Local Agency Formation Commission	X	
Vista Community Development Department	X	
City of Oceanside Planning Department		
San Dieguito Water District	X	

2.3 Public Participation

CMWD encouraged community and public involvement in the 2020 UWMP. CMWD has scheduled a public hearing for June 8, 2021, that will provide an opportunity for CMWD's customers (including social, cultural, and economic community groups) to learn about the water supply situation and plans to continue to provide a reliable water supply for the future. The hearing was an opportunity for people to ask questions regarding the 2020 UWMP and Water Shortage Contingency Plan and included discussion of 2020 per capita water use.

A 60-day notice of the public hearing was provided to San Diego County and adjacent cities and other entities on March 26, 2021. The notification list is included in **Appendix A.**

Public hearing notifications were published in the San Diego Union Tribune on May 25 and June 1, 2021. In addition, CMWD customers were noticed of plan availability with a message on their utility bills in May. A copy of the draft 2020 UWMP was made available for public review on the City of Carlsbad's website at www.carlsbadca.gov 30 days before the public hearing. Due to the COVID-19 emergency, no hard copies were made available for review at City offices. A copy of the Notice of Public Hearing is included in **Appendix A.** This Plan was adopted by the Board of Directors on June 8, 2021. A copy of the adoption resolution is provided in **Appendix B.**

The 2020 UWMP was submitted to DWR, the California State Library, and San Diego County within 30 days after adoption. The 2020 UWMP will be available for public review on the City of Carlsbad's website (www.carlsbadca.gov) within 30 days after filing a copy of the 2020 UWMP with DWR. The CMWD implemented the adopted 2020 UWMP in accordance with the schedule described in this UWMP.

2.4 Plan Organization

Section 1 provides an overview of the background and purpose of the Urban Water Management Planning Act and the 2020 UWMP. *Section 2* describes the plan preparation process and plan organization. *Section 3* provides a description of the service area, climate, and water system. *Section 4* presents historical and projected water use and demands. *Section 5* presents the baselines targets, and demonstration of achievement of the 2020 target required by SBx7-7. *Section 6* describes CMWD's water supplies. *Section 7* provides an assessment of local and regional water supply reliability. *Section 8* discusses water shortage contingency planning. *Section 9* presents demand management measures. *Section 10* discusses the plan adoption, submittal and implementation process. The appendices provide relevant supporting documents.

DWR has provided a checklist of the items that must be addressed in each UWMP based upon the Act. This checklist makes it simple to identify exactly where in the UWMP each item has been addressed. The checklist was completed for this 2020 UWMP and is provided in **Appendix C.** It references the sections and page numbers where the specific items can be found. A copy of all the required DWR tables has been provided as **Appendix D.** CMWD has elected to include additional tables in various chapters to provide clarity and support chapter narratives. Throughout this 2020 UWMP, tables are numbered sequentially, with tables containing information addressed in the required DWR tables indicated in the dark blue header row of the given table:

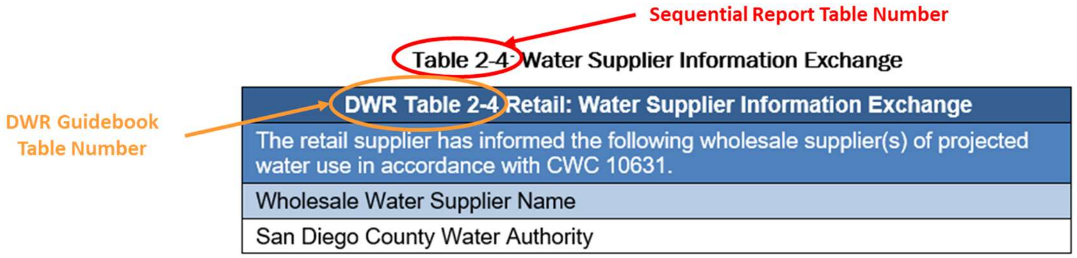


Table 2-4 Water Supplier Information Exchange

DWR 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
San Diego County Water Authority

Section 3

System Description

This section describes CMWD's service area and water system, including climate and water supply infrastructure.

3.1 Description of Service Area

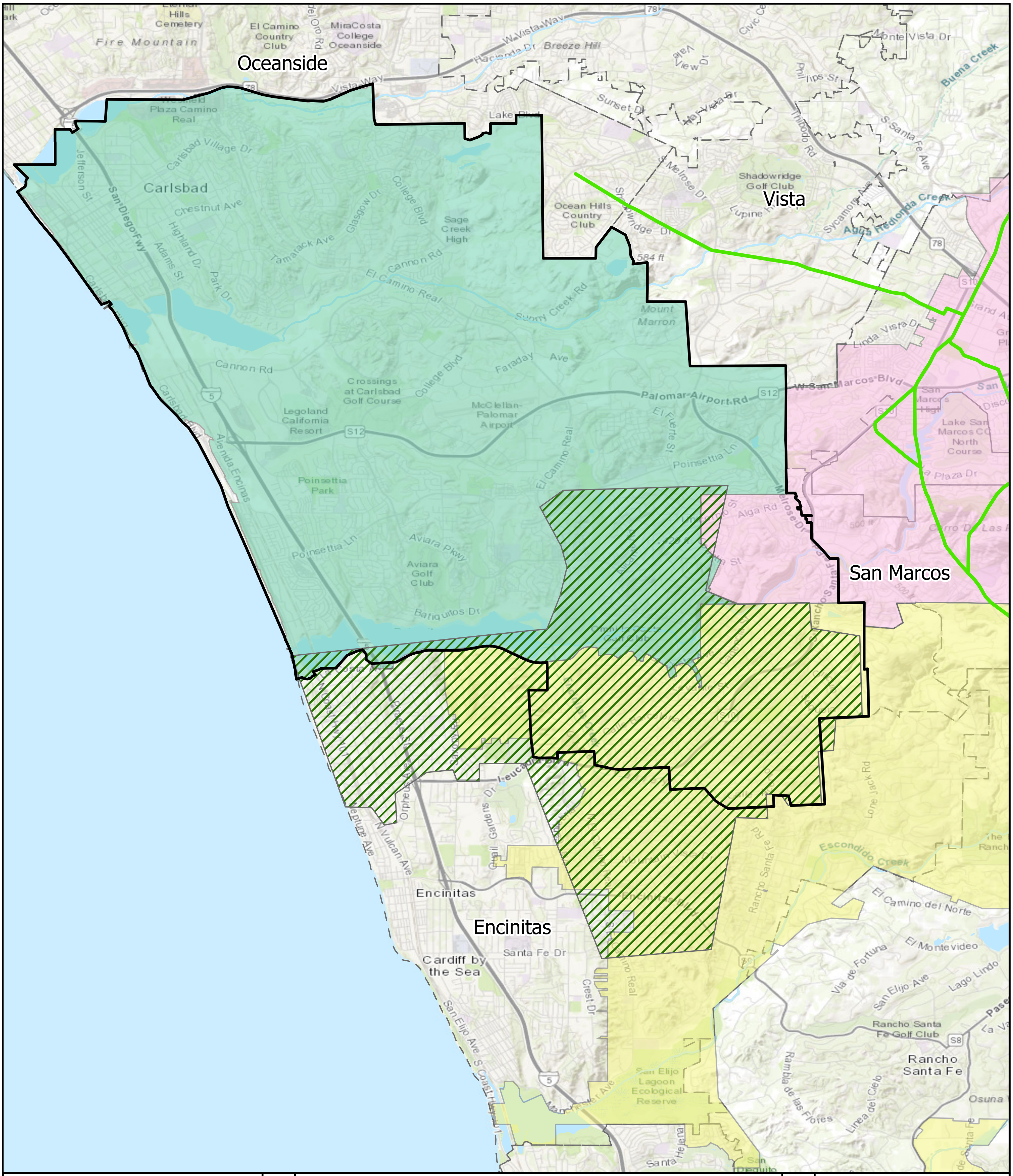
CMWD covers an area of 20,682 acres, approximately 32 square miles, and provides potable and recycled water supply to most of the City of Carlsbad (the City or Carlsbad). CMWD's boundary, which defines the Study Area for this 2020 UWMP, is shown in Figure 3-1.

CMWD supplies potable water within its service area and currently receives 82% of its potable water supply from SDCWA. The remaining 18% of CMWD's potable supply is purchased desalinated seawater from the Carlsbad Desalination Plant, delivered via SDCWA infrastructure, and is considered a local supply. The potable water distribution system consists of 455 miles of pipeline, 71 major pressure regulating stations, three pump stations, and nine reservoirs. CMWD also has an extensive recycled water distribution system. CMWD supplies recycled water from two supply sources, which include 95 miles of pipeline, six pressure zones, three storage tanks, four pumping stations, and four pressure regulating stations. Sanitary sewer collection service within the CMWD service area is provided by City of Carlsbad and LWWD. Wastewater treatment is provided by EWA through the EWPCF, located in Carlsbad. Tertiary treatment and recycled water production are provided by CWMD's Carlsbad Water Recycling Facility (WRF) and Meadowlark Treatment Facility.

Key water users within CMWD's service area are residential, which represented 53% of total demands in 2020, and commercial, which accounted for 12% of total demands in 2020. Carlsbad's housing stock composition consists primarily of single-family homes, with some multi-family and mobile homes. Single-family residences generally contain larger landscaped areas, predominantly planted in turf, and require more water for outdoor application in comparison to other types of housing. The general characteristics of multi-family and mobile homes limit their outdoor landscaping and water use, although some condominium and apartment developments contain green belt areas. Commercial users in CMWD's service area include offices and commercial centers, which have limited outdoor water use, but also include hotels, resorts, golf courses, and other tourism and recreational facilities. As described below, Carlsbad's visitor rates are often equal to or higher than its residential population in a given month. Additional information regarding these key users, along with other important water use sectors, is included in *Section 4 System Demands*.

3.1.1 Agency Organizational Structure

CMWD is a subsidiary district of the City of Carlsbad. The City was incorporated in 1952, and the assets of the two previous water suppliers for the Carlsbad area were purchased by the City in 1957. CMWD was initially formed in 1954 to facilitate the transfer of imported water to the unincorporated areas surrounding the City and to provide wholesale water to the newly formed City. In 1983, the City conveyed all of its functional water responsibilities for the provision of water service to CMWD. In 1990, CMWD became a subsidiary district to the City of Carlsbad. The five-member Carlsbad City Council governs CMWD and acts as CMWD's Board of Directors. CMWD's service area covers approximately 82% of the incorporated City (CMWD, 2019a). Additional history of water services within CMWD's service area is provided in *Section 3.2 Water System Background,* below.



Carlsbad Municipal Water District

Service Area
Figure 3-1

Legend

- 🟩 Carlsbad Municipal Water District
- ▭ City of Carlsbad
- 🟨 Olivenhain Municipal Water District
- 🟪 Vallecitos Water District
- ▨ Leucadia Wastewater District
- — San Diego County Water Authority Aqueducts
- ⌐ ¬ Local City Boundaries
- 🟦 Waterbody
- — River

0 0.02 0.04 0.09 Miles

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Map Created: October 2020

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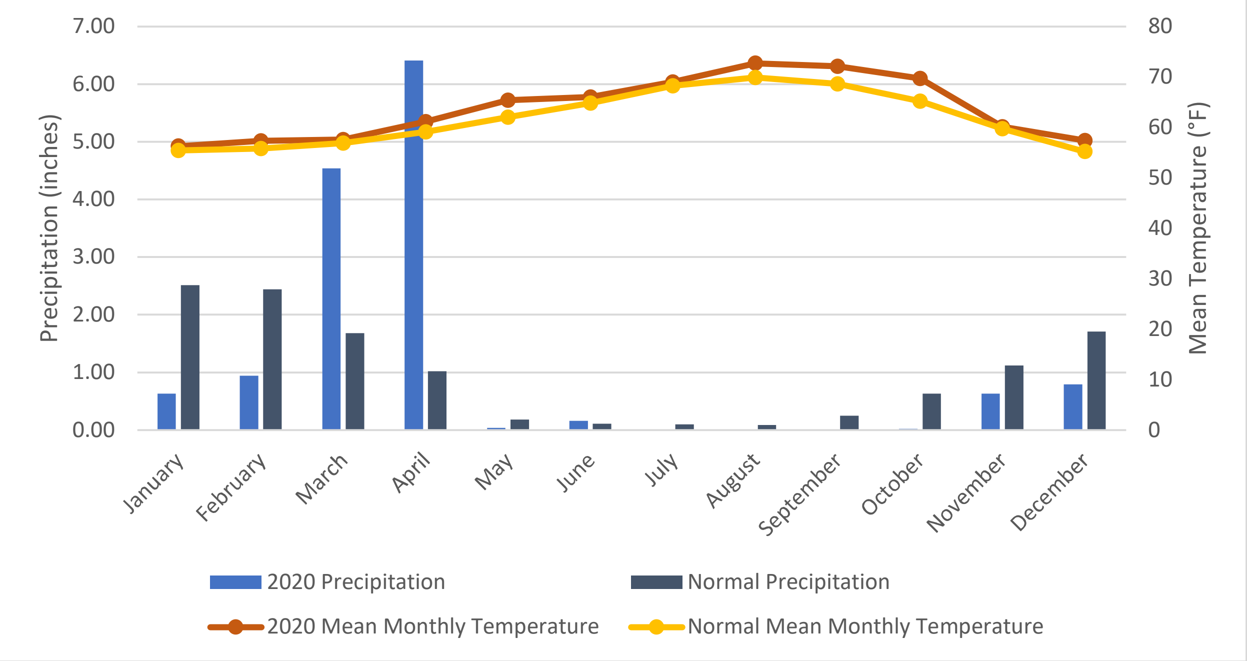
3.1.2 Service Area Climate

Carlsbad's climate is characteristically Mediterranean with mild temperatures year-round. This mild climate is derived equally from the warm ocean water being pulled north from Mexico and from its subtropical, semi-desert locale. The result is temperatures with an average high of 64 degrees in January and 75 degrees in August, with an average annual rainfall of about 11 inches. Data from the National Oceanic and Atmospheric Administration's (NOAA) climate station at the McClellan Palomar Airport shows that both 2020 mean temperatures and total precipitation were above normal (calculated for the 30-year period 1981 to 2010). There was also a shift in the precipitation pattern in 2020 from normal, with higher rainfall in the spring months than normal, and lower rainfall in the winter months. The months of September through February can bring warm wind from the desert called a "Santa Ana." Occurring about 10 days out of the year, these winds typically bring hot and dry conditions, which can spread and worsen wildfires (CMWD, 2019a). Figure 3-2 provides a comparison of 2020 precipitation and mean monthly temperatures with normal climate, as recorded at the McClellan Palomar Airport. A detailed discussion of potential climate change impacts to CMWD's service area is provided in *Section 3.4 Climate Change*, below.

Figure 3-2: Comparison of 2020 Climate to Normal for Carlsbad, California



Source: NOAA, 2016 and National Weather Service, 2021

3.1.3 Population and Demographics

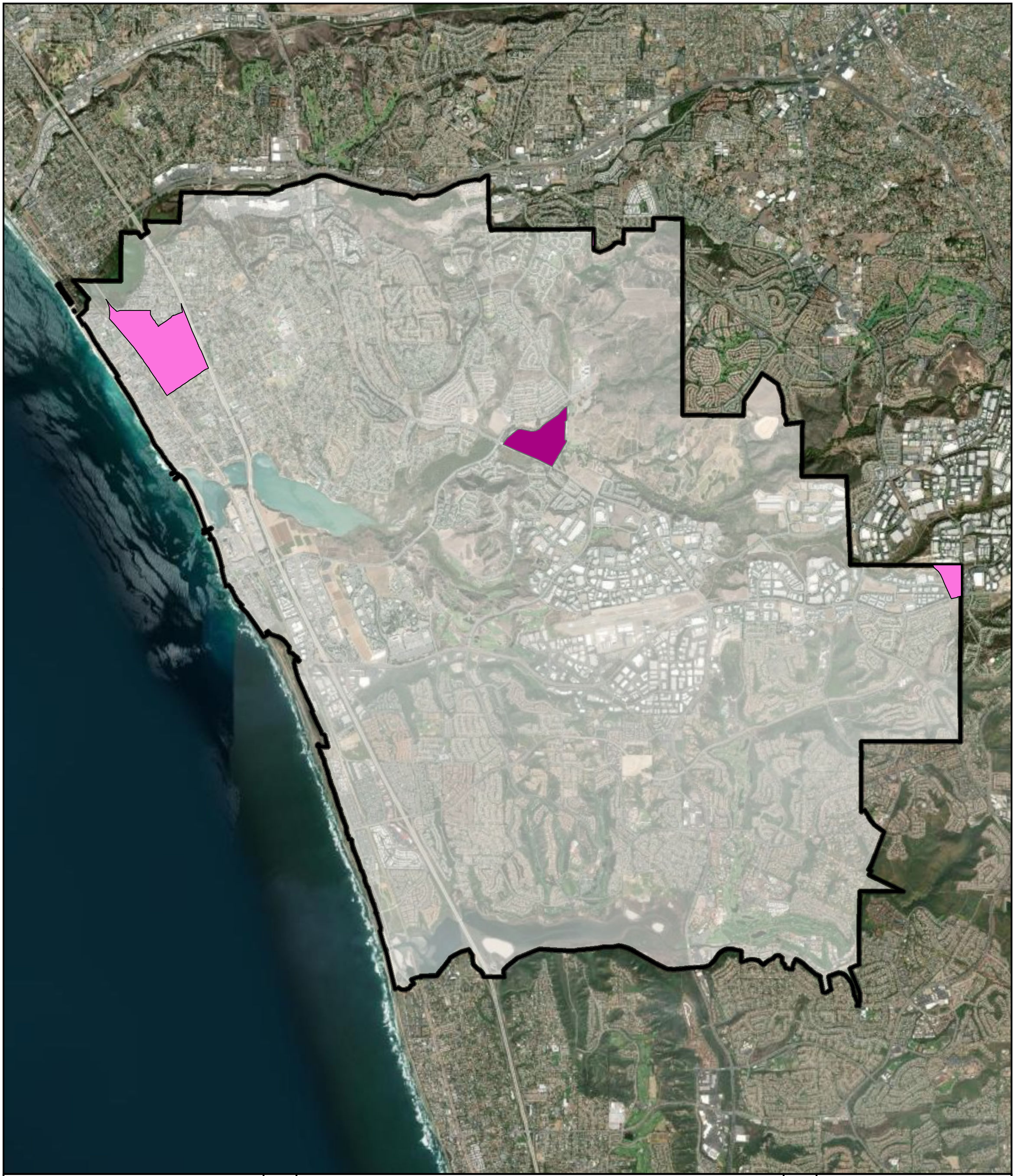
To accurately project CMWD's future water demands and water use characteristics, future population and growth trends are essential. The population projections presented in Table 3-1 were developed using San Diego Association of Government (SANDAG)'s Series 14 Regional Growth Forecast, Version 17 (Interim Series 14) for CMWD's service area. A secondary analysis was completed to confirm the SANDAG projection, comparing the Interim Series 14 estimates with U.S. Census American Community Survey (ACS) five-year estimates for population and the 2015 UWMP population estimates. In the most recent ACS five-year estimate (2014-2018), the City recorded a population of 111,717 people, while a Geographical Information System (GIS) analysis of population data by census block found CMWD's service area included 86,993 people (77.9% of the City's population). CMWD has therefore assumed its population is approximately 77.9% of the City of Carlsbad. This baseline population projection was then adjusted to consider additional planned developments not accounted for in Interim Series 14. The City provided additional planned development data from November 2017 through May 2020. The estimated population associated with these additional development housing units was added to the baseline population to determine CMWD's total population.

Table 3-1: CMWD's Service Area Population – Current and Projected

DWR Table 3-1 Retail: Population - Current and Projected						
Population Served	**2020**	**2025**	**2030**	**2035**	**2040**	**2045*(opt)***
	91,694	96,371	98,359	98,760	99,119	100,809
NOTES: Projections used 2018 ACS 5-year estimate data (77.9% of City of Carlsbad population) and 2020-2045 projections from SANDAG Interim Series 14 for CMWD service area. Population was adjusted up to account for additional planned development approved from November 2017 to May 2020, which was not included in Interim Series 14.						

Water use in CMWD's service area is closely linked to the local economy, population, and weather. Over the last half century, a prosperous local economy has stimulated population growth, which in turn produced a relatively steady increase in water demand. However, fluctuating economic and weather conditions in the 1990s and lingering effects from the 1987-1992 drought resulted in deviations from historic demand patterns. By 1999, a new combination of natural population increases, and job creation surfaced as the primary drivers of water consumption increases. The recession that started in 2008 brought an increase in unemployment and decrease in housing prices that dampened population growth and water use. In addition, CMWD adopted a residential tiered water rate in July 2009 which further dampened demand by the residential population. Current demand trends are lower than the long-term average prior to 2015. This was a result of drought response measures and State-mandated water use cutbacks in 2015 and 2016. The current COVID-19 pandemic has resulted in increased unemployment and work-from-home patterns that may result in additional long-term socioeconomic changes for the region. For example, Carlsbad may experience an increase in people relocating to the region from larger metro areas in order to work-from-home in a location where they can afford a larger living space. As described in *Section 4 System Demands*, CMWD's service area is host to a substantial tourist and temporary population throughout the year, with overnight guests in the City of Carlsbad ranging between approximately 75,000 and 199,000 people per month. In 2017, the City had an estimated 2.3 million overnight guests based on transient occupancy tax data. Water use is further described in *Section 4 System Demands* and *Section 5 Baselines and Targets*.

The City of Carlsbad has a median household income (MHI) of $107,172 (in 2018 dollars) and a poverty rate of 5.7%. About 23% of the population is under 18 years of age and 17% is over 65 years of age. Of the City's population that is 25 years of age or older, 95.2% have a high school degree or higher, with 59.6% obtaining a bachelor's degree or higher. About 73% of the population identify as Non-Hispanic white, 14.3% identify as Hispanic or Latino, 8.3% identify as Asian, and 4.6% identify as other or a mix of two or more races (US Census, 2020). Of the City service area, about 2% is defined as disadvantaged communities (DACs), areas with an average MHI less than 80% of the statewide MHI of $71,228. Of these DAC areas, about 20% are considered severely disadvantaged communities (SDACs), defined as having an average MHI less than 60% of the statewide MHI (see Figure 3-3).



CMWD DAC Analysis

Figure 3-3

Legend

🟪 Severely Disadvantaged Communities (MHI<$42,737)

▨ Disadvantaged Communities ($42,737 < MHI < $56,982)

□ CMWD Service Area

N

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3.1.4 Existing and Future Development

The City's *2015 General Plan Update* identifies current land uses, including residential, commercial and industrial, public and quasi-public uses, parks and recreation, agriculture, open space or natural areas, and vacant land. The remaining land is right-of-way (City of Carlsbad, 2015). Approximately 1,220 acres, or 5% of the City is currently undeveloped vacant properties, of which about 80% is within the CMWD service area. These vacant properties are anticipated to be developed in the future (CMWD, 2019a). Table 3-2 provides a summary of the land use classifications and the total acres within the City of Carlsbad.

Table 3-2: Land Use Classifications within City of Carlsbad

Land Use Classification	City Acres[1]	Percent of City of Carlsbad	Percent of CMWD[2]
Residential	7,054	28%	26%
Commercial and Industrial	2,269	9%	13%
Public and Quasi-Public Uses	1,417	6%	8%
Parks and Open Space	8,293	33%	32%
Agriculture	568	2%	3%
Rights-of-Way	4,213	17%	14%
Vacant	1,220	5%	3%

1. City of Carlsbad 2015
2. CMWD 2019a

The City has maintained a *Growth Management Plan* (GMP) and Growth Database since 1986 to monitor development within the city and to ensure that adequate facilities are constructed in an orderly manner to support future growth. The City prepared an updated annual GMP Monitoring Report, in May 2017. The City's *General Plan* estimates buildout at 51,821 housing units by 2035, or nearly 95% of the maximum allowed under the *Growth Management Plan*. The majority (80%) of this growth is projected to occur within the Northwest and Northeast quadrants of the City, both of which lie within CMWD's service area (City of Carlsbad, 2015). These developments are in various stages of planning, design, and construction. Additional growth within the City includes "in-fill" or redevelopment projects in the older portions of the City (CMWD, 2019a). In addition, future growth within the City may reflect recent Statewide regulations to relax restrictions on accessory dwelling units (e.g., SB 13 and AB 68). These development patterns are accounted for in the SANDAG growth forecasts that were relied upon in this 2020 UWMP.

Existing land uses within the CMWD service area are primarily residential and parks and open space, with a mix of agricultural, light industrial, and commercial. Additionally, a county airport, tourist attractions such as Legoland, and a mix of resorts are located within CMWD's service area. Residential uses make up approximately 26% and parks and open space make up approximately 32%. Vacant land makes up approximately 3% of CMWD's service area.

SANDAG's Series 13 Growth Forecast is used to analyze land projections within CMWD's service area. Interim Series 14 land use data were not available at the time this 2020 UWMP was prepared. According to SANDAG's Series 13 Growth Forecast land use projections, 1,038 acres were anticipated to be developed within CMWD's service area between 2015 and 2040. The bulk of this development was expected to increase single-family, industrial, and commercial land; a decrease would occur in agricultural land. Although some land uses were anticipated to grow or decrease by a few hundred acres, most land use categories were anticipated to continue to represent a similar proportion of total developed area within CMWD's service area. For example, single-family residential land use is 35% of CMWD's developed area in 2015, and despite growing by over 700 acres between 2015 and 2040, would only represent 38% of CMWD's total developed area in 2040. **Table 3-3** shows the projected land uses within CMWD's service area, as a percentage of total developed land.

Table 3-3: Projected Land Use within CMWD's Service Area as Percentage of Developed Area

Land Use	Year				
	2025	2030	2035	2040	2045[1]
Agricultural	4%	3%	2%	2%	2%
Commercial	10%	11%	11%	11%	11%
Industrial	13%	14%	14%	15%	15%
Institutional	2%	2%	2%	2%	2%
Irrigation	28%	26%	26%	26%	26%
Multi-Family	4%	3%	2%	2%	2%
Single-Family	36%	37%	37%	37%	37%

Source: SANDAG, Series 13 Growth Forecast Land Use Data, CMWD Service Area. Total land use may not equal to 100 percent because of the accuracy of updating land use. Agricultural lands that are included in the inventory of SANDAG, Series 13 are only updated once the land becomes developed or urbanized. Between the variability of agricultural land use and land area covered by water, land use percentages may not show 100% coverage.

1. *Assumes percentages stay constant in 2045 because the City of Carlsbad is close to buildout.*

As of June 2016, CMWD contained an estimated 46,000 residential and commercial living units (CMWD, 2019a). Projected buildout in 2035 for CMWD's service area includes 51,821 residential units (CMWD, 2019a). Planned development within the City of Carlsbad is anticipated to include a mix of residential, commercial and park/open space, with a decrease in agricultural and vacant areas. These planned developments are expected to occupy the majority of the remaining vacant land in CMWD's service area by 2035 (CMWD, 2019a).

3.1.5 Overview of Significant Water Uses

The primary water uses in CMWD's service area are residential, commercial, industrial, agricultural, and irrigation. Residential water use represents the largest water use sector for CMWD. Residential water uses include both indoor and outdoor uses for single-family and multi-family categories. Commercial water uses generally consist of uses necessary for business operation and, although the commercial sector's demand is not as large as residential, the uses are more varied. Major commercial water uses include restaurants, car washes, laundries, hotels, as well as institutional uses including schools and churches. Commercial water uses also encompass resorts, golf courses, Legoland, and other tourism and recreational facilities. Industrial water uses consist of product processing, equipment cooling, sanitation and air conditioning. Agricultural water uses are relatively minor, and primarily consist of commercial strawberry and flower fields, and wholesale nursery operations. Irrigation water uses fluctuate by season and primarily include the irrigation of medians, slopes and parkways. Detailed information of CMWD's water use sectors can be found in *Section 4.1.1 Water Uses by Sector*.

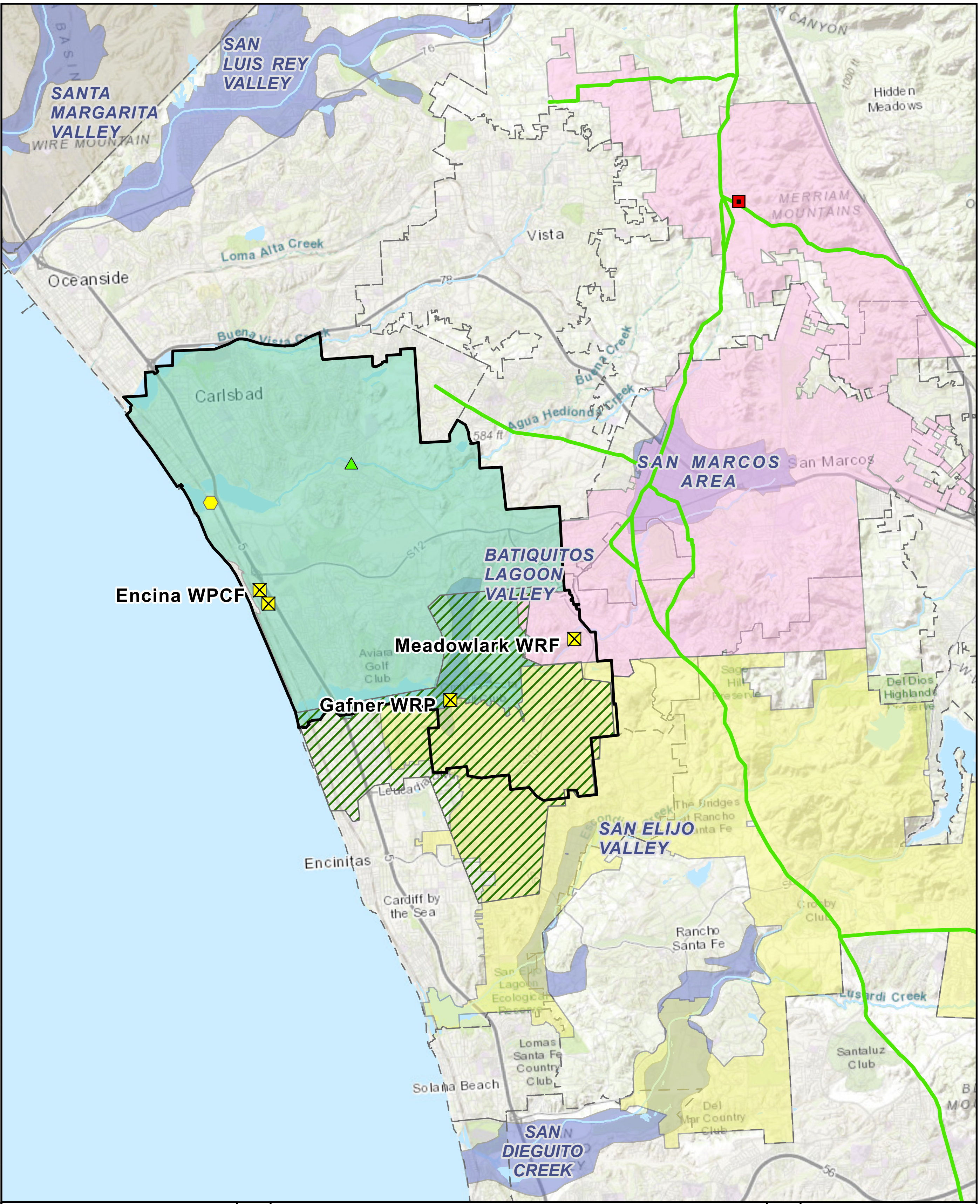
3.2 Description of Water System

CMWD currently receives 100% of its potable water supply through four SDCWA treated water turnouts. Two of the turnouts, Connections No. 6 and No. 2, are direct connections to SDCWA's Second Aqueduct.

Connection No. 6 supplies only CMWD, and Connection No. 2 is delivered through a VWD transmission main. Connections No. 3 and No. 4 are on SDCWA's Tri-Agency Pipeline (TAP), which is supplied from the Second Aqueduct. Major water infrastructure facilities are shown in Figure 3-4.

Potable water is delivered within the CMWD service area through 455 miles of pipeline, 17 pressure zones, 71 pressure regulating stations, three pump stations, and nine reservoirs. The CMWD water distribution system is flexible in that supply from the four aqueduct connections can be routed to different parts of the distribution system, as needed. The total operational storage for CMWD is 242.5 million gallons (MG),

CMWD also has an extensive recycled water distribution system, shown in Figure 6-1 in *Section 6 System Supplies*. CMWD supplies recycled water through two recycled water distribution systems, which include 95 miles of pipeline, six pressure zones, three storage tanks, four pumping stations, and four pressure regulating stations. The Carlsbad WRF capacity was recently expanded from 4.0 mgd to 7.0 mgd. CMWD supplies a majority of recycled water from the Carlsbad WRF, owned by CMWD and operated by EWA. Finally, a portion of the eastern service area is served by a second supply fed from VWD's Meadowlark WRF. CMWD is currently in the process of expanding its recycled water system with the Phase III Recycled Water Project, which will construct an additional 18 miles of recycled water pipeline, install 143 metered service connections, and construct a 1.5 MG storage reservoir (CMWD, 2012).



Major Water Infrastructure

Figure 3-4

Legend

- ▲ Cannon Well Field
- ⬢ Carlsbad Desalination Plant
- ☒ WWTPs/WRPs
- ■ Twin_Oaks WTP
- ☐ City of Carlsbad
- ▨ Leucadia Wastewater District
- 🟨 Olivenhain Municipal Water District
- 🟪 Vallecitos Water District
- 🟩 Carlsbad Municipal Water District
- ⌐ ¬ Local City Boundaries
- — River
- 🟦 Waterbody
- 🟦 Groundwater Basins
- — San Diego County Water Authority Aqueducts

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3.3 Water System Background

Water demands for the area were initially supplied by the privately held Carlsbad Mutual Water Company and Terramar Water Company through the utilization of local groundwater and surface water supplies. The Carlsbad Mutual Water Company constructed nine wells in the Mission Basin of the San Luis Rey River, booster pumping stations, storage tanks, an earthen dam (Lake Calavera), and transmission facilities to supply residential, commercial and agricultural users. The Terramar Water Company constructed four wells located in Agua Hedionda Creek (referred to as the Cannon Well Field), a second connection to the Carlsbad Mutual Water Company's pipeline from Lake Calavera at El Camino Real, a reservoir, plus a distribution system to supply residential, commercial, and agricultural users.

The Carlsbad Mutual Water Company's groundwater wells began being developed prior to 1914 with rights to 2,382 AFY. In addition, a license was obtained (terminable by the State Division of Water Rights, Department of Water Resources [DWR]) for another 1,000 AFY. A total of 9 wells were eventually constructed in the Mission Basin of the San Luis Rey River located in the City of Oceanside generally near the intersection of Mission Avenue and Foussat Road. Prior to 1942, local groundwater was the only developed source of water for the Carlsbad Mutual Water Company.

In September 1941, Carlsbad Mutual Water Company completed construction of an earthen dam (Calavera Dam), which captured local surface water runoff creating Lake Calavera. Lake Calavera also included a 2 million gallons per day (mgd) water filtration plant. A permit to divert 150 AFY from Calavera Creek was also obtained.

The Cannon Well Field's four wells were constructed beginning in 1950 and are located at and around the Rancho Carlsbad Golf Course property. The groundwater pumped from these wells was the original supply for the Terramar Water Company and had a safe yield capacity estimated at 400 AFY. This groundwater was obtained from the Carlsbad hydrologic unit of the San Diego Region, a designation assigned by DWR. The four wells remain but are in a state of disrepair and will need to eventually be removed and new replacement wells constructed. CMWD does not currently pump groundwater with these wells.

The City of Carlsbad was incorporated in 1952, and the assets of the Carlsbad Mutual Water Company and Terramar Water Company were purchased by the City of Carlsbad in an agreement dated August 30, 1957. The City operated and maintained both water systems from 1958 to 1962.

CMWD's 8.5 MG D3 Reservoir

CMWD was formed in 1954 as a vehicle to bring imported water to the unincorporated areas surrounding the City of Carlsbad and to wholesale water to the newly formed City of Carlsbad. CMWD's first meeting was held on March 22, 1954, and CMWD became a member of SDCWA that same year. CMWD began receiving imported water deliveries in 1955 through existing aqueduct connections located in the City of Escondido. CMWD constructed a pipeline in 1956 to convey imported water directly to the City of Carlsbad and unincorporated areas within CMWD's service area. In 1962, CMWD constructed Maerkle Dam (previously called Squires Dam) with a capacity of 600 AF in the Agua Hedionda Basin. CMWD also obtained a permit for surface water rights tributary to Maerkle Dam in the amount of 25 AFY.

As demands for water increased, seawater intrusion into the groundwater supply resulted in the gradual degradation of groundwater quality in the Mission Basin of San Luis Rey River. The total dissolved solids (TDS) content of the groundwater in the Mission Basin increased to the point where treatment would be required. At the same time, lower-cost imported water became available through CMWD. As a result of the availability of this alternative supply of water, the City of Carlsbad ceased extracting groundwater and suspended use of local surface water supplies by the end of 1962. As a result, the water filtration plant at Lake Calavera was dismantled because of regulations requiring that surface waters be fully treated prior to introduction into a potable water system. The cost to construct facilities to treat the small amount of infrequently occurring surface water was determined to be much greater than the comparable cost of imported water. The Mission Basin wells were beyond repair and subsequently removed by 2005, in accordance with California Department of Public Health requirements.

In an agreement dated May 25, 1983, the City of Carlsbad conveyed all its functional water responsibilities for the provision of water service to CMWD, including all the water facilities and groundwater and surface water rights purchased from Carlsbad Mutual Water Company and Terramar Water Company in 1957. This included all existing water facilities and responsibility for planning, financing, and construction of all major capital facilities necessary to provide potable water service within CMWD and portions of the City of Carlsbad not located in other retail water service agencies.

On January 1, 1990, CMWD became a subsidiary district of the City of Carlsbad through an agreement between both agencies approved by the City Council on April 25, 1989. From 1979 until joining with the City as a subsidiary district, CMWD was known as the Costa Real MWD. The Carlsbad City Council acting as CMWD's Board of Directors governs CMWD. CMWD's current water supplies consist of treated water purchased from SDCWA, local potable desalinated water received with SDCWA blended supplies, and recycled water. In April 2016, CMWD's Board approved an agreement to purchase 2,500 AF of desalinated seawater from SDCWA, which is blended along with the purchased water provided to all member agencies. SDCWA's supply mix includes desalinated seawater, imported water purchased from MWD (treated at MWD's Skinner Filtration Plant in Riverside County), and through purchase agreements and exchanges with other agencies. SDCWA supplies delivered to CWMD are also treated at SDCWA's Twin Oaks Water Treatment Plant in San Marcos and conveyed to CMWD through SDCWA aqueducts.

3.4 Climate Change

Climate change is anticipated to result in higher temperatures, changes in precipitation, and decreased water supplies, all of which are currently affecting and expected to continue to affect Carlsbad. Impacts of climate change include increased water demand, increased risk of wildfire, a greater number of extremely hot days, and the decline or loss of plant and animal species. Climate change also has associated public health impacts. City residents who are already more vulnerable to health challenges are likely to be the most affected by climate change. These vulnerable populations tend to be the young and the old, the poor, and those who are already sick. Increases in extreme heat events can increase the risk of heat-related illness or death, or the worsening of chronic health conditions. Food scarcity and higher food prices from climate change impacts on agriculture can cause increased hunger and reduced availability of nutrition. The increased frequency of natural disasters such as floods, droughts, wildfires, and storm surges can cause injury or death, illness, and increases or shifts in infectious diseases (City of Carlsbad, 2020).

3.4.1 Climate Action Plan and Energy Intensity of Water System

The City of Carlsbad adopted a *Climate Action Plan* in 2015, which was recently revised in 2020 (City of Carlsbad, 2020). The *Climate Action Plan* in part identifies actions to reduce the City's greenhouse gas (GHG) emissions that contribute to climate change. Government operations, including CMWD's operations, produce 1.2% of the City's GHG emissions. According to the inventory of government operations summarized in the *Climate Action Plan*, which was conducted in 2011 and used in the 2015 *Climate Action Plan* and 2020 update, CMWD's operation and maintenance activities were estimated to use 189,440 kilowatt hour (kWh) electricity and 86 terms of natural gas, or 2% and less than 0.01% of the government operations energy demands, respectively, for buildings. Water and wastewater transport (conveyance and distribution system) used over 2.3 million kWh in 2011, or 10% of the entire government operations emissions (0.12% of citywide emissions). The *Climate Action Plan* identifies actions to reduce GHG emissions, including those presented in Table 3-4, which are GHG reduction actions associated with water and wastewater facilities and operations. A detailed discussion of energy intensity of CMWD's 2020 supplies is provided in *Section 6 System Supplies*.

In addition, the City Council approved a Settlement Agreement in 2017 regarding the Climate Action Plan that states under Section 4.3.11 that, "The City shall address water supply and demand considerations, including a discussion of groundwater and recycled water supplies (to include greywater), in its 2020 Urban Water Management Plan, shall continue its involvement in the North San Diego Water Reuse Coalition, and shall continue to monitor the development of the San Diego Integrated Regional Water Management (IRWM) Program Storm Water Capture Feasibility Study (SWCFS) and evaluate for methods and best practices by which to pursue storm water reuse projects in the future." Refer to Chapter 6 for additional details.

Table 3-4: Water- and Wastewater-Related GHG Emissions Reduction Measures Included in 2020 Climate Action Plan

Goal	Action
Reduce intensity of GHG emissions from water utilities (including water supply, wastewater, and recycled water) conveyance, treatment, and distribution by 8% by 2035	Improve water utilities (including water supply, wastewater, and recycled water) conveyance, treatment and distribution, and other system improvements (e.g., replace sewer lift stations with gravity pipelines; increase utilization of methane capture and cogeneration; expand recycled water distribution system)
Encourage installation of greywater and rainwater collection systems with a goal of 15% of homes by 2035	Work with water wholesaler to promote rainwater collection systems.
	Created a design reference manual, or provide links to an existing one, for the design of greywater and rainwater collection systems
	Evaluate the feasibility of offering a rebate for residential greywater systems that require a permit to cover the cost of obtaining a permit

Source: City of Carlsbad, 2020.

3.4.2 Climate Change Vulnerability Analysis

As an agency with limited local water supplies and located in a coastal area that could be subject to impacts from sea level rise, climate change is of concern to CMWD. CMWD is an active participant in the San Diego Integrated Regional Water Management (IRWM) Program, having been a member of the Regional Advisory Committee (RAC) since 2013. In 2019, the IRWM Program completed an update of the *San Diego IRWM Plan* (RWMG, 2019), which collated regional water management information and identified water management priorities for the region. A Climate Change Vulnerability Analysis, completed in the 2013 plan, was included in the *San Diego IRWM Plan* (refer to Section 7 and Appendix 7-D of the *San Diego IRWM Plan*). While this analysis evaluated climate change vulnerabilities and identified priorities and actions for the region as a whole, it generally corresponds closely with CMWD's individual vulnerabilities, priorities, and potential actions.

The San Diego region anticipates experiencing temperature increases, sea level rise, changes to precipitation patterns, increased storm and wildfire intensity, and increased energy demand. Table 3-5 presents the potential climate change impacts to the San Diego region, as presented in the *San Diego IRWM Plan* Climate Change Vulnerability Analysis. Regional climate change vulnerabilities that are applicable to CMWD and its service area are presented in Table 3-6, and include decreased imported supplies, sensitivity due to higher drought potential, damage to coastal areas and inundation of storm drains and sewer systems from sea level rise, and decreases in available habitat for native species. Table 3-6 has been modified from the version in the *San Diego IRWM Plan* to reflect specific vulnerabilities for CMWD.

Table 3-5: Potential Impacts of Climate Change on the San Diego Region

Impact	Effect[1]
Temperature	1.5°F to 4.5°F average temperature increase
Rainfall	Variable projections predict between 35% drier and 17% wetter Increase in variability between years
Supply	Up to 25% decrease in State Water Project (SWP) supply Up to 20% decrease in Colorado River supply 164,000 acre-feet per year shortfall in imported supply
Demand	Potential 0.6% to 1.8% increase in demand by 2035
Sea level rise	12 to 18 inch rise in mean sea level rise
Wildfires	40% increase in California Coastal Shrub acreage burned in Southwestern U.S. 54% increase in overall acreage burned in Western U.S.

[1] Effects are described to the year 2050, unless otherwise noted

Source: RWMG, 2019.

Table 3-6: Prioritized Climate Change Vulnerability Issues for CMWD's Service Area

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: Industrial demand would increase Water Quality: Increase in treatment cost Sea Level Rise: Damage to coastal recreation / tourism due to inundation Sea Level Rise: Decrease in land Sea Level Rise: Damage to ecosystem/habitat
Low	Water Demand: Crop demand would increase Water Demand: Limited ability to conserve further Water Quality: Increased 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 supply available Water Quality: Decrease in recreational opportunity Ecosystem/habitat: Decrease in environmental flows

Source: Adapted from RWMG, 2019.

Following identification and prioritization of regional climate change vulnerabilities, the *San Diego IRWM Plan* Climate Change Vulnerability Analysis identified and prioritized strategies to mitigate and adapt to the identified vulnerabilities. These strategies were grouped into Tier 1, 2, and 3, which represent actions that are recommended to implement first, second, and third, based on ease, effectiveness, and contribution to reducing GHG emissions. Table 3-7 presents the Tier 1 strategies that are applicable to CMWD. A complete list of strategies is provided in Appendix E, along with the vulnerability indicator question assessment completed for the Climate Change Vulnerability Analysis.

Table 3-7: Tier 1 Climate Change Management Strategies Relevant to CMWD and its Service Area

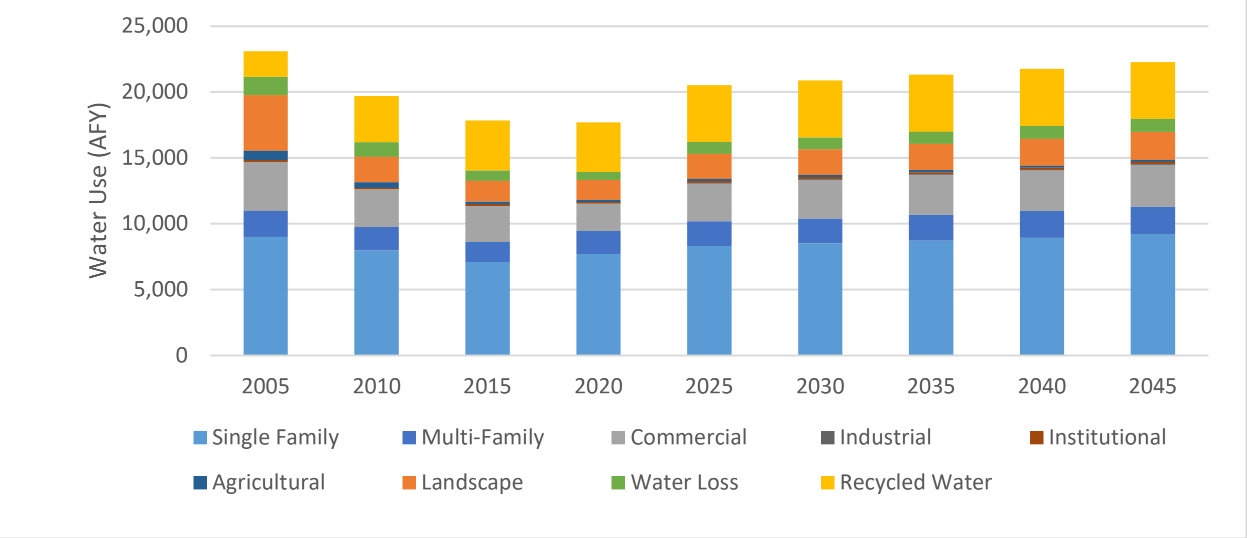
Strategy	Description
Reduce Water Demand	
Urban water use efficiency	Technological and behavioral improvements that decrease indoor and outdoor residential, commercial, industrial and institutional water use.
Education	Implement outreach program to educate urban and agricultural water users in water demand reduction practices.
Gray water use	Implement gray water use systems to reduce water supply demand.
Rainfed agriculture	Transfer crop consumptive use to be supplied directly by rainfall.
Improve Operational Efficiency/Transfers	
Conveyance - Regional/local	Improvements to regional and local conveyance facilities that improve conveyance capacity, if needed.
System Reoperation	Change existing operation and management procedures for existing reservoirs and conveyance facilities to increase water related benefits from these facilities.
Increase Water Supply	
Recycled Municipal Water	Increase supply of recycled water through additional wastewater treatment, and/or expand conveyance of recycled water to end users.
Economic Incentives (Loans, Grants, Water Pricing)	Provide incentives such as financial assistance, water pricing, and water market policies intended to influence water management.
Water-dependent recreation protection	Incorporate planning for water-dependent recreation activities and implement projects that protect/create water-dependent recreation opportunities.
Sea Level Rise	
Building water facilities in coordination with land use/sea level rise planning	Integrate water/wastewater resources planning with land use/sea level rise planning.
Source: Adapted from RWMG, 2019.	

Section 4

System Water Use

This section addresses current and projected system water use for CMWD's service area. System water use consists of water used by CMWD, water sold to others, and additional water uses and losses. Tables 4-1 and 4-6 present the current (2020) and projected (through 2045) potable water sales, respectively, including demands from low-income households. CMWD's demand projections presented in this section meet CMWD's gallons per capita per day (gpcd) demand targets that are described in *Section 5 Baselines and Targets*. This section also discusses unconstrained demand in the context of the water supply reliability assessment. Figure 4-1 shows historical, current, and projected water use within CMWD's service area by use type. Note that non-potable recycled water use is included.

Figure 4-1: Historical, Current, and Projected Water Use (AFY)



4.1 Existing Water Use and Demands

Existing water use and demands are based on metering data for calendar year 2020. Water use consists of water used by CMWD, and additional water uses and losses. Table 4-1 presents the current potable and non-potable water sales by customer sector for 2020. In addition to potable water, CMWD also provides recycled water to some of its customers. Current and projected recycled water demands are summarized with a detailed discussion of CMWD's recycled water supplies and demands in *Section 6 System Supplies*.

Table 4-1: 2020 Demands for Potable and Non-Potable Water (AFY)

DWR Table 4-1 Retail: Demands for Potable and Non-Potable Water - Actual		
Use Type	2020 Actual	
	Level of Treatment When Delivered	Volume (AFY)
Single Family	Drinking Water	7,694
Multi-Family	Drinking Water	1,752
Commercial	Drinking Water	2,066
Industrial	Drinking Water	19
Institutional	Drinking Water	102
Agricultural	Drinking Water	163
Landscape	Drinking Water	1,530
Water Losses	Drinking Water	605
Landscape	Non-Potable Water	3,764
	TOTAL	**17,693**
NOTES: CMWD does not serve raw water to customers; all non-recycled water is potable. Actual potable water demands are based on CMWD's 2020 billing data and the AWWA water loss audit (refer to **Appendix F** for the complete audit). The AWWA water loss audit was completed for FY2020 as the most recent water loss data available, while billing data are reported in calendar year. CMWD's temporary potable meters billing category was incorporated into the Single Family use type, while the fire protection billing category was incorporated into the Institutional/Governmental use type for consistency with demand projection categories for 2025 through 2045. Non-potable landscape represents recycled water demands, which may include agricultural, commercial, irrigation, and industrial customers. Recycled water demands also includes temporary recycled water meters.		

4.1.1 Water Use by Sector

CMWD's potable water system serves water to four major sectors: 1) Residential (single family and multi-family); 2) Commercial/Industrial/Institutional (CII) (reported as three separate sectors); 3) Agricultural; and 4) Landscape. A brief description of each sector and factors affecting their water use is provided here. In addition to the four major sectors, tourism and temporary residents create a substantial demand for water within CMWD's service area. These temporary population increases affect demands, but their impacts are not always captured to their true extent in reported metrics. A brief narrative of the tourism sector, captured in CII demands, in CMWD's service area is provided below. Table 4-1 presents current potable water demands of these sectors in 2020.

Demand projections presented in this 2020 UWMP are based on San Diego Association of Governments' (SANDAG's) Series 14 Regional Growth Forecast Version 17 (Interim Series 14). Interim Series 14 is based on the most recent information on population and housing growth and is the best available data for CMWD to use. However, land use projections were not included in the Interim Series 14 data. Land Use projections presented in this section are based on SANDAG's Series 13 Regional Growth Forecast (Series 13) and is the best available data for CMWD to use at the time of this writing.

Residential

Residential water use represents the largest water use category for CMWD and includes both single-family and multi-family customers. Residential water consumption comprises both indoor and outdoor uses. Residential indoor water use includes sanitation, bathing, laundering, cooking, and drinking. The majority of outdoor residential water use satisfies landscaping irrigation needs. Other minor outdoor residential water uses include car washing, surface cleaning, and similar activities. Total residential water use is anticipated to increase over time as CMWD's service area reaches residential buildout, though an increased culture of conservation and water use restrictions are likely to result in a lower per-capita increase in demands compared to historical growth. Residential land use currently occupies almost 5,380 acres and is anticipated to continue to expand to approximately 5,970 acres by 2040.

Commercial/Industrial/Institutional

Commercial water use generally consists of incidental uses necessary for the operation of a business or institution, such as drinking, sanitation, and landscape irrigation. Major commercial water users include service industries such a restaurants, car washes, laundries and hotels. Statistics indicate that almost 60% of Carlsbad's employment base is in the commercial sector. This sector is anticipated to grow substantially in the near future, as infill development in the Carlsbad Village is implemented, and additional hotel properties are developed to support the City's growing tourism economy.

Industrial water use consists of a wide range of uses, including product processing and small-scale equipment cooling, sanitation and air conditioning. Water-intensive industrial uses in Carlsbad, such as electronics manufacturing and biotech research, typically require smaller amounts of water when compared to other water-intensive industries found elsewhere in Southern California, such as petroleum refineries, chemical processors, and canneries.

Institutional water use consists primarily of schools and churches within the service area. Water use characteristics tend to be similar to commercial uses, but based on average daily attendance outdoor use also tends to be somewhat higher for landscaped areas and ball fields. However, many of these areas tend to be metered separately and categorized as irrigation. Overall, CII land uses are anticipated to grow from 2,760 acres in 2020 to 3,700 acres in 2040.

Tourism and Temporary Residents

Included in CMWD's CII water uses are tourism-related water demands. Within the city, overnight visitors averaged over 194,000 people per month, over 2 million annual visitors, in 2017 (Hull, pers. comm. 2020). With a permanent population estimated at approximately 91,700 in 2020, the City's population more than doubles on a monthly basis when considering temporary residents. Visitors are drawn to Carlsbad for its proximity to attractions in San Diego County, Legoland, nearby state beaches, and other general lifestyle factors that make Southern California a tourist destination.

Recycled water use at golf course in CMWD's service area

The tourism industry in Carlsbad affects water usage by not only the number of visitors, but also through the expansion of service industries and attractions, which tend to be larger outdoor water users. Tourism peaks during summer months, particularly July and August, but is high throughout the year. The peaking experienced in summer months affects seasonal demand and water system peaking. Population forecasts do not specifically account for tourism, but tourism is reflected in the economic forecasts and causes per capita use to increase. Tourism can also increase per capita demands because tourists are less likely to be as conscientious with their water use as locals. Tourists may not be familiar with water-wise practices (e.g., shorter showers, turning off faucets when brushing teeth) or are in "vacation mode" and not actively aware of their water use. They may also be engaging in inherently water-heavy tourism-based activities.

Agricultural

Agricultural water use has been decreasing in Carlsbad for the last two decades to the point that it currently represents a very small portion of CMWD's water demand. In 1991 CMWD sold 1,744 AF to agriculture. By 2000, the agriculture consumption had declined to 1,204 AF, to 420 AF in 2010, and to 163 AF in 2020. By 2045, agricultural demands are projected to drop to only 154 AFY. The Agricultural sector experiences wide seasonal fluctuations due to weather conditions and timing of the growing seasons, and consists primarily of commercial strawberry and flower fields, and wholesale nursery operations. Agricultural land use is anticipated to continue to decrease from a current extent of 545 acres to an estimated 102 acres by 2040 (SANDAG, 2016).

Landscape

Landscape irrigation is the third largest water use in CMWD's service area, just behind commercial water use, and demands are strongly influenced by seasonal differences. Development within the City of Carlsbad over the last decade and a half has brought about the creation of a large amount of irrigated areas with various uses, including medians, slopes and parkways, which used 34% potable water (1,530 AF) and 66% recycled water (2,996 AF) in 2020 (see Table 4-1 and Table 6-10).

The City of Carlsbad adopted a *Landscape Manual* in November 1990 to assist development applicants and landscape architects in understanding the City's policies toward landscaping. Specifically, the manual requires that irrigation systems be designed to provide the optimum amount of water for plant growth without causing soil erosion or runoff. At the same time, it requires that landscape design will include water conservation and alternative (non-potable) water sources as primary criteria. This manual was updated in 2016 and incorporates Carlsbad Municipal Code Chapter 18.50 – Water Efficient Landscape Ordinance (WELO), among other changes. In May 2010, the City of Carlsbad adopted the WELO in accordance with the State's Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881), which promotes consistency in landscape regulations among land use authorities throughout San Diego County. The State's Model Water Efficient Landscape Ordinance (MWELO) was subsequently updated in 2015. The regulations reflect improvements for landscape and irrigation design plans, irrigation technologies, and water management for achievable water savings. Total irrigated land use areas, including roadways and parks, was anticipated to remain relatively constant between 2015 and 2040, decreasing by only 8 acres, or approximately 0.2%.

Landscape irrigation is also a substantial recycled water user within CMWD's service area. Recycled water is regulated by CMWD's *Reclamation Rules and Regulations for Construction of Reclaimed Water Mains* (1993) and *Mandatory Use Ordinance* (Ordinance No. 43, 2005), the San Diego Regional Water Quality Control Board's reclamation permits and waste discharge requirements for CMWD's Carlsbad WRF (Order No. 2001-352, as amended by Order No. R9-2012-0027), and VWD's Meadowlark WRF (Order No. R9-2007-0018), and California's Title 22 regulations.

Total recycled water use, including golf courses and industrial purposes discussed in Section 4.1.2 below, represents 22% of total water use in CMWD's service area for 2020. Recycled water use tends to be lower in the winter months because of less irrigation demand for landscape, the primary use for recycled water. Recycled water use is projected to increase in the near future through completion of the Phase III Recycled Water Project and increased awareness of safe and appropriate use of recycled water. Recycled water use is addressed in greater detail in *Section 6 System Supplies*

4.1.2 Additional Water Uses

Additional water uses include other uses such as fire protection. Additional water uses also include recycled water used to water golf courses as well as for industrial purposes.

4.1.3 Distribution System Water Losses

System losses or unaccounted-for water use (UAW) is unmetered water use such as for water system flushing, sewer cleaning, system leaks, unauthorized connections, reservoir cleaning, and other municipal uses. Unaccounted-for water can also result from meter inaccuracies, although these losses are relatively small. As required by the 2020 Guidebook, CMWD completed a water loss audit using the American Water Works Association (AWWA) Water Audit methodology (see Appendix F). Apparent losses (unauthorized consumption and metering inaccuracies) were calculated as 284 AFY, while Real Losses were calculated at 321 AFY, for a total loss of 605 AFY. Unlike the rest of the data presented in this UWMP, the Water Loss Audit was completed for Calendar Year 2019, while the rest of the UWMP reports data from calendar year 2020. 2020 water losses are therefore considered approximate. Calculated water losses for CMWD's water system for the previous five years of reporting are shown in Table 4-2. Based on average annual losses, CMWD anticipates that water losses represent 4% of total potable and non-potable use, calculated as the volume of water loss divided by the total volume of water produced. Projected water losses presented in Table 4-6 are estimated using this proportion.

Table 4-2: 2020 Water Losses (AFY)

DWR Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date	**Volume of Water Loss**
07/2014	765
01/2016	905
01/2017	1,305
01/2018	672
01/2019	605

4.1.4 Sales to Other Agencies

CMWD does not currently sell potable water to other agencies, nor does it anticipate doing so in the future. CMWD has its own local potable water supply through a purchase agreement with SDCWA to purchase desalinated seawater from the Claude "Bud" Lewis Carlsbad Desalination Plant (Carlsbad Desalination Plant) blended with other SDCWA supply. CMWD sells a portion of the recycled water it produces at the Carlsbad WRF to customers of neighboring agencies to help meet their non-potable water demands, but does not sell recycled water directly to any other agency. In 2020, CMWD sold recycled water through nine meters (customers) located within the City, but within VWD's service area. As part of the NSDWRC, CMWD anticipates there may be potential future recycled water sales to additional customers of other agencies, generally building on recycled water system expansions designed to primarily serve CMWD's service area.

4.1.5 Estimating Water Savings from Codes, Ordinances, or Transportation and Land Use Plans

CMWD is actively encouraging customers to reduce potable water use through the increased use of recycled water, installation of water-wise landscaping, replacement of fixtures with water-saving and low-flow devices, and outreach and educational campaigns. *Section 9 Demand Management Measures* provides details on CMWD's efforts to encourage water conservation. CMWD's future water savings resulting from increased conversion from potable to recycled water through its Phase III Recycled Water Project is included in future water use projections. Compliance with applicable regulations and codes requiring use of low-flow fixtures in new construction will result in passive savings. Passive savings are reflected in CMWD's SBx7-7 target water use, and therefore incorporated into the demand projections presented in *Section 4.3 Projected Total Water Use and Demand Projection Provided to Wholesaler*.

Table 4-3: Inclusion of Future Water Savings and Lower Income Demands

DWR Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections?	Yes
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.	Sections 4.1.5 and 5.2
Are Lower Income Residential Demands Included In Projections?	Yes

On June 21, 2005, CMWD's Board of Directors adopted Ordinance No. 43. This ordinance, also referred to as CMWD's Mandatory Use Ordinance, requires customers to use recycled water "wherever it has determined that its use is economically justified, financially and technically feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment." As a result of this ordinance, new development is prepared to convert to recycled water for irrigation purposes once recycled water becomes accessible. CMWD's ability to meet potential customers' recycled water demands now and in the future has been included in its recycled water use and recycled water supply projections. As recycled water use has increased, CMWD's per capita potable water use has decreased, helping to achieve its SBx7-7 targets.

In addition to potable water use savings achieved through conversion to recycled water, CMWD anticipates water savings resulting from compliance with water efficiency regulations. A number of regulatory changes have been made in recent years to encourage or mandate the use of low-flow and efficient plumbing fixtures, along with improvements to building standards to encourage green building that is more water efficient. These changes include, but are not limited to, AB 715 (efficient toilets and urinals) and SB 407 (retrofitting for efficient fixtures). CMWD has successfully taken measures to reduce per capita water use since the Water Conservation Act of 2009 was enacted. CMWD was below its SBx7-7 interim target of 233 gpcd in 2015 and its 2020 target (see Chapter 5). New indoor and outdoor water use objectives are being developed under SB 606 and AB 1668 and are anticipated to be released in 2023. Conservation measures implemented by CMWD, which have helped to meet SBx7-7 targets and will help to meet future water use objectives, include installation of water efficient fixtures and turf replacement, as described in *Section 9 Demand Management Measures*. New development in CWMD's service area will be constructed compliant with all applicable codes, and mandatory retrofits will be implemented, as applicable. The reduced water use resulting from these codes and regulations have been incorporated into CMWD's demand projections because they are reflected in the decreased per capita demands of the SBx7-7 targets. Because much of the existing development in the City of Carlsbad is relatively new, many residences, commercial buildings, and other facilities already use lower flow devices, and there are limited opportunities or need to retrofit existing structures to further improve water use efficiency to increase passive savings for existing development. Recent reductions in water use and SBx7-7 compliance is discussed in greater detail in *Section 5 Baselines and Targets*.

Solar and wind power used at CMWD's off-grid Santa Fe II facility

4.1.6 Climate Change Effects on Demand

As discussed in *Section 3 System Description*, CMWD is vulnerable to the effects of climate change, in large part due to its reliance on imported water to meet potable demands. As a participant in the San Diego IRWM Program, CMWD contributed to the climate change vulnerability assessment included in the *2019 San Diego IRWM Plan* (RWMG, 2019), the results of which are summarized in *Section 3 System Description*. The complete assessment is included here as Appendix E.

Preliminary analysis indicates that regional water demands would show a slight increase of between 0.6% – 1.8% by 2035. These increases in demand are anticipated to be associated with increased temperatures, increased drought potential, and increased wildfire potential, coupled with increased variability in rainfall that may reduce the availability of local supplies and/or the ability for vegetation to access natural water supplies when they need them. Within the San Diego region as a whole, five water demand vulnerabilities were identified, four of which apply to CMWD's service area. These vulnerabilities include potential increases in industrial and crop demands, a limited ability to conserve further, and a limited ability to meet summer demand.

Table 3-6 in *Section 3 System Description* presents these vulnerabilities and their priorities for CMWD. None of the water demand vulnerabilities applicable to CMWD were classified as very high or high priority. CMWD has taken steps to address water demand vulnerabilities by increasing supply reliability and expanding use of local and recycled water supplies, as well as encouraging improved water use efficiencies (refer to *Section 6 System Supplies*, *Section 7 Water Supply Reliability Assessment*, and *Section 9 Demand Management Measures*). As described below, agricultural land use is anticipated to decrease, reducing the impact of increases in crop demand that may result from climate change. Increases in industrial demand are not anticipated to substantially affect CMWD demands because industrial use is currently low and projected to remain low. While there may be limitations to CWMD's ability to further conserve, CMWD has met its SBx7-7 2020 target, achieved through a combination of conservation and increased recycled water use. CMWD's efforts to improve supply reliability will help meet summer demands, and in a normal year, supply is anticipated to exceed demands, providing a buffer for unexpected increases in demand that may result from climate change.

4.2 Projected Water Demands

This section presents CMWD's projected potable water use, in five-year intervals, from 2025 through 2045. Projected water use consists of projected water used by CMWD, projected water sold to others, and additional projected water uses and losses. Table 4-4 shows projected potable and recycled water demands. CMWD's demand projections presented in this section meet CMWD's gpcd demand targets that are described in *Section 5 Baselines and Targets*.

SDCWA currently provides the majority of potable water distributed by CMWD. The projected amount of water that CMWD expects to purchase from SDCWA to meet water demands in the future is considered in *Section 6 System Supplies*. Water use and production records, combined with population, employment, and urban development projections, provide the basis for estimating future water supply requirements. The population projections presented in *Section 3 System Description* already incorporate land use changes and other local economic and demographic factors, and provide an appropriate basis for demand projection calculations. SDCWA's draft demand forecast model was used to determine CMWD's baseline water demands and projected active and passive conservation. SDCWA's model incorporates land use and population projections generated by SANDAG for water agency service areas in San Diego County, and utilizes the Interim Series 14 Growth Forecast model developed specifically for the San Diego region (including CMWD's service area). The Interim Series 14 model incorporates land uses and historical growth to project population growth in the future. A description of the demand forecast methodology is provided in SDCWA's 2020 UWMP.

CWMD has elected to use SDCWA's draft forecast as the basis of its demand projections for consistency with its wholesale water supplier and to allow for a consistent supply reliability analysis. SDCWA's water demand projections for the CMWD service area include both potable and recycled water. CMWD has elected to use SDCWA's draft forecast of recycled water supply and baseline agricultural demand for inclusion in its demand projection. Additional future demands, based on CMWD recycled water system are included in the total recycled demands through 2045 (see Table 4-4). Although CMWD's SBx7-7 target allows potable water use to be as high as 207 gpcd from 2020 into the future (refer to *Section 5 Baselines and Targets*), CMWD projects a lower per-capita water use as a result of the area's growing conservation ethic and the increased use of recycled water to offset potable demands. Figure 4-2 shows the share of total demands that will be met by potable supplies and those met by recycled supplies. In addition to the projected demands, CMWD applied four scenarios to its water projections for purposes of comparison. These scenarios considered the five-year, ten-year, and fifteen-year historical average per-capita water use ending in 2020, as well as CMWD's SBx7-7 target per-capita water use, and multiplied these gpcd scenarios by the projected population. These scenarios are also presented in Figure 4-2. The water use forecast based on the fifteen-year, ten-year, and five-year historical gpcd scenarios were similar to one another and were found to be within a reasonable range of the SDCWA's forecast. The demand forecast based on the fifteen-year and ten-year historical average gpcd scenarios reflect both depressed demands from extraordinary conservation, normal water years, and wet water years which all occurred in the historical periods (2006-2020 and 2011-2020). CMWD's demand projections as well as the demand projections based on the three historical water use scenarios are well below the SBx7-7 target, which reflects CMWD's legal maximum potable water use.

Table 4-4: Projected Demands for CMWD (AFY)

		2025	**2030**	**2035**	**2040**	**2045**
A	Baseline Water Use[1]	22,754	23,027	23,599	24,221	24,755
B	Active and Passive Conservation[1]	2,234	2,154	2,295	2,484	2,492
C	Projected Demands[2] (A-B)	20,520	20,873	21,304	21,737	22,263
D	Existing Recycled Water Use[3]	4,218	4,218	4,218	4,218	4,218
E	Increase in Recycled Water Use[4]	0	0	0	0	0
F	Total Recycled Water (D+E)	4,218	4,218	4,218	4,218	4,218
G	Total Potable Water[5] (C-F)	16,302	16,655	17,086	17,519	18,045

[1] Baseline water use and active/passive conservation calculated via SDCWA 2020 UWMP demand forecast.

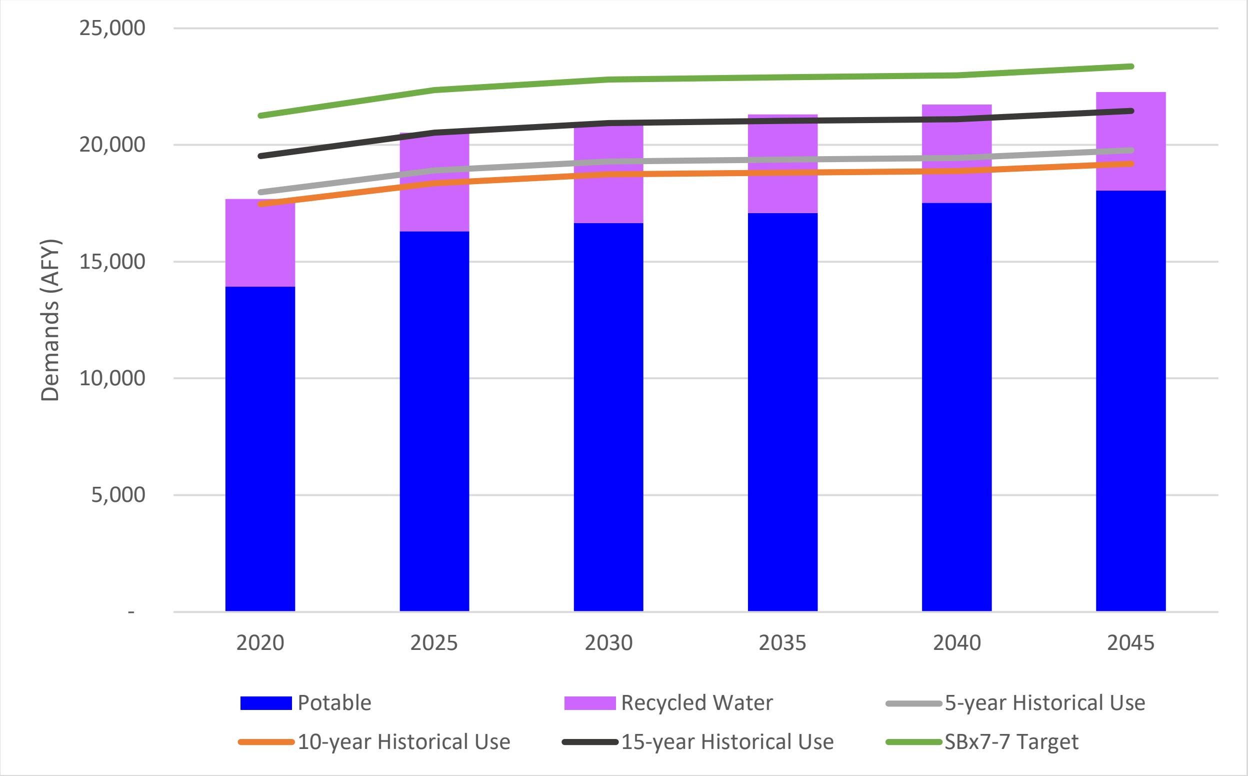
[2] Projected demands include potable and recycled water demands.

[3] Existing recycled water use projected forward is based on SDCWA's forecast of verifiable local supply of recycled water, and includes CMWD's Phase III Recycled Water Project, which is expected to be complete by 2023.

[4] Increased demand from expansion of recycled water system is expected to be complete by 2022, refer to *Section 6 System Supplies* and will offset projected potable demands. Between 2025 and 2045, expansions of recycled water system are conceptual and have not been included in projected demands in order to be conservative about future demands on potable water. No additional feasible recycled water system projects are included through 2045.

[5] Total Potable Water is the Projected Demands less Recycled Water Demand.

Figure 4-2: Projected CMWD Demands



Projected non-agricultural potable demands by use category were calculated using average historical proportions for years 2016 through 2020. **Table 4-5** presents the allocation of non-agricultural potable demand projections by each applicable water use category. The estimated projected water use by sector for 2025 through 2045 is presented in **Table 4-6.**

Table 4-5: Demand Projection Allocations

Water Use Category	Percent Allocation of Non-Agricultural Potable Demands
Single Family	51.8%
Multi-Family	11.6%
Commercial	17.9%
Industrial	0.3%
Institutional	0.9%
Landscape	11.8%
Water Losses	5.6%

Table 4-6: Projected Demands for Potable Water (AFY)

DWR Table 4-2 Retail: Use for Potable and Non-Potable Water - Projected					
Use Type	Projected Water Use				
	2025	**2030**	**2035**	**2040**	**2045**
Single Family	8,351	8,538	8,766	8,993	9,268
Multi-Family	1,878	1,920	1,971	2,022	2,084
Commercial	2,887	2,952	3,031	3,109	3,205
Industrial	49	50	51	52	54
Institutional/Governmental	150	154	158	162	167
Agricultural irrigation	182	173	164	160	154
Landscape	1,905	1,948	2,000	2,051	2,114
Recycled Water	4,218	4,218	4,218	4,218	4,218
Losses	900	921	945	970	999
TOTAL	**20,520**	**20,873**	**21,304**	**21,737**	**22,263**
NOTES: All non-recycled water is potable. Institutional use includes public buildings, schools, and fire protection. Single Family includes single family, low density single family, and temporary potable meters. Water loss was calculated as 6% of total demand based on five-year average (2016-2020) of AWWA water audits for CMWD's potable system. Some differences may occur due to rounding.					

4.2.1 Unconstrained Demand

New requirements for the 2020 UWMP provide that Suppliers conduct an annual water supply and demand assessment on or before July 1 of each year, starting in 2022. The annual assessment will include current year unconstrained demand. Per the 2020 UWMP Guidebook, CMWD is considering unconstrained demand as the expected water use in the upcoming year, based on recent water use, and before any projected response actions CMWD may trigger under its WSCP.

4.3 Projected Total Water Use and Demand Projection Provided to Wholesaler

Table 4-7 provides a summary of the total projected potable and recycled water use for CMWD, including retail water deliveries and additional water uses and losses for a normal or average year. SDCWA is projecting higher demands in dry years (SDCWA, 2021). CMWD's water demands would be higher in dry years similar in proportion to SDCWA projections. Estimated changes in demand resulting from single or multiple dry years are provided in *Section 7 Water Supply Reliability Assessment*.

Table 4-7: Current and Projected Total Water Demands (AFY)

DWR Table 4-3 Retail: Total Water Demands						
	2020	**2025**	**2030**	**2035**	**2040**	**2045**
Potable Water	13,929	16,302	16,655	17,086	17,519	18,045
Recycled Water	3,764	4,218	4,218	4,218	4,218	4,218
Total Water Demand	**17,693**	**20,520**	**20,873**	**21,304**	**21,737**	**22,263**
NOTES: Recycled Water Demands are discussed in *Section 6 System Supplies*						

SDCWA currently provides 82% of the potable water distributed by CMWD, and CMWD does not receive raw water from any of its supply sources. The remaining 18% of CMWD's potable supply is purchased desalinated seawater from the Carlsbad Desalination Plant, delivered via SDCWA infrastructure, and is considered a local supply. CMWD's current and projected demands on imported SDCWA potable water are equal to the total potable water demands presented in Table 4-6, less the 2,500 AFY desalinated seawater local supply.

4.4 Water Demands for Lower Income Households

CMWD does not keep direct records of which customers are low income households, but an estimate of low income water use and projected demands has been developed based on estimated household incomes for the City of Carlsbad. DWR has defined a low-income household as one with a median household income (MHI) of less than 80% of statewide MHI of $71,228. See *Chapter 3 System Description* for additional detail on disadvantaged communities.

The City of Carlsbad's General Plan does not include data on number of low income housing units currently present within the City. CMWD therefore used SANDAG projections of household incomes to estimate the number of low income households it serves. Using the Series 14 Growth Forecast, which was developed based on general plans and anticipated development for cities within San Diego County, SANDAG developed projections of household incomes in tiers of $15,000. This analysis assumes that any household earning less than $45,000 annually (approximately 60% of the statewide MHI of $71,228) qualifies as low income now and into the future. Within the City of Carlsbad, this translates to 24% of households, or 8,481 households, in 2020. The proportion of households designated as low income with this analysis was then applied to projected residential demands to estimate water demands for lower income housing units. For the purposes of this 2020 UWMP, it was assumed that the ratio of low-income multi-family and single-family homes is consistent with the overall ratio of multi-family and single-family customers. Table 4-8 presents the projected low-income water demands. The residential water demands presented in Table 4-1 and 4-6 include the water demands of low-income housing as required by SB 1087.

Table 4-8: Projected Water Demands of Low-Income Households

Low Income Water Demands	2020	2025	2030	2035	2040	2045
Low Income Households	8,481	8,610	8,653	8,658	8,663	8,785
Low Income Single-Family Demands (AFY)	1,838	1,962	1,980	1,992	2,017	2,062
Low Income Multi-Family Demands (AFY)	419	441	445	448	453	464
Total (AFY)	**2,257**	**2,404**	**2,425**	**2,439**	**2,470**	**2,525**

Section 5

Baselines and Targets

The Water Conservation Act of 2009 (also known as SBx7-7) was signed into law in November 2009 as part of a comprehensive water legislation package. SBx7-7 sets a goal of achieving a 20% reduction in urban per capita water use statewide by 2020. DWR developed technical methodologies to guide the consistent development by urban water suppliers of their baseline per capita water use and targets. These baselines and targets were first reported in the 2010 UWMPs and revised in the 2015 UWMPs. The 2020 Guidebook requires that all urban water retailers use the baseline, targets, and methodology established in their 2015 UWMPs, unless there has been a change to their water service areas. Because the City's water service area boundary remains unchanged from 2015, its baseline, targets, and methodology remain consistent with those presented in the 2015 UWMP.

5.1 Overview of Baselines and Targets Calculations

SBx7-7 requires urban water suppliers to establish per capita water use targets by using one of four methods:

- **Method 1:** A per capita water use by 2020 that is 80% of the urban retail water supplier's baseline per capita daily water use using a 10-year average ending no earlier than December 31, 2004, and no later than December 31, 2010. CMWD's recycled water comprised more than 10% of 2008 retail water delivery, therefore a 10- to 15-year baseline period can be used that ends no earlier than December 31, 2004 and no later than December 31, 2010. As described below, a 10-year baseline period from 1999-2008 was selected, resulting in a baseline of 259 gallons per capita per day (gpcd). The resulting per capita demand target for 2020 is 207 gpcd.
- **Method 2:** The per capita daily water use estimated using the sum of several defined performance standards. This method requires quantifying the landscaped area and the baseline commercial, industrial, and institutional use. Method 2 was not calculated during development of the 2015 UWMP.
- **Method 3:** The 2020 water use target is calculated as 95% of the applicable state hydrologic region target, as set forth in the 2015 UWMP Guidebook (DWR, 2016). CMWD, located in DWR's South Coast Hydrologic Region Number 4, has a year 2020 target of 95% of 149 gpcd, which is 142 gpcd according to Method 3.
- **Method 4:** A provisional method that was developed by DWR where the target is based on indoor residential, CII, outdoor, and water loss components. Using the Provisional Method 4 Target Calculator provided by DWR with a CII water use in 1997 of 3,241 AF, Method 4 establishes a target of 207 gpcd.

An urban water supplier must select one of the methods to set its per capita water use target. Water suppliers may choose to change the selected method until 2015. CMWD selected Method 1 for establishing the 2020 per capita water use target of 207 gpcd.

In January 2014, the Governor of California declared a State of Emergency, directing State officials to take all necessary actions to prepare for drought conditions. This declaration requested that all Californians reduce water consumption and that local water suppliers implement local water shortage contingency plans. With the continuation of the drought, in April 2015, the Governor issued an executive order (Executive Order B-29-15) to impose mandatory water use restrictions, including an order for CMWD to reduce potable water use by 28%. On February 2, 2016, the emergency drought regulations were revised and extended through October 2016. These revisions adjusted agency reduction targets to reflect local supplies and conservation efforts. As a result, CMWD's mandatory reduction target dropped from 28% to 20%. CMWD implemented mandatory water restrictions such as restricted irrigation watering days and times during the previous multi-year drought. This level of reduction helped to reduce CMWD's water use below its 2020 target.

From 2007 to 2015, CMWD's per capita water use experienced a decline partially due to increased retail water cost, increased use of water conservation measures by customers responding to drought conditions, introduction of a tiered billing structure, conservation programs, and the 2009 global recession and housing market crash. Since 2015, as the region continued to recover from recession and drought, per capita water use has rebounded to 2014 levels with a five-year average (2016-2020) per capita use of 175 gpcd. CMWD's per capita water use in 2020 (134 gpcd) is below the 2020 target. This 2020 water use may be temporary as a result of changes in water use patterns due to the COVID-19 pandemic. A return to prior per capita water use trends may occur once the pandemic is over, although water use has met or exceeded its SBx7-7 targets.

CMWD's approach to meeting the 2020 per capita water use target had several elements consisting of increased saturation into the customer base of low flow plumbing devices and fixtures, continued implementation of demand management measures, water use reductions that occur with the increased costs of water, and increased use of recycled water. Recycled water is excluded from gross water use in determining per capita water use according to the DWR guidance. CMWD's water conservation efforts are described in *Section 6 Demand Management Measures*.

5.2 Water Use and SBx7-7 Compliance

CMWD's gross water use is the total volume of potable water entering its distribution system. Only gross potable water use is used for SBx7-7 compliance. All required tables for calculating and demonstrating SBx7-7 compliance are provided in Appendix G.

CMWD used the 2015 UWMP as an opportunity to revise the SBx7-7 baselines and targets using finalized 2010 U.S. Census data for its population estimates for baseline years. CMWD updated its population estimates for 2000-2010, and subsequently revised its baseline water use and targets, as described below. This 2020 UWMP describes the process used during the development of the 2015 UWMP to determine 2020 water use targets.

5.2.1 Baseline GPCD Water Use

The 2020 Guidebook states that urban water suppliers must use the same methodology in their 2020 UWMPs as their 2015 UWMPs. Baseline gpcd water use was calculated using Method 1 in the CMWD 2015 UWMP, and is therefore used in this 2020 UWMP. This method requires calculating gpcd for each of the potential baseline periods, using updated U.S. Census population estimates for the years 2001-2009. Census data for 2000 and 2010 were overlaid with the CMWD service area, and an analysis was completed at the block-level to calculate the population served by CMWD in those years. For Census blocks that are partially within the CMWD service area, a proportion of the population equal to the proportion of the geographical area within the service area was used. The resulting population numbers were then compared to the U.S. Census population for the City of Carlsbad, and it was determined that on average, CMWD serves 77.6% of the total City's population. This proportion was then applied to California Department of Finance population estimates for the City of Carlsbad to provide an estimate of CMWD population in non-Census years. Using the population analysis results and water use data, the annual gpcd was determined for each year between 1990 and 2010. Table 5-1 presents the annual gpcd for each potential baseline year.

Table 5-1: Annual Potable Water Use for Potential Baseline Years

Year	Service Area Population	Gross Potable Water Use (AFY)	Daily Per Capita Water Use[1] (GPCD)
1990	50,764	17,919	315
1991	51,730	16,450	284
1992	52,715	13,753	233
1993	53,718	14,928	248
1994	54,741	14,963	244
1995	55,783	14,008	224
1996	56,845	15,140	238
1997	57,927	16,011	247
1998	59,030	15,449	234
1999	60,154	17,313	257
2000	61,261	19,952	291
2001	64,372	18,884	262
2002	68,007	20,586	270
2003	69,916	20,278	259
2004	71,459	21,222	265
2005	72,975	20,163	247
2006	75,672	21,206	250
2007	77,619	22,099	254
2008	79,400	21,187	238
2009	80,340	19,867	221
2010	81,081	17,142	189

5.2.2 Baseline Periods

The population projection described above was applied to CMWD's 1990-2010 gross potable water use to determine a revised baseline for CMWD's SBx7-7 compliance. No adjustments were made to the 1990-2010 water use data from the 2010 UWMP because they are actual gross potable water use for CMWD's system. The baseline period for CMWD was selected after consideration of all potential baseline periods. In accordance with the *2015 UWMP Guidebook*, agencies meeting at least 10% of total water deliveries with recycled water in 2008 can use a 10- to 15-year baseline. CMWD's recycled water deliveries in 2008 were 3,877 AF, or 15.9% of its total water deliveries of 24,460 AF. CMWD can therefore use a baseline consisting of a 10- to 15-year continuous period ending between December 31, 2004, and December 31, 2010. The potential baselines in Table 5-2 are presented by ending year. For a 10-year baseline ending in 2004, the starting year would be 1995; for the 15-year baseline ending in 2004, the starting year is 1990.

Table 5-2: Average GPCD for Potential Baseline Years, by Ending Year

Ending Year	Average GPCD for Baseline Years					
	10-years	11-years	12-years	13-years	14-years	15-years
2004	255	254	253	252	254	258
2005	257	254	253	253	251	253
2006	258	256	254	253	252	251
2007	259	258	256	254	253	253
2008	259[1]	257	256	255	253	252
2009	256	256	254	253	252	250
2010	245	250	250	249	249	248
[1] Selected Baseline GPCD						

CMWD selected 1999-2008 for its baseline period, which has an average per capita water use of 259 gpcd. As shown in **Table 5-1**, during this baseline period, gross potable water use ranged between 17,313 AF in 1999 to a high of 22,099 AF in 2007. The average gross potable water use during the baseline period was 20,289 AFY. Population grew from 60,154 people in 1999 to 79,400 people in 2008, a growth of over 19,000 people over ten years.

5.2.3 SBx7-7 Baseline and Targets

Using Method 1, which calculates the 2020 Target as 80% of the baseline per capita water use, CMWD's water use target for 2020 is 207 gpcd, or a reduction of 52 gpcd.

A 5-year baseline from 2003 to 2007 had an average water use of 255 gpcd and was used to confirm the 2020 target was reasonable. While the 2003 to 2007 baseline had a minimally higher SBx7-7 target, which could have provided for some flexibility should growth occur at a different rate than was projected in the 2015 UWMP, it did not substantially affect CMWD conservation planning or implementation activities. **Table 5-3** provides a summary of the baseline and targets for CMWD.

Table 5-3: Baselines and Targets Summary

DWR Table 5-1 Retail: Baselines and Targets Summary				
Baseline Period	**Start Year***	**End Year***	**Average Baseline GPCD***	**Confirmed 2020 Target***
10-15 year	1999	2008	259	207
5 Year	2003	2007	255	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: CMWD selected a 10-year baseline period				

The 2020 UWMP is required to show compliance with the 2020 target for SBx7-7. As shown in **Table 5-4**, CMWD has met, and exceeded, its 2020 target. Because of this, no additional calculation of extraordinary events, economic adjustment, or weather normalization was conducted.

Table 5-4: 2020 Compliance

DWR Table 5-2 Retail: 2020 Compliance				
2020 GPCD			**2020 Confirmed Target GPCD***	**Did Supplier Achieve Targeted Reduction for 2020? Y/N**
Actual 2020 GPCD*	**2020 TOTAL Adjustments***	**Adjusted 2020 GPCD*** ***(Adjusted if applicable)***		
134	*0*	*134*	*207*	*Yes*
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: No adjustments were made to CMWD's 2020 GPCD.				

Section 6

Water Supplies

This section discusses CMWD's sources of water supply, new supply opportunities, exchanges and transfers of water, wastewater and recycled water opportunities, projected water supplies, and climate change impacts to water supply.

6.1 Summary of Existing and Planned Water Sources

CMWD's existing water sources include a local supply of recycled water and purchased SDCWA water. All of CMWD's potable demands are currently met with imported purchased and desalinated seawater through SDCWA. CMWD's planned supplies include recycled water from the Phase III Recycled Water Project along with continued purchases from SDCWA and desalinated seawater. The Phase III Recycled Water Project, which is currently being implemented, is expanding CMWD's existing recycled water system to increase recycled water production and delivery. Construction of four pipeline segments and the Carlsbad WRF expansion have been completed, with the construction of one additional pipeline segment and one reservoir anticipated to be complete by December 2022. Since late 2015, desalinated seawater made available via the Carlsbad Desalination Plant has been blended into the treated water purchased from SDCWA. On April 12, 2016, CMWD entered into a purchase agreement with SDCWA to receive local desalinated water blended with other SDCWA supplies. CMWD and SDCWA are working to develop a preliminary design that would connect the Carlsbad 5 Flow Control Facility and Pressure Reducing Station to the Carlsbad Desalination Conveyance Pipeline. CMWD is also developing a financial cost-benefit analysis that will be brought to the CMWD Board.

Greywater is gently used water from your bathroom sinks, showers, and bathtubs. It is not water that has come into contact with human waste and is typically used for onsite irrigation purposes. Currently CMWD does not utilize greywater in its supply. In compliance with the City of Carlsbad's Climate Action Plan, CMWD will host greywater and rainwater harvesting workshops, or partner with existing workshop providers. CMWD will also reference or develop a greywater and rainwater collection system design manual and consider offering a rebate for residential greywater systems that require a permit to cover the cost of obtaining a permit. Homeowners would be responsible for the installation of greywater and rainwater collection systems.

A detailed summary of CMWD's projected supplies is provided in *Section 6.9 Projected Water Supplies*, while an overview of CMWD's supplies is provided in Table 6-1. Figure 6-1 shows CMWD's water supply facilities and infrastructure, and groundwater basins.

Table 6-1: Summary of Historical, Existing, and Planned Water Supplies (AFY)

Source	**2015[1]**	**2020[1]**	**2025**	**2030**	**2035**	**2040**	**2045**
SDCWA Imported Purchases	14,320	11,429	13,802	14,155	14,586	15,019	15,545
Seawater Desalination[2]	0	2,500	2,500	2,500	2,500	2,500	2,500
Recycled Water[3]	3,792	3,764	4,218	4,218	4,218	4,218	4,218
Total Water Supplies	**18,112**	**17,693**	**20,520**	**20,873**	**21,304**	**21,737**	**22,263**

[1] 2015 and 2020 show actual supplies produced.

[2] Purchases of desalinated seawater may increase after 2030, but have yet to be determined, so are kept constant for the purposes of the UWMP.

[3] Recycled Water supplies include the Carlsbad WRF deliveries plus recycled water purchased from VWD.

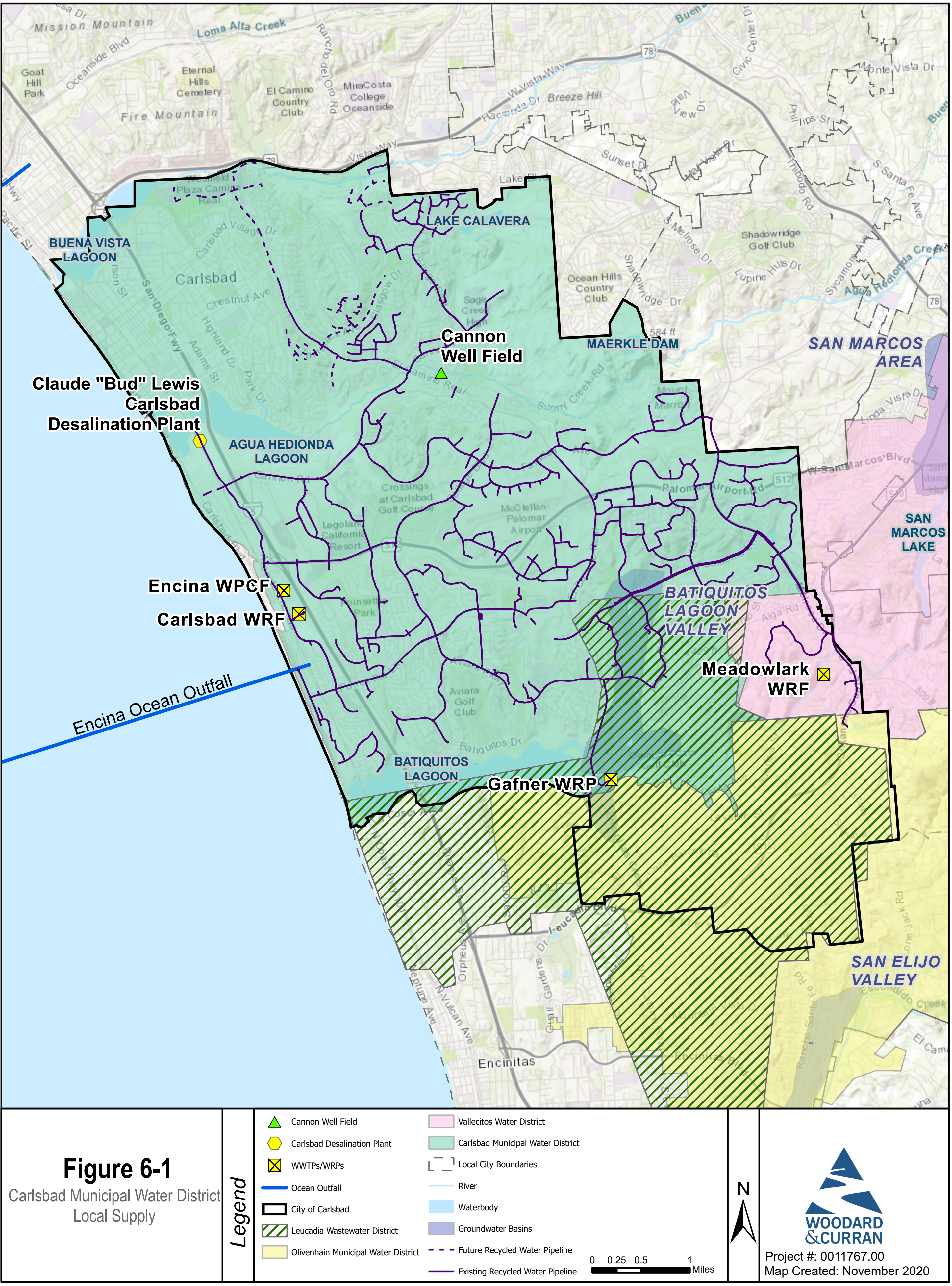


Figure 6-1

Carlsbad Municipal Water District Local Supply

WOODARD & CURRAN

Project #: 0011767.00

Map Created: November 2020

Figure Exported: 3/31/2021 By: mstine Using: \\woodardcurran.net\shared\Projects\0011767.00 CMWD 2020 UWMP\wip\04_GIS\CMWD_2020UWMP.aprx Layout: Fig. 6-1

6.2 Purchased Water

CMWD purchases the majority of its potable water from SDCWA, which in turn purchases SWP and Colorado River water from MWD, acquires Colorado River supplies directly or from other agencies, and purchases desalinated seawater produced at Poseidon's Carlsbad Desalination Plant. Imported water is conveyed into the area via MWD and SDCWA aqueducts. Upon its formation in 1954, CMWD joined SDCWA to acquire the right to purchase and distribute imported water throughout its service area. SDCWA has 24 member agencies, including CMWD, and is the regional wholesaler of imported water in San Diego County. In 2016, CWMD entered an agreement with SDCWA to purchase direct deliveries of desalinated seawater, reducing CMWD's reliance on SDCWA imports for potable supplies (see *Section 6.5 Seawater Desalination*).

CMWD also purchases disinfected tertiary recycled water from VWD to help meet recycled water demands for customers remote from the Carlsbad WRF. Further discussion is provided in *Section 6.7 Wastewater and Recycled Water Opportunities*.

6.2.1 Metropolitan Water District of Southern California (MWD)

MWD was created in 1928 following the passage of the Metropolitan Water District Act by the California Legislature to provide supplemental water for cities and communities on the south coastal plain of California. MWD serves as a water wholesaler and provides water to its member agencies from both the Colorado River and the SWP. It has 26 member agencies including SDCWA, and covers an area which includes all, or portions, of Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties. MWD's water supplies and management programs are discussed in their *2020 Regional Urban Water Management Plan* (MWD, 2021).

6.2.2 San Diego County Water Authority (SDCWA)

SDCWA was organized on June 9, 1944 under the County Water Authority Act for the express purpose of importing Colorado River water into San Diego County. SDCWA annexed to MWD in 1946. As its largest customer, SDCWA is now represented on MWD's Board of Directors by four directors. SDCWA purchases water from MWD and other sources for resale to its 24 member agencies. As of 2020, SDCWA's potable supplies include a mix of imported water and local supplies, including desalinated seawater from the Carlsbad Desalination Plant.

CMWD is one of 24 member agencies of SDCWA. Each member agency is autonomous and represented on SDCWA's Board of Directors, setting local policies and water pricing structures. The representatives on the Board of Directors are appointed by each member agency and the number of representatives for each agency is based on a ratio of each member's assessed valuation compared to the total of all member agencies. CMWD currently has two Board members on the 36-member Board of Directors. Member agency status entitles CMWD to directly purchase water from SDCWA on a wholesale basis. CMWD also looks to SDCWA to ensure, to the best of its ability, that adequate water will be available to satisfy future potable water requirements.

SDCWA's water supplies and management programs are discussed in its *2020 Urban Water Management Plan* (SDCWA, 2021). CMWD's current and projected water purchases from SDCWA are provided in Table 6-13 and Table 6-14, below.

6.3 Local Surface Water and Groundwater

CMWD does not currently use any local groundwater and surface water supplies, although in the past both types of water sources were used. Prior to 1957, the Carlsbad Mutual Water Company supplied local surface water from Lake Calavera and groundwater from the Mission Basin of the San Luis Rey River to the City of Carlsbad. In addition, the Terramar Water Company provided local groundwater to a portion of the City of Carlsbad from the Agua Hedionda subunit 4.30 of the Carlsbad hydrologic unit through wells it developed, referred to as the Cannon Well Field. In August 1957, the water rights and other assets of the Carlsbad Mutual Water Company and Terramar Water Company were purchased by the City of Carlsbad. In May 1983, through an agreement, these local surface water and groundwater rights were transferred to CMWD by the City of Carlsbad. This included rights to Mission Basin of the San Luis Rey River Valley of 200 miner's inches (approximately 3,650 AFY) of groundwater, prescriptive rights of 5 cubic feet per second (cfs) (up to 2,382 AF) of groundwater, and/or pre-1914 appropriative rights.

The Carlsbad Mutual Water Company held a permit with the State Division of Water Rights for another 1,000 AF annually from the Mission Basin. The original permit was for irrigation purposes and was later changed to recreational and fire protection purposes. Additionally, there were surface water rights for 150 AFY which were held from Calavera Creek. The Terramar Water Company had rights to 450 AFY of groundwater from the Agua Hedionda Creek Basin. Finally, CMWD obtained a permit for surface water in the amount of 25 AF from Agua Hedionda Creek as a result of constructing Maerkle Dam in 1962.

Table 6-2 identifies the groundwater basins in the vicinity of CMWD according to DWR Bulletin 118, which are also shown in Figures 3-4 and 6-1. The Batiquitos Lagoon Valley Groundwater Basin is the only basin located in CMWD's service area. The San Luis Rey Valley Groundwater Basin is located north of CMWD and the San Marcos Valley Groundwater Basin is located east of CMWD. Of these groundwater basins, the Upper San Luis Rey Valley Groundwater Basin has been designated as a Medium Priority Basin under California Groundwater Elevation Monitoring (CASGEM), while the Lower San Luis Rey Valley, Batiquitos Lagoon Valley and San Marcos Area Groundwater Basins are designated as Very Low Priority. High and Medium priority basins are required by the State to be monitored, while Low and Very Low priority basins are not currently considered basins of concern; as such, of the basins in the vicinity of CMWD's service area, only monitoring of the Upper San Luis Rey Valley Groundwater Basin is mandated. This monitoring is being undertaken through a coordinated effort between the City of Oceanside, the Pauma Valley Groundwater Sustainability Agency, and the County of San Diego. None of the basins listed in Table 6-2 are adjudicated, nor has DWR identified any of these groundwater basins as being in overdraft. Within the San Luis Rey Valley Groundwater Basin are several locally-recognized subbasins, which are commonly considered separate hydrological units: Mission, Bonsall, Moosa, Pala, and Pauma Basins (SDCWA, 2010).

Other groundwater includes subsurface flows from local hydrologic areas within the Carlsbad Watershed, including Buena Vista Creek Basin, Agua Hedionda Creek Basin, Encinas Creek Basin, and the Batiquitos Hydrologic Subarea. These resources have low potential yields, poor quality, or no available data to substantiate their long term use in the public water supply. Generally speaking, these basins do not have geological characteristics or size comparable to the Mission Subbasin of the Lower San Luis Rey Valley Groundwater Basin, and collectively could supply only a small portion of CMWD's needs.

Table 6-2: Groundwater Basins in the Vicinity of CMWD

Basin Name	DWR Basin Number	Basin Priority[1]	Located Within CMWD Service Area	Supply Currently Utilized by CMWD	Groundwater Management Plan Status
Lower San Luis Rey Valley (including the Mission Subbasin)	9-7-2	Very Low	No	0 AFY	Groundwater Sustainability Plan under development by Pauma Valley Groundwater Sustainability Agency
Batiquitos Lagoon Valley	9-22	Very Low	Yes	0 AFY	None[2]
San Marcos Area	9-32	Very Low	No	0 AFY	None[2]

[1] California Sustainable Groundwater Elevation Monitoring (CASGEM) designated priority

[2] Basin is not currently used as supply and no groundwater management plan has been developed or adopted by CMWD. Groundwater management plans or groundwater sustainability plans would be adopted prior to use of these groundwater basins for supply, as required.

Mission Subbasin

Of the groundwater basins in the vicinity of CMWD, the Mission Subbasin of the Lower San Luis Rey Valley Groundwater Basin has the most potential as a viable water resource. This basin has a large drainage area of 565 square miles and consists of alluvium and river channel deposits averaging 150 feet in depth. The quality is mildly brackish with TDS concentrations ranging from 1,000 to 1,500 milligrams per liter (mg/L). For CMWD's use, the water would need to be treated by a low-pressure membrane, reverse osmosis process to achieve treated water quality in the range of 500 mg/L. The City of Oceanside is currently doing this at its Mission Basin Groundwater Purification Facility and plans to recharge the basin with advanced treated water though its Pure Water Oceanside project.

In 2005, CMWD completed a study on the cost effectiveness of utilizing the groundwater from the Mission Subbasin. This study showed that while the treatment and delivery of groundwater is feasible, it was not cost effective for CMWD at the time of the study. As a result, CMWD's Board approved the staff recommendation to discontinue efforts to utilize this groundwater source as an alternate local supply at that time. However, since 2005, improvements in technology may have resulted in lower costs for removing TDS, and these costs may continue to decrease over time. In addition, the cost of imported water has increased significantly since 2005 and this trend is projected by both MWD and SDCWA to continue over time. With the increasing cost and decreasing reliability of imported water, the cost effectiveness of using local groundwater once again may become attractive. A groundwater supply from the Mission Subbasin would require the construction of several wells, a groundwater treatment facility, and a conveyance system. Wheeling the treated groundwater through the Oceanside distribution system may be an option. Accordingly, CMWD will continue to monitor the benefits and costs of utilization of groundwater in the Mission Subbasin, which may become cost effective, for CMWD or third parties, as technology continues to improve and imported water costs continue to increase. A partnership with City of Oceanside for treatment of brackish groundwater or wheeling the treated groundwater through its distribution system may be an option. The Mission Subbasin project is not being considered at this time, but could be explored again in the future as CMWD continues to coordinate with City of Oceanside.

Cannon Well Field

The Cannon Well Field, located within the Agua Hedionda Creek Basin subarea of the Carlsbad Watershed, was historically used as a source of local water. Pumping ceased after 1962, but in the years leading up to then, production ranged from 16 AFY to 238 AFY. This well field could be considered having a potential available yield of 450 AFY. Historically, additional small private wells for individual residences were also located within this subarea, along with private wells in the Buena Vista Creek Basin (CMWD, 2019b).

A 1991 study titled *Report on the Feasibility for Development of the Cannon Well Field Carlsbad, California* was completed of the Agua Hedionda subunit where the Cannon Well Field is located. This study indicated that by a 1950 agreement between then-landowner Ellen Hall and J.D. Cannon, the Terramar Water Company was granted the right to drill for and remove water from the land. In 1964, this original agreement was merged with an agreement with the City of Carlsbad and the then-landowner to have the sole right and exclusive right to drill wells on the property and take and remove all water developed on the property and deliver it to such places as the City, in its sole discretion, may determine. The City (CMWD) shall be entitled to produce from the property an additional 16.5 AFY; however, there are no recorded groundwater rights. The safe yield was estimated in the 1991 study at 400 AFY. CMWD could begin the process of developing the groundwater. The Rancho Carlsbad Mobile Home Park has one operating well in the vicinity, estimated at 100 AFY, which it uses to supply water for irrigation of their landscaping and through a separate agreement supply water to the adjacent Rancho Carlsbad Golf Course. Ultimately, if there is excessive pumping, there may be adverse effects, such as the elimination of surface flow in Agua Hedionda Creek, reduction in the wetlands area downstream of the El Camino Real Bridge, and increased salinity in the transition zone of fresh water to salt water in the Agua Hedionda Lagoon. These problems can be addressed if the Cannon Well Field is developed by CMWD through a program of scheduled observations and monitoring.

CMWD must clarify its groundwater rights before providing groundwater to customers.. Groundwater could potentially be recovered from the Mission Basin and/or Agua Hedionda Lagoon, although such groundwater would require desalination. CMWD may still explore groundwater as a local water supply concept; as such, groundwater is not included in CMWD's supply projections. CMWD does not currently pump groundwater; therefore, DWR Table 6-1 (Table 6-3) is not currently applicable.

Table 6-3: Groundwater Volume Pumped

DWR Table 6-1 Retail: Groundwater Volume Pumped	
☑	Supplier does not pump groundwater. The supplier will not complete the table below.

6.4 Storm Water

While CMWD does not currently utilize storm water for supply, the City of Carlsbad's 2020 Climate Action Plan identified greywater and rainwater goals, and associated actions, to take over the 2020 UWMP planning horizon.

CMWD evaluated the San Diego Region Stormwater Capture and Use Feasibility Study prepared for the County of San Diego in 2018. In addition, CMWD has already implemented one of the study alternatives by providing outreach and information on rebates for private rain barrels. In general, costs to implement many of the alternatives presented in the study are greater than the cost to purchase from local water supply sources (i.e. desalination). If CMWD was to treat rainwater for potable use, it would need a significant investment in infrastructure to capture, treat, and convey such water. CMWD will continue to monitor the development of funding opportunities and best practices by which to pursue storm water reuse projects in the future. As such, the 2020 UWMP complies with the Poinsettia 61 Settlement and Community Benefit Agreement, specifically section 4.3.11, approved by City Council resolution 2017-044 on March 14, 2017.

6.5 Desalinated Water

Since 1999, a large-scale seawater desalination facility has been actively explored as a potential local supply for the San Diego region. CMWD was involved in planning for the seawater desalination facility throughout its development. After exploring the feasibility of a variety of purchase agreements and delivery structures, Poseidon Resources (Channelside), L.P. (Poseidon), SDCWA, and SDCWA's member agencies came to agreement to move forward with implementation of a desalination facility for the region. In 2015, Poseidon completed construction of the Carlsbad Desalination Plant, located at the Encina Power Plant site adjacent to Agua Hedionda Lagoon, and began deliveries of desalinated seawater. Desalinated water produced at this facility is designated a local supply. Desalinated water from this facility is pumped to SDCWA's Twin Oaks Treatment Plant (refer to Figure 3-4), where it is blended with treated imported water for delivery to SDCWA member agencies, including CMWD. On April 12, 2016, CMWD Board of Directors approved an agreement between SDCWA and CMWD for the planning and design of the direct connection to the desalinated pipeline (Carlsbad 5 Flow Control Facility and Pressure Reducing Station), to provide 2,500 AFY of local desalinated seawater to CMWD through a Take or Pay agreement. SDCWA currently purchases all the water produced at the desalination facility under its purchase agreement with Poseidon. In addition to receiving desalinated seawater through SDCWA's supply mix, CMWD also opted to maintain its rights to receive water directly from the desalinated pipeline coming from the facility. A direct connection would improve water supply reliability and add infrastructure redundancy by providing a delivery system independent of SDCWA's larger system. Should supply disruption occur as a result of damage to SDCWA's system, CMWD would still be able to receive desalinated seawater if and when the option to pursue a direct connection to the facility, which will consist of Carlsbad 5 Flow Control Facility and Pressure Reducing Station, is implemented. CMWD is currently working to determine if the direct connection is financially feasible.

Through its general purchase of water supplies from SDCWA, CMWD receives a pro rata share of 1,449 AFY desalinated water. CMWD also directly receives an additional 2,500 AFY desalinated water as part of a Take or Pay agreement. This direct supply is considered a local supply for CMWD. In the event that additional water is produced by the Carlsbad Desalination Plant, beyond SDCWA's annual demand commitment of 48,000 AFY, CMWD may purchase an additional volume of desalinated water, equal to 5.21% of the additional production. This additional water is not accounted for in current supply projections due to uncertainty surrounding its procurement. While the Carlsbad Desalination Plant has a capacity of 56,000 AFY, CMWD only receives a portion through its agreement with SDCWA (see Table 6-4).

Table 6-4: Source Water Desalination (AFY)

DWR Table 6-8ds: Source Water Desalination										
☐	Neither groundwater nor surface water are reduced in salinity prior to distribution.									
Plant Name or Well ID	Plant Capacity	Intake Type	Source Water Type	Influent TDS	Brine Discharge	Volume of Water Desalinated in AFY				
						2016	2017	2018	2019	2020
Carlsbad Desalination Plant	56,000	open-water intake (screened or unscreened)	sea water	.015 ntu	Brine Line	1,250	2,500	2,500	2,500	2,500
					Total	1,250	2,500	2,500	2,500	2,500
Notes: CMWD purchases ocean desalinated water blended with non-desal water from its wholesaler, SDCWA.										

As shown in Table 6-5, brackish groundwater from the San Luis Rey Valley provide opportunity for the development of additional desalinated water within CMWD's service area as a future supply source.

Table 6-5: Opportunities for Desalinated Water

Sources of Water	Opportunities
Brackish groundwater	Mission Subbasin of San Luis Rey Valley

6.6 Transfers and Exchange Opportunities

CMWD relies on water purchased from SDCWA and desalinated seawater for potable water supplies, and does not participate individually in any water transfer or exchange programs at this time. After completion of the Phase III Recycled Water Project, CMWD may provide recycled water via transfers or exchanges to other agencies in the future as part of the North San Diego Water Reuse Coalition (NSDWRC), a nine-agency regional recycled water system, described in further detail in *Section 6.8 Future Water Projects*, below. In addition, CMWD has informal agreements with neighboring agencies for emergency purposes only that are not considered in CMWD's normal supplies. These interties would only be needed in rare emergency events or planned maintenance.

6.7 Wastewater and Recycled Water

The City of Carlsbad provides wastewater collection services, and EWA provides wastewater treatment. CMWD owns the Carlsbad Water Recycling Facility that provides recycled water to its customers. CMWD produces, buys, sells, and distributes recycled water to customers both within its service area and to customers located in adjacent agency service areas. Table 6-6 provides a summary of recycled water supply and demand, which are all further explained in detail below. CMWD's supply projections are significantly higher than current identified demands because CMWD has the potential to retain its current purchasing rights from VWD and has also expanded its Carlsbad WRF to increase local production of recycled water. CMWD will either identify new non-potable customers or sell the recycled water to neighboring agencies to allow the region to maximize local sources. CMWD anticipates only producing as much recycled water at Carlsbad WRF to meet demands, but the potential surplus of recycled water allows for flexibility in management of its supplies, and provides potential for increasing recycled water use within and adjacent to CMWD's service area.

Table 6-6: Summary of CMWD's Recycled Water Supplies and Demands (AFY)

	2020[1]	**2025**	**2030**	**2035**	**2040**	**2045**
Recycled Water Supplies						
Carlsbad WRF[2]	2,118	2,318	2,318	2,318	2,318	2,318
Meadowlark WRF[3]	1,646	1,900	1,900	1,900	1,900	1,900
Total Recycled Water Supplies	**3,764**	**4,218**	**4,218**	**4,218**	**4,218**	**4,218**
Recycled Water Demands						
Projected Recycled Water Demands[4]	3,764	4,218	4,218	4,218	4,218	4,218
Potential Recycled Water Surplus	***0***	***0***	***0***	***0***	***0***	***0***

[1] Actual 2020 volume supplied.

[2] CMWD anticipates producing as much recycled water at Carlsbad WRF to meet demands. See **Table 6-13** and **6-14** for the total safe yield.

[3] Meadowlark supplies based on average between 2015 and 2020. See **Table 6-13** and **6-14** for the total safe yield.

[4] Projected recycled water demands reflect demands anticipated with completion of the Phase III expansion, which is expected to be complete in 2022. Recycled water demands after 2022 may increase or decrease depending on many factors, but any future additional pipeline expansions or connections are too conceptual to be included in this 2020 UWMP.

6.7.1 Recycled Water Coordination

For production and delivery of recycled water sufficient to meet local demands, CMWD's recycled water system requires coordination with the two agencies listed here. CMWD's relationship with each of these organizations is also described.

- Encina Wastewater Authority (EWA): Regional wastewater collection and treatment system; supplies secondary effluent to Carlsbad WRF for tertiary treatment and discharges unused secondary effluent to the Pacific Ocean via the Encina Ocean Outfall
- Vallecitos Water District (VWD): Produces tertiary recycled water and sells to CMWD

6.7.2 Wastewater Treatment and Collection Facilities

EWA provides regional treatment and effluent disposal through an ocean outfall from the EWPCF. EWA is owned by six agencies in northern San Diego County, and operates under a joint powers authority: Cities of Carlsbad, Vista, and Encinitas, VWD, Buena Sanitation District, and LWWD. In total, EWA provides wastewater services to approximately 377,000 people and is comprised of approximately 123 square miles of coastal north San Diego County (EWA, 2020). Wastewater collected by EWA members are conveyed to the EWPCF, where it is treated to secondary, and either discharged to the Pacific Ocean via the Encina Ocean Outfall or conveyed to the Carlsbad WRF or Gafner WRF for additional treatment for beneficial reuse. The City of Carlsbad owns capacity rights at EWPCF for 10.26 mgd. The EWPCF provides full secondary treatment, sludge handling, and disposal through a deep ocean outfall, Encina Ocean Outfall. The outfall extends along the ocean floor to a point one and a half miles off shore, at a depth of over 150 feet. Treatment levels at EWPCF meet all current State and Federal requirements. Refer to Figure 6-1 for location of the EWPCF and Encina Ocean Outfall.

Within CMWD's water service area, wastewater collection is provided by the City of Carlsbad and LWWD. The City of Carlsbad's sewer system includes 265 miles of pipeline, and conveyed an average flow of 6.32 mgd for Fiscal Year 2020, a 0.38% increase over 2019 (EWA, 2020). LWWD provides wastewater services to the La Costa portion of CMWD's service area and operates approximately 200 miles of pipeline to serve 62,600 people in Carlsbad and neighboring Encinitas (LWWD, 2020). LWWD's flows to the EWPCF averaged 3.85 mgd in Fiscal Year 2020, a 0.32% decrease from 2019 (EWA, 2020). All sewer flows are conveyed to the EWPCF for treatment.

Table 6-7 identifies the wastewater collected within CMWD's service area, while Table 6-8 identifies the volume of wastewater that is either recycled or discharged within CMWD's service area. The wastewater amounts generated within CMWD boundary are estimated to be approximately 5-10% greater than the City of Carlsbad's sewer service area because the CMWD service area also includes a portion of LWWD's sewer collection service area.

Recycled water is presently supplied to CMWD from two sources consisting of a maximum allocation of 7.0 mgd from Carlsbad WRF and 3.0 mgd from Meadowlark WRF (owned by VWD). Meadowlark can produce up to 5.0 mgd tertiary recycled water, or 5,600 AFY. Approximately 1,900 AFY of this tertiary recycled water is typically delivered to CMWD, and approximately 750 AFY is typically delivered to Olivenhain Municipal Water District.

Chlorine contact basin at the existing Carlsbad WRF

Table 6-7: Wastewater Collected within Service Area in 2020 (AFY)

DWR Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
100%	Percentage of 2020service area covered by wastewater collection system					
100%	Percentage of 2020 service area population covered by wastewater collection system					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2020 (AFY)	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Carlsbad	Metered	7,128	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Leucadia Wastewater District	Estimated	744	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Vallecitos Water District	Estimated	20	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Total Wastewater Collected from Service Area in 2020:		7,892				
NOTES: Wastewater flows are reported for Fiscal Year 2020, ending June 30, 2020. In 2015, CMWD estimated that total wastewater flows within its service area are 5-10% higher than those collected by the City of Carlsbad due to LWWD providing sewer collection service to a portion of CMWD's service area (refer to Figure 3-4). The 744 AF was reported by Leucadia for last FY. The Encina Pollution Control Facility is owned and operated by the Encina Wastewater Authority, a joint powers authority that is owned by six agencies, including City of Carlsbad and Leucadia Wastewater District. Vallecitos collects wastewater for 80 homes in the CMWD service area. The agreement estimates that Vallecitos collects 220 gallons per day of wastewater from each home.						

Table 6-8: Wastewater Treatment and Discharge within CMWD's Service Area (AFY)

DWR Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020											
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.										
							2020 volumes (AFY)				
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Require-ment
Encina Water Pollution Control Facility[1]	Encina Ocean Outfall	Pacific Ocean		Ocean outfall	Yes	Secondary, Undisinfected	26,947	25,970	0	0	n/a
Encina Water Pollution Control Facility[1]	Carlsbad WRF	Carlsbad WRF		Other	Yes	Tertiary	0	0	2,118	0	n/a
Encina Water Pollution Control Facility[1]	Gafner WRF	Gafner WRF		Other	Yes	Tertiary	0	0	193	0	n/a
Meadowlark WRF[2]	CMWD	CMWD Customers		Other	Yes	Tertiary	1,760	114	1,646	728	n/a
						Total	28,707	26,083	3,957	728	n/a

NOTES: Wastewater flows reported in this table are for Fiscal Year 2020. All wastewater flows within CMWD's service area are treated at EWPCF, which discharges to three facilities - an Ocean Outfall, the Carlsbad WRF, and Gafner WWTP, the latter two of which recycle water for reuse. Meadowlark WRF, located outside of the CMWD service area, discharges wastewater to the VWD failsafe and the EWA ocean outfall, which is within the Carlsbad service area. Vallecitos Water District owns Meadowlark and operates it within their service area. LWWD produces and delivers recycled water to the south portion of the Omni La Costa Resort & Spa Golf Course within CMWD's service area.

Encina Water Pollution Control Facility

The EWPCF is owned and operated by EWA. It currently treats an average flow over 20 mgd wastewater, but has the capacity to treat 40.5 mgd. The EWPCF produces over 5.0 mgd of secondary treated recycled water. Treated secondary recycled water is used in the plant and reduces costs for potable water required to operate the facility. Additional effluent flows from the facility are diverted from the ocean outfall and transferred to Carlsbad WRF. Secondary effluent that cannot be reused, either directly or through additional treatment to meet tertiary recycled water demands, is discharged through the Encina Ocean Outfall.

Carlsbad Water Recycling Facility

The Carlsbad WRF, owned by CMWD but operated by EWA staff, can currently be maximized at 7.0 mgd (7,839 AFY). Recent consumption report data show an average of 3,900 AFY in combined recycled water deliveries in the past three years, with an average of 2,034 AFY from the Carlsbad WRF. This facility receives secondary treated water from the EWPCF for tertiary treatment.

Carlsbad Recycled Water Facility (Carlsbad WRF)

Gafner Water Recycling Facility

The Gafner WRF is owned and operated by LWWD, and has a total capacity of 1.0 mgd (RWQCB, 2001). Currently, CMWD no longer purchases these supplies. Rather, LWWD sells and delivers directly to the south portion of the Omni La Costa Resort & Spa golf course, which is in the southern portion of CMWD's service area.

Meadowlark Water Reclamation Facility

Meadowlark WRF is owned and operated by VWD, and has a total capacity of 5.0 mgd. CMWD's rights to disinfected tertiary water from the Meadowlark WRF ranges from 2.0 mgd during the months of November through March and 3.0 mgd during the months of April through October and equates to 2,989 AFY. The remaining amount of recycled water produced by the Meadowlark WRF can be sold to OMWD under an agreement up to a maximum of 1.0 mgd or 1,120 AFY. CMWD generally purchases approximately 1,900 AFY recycled water from Meadowlark WRF, although 2020 resulted in slightly lower purchases of 1,646 AF. In 2020, Meadowlark produced a total of 2,374 AF recycled water.

6.7.3 Recycled Water Master Plan

CMWD completed an update to its *Recycled Water Master Plan* in July 2019. The *Recycled Water Master Plan* evaluates the existing recycled water system, demands, supplies, regulations, and future system expansions. Beginning in 1990, CMWD began implementation of recycled water within its service area. By 1995, CMWD served over 1,000 AFY of recycled water through the implementation of the recycled water system facilities of Phase I. CMWD began implementation of Phase II in 2000, which included the construction of the Carlsbad WRF, improvements to Mahr reservoir, three new booster pump stations, and 24 miles of additional recycled water pipelines. CMWD is now in the process of implementing its Phase III Recycled Water Project, which is discussed in further detail in *Section 6.8 Future Water Projects*, below.

6.7.4 Recycled Water Use

CMWD began serving recycled water in 1993. Since 1993, CMWD has constructed treatment facilities, pumping stations, reservoirs, pipelines, and has adopted a mandatory use ordinance requiring developers to install recycled water distribution pipelines within their projects. Water recycling is provided by CMWD to developed areas within CMWD's boundaries. This includes the majority of the City of Carlsbad's boundary, with the exception of the southeast corner of the City, which is served by OMWD and VWD, and the south portion of the Omni La Costa Resort & Spa golf course, which is served directly by LWWD. As described above and identified in Table 6-13, recycled water is presently supplied to CMWD from two sources: Carlsbad WRF and Meadowlark WRF. The maximum flow rate available to CMWD from each treatment facility varies.

CMWD's current recycled water system has approximately 95 miles of recycled water distribution pipelines, as shown in Figure 6-1, and is expanding its system through the Phase III Recycled Water Project. The largest and/or most recognized customers currently served by recycled water include:

- Omni La Costa Resort & Spa North golf course,
- Four Seasons Resort at Aviara
- Kemper Sports Management (Carlsbad Municipal Golf Course)
- Legoland of California
- Grand Pacific Palisades Hotel
- Karl Strauss Brewery
- Caltrans (Interstate 5 landscaping)
- The NRG Power Plant (for industrial purposes)

The 150 HP Twin "D" Pump Station, which helps deliver recycled water to CMWD customers.

In addition, recycled water is supplied to parks, median strips, shopping areas, the common areas of numerous homeowners' associations, and industrial parks. As of December 2020, this distribution system had 970 meters supplying 606 recycled use sites. With full implementation of the Phase III Recycled Water Project (see below), an additional 143 connections will be connected to CMWD's recycled water distribution system. CMWD projects a total of 4,218 AFY recycled water demands beginning in 2022 and into the future. This includes only verifiable recycled water supplies, consistent with SDCWA's demand projections, but does not include planned or conceptual recycled water projects. There is potential for future projects to expand recycled water demands and deliveries beyond this volume. Recycled water use (current and projected) is presented, by use category, in Table 6-9.

Table 6-9: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (AFY)

DWR Table 6-4 Retail: 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:				Carlsbad Municipal Water District, Vallecitos Water District, Leucadia Wastewater District						
Name of Agency Operating the Recycled Water Distribution System:				Carlsbad Municipal Water District						
Supplemental Water Added in 2020				0 AFY						
Source of 2020 Supplemental Water				N/A						
Beneficial Use Type	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (AFY)	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045
Agricultural irrigation										
Landscape irrigation (excludes golf courses)	Irrigation for City property and large used spaces		Commercial property irrigation, community facilities, highways, HOAs, resort property irrigation, parks, and schools	Tertiary	2,996	3,493	3,493	3,493	3,493	3,493
Golf course irrigation			Golf course irrigation	Tertiary	725	725	725	725	725	725
Commercial use	Cooling		Cooling	Tertiary	0	0	0	0	0	0
Industrial use	NRG Power Plant		NRG Power Plant	Tertiary	43	0	0	0	0	0
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	Public Works Project		Public Works Project	Tertiary	0	0	0	0	0	0
				Total:	**3,764**	**4,218**	**4,218**	**4,218**	**4,218**	**4,218**

Notes: CMWD does not track recycled water sales for agricultural irrigation purposes; some of the landscape irrigation may include recycled water used for this purpose. Recycled water for golf course irrigation use declined between 2015 and 2020 due to the adoption of conservation practices in 2016-2018 in response to the drought, followed by a wet hydrologic year which depressed irrigation needs. The NRG power plant is currently being decommissioned. Recycled water for commercial cooling use was projected to be 62 AFY in the 2015 UWMP; however, this is no longer expected as of 2020. Recycled water for public works projects was projected to be 40 AFY in the 2015 UWMP; however, this is no longer expected as of 2020.

6.7.5 Potential and Projected Recycled Water Use

Actual recycled water use in 2020 within CMWD's service area was 3,764 AFY. The 2015 UWMP projected recycled water use in 2020 would be 5,078 AFY. The difference is accounted for by delays in construction and implementation of the Phase III Recycled Water Project and general implementation of drought tolerant landscaping which has lower irrigation demands than turf. Table 6-10 compares the projected recycled water use for 2020 (as projected in the 2015 UWMP) with actual metered recycled water use for 2020.

Table 6-10: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual (AFY)

DWR Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual			
☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below.		
Use Type		2015 Projection for 2020	2020 actual use
Agricultural irrigation		23	
Landscape irrigation (exc golf courses)		3,705	2,996
Golf course irrigation[1]		1,033	725
Commercial use		62	0
Industrial use		215	43
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	Type: Public works projects	40	
Total		**5,078**	**3,764**
NOTES: 1. Use of recycled water for golf course irrigation decreased between 2015 to 2020 because of water conservation measures implemented in 2016 to 2018 in response to the drought, followed by wet years in which the demand for recycled water for irrigation was depressed.			

6.7.6 Methods to Encourage Recycled Water Use

CMWD has actively pursued recycled water in its service area and has implemented multiple mechanisms to encourage recycled water use. Some of these mechanisms include affordable rates, policies and ordinances, development of clear use guidelines, participation in regional trainings and certifications, and active participation in regional and local recycled water projects that include outreach and expanded distribution systems. Table 6-11 provides a summary of the methods that have been used to encourage recycled water use within CMWD's service area.

In 2021, CMWD charged a rate of $3.79/unit, or approximately $1,651/AF for recycled water. This is lower than potable water rates for all customer classes and rate types. Commercial and Non-Residential customers paid $4.36/unit potable water, Agricultural customers paid $4.71/unit potable water, and Irrigation customers paid $5.41/unit potable water. Recycled water can be an attractive choice given potential savings as compared to potable water of between $0.57/unit and $1.52/unit for non-residential users, and up to $0.34/unit for tier 1 residential user.

CMWD policy is that recycled water shall be used within the jurisdiction wherever its use is economically justified, financially and technically feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment. Since 1990, City policy requires that recycled water be used on all new land use developments proposed in the City of Carlsbad for all State-approved non-potable uses, if and when available. CMWD's *Recycled Water Master Plan* (2019) was prepared in support of CMWD's recycled water policy to define, encourage and develop the use of recycled water, and is required to be updated no less than every five years. The installation of dual irrigation systems and connections to recycled water sources is also required and subject to the conditions of CMWD's *Recycled Water Master Plan*.

CMWD has Cross Connection Control Technicians who review on-site irrigation systems to verify no cross connections have occurred between the potable and recycled water systems. In addition, reviews are made to eliminate overspray and nuisance problems. To date, no major problems have occurred. A quarterly report is submitted to the San Diego Regional Water Quality Control Board (RWQCB) on any field tests and observations. Cross connection tests are often performed at night to reduce impacts on customers.

City of Carlsbad Recycled Water Use Guidance

- Irrigate between 10:00 p.m. and 6:00 a.m. only.
- Irrigate to minimize run-off, pooling and ponding.
- Adjust spray heads to eliminate overspray onto areas not controlled by the user.
- Monitor and maintain the system to minimize equipment and material failure.
- Continually educate all maintenance personnel on the presence and allowable uses of recycled water.
- Gain prior approval by CMWD of all proposed changes and modifications to any private facilities.
- Conduct annual cross connection inspection.
- Designate an on-site supervisor, in writing, who is familiar with the plumbing system, basic concepts of backflow/cross connection protection and the specific requirements of a recycled water system.

CMWD's *Engineering Standards – Volume 2: Potable and Recycled Water* (CMWD, 2016) provide user guidelines that have been established by CMWD, in conjunction with the review by San Diego County Department of Environmental Health, which are intended to provide the basic parameters for the use of recycled water in landscape irrigation.

Each year, the City of San Diego Public Utilities Department hosts a half-day certified course designed to provide irrigation supervisors with a basic understanding of recycled water. Completion of the Recycled Water Site Supervisor Certification fulfills the training requirement as mandated by regulatory authorities. The class provides information to supervisors on the water recycling process, recycled water quality and safety issues, the duties and responsibilities of the supervisor, landscape irrigation fundamentals, maintenance and management, and cross connection control shut-down tests and inspections. Understanding similarities and differences between recycled and potable water is important to the successful operation of a recycled water system.

Table 6-11: Methods to Expand Future Recycled Water Use (AFY)

DWR 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.		
N/A	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (AFY)
Rate Controls	Maintain recycled water rates below potable water rates	On-going	
Mandatory Use Ordinance	Requires dual plumbing in new development and use of recycled water if available	1990	
Public Outreach	On-going Outreach and education efforts as part of NSDWRC to educate public on benefits, safety, and proper use of various types of recycled water	On-going	
Phase III Recycled Water Project – Segment 5	Expand recycled water system to meet identified demands	2022	188
		Total	**188**
NOTES: The actions included in this table all support increased recycled water use made available and accessible through the Phase III Recycled Water Project.			

6.8 Future Water Projects

Recycled Water

CMWD is nearing the completion of implementing the Phase III Recycled Water Project, which is being implemented by segment. Portions of this project have already been built and are, therefore, considered in CMWD's existing water supplies and demands. Of the segments not yet implemented, there is a total of 188 AF in demands considered to be "verifiable." These demands are ones that have already been awarded funding or are far enough along in the design and contracting process to be considered certain. The remaining demands of the Phase III Recycled Water Project are considered "planned" or conceptual recycled water demands and are not included in the recycled water projections in this UWMP. The Phase III project includes the following components, designed to meet the following demands. Note that some demands may have changed as the project is being implemented:

- Segment 1A&7 – 158 AFY
- Segment 2 – 286 AFY
- Segment 5 – 188 AFY
- Segment 7 – 114 AFY
- Segment 9 – 91 AFY
- Segment 18 – 25 AFY
- Connection of Adjacent to Existing Users – 86 AFY
- Carlsbad WRF Expansion
- D-4 Reservoir

CMWD is also one of nine member agencies of the NSDWRC, which is cooperatively implementing a regional recycled water system to maximize recycled water use and implement potable reuse in northern San Diego County. CMWD's portion of the NSDWRC Regional Project is the Phase III Recycled

Water Project. Through the NSDWRC, CMWD may provide recycled water to other members, and may receive additional recycled water from other members, as necessary.

North County One Water

Building on over a decade of collaborative efforts in the region by the NSDWRC, EWA and SEJPA have been working with multiple local water agencies to develop the North County One Water Program. It is currently in the preliminary planning phase. The wastewater flows and facilities from two coastal treatment facilities in North San Diego County, the EWPCF and the San Elijo Water Reclamation Facility (SEWRF), represent a unique opportunity for large-scale production of purified water. The EWPCF in the City of Carlsbad, California could accommodate an advanced water purification facility. The EWPCF has key assets available for production of purified water such as an ocean outfall, available land for advanced treatment, treated secondary effluent and technically capable staff. The SEWRF in the Cardiff area within the City of Encinitas, California could also accommodate an advanced water purification facility. The SEWRF also has key assets available for production of purified water such as an ocean outfall, available land for advanced treatment, treated secondary effluent and technically capable staff. The program would supply an estimated 18,000 AFY to 35,000 AFY of purified water by 2035. Members of the Encina Wastewater Authority are embarking on preliminary planning and a possible pilot program. CMWD expects to have the opportunity to purchase purified water by 2035. Additional information about the NSDWRC and its recycled water project can be found at http://nsdwrc.org/. Because the North County One Water Program is still in the planning stages, it is not counted as a future water supply in Table 6-14.

Groundwater

Potential groundwater supplies are still considered uncertain, and are not accounted for in Table 6-14, which presents reasonably available volume of future water supplies. Despite this uncertainty, CMWD will reassess the benefits and costs of developing its groundwater rights in the future, which could help to offset CMWD's demands on SDCWA for potable water. This addition of groundwater to CMWD's supply portfolio could strengthen its supply reliability and help reduce CMWD's reliance on imported supplies.

Desalinated Seawater

As noted previously, CMWD's Board approved an agreement with SDCWA to develop a direct connection to the desalinated seawater pipeline, though preliminary design and a feasibility analysis is still underway. Development of this supply would involve implementation of the Carlsbad 5 Flow Control Facility and Pressure Reducing Station project. If constructed, CMWD would own and operate the Pressure Reducing Station component, while the flow control facility would be constructed in agreement with SDCWA. CMWD could purchase an additional 5.21% of any desalinated seawater produced beyond the 48,000 AFY minimum volume produced for SDCWA, which would further increase CMWD's share of desalinated seawater in its supply mix.

Claude "Bud" Lewis Carlsbad Desalination Plant is located adjacent to the Agua Hedionda Lagoon

Table 6-12: Expected Future Water Supply Projects or Programs

<table>
<tr><th colspan="7">DWR Table 6-7 Retail: Expected Future Water Supply Projects or Programs</th></tr>
<tr><td>☐</td><td colspan="6">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.</td></tr>
<tr><td>☐</td><td colspan="6">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.</td></tr>
<tr><td>N/A</td><td colspan="6">Provide page location of narrative in the UWMP</td></tr>
<tr><th rowspan="2">Name of Future Projects or Programs</th><th colspan="2">Joint Project with other agencies?</th><th rowspan="2">Description</th><th rowspan="2">Planned Implementation Year</th><th rowspan="2">Planned for Use in Year Type</th><th rowspan="2">Expected Increase in Water Supply to Agency (AFY)</th></tr>
<tr><th>Y/N</th><th>Agency Name</th></tr>
<tr><td>Phase III Recycled Water Project – Long-term demands</td><td>No</td><td></td><td>Expansion of recycled water distribution system</td><td>2035</td><td>Average Year</td><td>--</td></tr>
<tr><td>Groundwater Supply</td><td>No</td><td></td><td>Development of groundwater supplies</td><td>--</td><td>Average Year</td><td>Unknown at this time</td></tr>
<tr><td>NSDWRC Regional Project</td><td>Yes</td><td>Leucadia Wastewater District, Vallecitos Water District, City of Oceanside, City of Escondido, Olivenhain Municipal Water District, Rincon del Diablo Municipal Water District, San Elijo Joint Powers Authority, Santa Fe Irrigation District, and Vista Irrigation District</td><td>Regional recycled water project</td><td>2035</td><td>Average Year</td><td>Supports implementation of Phase III recycled water project</td></tr>
<tr><td>Carlsbad 5 Flow Control Facility and Pressure Reducing Station</td><td>Yes</td><td>SDCWA</td><td>Development of a direct connection to the desalinated seawater pipeline</td><td>--</td><td>Average Year</td><td>Additional 5.21% of any desalinated seawater produced beyond the 48,000 AFY minimum volume produced for SDCWA</td></tr>
</table>

6.9 Current and Projected Water Supplies

CMWD's supplies include SDCWA water (treated SWP and Colorado River, along with desalinated seawater, purchased as a blend from SDCWA), recycled water, and could in the future include groundwater. Current water supplies for CMWD during 2020 are presented in Table 6-13. Projected supplies for CMWD are presented in Table 6-14, and include water supply projects that are underway or in development, along with projected population growth and supply availability from SDCWA.

Table 6-13: Water Supplies – Actual (AFY)

DWR Table 6-8 Retail: Water Supplies — Actual				
		2020		
Water Supply	Additional Detail on Water Supply	Actual Volume	Water Quality	Total Right or Safe Yield (optional)
Purchased or Imported Water	Purchased from SDCWA	11,429	Drinking Water	11,429
Purchased Local Water (Desal)	Purchased from SDCWA	2,500	Drinking Water	2,500
Recycled Water	Carlsbad WRF	2,118	Recycled Water	7,839
Recycled Water	Meadowlark WRF	1,646	Recycled Water	2,989
	Total	**17,692**		**24,757**

Table 6-14: Water Supplies – Projected (AFY)

DWR Table 6-9 Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*									
		2025		**2030**		**2035**		**2040**		**2045**	
		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)
Purchased or Imported Water	Purchased from SDCWA	13,802	13,802	14,155	14,155	14,586	14,586	15,019	15,019	15,545	15,545
Recycled Water	Carlsbad WRF	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839
Recycled Water	Meadowlark WRF	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989
Desalinated Water	Carlsbad Desalination Plant (purchased under Take or Pay with SDCWA)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
	Total	20,520	27,130	20,873	27,483	21,304	27,914	21,737	28,347	22,263	28,873
NOTES: CMWD receives 2,500 AFY desalinated water through a purchase agreement with SDCWA. If the plant produces more desalinated water and SDCWA purchases more than the 48,000 AFY that it currently purchases, CMWD may receive an additional 5.21% of the additional amount available. Because of uncertainty regarding this water, it has been omitted from this table as an available volume. Purchases from SDCWA are not limited by Total Right or Safe Yield.											

6.10 Energy Intensity of Supplies

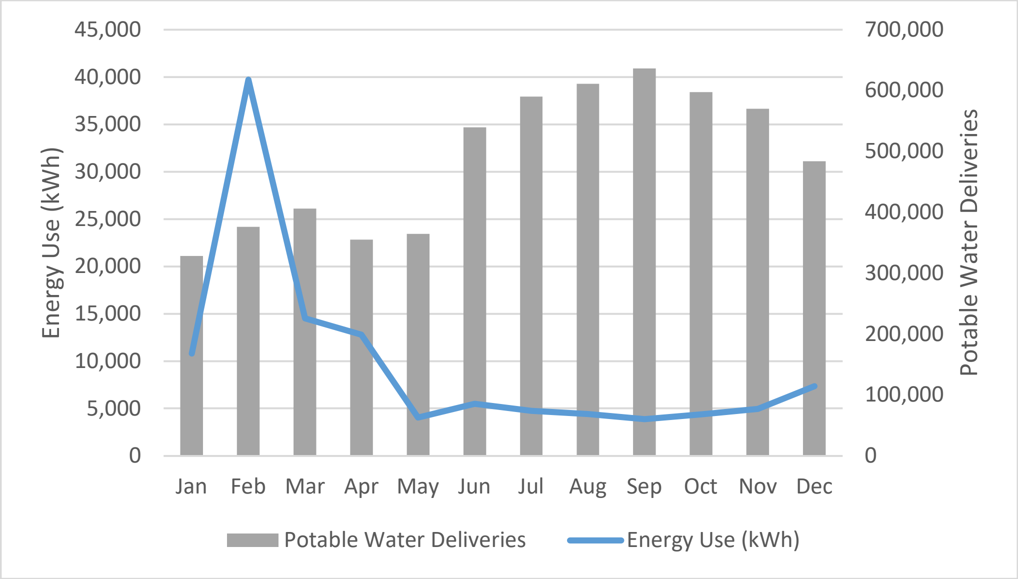
CMWD elected to estimate the energy intensity of its potable supplies using Appendix O of the Guidebook. A technical memorandum and the applicable Appendix O tables have been included here as Appendix H of this 2020 UWMP.

Water energy intensity (EI) is the total amount of energy expended on a per AF basis to take water from the location CMWD acquires it to the point of delivery. Thus, EI includes conveyance, extraction, treatment, placing water into and taking it from storage, and distribution. CMWD's water EI only accounts for the water management processes occurring within its operational control; energy use associated with the extraction, treatment and conveyance of wholesale water to CMWD's points of diversion is not included. CMWD receives its potable water from SDCWA and this water is already treated prior to entering CMWD's distribution system. CMWD also receives potable water from the Claude "Bud" Lewis Carlsbad Desalination Plant. The desalinated water is also already treated prior to entering CMWD's operational control and the energy involved in delivering the desalinated water is captured in the overall distribution system energy demands. Thus, energy demands for CMWD's potable system are limited to the requirements for distribution and limited local storage. As of 2021, CMWD's potable water distribution system is entirely gravity fed.

Using San Diego Gas & Electric billing data for CMWD, which documents the amount of power needed to serve CMWD potable water equipment, such as chlorination equipment, pumping, and SCADA monitoring equipment, CMWD's total energy use associated with potable water supplies over the time period October 2019-September 2020 was 144,679 kWh. During this same timeframe, CMWD received 13,170 AF of water, including desalinated seawater and purchased water from SDCWA that was placed in local storage or distributed to customers. Note that water placed in storage in any given year is excluded from gross water use reported elsewhere in this document. CMWD uses hydropower from the pressure difference of purchased SDCWA water and CMWD operational pressures. During the time period from October 2019-September 2020, CMWD generated 470,287 kWh of hydropower from this source. This type of hydropower is referred to by DWR as "consequential" hydropower because it is generated as a consequence of water delivery. According to DWR recommended methods for estimating EI (Appendix O of the Guidebook), this "consequential" hydropower is subtracted from CMWD's total energy use, to result in a net energy use of -325,608 kWh over the October 2019-September 2020 year. CMWD's potable water system therefore has a local EI of -10.3 kWh/AF or -31.6 kWh/MG, meaning that CMWD's potable water delivery is a net negative energy consumer, as calculated according to the DWR UWMP Guidebook Appendix O methods. The energy savings are applied to other utilities electric bills as credits.

Monthly energy demands vary greatly from month to month, depending on the length of time water remains in local storage, the level of demand (affecting pumping and storage levels), and the need to implement minor treatment or mixing to maintain potable quality. In addition, CMWD has made investments in its potable water distribution system to rely primarily on gravity instead of pumps. Figure 6-2 shows energy demands and potable water consumption over the course of 2020.

Figure 6-2: Monthly 2020 Energy Use and Potable Water Deliveries



Note: The high usage in February was due to the San Diego County Water Authority shutdown and the need to turn on pumps.

According to Appendix O of the Guidebook, "the energy intensity of recycled water operations is the incremental amount of energy consumed within an urban water supplier's operational control to convey, treat, and distribute recycled water supplies that exceeds the amount of energy that otherwise would have been required to collect, treat, and discharge wastewater effluent divided by the amount of water entering the recycled water distribution system." CMWD has operational control over the Carlsbad WRF, which, during the period January-December 2020 consumed 895,619 kWh of electricity. In addition, CMWD has operational control over recycled water distribution, which used 11,159 kWh over the time period. During that time period, 3,764 AF of recycled water entered CMWD's recycled water process. As CMWD does not have operation control over wastewater treatment which could be netted out of the energy consumed to treat and distribute recycled water supplies, its recycled water EI is 133.5 kWh/AF or 409.7 kWh/MG.

6.11 Climate Change Impacts to Supply

Climate change is a concern for CMWD and other agencies within the San Diego region. A summary of climate change vulnerabilities, impacts, and actions to address these impacts is provided in *Section 3 System Description*. While the exact effects of climate change are unknown, average temperatures will increase, weather events will be more intense and more frequent, and precipitation patterns will change. As with other agencies in the region, CMWD relies heavily on imported water purchased from SDCWA. These imported supplies come from the SWP and the Colorado River. SWP reliability is dependent on rainfall and snowpack, and the timing of snowmelt. Climate change will make snowpack less reliable, either through changes in amount of water stored in snowpack, or through changes to the timing of snowmelt (e.g., earlier melt means excess water is available when demands are low, and less water is available during warmer months when demands are higher). Extreme weather events could damage imported water infrastructure or could exacerbate drought conditions. Extreme climate events, such as prolonged droughts, are also expected to increase fire event frequency and severity, further exacerbating water quality issues and flooding risk associated with fire-prone and flood-prone areas.

As identified by the Climate Change Planning Study included in the *2019 San Diego IRWM Plan* (RWMG, 2019), climate change is anticipated to result in up to a 25% decrease in supplies from the SWP, up to a 20% decrease in supplies from the Colorado River, totaling a 164,000 AFY average shortfall in imported supply for the San Diego Region. The Climate Change Vulnerability Analysis found that that this anticipated decrease in imported supply was the greatest concern for the region, and was given a "Very High Prioritization." The vulnerabilities identified in the assessment may contribute to issues including a decrease in imported supply, a decrease in groundwater supply, sensitivity due to higher drought potential, and reduction in available supplies due to impacts from invasive species.

Local supply development is anticipated to help mitigate climate change impacts by developing drought-resilient supplies (e.g. recycled water), reducing potential supply disruptions from imported water, and reducing overall energy demands for providing water to customers.

Table 6-15: Climate Change Vulnerability Assessment

Vulnerability Question	Justification
Does a portion of the water supply in your region come from snowmelt?	Imported supplies (SWP, Colorado River) come from snowmelt.
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?	Approximately 80% of the Region's supplies are imported.
Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?	Some brackish groundwater exists near the coast which limits the use of coastal aquifers.
Has your region faced a drought in the past during which it failed to meet local water demands?	Drought management plans had to be put into effect. Note that the Region has never failed to meet its customers' demands since drought measures were put into place.
Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?	Invasive species include Quagga mussels, Arundo, and Tamarisk
Source: RWMG, 2019.	

Section 7

Water Supply Reliability

As an agency almost entirely dependent on SDCWA for its potable water supplies and with limited diversification options for its local supply portfolio, CMWD is particularly concerned about water supply reliability. CMWD is improving supply reliability by increasing recycled water use, utilizing local desalinated seawater, and reducing imported water demands. SDCWA has also taken action to increase its supply portfolio and decrease dependence on water imported via MWD. Nevertheless, there remain a number of threats to supply reliability within CMWD's service area.

7.1 Constraints on Water Sources

CMWD's water supply is subject to some factors that could result in inconsistency of supply due to legal, environmental, water quality, or climatic factors. As noted throughout this 2020 UWMP, CMWD's potable demands are almost entirely served with potable water purchased from SDCWA, and is subject to availability of and access to those supplies. A lack of supply diversity contributes to potential supply constraints. Table 7-1 provides a summary of potential threats to supply reliability for CMWD's various sources of potable and non-potable water.

Table 7-1: Constraints on Water Supplies

Source	Potential Constraint on Supply
Imported Water[1]	**Legal:** Current supply from SWP is occasionally inconsistent due to legal and environmental factors. Future supply may not be consistent due to delays in construction, legal rulings, or environmental decisions. Legal decisions regarding the Quantification Settlement Agreement could reduce supplies from the Colorado River. **Climatic:** Drought and climate change could result in reductions of imported water supply. Colorado River supply may be reduced due to an extended drought period. Mandatory use restrictions during drought may affect ability to utilize supply, even if sufficient supplies are available.
Desalinated Seawater	No constraints identified at this time.
Groundwater	**Legal:** CMWD is continuing to monitor the costs and benefits of developing its groundwater rights and the feasibility of using groundwater. **Water quality:** The Mission Sub-Basin has high levels of total dissolved solids (TDS) and requires desalination for potable use. **Other:** Groundwater basins in the region have limited storage capacity.
Recycled Water	**Cost:** Cost of recycled water system expansion can make it challenging to complete connections.

[1] Refer to SDCWA's 2020 UWMP for additional details regarding constraints on their supplies

SDCWA Supply Constraints and Reliability Actions

SDCWA's primary supplies include a mix of imported water from various sources and desalinated seawater. As noted in Table 7-1, SDCWA supply constraints are primarily due to legal and climatic factors. Imported water from the SWP may be subject to restrictions during drought or specific times of year as a result of legal decisions to maintain minimum flows for environmental needs or other legal agreements. In addition, flows from SWP may be constrained if a section of the system shuts down for repair, construction, or other reason. Imported Colorado River supplies are subject to the Quantification Settlement Agreement (QSA), which may change as a result of legal decisions. However, Colorado River supplies are considered substantially more secure than SWP supplies and are not anticipated to be constrained in this manner. Colorado River supplies are higher in TDS than SWP water however, affecting SDCWA's blended raw water quality. This does not affect CMWD's access to SDCWA supplies because CMWD purchases treated water from SDCWA, not raw water.

Drought may also reduce availability of imported water to SDCWA, and subsequently reduce SDCWA supply availability to CMWD. During the most recent drought, SWP supplies faced allocations in 2014, 2015, and 2016. In addition, under the *Lower Colorado River Basin Drought Contingency Plan* (Lower Basin DCP; USBR 2019), California contractors, including MWD and SDCWA, have committed to shortage allocations or "DCP Contributions" starting when the elevation of Lake Mead, a major storage reservoir, drops to 1,045 feet. According to SDCWA's 2020 UWMP, as of August 2020, projections indicate that it is unlikely that Lake Mead will reach a level that requires contributions from California thorough 2025. Operating agreements are set to expire in 2026 and new agreements would be negotiated to govern storage and cutbacks beyond 2026.

SDCWA has taken steps to diversify its water supply with alternative sources, as described in SDCWA's 2020 UWMP. Such efforts include canal lining and the Carlsbad Desalination Plant. SDCWA's canal lining project provides conserved water by preventing unplanned loss to incidental recharge. This conserved water is guaranteed for SDCWA under the terms of the canal lining project. SDCWA also enabled construction of the Carlsbad Desalination Plant by agreeing to a minimum annual purchase of desalinated water from the facility. This increases supply reliability because it is a drought-proof local supply. Desalinated seawater from the Carlsbad Desalination Plant meets approximately 8% of the region's potable water demands. In addition, many of SDCWA's member agencies are taking steps to diversity their water supplies through recycled water, groundwater, potable reuse and other local supply projects.

The reduced availability of any one of SDCWA's supply sources would be buffered because of the diversity of the supplies; the region's wholesale supplies are not reliant on a single source. To replace or supplement an existing supply, SDCWA could take steps to increase development of transfers or distribution of seawater desalination. SDCWA's 2020 UWMP should be consulted for details regarding its actions to ensure consistency of the wholesale water supply. While regional efforts to improve supply diversification, storage, and system redundancy have worked to reduce the impacts such allocations have on local access to supplies, there is potential that mandatory use restrictions (at a statewide level) will be enacted during severe drought. Such restrictions, including those put in place by the State in 2015, may not affect supply that the region has in storage, but could affect the region's ability to utilize supplies.

CMWD Local Supply Constraints and Reliability Actions

CMWD's reliance on SDCWA for potable supplies leaves it vulnerable to supply disruptions to SDCWA's system. As a result, CMWD has taken steps to ensure a more consistent water supply by expanding its local supplies. CMWD has two sources of local supply (recycled water and desalinated seawater) and rights to one potential source of local supply (groundwater). Additionally, CMWD is exploring a potable reuse project, which is still considered conceptual and not included in water supply projections in this UWMP.

Constraints on recycled water are capacity, connectivity, and the associated costs of providing additional connections. CMWD's Phase III Recycled Water Project has expanded its tertiary recycled water production capacity, and is currently expanding CMWD's recycled water distribution system to reach additional customers, with anticipated completion in 2022. After the last feasible connection is constructed in 2022, there may be an increase in demand for recycled water from existing connections. However, there are no feasible new additional recycled water pipeline connections identified beyond 2022. As such, CMWD has conservatively assumed in this 2020 UWMP that recycled water demand is not increasing beyond 2022. In addition, as part of the NSDWRC, CMWD is participating in a cooperative effort of nine north San Diego County water and wastewater agencies to maximize recycled water use and improve interconnectivity between their non-potable water systems. This effort will allow for additional flexibility in non-potable water system operation and increase recycled water efficiencies. To help defray the cost of expanding its recycled water services, CMWD has actively pursued additional funding programs to help cover costs of the Phase III Recycled Water Project. As of the end of 2020, CMWD has received grants from Proposition 84 and Proposition 1, as well as a low-interest loan through the Clean Water State Revolving Fund.

While CMWD is currently receiving its desalinated seawater via SDCWA's pipelines, CMWD is planning on constructing a direct connection to the desalinated seawater pipeline. CMWD and SDCWA are working to develop a preliminary design that would connect the Carlsbad 5 Flow Control Facility and Pressure Reducing Station to the Carlsbad Desalination Plant, which would provide a local, drought-proof supply that would function independently of SDCWA's distribution system. This would create redundancy in the potable distribution system that would increase reliability of water deliveries from a drought-proof, secure, supply.

To further diversify its local supplies, CMWD is continuing to monitor the costs and benefits of developing its groundwater rights (refer to *Section 6 System Supplies*). Groundwater in the Mission Subbasin is high in TDS and would require desalination before use as a supply. The addition of groundwater to CMWD's supply portfolio could reduce its reliance on SDCWA to meet potable demands. However, because CMWD is currently monitoring its groundwater rights and the potential available volume of groundwater supply is uncertain, it has been excluded from CMWD's supply portfolio in this 2020 UWMP.

CMWD is also collaborating with member agencies of the NSDWRC on development of a potable reuse program known as the North County One Water Program. The City of Carlsbad is expected to receive purified water from this effort by 2035. However, because the North County One Water Program is still in the planning stages, it is not counted as a verifiable future water supply for the purposes of this 2020 UWMP.

In the event of a severe drought, CMWD could effectively implement temporary water use reduction measures as defined in the water shortage contingency plan (see Chapter 8) to assist in ensuring reliability. Such use reduction measures were implemented in the most recent drought (2014 to 2017) and were successful in helping CMWD reach its temporary state-mandated reduction target of 28% under the State's Emergency Drought Restrictions issued in 2015.

7.2 Reliability by Type of Year

Calavera Hills Pump Station (60 HP)

The water supply available to CMWD is defined based on three water supply condition scenarios: average/normal water year, single-dry water year, and five multiple-dry water year scenarios. The water supplies available to CMWD from SDCWA during single- and multiple-dry years are based on the historical dry periods presented in **Table 7-2** and are defined in SDCWA's 2020 UWMP. Both of CMWD's quantified local supplies (desalinated seawater and recycled water) are considered drought-proof supplies whose availability are not affected by drought. Demand for recycled water may increase in drought conditions as irrigation practices change; however, CMWD has recycled water production capacity to meet the anticipated increase in demand under dry conditions (see **Table 6-6**). Because demands that cannot be met with local supplies are met using supplies purchased from SDCWA, CMWD has aligned its water supply reliability analysis with SDCWA's supply reliability assessment.

Table 7-2: Basis of Water Year Data

DWR Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	Base Year	Volume Available (AFY)	Available Supplies if Year Type Repeats % of Average Supply
Average Year	1986-2018	21,339	100%
Single-Dry Year	2015	22,805	107%
Consecutive Dry Years 1st Year	2011	22,909	107%
Consecutive Dry Years 2nd Year	2012	22,991	108%
Consecutive Dry Years 3rd Year	2013	23,075	108%
Consecutive Dry Years 4th Year	2014	23,159	109%
Consecutive Dry Years 5th Year	2015	23,236	109%
NOTES: CMWD selected base years that aligned with SDCWA's 2020 UWMP supply reliability assessment. SDCWA supplies are expected to be reliable through all years of a multiple year drought, with additional carryover supplies available in extended dry periods. As presented here, "% of Average Supply" indicates percent supply available to meet both potable and non-potable demands due to diversification and/or carryover storage.			

Although **Table 7-2** identifies the percentage of available supply to meet demand, supply availability will vary by source because CMWD's local supplies would not be affected by dry year conditions.

Changes to supply availability cannot be applied equally across each source. Potable and recycled water demands are both considered in CMWD's supply reliability assessment because recycled water use offsets potable demands, while shortages in recycled water supplies require supplementation with potable supplies.

SDCWA's 2020 UWMP projected overall demands would increase over time and across scenarios, with some variability depending on the time frame and hydrologic scenario. CMWD anticipates that its demands would generally increase in dry year scenarios consistent with SDCWA's overall demand increases in corresponding scenarios. Due to uncertainty inherent to projecting demands during dry hydrologic conditions, CMWD's demand projections increase over dry year scenarios at a consistent rate across time frames (2025, 2030, 2035, 2040, and 2045), calculated as the average increase presented in SDCWA's 2020 UWMP. Table 7-3 identifies how CWMD's demands are projected to change, as a percent of normal, for different scenarios.

Although demands are projected to increase, SDCWA has the right to purchase additional water from MWD in years where local supplies are insufficient to meet demands. Per SDCWA's purchase agreement with MWD, SDCWA has sufficient preferential rights to water from MWD to meet demands not met by other sources for all scenarios. SDCWA also has significant carryover supplies that can be accessed in an extended dry period. CMWD anticipates being able to purchase enough water from SDCWA to meet potable demands that cannot be met with desalinated seawater because SDCWA projections incorporate increased Member Agency demands in dry year scenarios. SDCWA's analysis also accounts for changes in Member Agency local supplies under each scenario that could affect overall demands on Water Authority supplies by the region.

Table 7-3: Demand and Supply Assumptions, as Percent of Normal

Source	Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Demands							
Potable Water	100%	107%	107%	108%	108%	109%	109%
Recycled Water	100%	107%	107%	108%	108%	109%	109%
Total Percent of Normal Demands		**107%**	**107%**	**108%**	**108%**	**109%**	**109%**
Supplies							
SDCWA Purchases	100%	108%	109%	109%	110%	110%	110%
Seawater Desalination	100%	100%	100%	100%	100%	100%	100%
Recycled Water	100%	107%	107%	108%	108%	109%	109%
Total Percent of Normal Potable Supplies		**107%**	**107%**	**108%**	**108%**	**109%**	**109%**
Total Percent of Overall Normal Supplies		**107%**	**107%**	**108%**	**108%**	**109%**	**109%**

7.3 Supply and Demand Assessment

Supply reliability is the ability of CMWD to meet its demands. A comparison of projected supplies against projected demands helps to identify potential reliability issues during each hydrologic year scenario identified in Table 7-2. As indicated in Table 7-3, demands will vary depending on the hydrologic conditions. During dry years, demands are projected to increase to varying degrees based on the prior year hydrologic conditions. Demand increases are projected consistently for potable and non-potable demands because they will primarily be driven by irrigation needs. Note that these demand projections do not assume implementation of CMWD's Drought Response Plan with its mandatory conservation measures; demands are assumed to increase as climatic conditions get hotter and drier. However, as demonstrated in 2014 and 2015, implementation of the drought response stages would significantly reduce water use across CMWD's service area and can be levied as necessary if a supply shortage is identified.

Supply availability will also vary within each hydrologic scenario, as identified in Table 7-3. CMWD's local supply availability of desalinated seawater will remain consistent with projected normal year supplies regardless of hydrologic scenario because it is a drought-proof supply. Likewise, CMWD's local supply of recycled water is considered drought-proof because CMWD has enough capacity to increase recycled water production to meet higher demand for irrigation water in a drought (see Table 6-6). Supply from SDCWA will vary depending on SDCWA's supply mix and demands from its member agencies. CMWD only purchases enough water from SDCWA to meet potable demands that cannot be met with local supplies. Any increases in potable demand must therefore be met with increased purchases from SDCWA. Because demands are projected to increase during dry years, CMWD's purchases from SDCWA would also increase in those years, to the extent available.

CMWD has 252.5 MG of potable water storage; however, it only purchases as much potable water as necessary from SDCWA. This reliability analysis assumes no potable water surpluses during any hydrologic scenario. CMWD has capacity to treat a surplus of recycled water due to the expanded Carlsbad WRF's capacity; however, CMWD does not anticipate producing recycled water in excess of demand (unused secondary wastewater is discharged via the ocean outfall). The additional capacity provides flexibility for CMWD to identify additional recycled water customers or additional opportunities to sell recycled water to neighboring agencies.

SDCWA's supply reliability analysis documents that regional water supplies are reliable because CMWD's demand projections in various scenarios are consistent with SDCWA's projections for member agency demands, and SDCWA has accounted for all member agency local supplies. For CMWD, potable supply reliability is assumed for any year in which SDCWA projects sufficient supplies to meet demands. SDCWA projects supply reliability for all single-dry year and multiple-dry year scenarios through 2045, therefore no potable supply deficit is projected for CMWD.

The analysis included here is conservative because it is based on SDCWA's conservative assessment of its available supplies, and because CMWD may add additional local potable supplies in the future that have not been incorporated in this 2020 UWMP.

Table 7-4 shows the projected normal year supplies for CMWD's service area, broken down by supply source, along with projected normal year demands for corresponding years. Table 7-5 and Table 7-6 compares the supply and demands for a normal year for potable and non-potable supplies. During normal years, CMWD anticipates sufficient supplies to meet projected demands. The net-zero surplus shown in Table 7-6 results from the flexibility in capacity of the Carlsbad WRF; it is anticipated that the Carlsbad WRF would only produce as much tertiary recycled water as required to meet demands and short-term storage needs. These normal year projections are consistent with the projections included in *Chapter 4 System Demands* and *Chapter 6 System Supplies*.

Table 7-4: Normal Year Supply and Demand Breakdown (AFY)

Source	2025	2030	2035	2040	2045
Demands					
Potable Demand	16,302	16,655	17,086	17,519	18,045
Non-Potable Demand	4,218	4,218	4,218	4,218	4,218
Total Normal Year Demand	20,520	20,873	21,304	21,737	22,263
Supplies					
SDCWA Purchases	13,802	14,155	14,586	15,019	15,545
Seawater Desalination	2,500	2,500	2,500	2,500	2,500
Normal Year Potable Supply	16,302	16,655	17,086	17,519	18,045
Recycled Water	4,218	4,218	4,218	4,218	4,218
Total Normal Year Supply	**20,520**	**20,873**	**21,304**	**21,737**	**22,263**

Table 7-5: Normal Year Supply and Demand Comparison – Potable (AFY)

DWR Table 7-2 Retail: Normal Year Supply and Demand Comparison - Potable					
	2025	**2030**	**2035**	**2040**	**2045**
Supply totals	16,302	16,655	17,086	17,519	18,045
Demand totals	16,302	16,655	17,086	17,519	18,045
Difference	0	0	0	0	0

Table 7-6: Normal Year Supply and Demand Comparison – Non-Potable (AFY)

DWR Table 7-2 Retail: Normal Year Supply and Demand Comparison – Non-Potable					
	2025	**2030**	**2035**	**2040**	**2045**
Supply totals	4,218	4,218	4,218	4,218	4,218
Demand totals[1]	4,218	4,218	4,218	4,218	4,218
Difference	0	0	0	0	0
Note: [1]There are no feasible new additional recycled water pipeline connections identified beyond 2022. As such, CMWD has conservatively assumed in this 2020 UWMP that recycled water demand is not increasing beyond 2022					

7.3.1 Single-Dry Year

The single-dry year scenario, selected to align with SDCWA's reliability assessment, was determined to be 2015. SDCWA anticipates that regional demands will increase by approximately 7% in a single-dry year. CMWD assumes that this demand increase is consistent across the planning horizon. SDCWA's analysis, which included a conservative consideration of member agency local supplies, found that there were sufficient supplies to meet projected demands on SDCWA, even in the face of increased demand during a single-dry year. This increased demand would be met with increased purchases from MWD. As a result, CMWD has assumed that SDCWA will be able to meet 100% of CMWD's needs that cannot be met by local supplies, as shown in Table 7-7, Table 7-8, and Table 7-9.

Table 7-7: Single-Dry Year Supply and Demand Breakdown (AFY)

Source	2025	2030	2035	2040	2045
Demands					
Potable Water Demands	17,422	17,799	18,259	18,722	19,284
Non-Potable Demands	4,508	4,508	4,508	4,508	4,508
Total Single-Dry Year Demand	21,929	22,307	22,767	23,230	23,792
Supplies					
SDCWA Purchases	14,922	15,299	15,759	16,222	16,784
Seawater Desalination	2,500	2,500	2,500	2,500	2,500
Single-Dry Year Potable Supplies	17,422	17,799	18,259	18,722	19,284
Recycled Water	4,508	4,508	4,508	4,508	4,508
Total Single-Dry Year Supply	**21,929**	**22,307**	**22,767**	**23,230**	**23,792**

Table 7-8: Single Dry Year Supply and Demand Comparison – Potable (AFY)

DWR Table 7-3 Retail: Single Dry Year Supply and Demand Comparison - Potable					
	2025	2030	2035	2040	2045
Supply totals	17,422	17,799	18,259	18,722	19,284
Demand totals	17,422	17,799	18,259	18,722	19,284
Difference	0	0	0	0	0

Table 7-9: Single Dry Year Supply and Demand Comparison – Non-Potable (AFY)

DWR Table 7-3 Retail: Single Dry Year Supply and Demand Comparison – Non-Potable					
	2025	2030	2035	2040	2045
Supply totals	4,508	4,508	4,508	4,508	4,508
Demand totals	4,508	4,508	4,508	4,508	4,508
Difference	0	0	0	0	0

7.3.2 Five-Consecutive-Year Drought

During a five-consecutive-year drought scenario, the region experiences on-going dry hydrologic conditions. SDCWA's 2020 UWMP states that in a five-consecutive-year drought scenario, water from carryover storage would be used to help address potential supply deficits. Similar to the single-dry year scenario, demands during a five-consecutive-year drought scenario are projected to increase over normal. In each year of a five-consecutive-year drought scenario demands are anticipated to increase by approximately 7% (year 1), 8% (year 2), 8% (year 3), 8% (year 4), and 9% (year 5).

SDCWA concludes that there is sufficient local, imported, and carryover storage supplies to meet demands in each year of a five-consecutive-year drought scenario for 2025 through 2045. SDCWA's analysis was conservative and only includes “verifiable” supplies. SDCWA’s analysis also incorporates anticipated increased Member Agency demands in dry years. CMWD has elected to be consistent with SDCWA’s analysis and assumes that any increase in demand beyond local supply capacity would be met with additional purchases from SDCWA.

CMWD’s projected supplies in single-dry years (Table 7-10) and multiple dry years (Table 7-11 and Table 7-12) would be sufficient to meet demand, and no extraordinary conservation measures would be required.

Table 7-10: Multiple-Dry Year Supply and Demand Breakdown (AFY)

	Source	2025	2030	2035	2040	2045
Multiple-Dry Year (First Year)	Potable Water Demands	17,501	17,880	18,343	18,808	19,372
	Non-Potable Demands	4,528	4,528	4,528	4,528	4,528
	Total Multiple-Dry Year 1 Demand	**22,030**	**22,409**	**22,871**	**23,336**	**23,901**
	SDCWA Purchases	15,001	15,380	15,843	16,308	16,872
	Seawater Desalination	2,500	2,500	2,500	2,500	2,500
	Multiple-Dry Year 1 Potable Supplies	17,501	17,880	18,343	18,808	19,372
	Recycled Water	4,528	4,528	4,528	4,528	4,528
	Total Multiple-Dry Year 1 Supply	**22,030**	**22,409**	**22,871**	**23,336**	**23,901**
Multiple-Dry Year (Second Year)	Potable Water Demands	17,564	17,944	18,409	18,875	19,442
	Non-Potable Demands	4,545	4,545	4,545	4,545	4,545
	Total Multiple-Dry Year 2 Demand	**22,108**	**22,489**	**22,953**	**23,420**	**23,986**
	SDCWA Purchases	15,064	15,444	15,909	16,375	16,942
	Seawater Desalination	2,500	2,500	2,500	2,500	2,500
	Multiple-Dry Year 2 Potable Supplies	17,564	17,944	18,409	18,875	19,442
	Recycled Water	4,545	4,545	4,545	4,545	4,545
	Total Multiple-Dry Year 2 Supply	**22,108**	**22,489**	**22,953**	**23,420**	**23,986**
Multiple-Dry Year (Third Year)	Potable Water Demands	17,628	18,009	18,475	18,944	19,512
	Non-Potable Demands	4,561	4,561	4,561	4,561	4,561
	Total Multiple-Dry Year 3 Demand	**22,189**	**22,570**	**23,036**	**23,505**	**24,073**

	Source	2025	2030	2035	2040	2045
	SDCWA Purchases	15,128	15,509	15,975	16,444	17,012
	Seawater Desalination	2,500	2,500	2,500	2,500	2,500
	Multiple-Dry Year 3 Potable Supplies	17,628	18,009	18,475	18,944	19,512
	Recycled Water	4,561	4,561	4,561	4,561	4,561
	Total Multiple-Dry Year 3 Supply	**22,189**	**22,570**	**23,036**	**23,505**	**24,073**
Multiple-Dry Year (Fourth Year)	Potable Water Demands	17,692	18,075	18,543	19,013	19,584
	Non-Potable Demands	4,578	4,578	4,578	4,578	4,578
	Total Multiple-Dry Year 4 Demand	**22,270**	**22,653**	**23,121**	**23,591**	**24,162**
	SDCWA Purchases	15,192	15,575	16,043	16,513	17,084
	Seawater Desalination	2,500	2,500	2,500	2,500	2,500
	Multiple-Dry Year 4 Potable Supplies	17,692	18,075	18,543	19,013	19,584
	Recycled Water	4,578	4,578	4,578	4,578	4,578
	Total Multiple-Dry Year 4 Supply	**22,270**	**22,653**	**23,121**	**23,591**	**24,162**
Multiple-Dry Year (Fifth Year)	Potable Water Demands	17,751	18,135	18,605	19,076	19,649
	Non-Potable Demands	4,593	4,593	4,593	4,593	4,593
	Total Multiple-Dry Year 5 Demand	**22,344**	**22,728**	**23,198**	**23,669**	**24,242**
	SDCWA Purchases	15,251	15,635	16,105	16,576	17,149
	Seawater Desalination	2,500	2,500	2,500	2,500	2,500
	Multiple-Dry Year 5 Potable Supplies	17,751	18,135	18,605	19,076	19,649
	Recycled Water	4,593	4,593	4,593	4,593	4,59
	Total Multiple-Dry Year 5 Supply	**22,344**	**22,728**	**23,198**	**23,669**	**24,242**

Table 7-11: Multiple Dry Years Supply and Demand Comparison – Potable (AFY)

DWR Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison - Potable						
		2025	**2030**	**2035**	**2040**	**2045**
First year	Supply totals	17,501	17,880	18,343	18,808	19,372
	Demand totals	17,501	17,880	18,343	18,808	19,372
	Difference	0	0	0	0	0
Second year	Supply totals	17,564	17,944	18,409	18,875	19,442
	Demand totals	17,564	17,944	18,409	18,875	19,442
	Difference	0	0	0	0	0
Third year	Supply totals	17,628	18,009	18,475	18,944	19,512
	Demand totals	17,628	18,009	18,475	18,944	19,512
	Difference	0	0	0	0	0
Fourth year	Supply totals	17,692	18,075	18,543	19,013	19,584
	Demand totals	17,692	18,075	18,543	19,013	19,584
	Difference	0	0	0	0	0
Fifth year	Supply totals	17,751	18,135	18,605	19,076	19,649
	Demand totals	17,751	18,135	18,605	19,076	19,649
	Difference	0	0	0	0	0

Table 7-12: Multiple Dry Years Supply and Demand Comparison – Non-Potable (AFY)

DWR Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison – Non-Potable						
		2025	**2030**	**2035**	**2040**	**2045**
First year	Supply totals	4,528	4,528	4,528	4,528	4,528
	Demand totals	4,528	4,528	4,528	4,528	4,528
	Difference	0	0	0	0	0
Second year	Supply totals	4,545	4,545	4,545	4,545	4,545
	Demand totals	4,545	4,545	4,545	4,545	4,545
	Difference	0	0	0	0	0
Third year	Supply totals	4,561	4,561	4,561	4,561	4,561
	Demand totals	4,561	4,561	4,561	4,561	4,561
	Difference	0	0	0	0	0
Fourth year	Supply totals	4,578	4,578	4,578	4,578	4,578
	Demand totals	4,578	4,578	4,578	4,578	4,578
	Difference	0	0	0	0	0
Fifth year	Supply totals	4,593	4,593	4,593	4,593	4,593
	Demand totals	4,593	4,593	4,593	4,593	4,593
	Difference	0	0	0	0	0

7.4 Drought Risk Assessment

A Drought Risk Assessment (DRA) was performed in the preparation of this 2020 UWMP to evaluate the reliability of each supply source under a long-term drought. The results of the DRA are considered in the development of demand management measures and water supply projects. The DRA provides an opportunity to evaluate the functionality of CMWD's Water Shortage Contingency Plan (WSCP). This evaluation can help identify undesired risks and allow for proactive steps to be taken prior to the next actual long-term drought. The DRA can be modified or updated on an interim cycle, as needed, to allow for the incorporation of new information as it becomes available or in the event of unforeseen circumstances.

7.4.1 Data and Methodology

Per UWMP requirements, the DRA is based on the five driest consecutive years on record. To align with SDCWA's DRA, the historical period used in this analysis is the period from 2014 to 2018. This represents the five-year period SDCWA determined had the lowest local water supply production from surface water and groundwater, the two local water supplies most susceptible to weather-induced variation. Data used to calculate CMWD's supply capabilities under the scenario of five consecutive dry years are provided in Table 7-13. Per SDCWA's methodology, projected local surface water and groundwater supplies reflect actual production from 2014 to 2018. Other local supplies are assumed not to experience a reduction in availability over the five-year dry period because of the drought-resilience of these supplies. The District's existing local supplies, desalinated seawater and non-potable recycled water, are held constant at current 2020 production volumes for the purposes of the DRA.

Projected demands were calculated by escalating 2020 demands annually for five years based on multipliers provided by SDCWA (shown in Table 7-13). The multipliers are based on a weather index developed to assess the impact of dry/hot weather on demands (SDCWA, 2021).

7.4.2 Determination of Reliability

SDCWA anticipates a surplus of water supplies in all five years of a drought and would have enough supply to meet CMWD's increased demands. Based on the analysis shown in Table 7-13, CMWD would be able to meet its water demands in all five years, before accounting for the impacts of any actions under the WSCP.

Table 7-13: Drought Risk Assessment

CMWD Drought Risk Assessment	**2021**	**2022**	**2023**	**2024**	**2025**
Local Supplies[1]					
Seawater Desalination	2,500	2,500	2,500	2,500	2,500
Non-Potable Recycled Water	3,764	3,764	4,218	4,218	4,218
Total Projected Local Supplies	**6,264**	**6,264**	**6,718**	**6,718**	**6,718**
Demand					
CY 2020 Year Demand[1]	17,693	17,693	17,693	17,693	17,693
Demand Projection Multiplier[2]	108%	112%	116%	120%	125%
Consecutive 5-Year Drought Demand	**19,108**	**19,816**	**20,524**	**21,231**	**22,116**
SDCWA Purchases[3]	12,844	13,552	13,806	14,513	15,398
Total Projected Supplies with SDCWA Purchases	**19,108**	**19,816**	**20,524**	**21,231**	**22,116**
Impacts of WSCP Actions	0	0	0	0	0
Remaining Potential Surplus Supply, or (Shortage) that will be addressed through Management Actions	0	0	0	0	0

1. All supplies held constant at actual CY 2020 levels to align with SDCWA 2020 UWMP methodology.
2. Based on a weather index developed to assess the impact of dry/hot weather on water demands, used in SDCWA's 2020 UWMP.
3. SDCWA anticipates having a surplus of supply per its 2020 UWMP.

Section 8

Water Shortage Contingency Planning

CMWD's arid climate, limited local supplies, and growing population make water shortage planning an important component of supply management, especially in light of the current severe drought and the potential for increased frequency, intensity, and duration of droughts due to climate change. CMWD has adopted measures and plans to address water shortages, should supplies be more limited than demand. This section describes CMWD's water shortage contingency plan, considers the potential impacts shortages could have on revenue and expenses, and summarizes CMWD's planned response in the event of catastrophic supply loss.

8.1 Water Shortage Contingency Plan

In 2009, CMWD's Board of Directors (Carlsbad City Council) adopted the following ordinances:

1. Ordinance No. 44 – Drought Response Plan and Water Conservation Program (Drought Ordinance), which established CMWD's current water conservation program and drought response levels.
2. Ordinance No. 46 – Watering Schedules, which revised Drought Response Levels 2 and 3.

Complete copies of these ordinances are provided here as **Appendix I** and the contents of each is described in further detail below. The Drought Ordinance replaced a previous Ordinance No. 35, which had included the Urban Water Shortage Contingency Plan. Because CMWD is dependent upon SDCWA for its water supply, SDCWA's 2020 UWMP should also be consulted for its water shortage contingency plan.

Emergency response stage actions become effective when SDCWA declares that it is unable to provide sufficient water supplies to meet the ordinary demands and requirements of its member agencies to the extent that insufficient water would be available. When SDCWA announces its stage declaration, CMWD concurrently declares its corresponding stage.

8.1.1 Legal Authorities

Under California law, including California Water Code (CWC) Chapters 3.3 and 3.5 of Division 1, Parts 2.55 and 2.6 of Division 6, Division 13, and Article X, Section 2 of the California Constitution, the Board of Directors is authorized to implement the water shortage actions outlined in this WSCP. In all water shortage cases, shortage response actions to be implemented will be at the discretion of the Board of Directors and will be based on an assessment of the supply shortage, customer response, and need for demand reductions.

It is noted that upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 [commencing with Section 8550] of Division 1 of Title 2 of the Government Code) based on drought conditions, the State will defer to implementation of locally adopted water shortage contingency plans to the extent practicable. CMWD will coordinate with regional and local water suppliers for which it provided water supply services for possible proclamation of a local emergency as necessary.

8.1.2 Plan Adoption, Submittal and Availability

CMWD's Water Shortage Contingency Plan (WSCP) is a part of CMWD's 2020 UWMP, however, the WSCP also functions as a stand-alone document that can be amended, as needed, without amending the City's 2020 UWMP. Additional requirements of the WSCP, such as the annual supply and demand reliability assessment protocol, are described below. The process for approving WSCP amendments and conducting required public hearings are described in *Section 10 Plan Adoption, Submittal, and Implementation.*

8.2 Annual Demand and Supply Reliability Assessment Procedures

The annual water supply and demand assessment (Annual Assessment) is a new requirement for UWMPs. This section describes the procedures used to conduct and approve the Annual Assessment. While the UWMP's Drought Risk Assessment (DRA) assesses longer-term, multi-year water supply reliability, the Annual Assessment focuses on actual forecasted near-term water supply conditions (i.e., next 12 months). The prescribed steps and annual timing to complete the Annual Assessment and submit the final report are listed below to ensure consistency year-after-year regardless of CMWD staff changes:

1. March - April
    a. CMWD determines CMWD local supply available.
    b. CMWD coordinates with SDCWA to gather necessary information to conduct SDCWA Annual Assessment.
2. May
    a. SDCWA announces member agency allocation determination for current year.
    b. SDCWA determines carryover (and emergency storage apportionments if under emergency).
    c. CMWD conducts Annual Assessment:
        i. CMWD determines total supply available – inclusive of imported water supply.
        ii. CMWD determines infrastructure constraints (including water quality conditions limiting local sources).
        iii. CMWD determines expected demand for current year and one subsequent dry year.
        iv. CMWD compares supply and demand and makes a determination of the water supply reliability (see *Section 8.2.6 Evaluation Criteria*).
3. June
    a. Board of Directors reviews and approves Annual Assessment determination.
    b. CMWD coordinates with SDCWA on submittal of the report. Annual Assessment report to be submitted to the state by July 1.

8.2.1 Decision-Making Process

A formal decision-making process will occur each year to approve the water supply reliability determination of the Annual Assessment. The Annual Assessment will document any anticipated shortage, any triggered shortage response actions, associated compliance and enforcement actions, and communication actions. These results and recommendations of the Annual Assessment will be presented to the Board of Directors for approval. Board of Directors approval will formally declare any foreseen water shortage level, if any, and trigger any recommendations for specific shortage response actions.

8.2.2 Water Supply Projection: Data Inputs and Methodology

CMWD will evaluate the reliability of the water system for the coming year, while considering a subsequent dry year. Under normal (non-shortage) conditions, CMWD can purchase as much water as necessary from SDCWA to meet demands. When that supply (imported supply) is under shortage conditions, the amount of shortage (allocation of shortage) specific to CMWD is determined in a process lead by SDCWA. Evaluation of CMWD supply begins with SDCWA's own supply evaluation as CMWD receives a large portion of its water supply from the SDCWA regional supply system. SDCWA uses the availability of CMWD's local supplies to determine CMWD's imported water allocation. As such, in years in which imported supply is short, CMWD's imported supply is dependent on availability of local supplies. To inform SDCWA's allocation process, CMWD must describe and quantify in AF, each source of CMWD-owned water supply. CMWD's local water supply portfolio consists of desalinated seawater and recycled water. In the event of a regional shortage, imported water supplies include SDCWA imported water and SDCWA carryover storage.

The available water supply evaluation will consider hydrological and regulatory conditions. The methodology for determining the available supply from each water supply source is presented in Table 8-1.

Table 8-1: Supply Source Availability Evaluation Methodology

Supply Source	Evaluation Methodology
Desalinated Seawater	Assume 2,500 AFY and apply potential production constraints
Recycled Water (Non-Potable)	Determine previous year's production and account for potential decreases in wastewater flow
SDCWA Imported Water	Allocation determined by SDCWA
SDCWA Carryover Storage	Determine available supply to CMWD based on SDCWA WSCP and the most recent information

8.2.3 Planned Water Use for Current Year and Subsequent Dry Year: Data Inputs and Methodology

Unless otherwise specified, the Annual Assessment will use CMWD's most recent unconstrained demand forecast to determine its current year water use. Unconstrained demand is defined as CMWD's expected customer water need for the coming year prior to the application of shortage response actions. Specifically, CMWD will use the projected demands presented in *Section 4 System Water Use* (see Table 4-4). Additional real-time adjustments should be applied to account for factors such as weather, prior-year conditions, anticipated new demands for the year, and other factors pertinent to the land use and customer use patterns.

Dry year demand is based on the single-dry year as defined in *Section 7 Supply Reliability Assessment* of CMWD's 2020 UWMP.

The current year water use projection should then be adjusted to include adjustment factors to ensure enough supply is available to meet the anticipated higher demands in the subsequent dry year. Each year's assessment will be informed by the characterizations in *Section 6 System Supplies* and other current pertinent factors and considerations.

8.2.4 Infrastructure Considerations: Data Inputs and Methodology

CMWD is required to describe the methodology for identifying existing water supply infrastructure capabilities and potential constraints. CMWD's existing water supply infrastructure is well-documented in its GIS system and continuously assessed by Water System Operations staff. Existing water supply infrastructure includes CMWD-owned infrastructure and imported and purchased water infrastructure. CMWD-owned infrastructure includes water treatment plants, pipelines, and pump stations. Imported and purchased water infrastructure includes a seawater desalination plant, and SDCWA's aqueducts and regional pipelines. CMWD will evaluate existing water supply and capacities, as well as any constraints for the current year and for one subsequent dry year. CMWD-owned infrastructure constraints may consider service area-level supply capabilities in the current year, such as shut-downs due to maintenance, construction impacts, and water quality impacts. In addition, CMWD should also consider new projects that may add capacity. Once constraints have been identified, CMWD will determine whether the total quantified water supply (as determined according to *Section 8.2.2* above) should be adjusted to account for these identified constraints. CMWD will coordinate with SDCWA to evaluate regional infrastructure constraints to determine how they would impact available CMWD water supplies.

8.2.5 Evaluation Criteria: Data Inputs and Methodology

CMWD relies primarily on SDCWA to evaluate regional supply and demand and potential water shortage levels. CMWD's supply and demand evaluation criteria are applied as minor adjustments to account for latest information on CMWD-owned supplies or unpredicted changes in CMWD demand. As such, CMWD will evaluate CMWD-owned supply storage levels, changes in recycled water availability, and recent water demand trends to determine any deviations from the SDCWA Annual Assessment.

8.3 Water Shortage Levels & Shortage Response Actions

The Drought Ordinance outlines CMWD's four drought response stages, as shown in Table 8-2. These stages, and their prohibitions, are described below. Each level builds on the previous level(s), placing additional restrictions on water use. Due to recent changes in the CWC, shortage levels have been standardized to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. Table 8-3 translates CMWD's current drought response levels, as described in its Drought Ordinance, to the new mandated WSCP shortage levels.

Table 8-2: CMWD Water Shortage Stages

DWR Table 8-1 Retail: Water Shortage Contingency Plan Levels		
Shortage	**Percent Shortage Range**[1]	**Water Shortage Condition**
1	Up to 10%	Drought Watch Condition - Reasonable probability that supplies will not meet demands
2	Up to 20%	Drought Watch Condition - Supplies will not be able to meet expected demands
3	Up to 30%	Drought Critical Condition - Supplies not meeting current demands
4	Up to 40%	Drought Critical Condition - Supplies not meeting current demands
5	Up to 50%	Drought Emergency Condition - Major failure of a supply, shortage, or distribution system
6	>50%	Drought Emergency Condition - Major failure of a supply, shortage, or distribution system
[1] One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: A water shortage above 40% (including a 50% shortage) triggers Level 4 restrictions, which includes prohibition on outdoor water uses, and provides CMWD the authority to make further restrictions, as necessary, for non-compliant users, as well as for any CMWD customer should water supplies require.		

Table 8-3: Relationship between Drought Ordinance and 2020 WSCP Mandated Water Shortage Levels

Drought Ordinance		2020 WSCP	
Stage	**Supply Condition/Shortage**	**Level**	**Shortage Level**
1	Drought Water Condition (up to 10% reduction)	1	≤10%
2	Drought Watch Condition (up to 20% reduction)	2	10 – 20%
3	Drought Critical Condition (up to 40% reduction)	3	20 – 30%
		4	30 – 40%
4	Drought Emergency Condition (above 40% reduction)	5	40 – 50%
		6	≥50%

Drought Response Level 1 – Drought Watch

A Level 1 Drought Watch condition may apply when SDCWA notifies its member agencies that a demand reduction of up to 10% is required to allow for adequate supplies to meet demands. CMWD's Executive Manager shall declare the existence of Level 1 conditions, and Level 1 conservation practices shall be implemented.

Drought Response Level 2 – Drought Alert

A Level 2 Drought Alert condition may apply when SDCWA notifies its member agencies that a demand reduction of up to 20% is required due to drought conditions or other reduction in supplies. The CMWD Board of Directors will declare a Level 2 condition, at which point all water conservation measures under Level 1 must be adhered to, with the addition of Level 2 water use restrictions.

Drought Response Level 3 – Drought Critical

A Level 3 Drought Critical condition may apply when SDCWA notifies its member agencies that demand reductions of up to 40% are required due to drought or other reduction in supplies in order to have sufficient supplies for anticipated demands. The CMWD Board of Directors will declare a Level 3 condition, requiring the continuation of conservation measures under Level 1 and Level 2, and the implementation of Level 3 water use restrictions.

Drought Response Level 4 – Drought Emergency

A Level 4 Drought Emergency condition may apply when SDCWA declares a water shortage emergency and notifies its member agencies that demand reductions of more than 40% are required in order to maintain sufficient supplies for anticipated demands. The CMWD Board of Directors shall declare a Level 4 Drought Emergency in the manner and on the grounds provided in the California Water Code §350. With the declaration of a Level 4 drought response, all water conservation measures under Levels 1, 2, and 3 must be adhered to, with the addition of Level 4 mandatory conservation measures.

8.3.1 Prohibitions and Reduction Methods

CMWD's water use restrictions and prohibitions are listed in Table 8-4. The stage in which each prohibition is implemented and whether a penalty for violation of the prohibition exists is indicated. Demand reduction actions, supply augmentation and other actions are presented in Table 8-4 and Table 8-5, and penalties are presented in Table 8-6. The percentage that each measure could be expected to reduce the shortage gap was estimated based on the specifications of each measure in the drought ordinance and experience from shortage conditions. Methods that will be used to determine actual water use reductions under shortage response scenarios are described below under *Section 8.5 Monitoring and Reporting*. The reduction in water use that would occur from each of the reduction methods has not been quantified, as it varies depending on drought stage, local hydrology, and customer behavior. As specific stages are implemented, CMWD would closely monitor projected supply availability and demand. Depending on these projections, the methods presented in Table 8-7 would be enacted and enforced to achieve the desired reductions in water use.

Prohibitions

CMWD prohibits water waste at all times, and increases water use restrictions with each Drought Response Level in the Drought Ordinance. A description of all prohibition and restrictions under all levels of drought responses are provided here. As stated above, each response level also includes the restrictions of all previous levels.

Mandatory Restrictions and Prohibitions in Effect at all Times

The following water waste prohibitions are in effect at all times for CMWD's service area:

- Washing down impervious surfaces with potable water
- Water waste resulting from inefficient landscape irrigation
- Use a hand-held hose with a positive shut-off nozzle or bucket to water landscaped areas that are not irrigated by a landscape irrigation system
- Use re-circulated water to operate ornamental fountains
- Wash vehicles using a bucket or a hand-held hose with a positive shut-off nozzle or a mobile high pressure/low volume wash system
- Serve and refill water in restaurants only upon request
- Offer guests in hotels and motels the option of not laundering towels and linens daily
- Use recycled or non-potable water for construction purposes when available
- Single pass-through cooling systems as part of new water service connections will be prohibited. Non-recirculating systems in all new conveyer car wash and commercial laundry systems will also be prohibited
- Breaks, leaks, or other malfunctions in water user's plumbing or distribution system resulting in excess use, loss, or escape of water must be repaired in a timely manner

Table 8-4: CWMD Water Use Restrictions at Each Drought Response Level

DWR Table 8-2: Demand Reduction Actions				
Shortage Level	**Demand Reduction Actions** (These are the only categories that will be accepted by the DWR online submittal tool. Select those that apply.)	**How Much is This Going to Reduce the Shortage Gap?**	**Additional Explanation or Reference**	**Penalty, Charge, or Enforcement?**
1	Landscape - Limit landscape irrigation to specific times	0.9%	Irrigate residential and commercial landscape before 10 a.m. and after 6 p.m.	No
1	CII - Other CII restriction or prohibition	0.2%	Irrigate nursery and commercial grower's products before 10 a.m. and after 6 p.m.	No
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.9%	Repair all water leaks within five days of notification by CMWD	No
1	Expand Public Information Campaign	4.7%	CMWD increased public education and outreach efforts to emphasize increased public awareness of the need to implement water conservation practices	No
1	Offer rebates on indoor and outdoor water use efficiency, turf replacement	4.2%	Ongoing programs	No
2	Landscape - Limit landscape irrigation to specific days	4.2%	Limit residential and commercial landscape irrigation to days assigned by CMWD General Manager	Yes
2	Landscape - Other landscape restriction or prohibition	1.8%	Limit irrigation using sprinklers to length of time determined by CMWD General Manager	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.9%	Repair all water leaks within seventy-two hours of notification by CMWD	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	5.8%	Stop operating ornamental fountains unless recycled water is used	Yes
3	Landscape - Limit landscape irrigation to specific days	8.3%	Limit residential and commercial landscape irrigation to days assigned by CMWD General Manager	Yes

DWR Table 8-2: Demand Reduction Actions				
Shortage Level	**Demand Reduction Actions** (These are the only categories that will be accepted by the DWR online submittal tool. Select those that apply.)	**How Much is This Going to Reduce the Shortage Gap?**	**Additional Explanation or Reference**	**Penalty, Charge, or Enforcement?**
3	Landscape - Other landscape restriction or prohibition	1.8%	Limit irrigation using sprinklers to time limits determined by CMWD General Manager	Yes
3	Water Features - Restrict water use for decorative water features, such as fountains	1.1%	Stop filing or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	0.8%	Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems	Yes
3	Moratorium or Net Zero Demand Increase on New Connections	2.8%	No new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service shall be issued, with the exception of the circumstances listed in the Drought Ordinance.	Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.9%	Repair all water leaks within forty-eight hours of notification by CMWD	Yes
4	Landscape - Prohibit all landscape irrigation	22.2%	Stop all landscape irrigation, except crops and landscape products of commercial growers and nurseries, and except for categories specified in the Drought Ordinance (e.g., fire protection, erosion control, rare or essential plants, livestock, environmental mitigation).	Yes
4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.9%	Repair all water leaks within twenty-four hours of notification by CMWD	Yes

Drought Response Level 1 – Drought Watch

During Level 1 Drought Watch conditions, CMWD will increase its public education and outreach efforts to emphasize the need to implement the following conservation practices in addition to the previous listed measures:

- Irrigate residential and commercial landscape before 10 a.m. and after 6 p.m. only
- Irrigate nursery and commercial grower's products before 10 a.m. and after 6 p.m. only
- Repair all water leaks within five days of notification by CMWD

In addition, under Level 1, CMWD will either directly offer or refer customers to programs that offer rebates on indoor and outdoor water use efficiency or turf replacement.

Drought Response Level 2 – Drought Alert

Under Level 2 Drought Alert conditions all water conservation measures under Level 1 must be adhered to, with the addition of the following mandatory conservation measures:

- Limit residential and commercial landscape irrigation to specified assigned days per week, which will be established by CMWD's General Manager
- Limit irrigation using sprinklers to time limits per watering station per assigned day as established by CMWD's General Manager
- All leaks must be repaired within 72 hours of notification by CMWD
- Stop operating ornamental fountains or similar decorative water features unless recycled water is used

Drought Response Level 3 – Drought Critical

During Level 3 Drought Critical conditions, conservation measures under Level 1 and Level 2 shall continue, with the implementation of the following additional mandatory measures:

- Limit landscape irrigation using sprinklers to time limits water station per assigned day as established by the General Manager
- Stop filling or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life
- Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems
- Repair all leaks within 48 hours of notification by CMWD

Additionally, under a Level 3 drought response, no new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service shall be issued, with the exception of the circumstances listed in the Drought Ordinance. The CMWD Board of Directors will suspend consideration of annexations to its service area and may establish a water allocation for property served by CMWD.

Drought Response Level 4 – Drought Emergency

With the declaration of a Level 4 Drought Emergency, all water conservation measures under Levels 1, 2, and 3 must be adhered to with the addition of the following mandatory conservation measures:

- Stop all landscape irrigation, except crops and landscape products of commercial growers and nurseries
- Repair all leaks within 24-hours of notification by CMWD
- CMWD may install a flow restricting device for services of up to one and one-half inch size and comparatively sized restrictors for larger services upon a prior determination that the customer has repeatedly violated the provision of Ordinance 44.

Additionally, CMWD may establish a water allocation for property served by CMWD.

Supply Augmentation and Other Actions

CMWD also implements supply augmentation and other actions to assist customers throughout its service area in reducing water use. These measures are provided in Table 8-5.

Table 8-5: Supply Augmentation Measures Implemented by CMWD

DWR Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	**Supply Augmentation Methods and Other Actions by Water Supplier**	**How Much is This Going to Reduce the Shortage Gap?**	**Additional Explanation or Reference**
3	Transfers	Flexible depending on other actions; can adjust to achieve conservation target	City of Oceanside, Vallecitos Water District, and SDCWA would be a potential source.
3	Stored Emergency Supply	600 AFY	Maerkle Reservoir holds a maximum 600AF.
3	Other actions (describe)	13%	Suspension of consideration of annexations to CMWD service area
4	Other actions (describe)	Flexible depending on other actions; can adjust to achieve conservation target	Establish a water allocation for property served by CMWD

8.4 Compliance and Enforcement

When mandatory restrictions are in place, CMWD implements penalties for violations of the restrictions or prohibitions described above, as proscribed by The Drought Ordinance and Ordinance No. 46. Each day that a violation occurs is considered a separate offense and administrative fines may be levied for each violation. For the first violation, CMWD will verbally notice the fact of the violation. For the second violation, CMWD will provide a written notice to the customer of the violation. For the third violation, CMWD may install a flow restricting device of one gallon per minute capacity for services of up to one and one-half inch size and comparatively sized restrictions for larger services upon a prior determination of multiple violations. Additionally, an administrative fine of $100 may be issued for the third violation. For a fourth violation within a one-year period, CMWD may issue a $200 administrative fine. Additional violations exceeding the fourth violation within a one-year period may result in a $500 administrative fine. Table 8-6 indicates the penalties for violation and at what stage they take effect.

Table 8-6: CMWD Penalties for Use Restriction Violations

Penalty	Stage	Trigger
Warning letter	All stages	First Violation
Notice of violation	All stages	Second Violation
Flow restriction installed	All stages	Third Violation
Administrative citations	All stages	Third Violation ($100) Fourth Violation ($200) Fifth or More Violation ($500)

In lieu of administrative penalties as described above, when deemed appropriate and necessary, each violation may be prosecuted as a misdemeanor punishable by imprisonment for no more than thirty days or by a fine not to exceed $1,000, or by both. All customers who incur a penalty due to violation of the Drought Ordinance and Ordinance No. 46 have the right to appeal the penalty.

8.5 Monitoring and Reporting

Because all water received from SDCWA is metered and monitored, and all CMWD customers are metered and billed monthly using computerized equipment, data are collected on an on-going basis that can allow CMWD to determine actual water use reductions. Each customer or customer group can be evaluated for compliance with conservation requirements. Methods used by CMWD to determine actual reductions in water use are summarized in Table 8-7.

Table 8-7: Methods for Measuring Water Use Reductions

Method for Determining Actual Reduction	Type and Quality of Data Expected
Use normalized or average water use baseline to determine reductions	Each customer will be given a schedule of monthly use targets based upon the required reduction compared to the base period usage. Usage over the amount allocated for any given month will result in the customer incurring penalty pricing for usage that month. Usage under that amount will be accumulated to possible offset over-usage in successive month period.
More frequent review of production	Water production is currently monitored on a real-time basis through CMWD's SCADA system, and reviewed on a daily basis.
More frequent meter reading at customer locations	Customer meters are read on a monthly basis which would coincide with the monthly allocation periods. Customers are given information on how to read their meter and monitor their own usage.
More frequent leak detection and repair	Leak detection and repair is currently an active and ongoing O&M function, so no major changes would be expected.
System audit	The water system is currently audited on a monthly and annual basis, comparing metered deliveries from the SDCWA to metered deliveries to retail customers.

Method for Determining Actual Reduction	Type and Quality of Data Expected
Automated sensors and telemetry	CMWD has a SCADA system, which contains features to provide real-time monitoring and alarms communications to on-call operators to identify abnormalities in reservoir fill rates, draw-down rates, and pump function, which can be associated with system leaks and other malfunctions that could result in water loss.
Monitor utility actions	All CMWD actions are monitored and reported in a comprehensive Activities Report provided to the Board of Directors on an annual basis. Other types of staff reports on CMWD activities are given at the two regular Board Meetings each month or on as needed basis by the Executive Manager.
Penalties for customers	If and when penalty pricing was implemented, the amount and frequency of penalties would be monitored by the City of Carlsbad's computerized billing system and then reported to the management staff and to the Board of Directors on a monthly basis.

8.6 Description of Revenue and Expenditure Impacts

In the event of a water emergency, the Drought Ordinance and Ordinance No. 46 would be activated to respond to the level of shortage. At that time, drought response stage actions would go into effect, and CMWD's revenue is anticipated to decrease due to reduced water sales. The amount of decreased revenue would depend upon the response stage, and how long each stage is in effect. In the event that revenues are less than required to meet CMWD's financial obligations as a result of a water shortage, CMWD would draw from its operating reserves and then propose increasing water rates to appropriate levels for the Board's consideration. The operating reserves are maintained at adequate levels to provide short-term operating capital in case of emergencies as well as provide for rate stabilization. Table 8-8 and Table 8-9 present how different actions and conditions impact revenues and expenditures, as well as provide a summary of potential actions that could be taken to address these impacts.

Table 8-8: Impacts to Revenues and Methods to Address Impact

Potential Impacts to Revenues	
Action	**Anticipated Revenue Impact**
Rate adjustment	No impact. This would be an administrative function to analyze rate structure options to offset potential losses in revenue associated with reduced sales.
Change in quantity of sales	Reduction in revenue expenses and associated reduction in quantity charge-based revenues generated to cover local O&M costs. Could be offset by a combination of budget reductions, expense deferrals, including some non-critical CIP projects, draws on rate stabilization and operating reserves, and rate adjustments.
Potential Solutions for Revenue Decreases	
Action	**Anticipated Effects**
Reserve Fund	This option would have no short-term impact on the rate payers or CMWD because there are currently sufficient funds in CMWD’s operating reserves.
Change rate structure	Minimal changes in rates could offset significant reductions in available water supplies.
Reduce overhead	Overhead, or local fixed O&M costs, can be reduced in the short and mid-term by deferring selected cash-funded CIP and major maintenance projects, other expenditure reductions and if needed, hiring freezes.
Decrease capital expenditures	Deferral of selected, non-critical replacement projects will have little or no impact on CMWD or its customers, and would only extend the duration of the master planned replacement schedule. Infrastructure for new development is funded by new development and progresses at the rate needed by new development projects.
Revise planning estimates	If supply reduction were long-term, CMWD would make commensurate adjustments to its CIP schedule, staffing levels and retail rate structures based upon lower retail sales. Impacts would be moderate and implemented over time.

Table 8-9: Impacts to Expenditures and Methods to Address Impacts

Potential Impacts to Expenditures	
Actions	**Potential Impacts**
Change in quantity of sales	Sales reductions could be offset with rate and budget adjustments and moderate CIP deferrals.
Increased staff/salaries/overtime	No impacts. Existing staff would be re-assigned to perform functions required to implement and enforce consumption reduction methods and requirements.
Increased costs of new supplies, transfers or exchanges	SDCWA would secure new supplies whose cost would be melded into overall costs. Increased costs of wholesale water would be passed through to CMWD's customers via rate increases and/or changes to the rate structure.
Potential Solutions for Expenditure Impacts	
Action	**Anticipated Effects**
Reserve Fund	No impacts. The Replacement Fund is sufficient, and exists for the very purposes anticipated in a supply shortage scenario.
Change rate structure	Given the mix of wholesale water and power expenditures, non-commodity revenues needed to cover local fixed costs, availability of reserves and the flexibility to adjust CIP expenditures, no short-term (1 to 2 year) impacts are anticipated, mid-term (3 years) impacts would be moderate, and long-term (beyond 3 years) impacts would be moderate and incremental.
Reduce overhead	In the short-term and mid-term, overhead or local costs can be reduced by deferring non-critical CIP and major maintenance expenditures. In the long-term, costs can be reduced by adjusting operational and staffing levels and retail water rate structures to incorporate the reality of lower retail water sales than previously anticipated.
Decrease capital expenditures	In the short-term, there could be a decrease in the level of expenditures for CMWD's replacement program, or an interruption of expenditures. In the mid- to long-term, the retail rate structure and the prioritization schedule would be adjusted to ensure that projects critical to service and system reliability were implemented.
Revise planning estimates	If the reduced supply is determined to be a long-term condition, then commensurate adjustments would be incorporated into long-term staffing and water system facility requirements.

8.7 Catastrophic Supply Interruption Plan

CMWD's supplies are at risk for a catastrophic interruption because of its reliance on imported water to meet potable demands. While CMWD and SDCWA are both striving to reduce this dependence on imported water (through development of local supplies and increased recycled water use), the risk still exists that supplies will be interrupted in the event of a natural or man-made disaster.

Potential catastrophes to which CMWD's supplies may be vulnerable include, but may not be limited to:

- Earthquake
- Fire/explosion
- Medical
- Flood
- Tornado/severe weather
- Bomb threat
- Hard freeze
- Loss of normal water supply
- Hazardous material release
- Contamination of SDCWA or CMWD water supplies
- Terrorist attack

The 125 HP Bressi Potable Water Pump Station

CMWD has taken several actions for preparation for, and implementation during, a catastrophic interruption of water supplies. In the event of a supply interruption, CMWD's defined command chain dispatches crews to inspect infrastructure and critical operations. Operations response crews are assigned to monitor system operations and modify operations as necessary, depending on the status of the system, the disaster, and needs. The defined communication command chain coordinates with other local water agencies and emergency response officials as necessary. Criteria and procedures are provided to return system to normal operations, including initiating water quality testing when necessary and performing necessary emergency repairs to the system. The emergency operations plan contains contact information for responsible parties and support services. Water shortage contingency plan stages will be implemented as required by the situation.

8.7.1 Seismic Risk Assessment and Mitigation Plan

CWC 10632.5 requires urban water suppliers to include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the supplier's various facilities of the water system and mitigate those vulnerabilities. An urban water supplier may also comply with this requirement by submitting a copy of the most recently adopted multi-hazard mitigation plan under the federal Disaster Mitigation Act of 2000 if the multi-hazard mitigation plan addresses seismic risk. The City of Carlsbad assessed seismic risk in its *2018 Hazard Mitigation Plan* as part of the County of San Diego's Hazard Mitigation Plan submitted to the State of California Office of Emergency Services. The goal of the *2018 Hazard Mitigation Plan* is to "reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to earthquakes". Some of the action items for implementation included:

- Periodic updates to local building codes, public works construction codes, and zoning and grading ordinances

- Review local vulnerability to ground motion, liquefaction, and landslide impacts on facilities and infrastructure
- Identify projects for pre-disaster mitigation funding
- Participate in earthquake response actions and preparedness exercises

The Carlsbad Emergency Management Administrative Team has on-going funding to develop hazard mitigation public awareness strategies and continue to develop and implement action items to meet the City's earthquake goal. Appendix J includes the 2018 Hazard Mitigation Plan for the City of Carlsbad.

8.7.2 CMWD Emergency Storage of Water Policy

In addition, CMWD is included in SDCWA's regional emergency storage plan (ESP), which plans and provides for regional supplies during a two-month and six-month emergency event (CMWD 2019a). In addition, CMWD is in the process of updating the City's emergency action plan and shall be complete by June 2021.

The regional emergency water supply reservoirs include Olivenhain with 18,000 AF of ESP capacity, Lake Hodges with 20,000 AF, and San Vicente with 52,100 AF. Actual amounts of ESP water to be delivered to each member agency are to be determined based on the specific emergency event. ESP supplies will depend on member agency demand, local supplies, infrastructure, availability of supplies, and duration of the emergency event. SDCWA's ESP is expected to provide a total of 90,100 AF of stored water which can potentially help meet regional water demands through 2045.

Local storage capacity was also projected through 2040 and CMWD is expected to have a 5.49 MG storage surplus in the distribution system which does not include the 195 MG Maerkle Reservoir (CMWD, 2019a). Overall, CMWD has sufficient storage to meet operational and short-term emergency demand requirements under 2040 projected conditions.

8.8 Communications Protocol

CMWD's communication protocol includes the various channels it will utilize to convey critical messages regarding water shortage allocations and voluntary and mandatory actions. A strong communication plan will educate CMWD ratepayers, local leaders and the business community, on the water supply situation; what actions are proposed; what the intended achievements are; and how these actions are to be implemented. While specific types of messaging are deployed at various shortage response levels, how these messages are conveyed to the public are described per this communication protocol. The communication protocol will be in place prior to a water supply shortage and be initiated in Shortage Level 1. Activation of the communication protocol will continue through all subsequent water shortage levels. At times, specific communities may require specialized outreach. CMWD will ensure outreach efforts are reaching key audiences as needed.

Per SDCWA's 2020 WSCP, it is important to communicate to ratepayers the following when urgent conservation is needed:

- Specific actions needed to save water;
- How much water needs to be saved and for how long;
- Why water needs to be saved; and
- What CMWD is doing to correct the supply problem or address the situation.

8.8.1 Coordination

In order to communicate effectively, avoid confusion, and maintain credibility, CMWD will work in close coordination with SDCWA at various levels of management. These levels include the Joint Public Information Council/Conservation Coordinators (JPIC; staff level), the Member Agency Managers group (management level), and SDCWA Board's Legislation and Public Outreach Committee (Board level). During droughts or other times of limited supply, the frequency and extent of coordination will increase to ensure outreach tactics are consistent with the changing needs of CMWD and its ratepayers. CMWD will seek opportunities to leverage external resources to complement its own outreach.

8.8.2 Communication Objectives

Communication objectives during the various water shortage levels of the WSCP include the following:

- Motivate water users to quickly increase conservation in ways that are consistent with any voluntary or mandatory actions called for at the current level of the WSCP.
- Raise awareness and understanding of the drought, regulatory, or other condition affecting water supplies and the need for increased conservation.
- Minimize confusion and maintain credibility of water agencies and conservation messages with an appropriate tone that carefully describes the current water shortage scenario.
- Make water users feel appreciated for existing accomplishments in improving their water-use efficiency, and for supporting regional and local investments in water supply reliability.
- Educate regional civic and business leaders, elected officials and the public about how CMWD has greatly improved its water supply reliability.
- Prepare CMWD for any potential escalation (or de-escalation) of the WSCP based on trending supply conditions.
- Ensure all stakeholders believe they are being treated fairly in relationship to other stakeholders.
- Maintain communication effectiveness by soliciting or monitoring feedback from member agencies, key stakeholders, and the general public to update or adapt messages or communication tools.
- Exit WSCP implementation having demonstrated the effectiveness and value of conservation actions and water supply reliability investments in minimizing impacts to the City of Carlsbad's economy and quality of life.

8.8.3 Communication Protocol for Current or Predicted Shortage

A current or predicted shortage, as determined by the Annual Assessment, will be communicated to the public upon submittal of the Annual Assessment Report in June of any given year. Communication by Water Shortage Level are outlined in Ordinance No. 44 and is described in the following subsections.

Drought Response Level 1 (Drought Watch)

The existence of a Drought Watch condition may be declared by the Executive Manager upon a written determination of the existence of the facts and circumstances supporting the determination. A copy of the written determination shall be filed with the Secretary of the CMWD and provided to the CMWD Board of Directors. CMWD may publish a notice of the determination of existence of Drought Response Level 1 condition in one or more newspapers, including a newspaper of general circulation within the CMWD service area. CMWD may also post notice of the condition on its website.

Drought Response Level 2 (Drought Alert) or 3 (Drought Critical)

The existence of Drought Response Level 2 or Level 3 conditions may be declared by resolution of the CMWD Board of Directors adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation measures applicable to Drought Response Level 2 or Level 3 conditions shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, CMWD shall publish a copy of the resolution in a newspaper used for publication of official notices.

Drought Response Level 4 (Drought Emergency)

The existence of a Drought Response Level 4 condition may be declared 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 shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, CMWD shall publish a copy of the resolution in a newspaper used for publication of official notices. If CMWD establishes a water allocation, it shall provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which CMWD customarily mails the billing statement for fees or charges for on-going water service. Water allocation shall be effective on the fifth (5) day following the date of mailing or at such later date as specified in the notice.

The CMWD Board of Directors may declare an end to a Drought Response Level by the adoption of a resolution at any regular or special meeting held in accordance with State law.

8.8.4 Communication Protocol for Triggered or Anticipated to Be Triggered Shortage Response Action

The public will be notified about triggered or anticipated to be triggered shortage response actions. The implementation of shortage response actions associated with any water shortage level will take effect on the tenth day after the date the shortage response action is declared. Within five days following the declaration of the shortage response action, the Executive Manager will publish a notice giving the extent, terms, and conditions around the use and consumption of water a minimum of one time for three consecutive days in the City of Carlsbad’s official newspaper.

8.8.5 Catastrophic Communications

In the event of a catastrophic supply interruption that requires water use to be quickly prioritized for or limited to essential public health and safety needs, CMWD will immediately deploy appropriate strategies from Drought Response Levels 1 through 4. In addition, outreach messaging will reflect emergency conditions and the need to focus on health and public safety. CMWD may also consider potential joint news release/new events with public health officials or incident commanders to announce conditions and explain needed action. Finally, CMWD will ensure ongoing coordination with emergency response services with daily advisories or alerts as needed.

8.9 Determination of Reliability

Based on the analysis shown in Chapter 7 of the 2020 UWMP, CMWD anticipates being able to purchase enough water from SDCWA to meet potable demands that cannot be met with local potable supplies. SDCWA anticipates a surplus of water supplies in all five years of a drought and would have enough supply to meet CMWD’s demands. Based on the analysis shown in Chapter 7 of the 2020 UWMP, CMWD would be able to meet its water demands in all dry year scenarios, before accounting for the impacts of any actions under the WSCP.

Section 9

Demand Management Measures

This section describes the past and current demand management measures (DMMs) undertaken by CMWD and quantifies, to the extent feasible, DMM efforts from 2016 through 2020 (the most recent years for which reporting is available).

9.1 Current Demand Management Measures

CMWD currently implements a variety of DMMs to manage customer demands. Together, these DMMs have contributed to CMWD's success in reaching its SBx7-7 Targets (refer to Section 5 Baselines and Targets), have contributed to a more conservation-literate population, and position CMWD to align with future water use objectives that will be developed in 2023.

9.1.1 Water Waste Prevention Ordinances

CMWD has two ordinances in place (both adopted in 2009) to prohibit water waste and encourage water use efficiency within the service area. The ordinances are updated as-needed in order to comply with State regulations and regional response to drought conditions. A short summary of these ordinances is provided here. For more details, refer to *Section 8 Water Shortage Contingency Planning* and Appendix I.

1. Ordinance No. 44 – Drought Response Plan and Water Conservation Program (Drought Ordinance)
2. Ordinance No. 46 – Watering Schedules

CMWD also provides information on its website's Water Rules page regarding any water use restrictions in place at a given time (http://www.carlsbadca.gov/services/depts/pw/utils/water/rules.asp).

UWMPs and the Water Conservation Act of 2009: Conservation requirements for the UWMP are based on the Water Conservation Act of 2009 (SBx7-7). This act mandates a 20% reduction in water use from average (based on 10-15 year baseline), measured in GPCD (gallons per capita per day, based on gross water use), by 2020, with an interim target of 10% reduction by 2015. For more information, refer to: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

2015/2016 Emergency Regulations: Executive Order B-29-15 (April 2015; extended March 2016) imposed temporary mandatory conservation aimed at achieving 25% reduction statewide from 2013 levels during the most recent multi-year drought. Each water purveyor was assigned a conservation target by the state, measured in R-GCPD (residential gallons per capita per day, based on residential water use). CMWD's initial conservation target was 28%, but was reduced to 20% due to regional supply development. For more information, refer to: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

2016 Extended Emergency Regulations: In May 2016, the SWRCB adopted new emergency regulations (applied June 2016 – January 2017) that would allow water purveyors to identify their own temporary conservation targets based on their ability to meet demands during continuation of multiple dry year conditions into 2017, 2018, and 2019. For more information refer to: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

2018 Water Conservation Legislation: In 2018, California SB 606 and AB 1668 were enacted and expand authority to implement a water budget-based approach to conservation and water use efficiency. New urban water use standards are anticipated to be in place in 2023. For more information, refer to: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Making-Conservation-a-California-Way-of-Life

Drought Response Plan and Water Conservation Program (Drought Ordinance):

The Drought Ordinance establishes ten water waste prohibitions in effect at all times, as well as four drought response levels for signaling appropriate conservation use restrictions and targets. Table 9-1 provides a summary of the four drought response levels and Section 8 *Water Shortage Contingency Plan* includes a detailed discussion of the four levels as they relate to the WSCP water shortage levels. A copy of the full ordinance is included in Appendix I.

Table 9-1: Drought Response Levels

Drought Response Condition Levels	Use Restrictions	Conservation Target	WSCP Water Shortage Levels
Level 1-Drought Watch	Voluntary	Up to 10%	Stage 1
Level 2-Drought Alert	Mandatory	Up to 20%	Stage 2
Level 3-Drought Critical	Mandatory	Up to 40%	Stage 3 or 4
Level 4-Drought Emergency	Mandatory	Above 40%	Stage 5 or 6

Watering Schedules:

Ordinance No. 46 provides the authority for CMWD to set watering schedules when a drought response condition level is triggered and provides a mechanism for appropriate public notification of any changes to watering schedules resulting from implementation of a drought response condition level. A copy of the ordinance is included in Appendix I.

9.1.2 Metering

All of CMWD's water connections are metered and billed according to water consumed. There are some mixed-use meters where irrigation and domestic use are metered through one service connection meter in CMWD's service area. CMWD plans to convert those properties' irrigation systems to recycled water as the Phase III Recycled Water Project is constructed and the recycled water distribution system is extended.

CMWD has a water meter replacement and calibration plan in place to ensure that meters are performing correctly, and all water consumed is being recorded. In general, CMWD replaces meters under 1-inch every 20 years and meters over 1-inch every 15 years. In 2012, CMWD began replacing traditional water meters with "smart meters" that enabled collection of water usage information to be automated. CMWD has now completed the final stage of its Advanced Metering Infrastructure (AMI) project.

In 2018, CMWD installed data analytics software, known as WaterSmart, to work in conjunction with its AMI system. WaterSmart enables staff to be alerted in real time about customer leaks and bursts. Staff can then notify the customer via email or phone call. The WaterSmart software has saved thousands of gallons of water that would have otherwise been wasted at a high cost to CMWD's customers and enhanced CMWD's water conservation program.

9.1.3 Conservation Pricing

CMWD has and will continue to utilize a combination of uniform and increasing block or tiered rate conservation rate structures for potable water served. Single family and multifamily residential customer classes are billed in increasing block structures where the water rate increases for additional water units consumed. Table 9-2 shows the residential customer billing rates for 2021. Commercial, agricultural, and irrigation customer classes are billed using uniform rate structures where a flat rate is billed for every unit consumed. One unit is equal to a hundred cubic feet, or 748 gallons. Table 9-3 shows the 2021 billing rates for commercial customers. Recycled water was billed at a flat rate of $3.79 for all non-potable water customers in 2021.

Table 9-2: 2021 Residential Customer Billing Rates for Potable Water

Tier	Block Structure	Cost per Unit[1]
Single Family and Master-Metered[2]		
Tier 1	0 – 10 units	$4.13/unit
Tier 2	11-18 units	$4.51/unit
Tier 3	19 units and above	$7.18/unit
Multiple Family[2]		
Tier 1	0 – 5 units	$3.93/unit
Tier 2	6+ units	$5.04/unit
[1] One water unit is 100 cubic feet or 748 gallons [2] Tiers are based on water use per dwelling unit, as measured in units of water consumed		

Table 9-3: 2021 Commercial Customer Billing Rates for Potable Water

Tier	Cost per Unit[1]
Agricultural rate	$4.71/unit
Irrigation rate	$5.41/unit
Commercial rate	$4.36/unit
[1] One water unit is 100 cubic feet or 748 gallons	

9.1.4 Public Education and Outreach

CMWD implements multiple approaches to public education and outreach on a variety of projects, initiatives, and goals. These approaches use outreach, workshops, school education programs, and provision of resources for CMWD customers. Many of CMWD's efforts are implemented in coordination with other agencies and through regional efforts. Between fiscal years 2015-16 and 2019-20, CMWD has spent approximately $1,256,000 on conservation, including staff time and the implementation of WaterSmart software. In addition, since 2012, total turf and device rebates provided to CMWD customers have valued $3,605,000. This section summarizes conservation programs currently available to CMWD customers.

Outreach Activities

CWMD staffs a water conservation booth dedicated to promoting water conservation at several events throughout the year. At the events, CMWD displays handouts containing indoor and outdoor water saving information and conservation tools.

In order to reach a wide range of audiences, CMWD also makes brochures and handouts available at various community centers and City of Carlsbad and CMWD offices. CMWD has consistently reached out to customers on at least a quarterly basis using various methods every quarter within the last five years. In coordination with SDCWA, CMWD promotes opportunities for residents to participate in regional programs such as the California–Friendly landscape contest, Speaker Bureaus, and Citizens Water Academy. As a member of the NSDWRC, CMWD participates in outreach efforts educating the public on recycled water and potable reuse safety and use, and the importance of potable water conservation to the region.

Workshops

In coordination with SDCWA, CMWD provides workshops on water related themes geared to the residential user. Workshop topics presented in the past include California Friendly Landscape Training. Workshops are offered for free and held at different locations throughout the county, including within CMWD's service area.

School Education

CMWD offers school education programs for local schools as well as education materials to teachers upon request through SDCWA. The Splash Lab offers assembly presentations available to grades 4 - 8 to educate students on water science. For Grades K – 6, students can participate in an assembly that is fact-filled and engages students in water conservation. In addition, there is an annual calendar art contest for fourth graders from schools within CMWD's service area with an opportunity to win prizes by drawing a water conservation themed picture.

Residential Customer Resources

In coordination with MWD's SoCal Water$mart program and SDCWA's WaterSmart San Diego County program, rebates are available to CMWD customers to promote indoor and outdoor water conservation. One popular program is the turf removal rebate program designed to encourage the replacement of water-thirsty turf for drought tolerant plants. These programs are advertised and linked to on CMWD's water conservation website. Through SDCWA's turf replacement rebate program, CMWD customers have converted 32,386 square feet of turf to water-wise landscaping, as of June 2020. Additional funds were recently secured by SDCWA to continue its turf conversion rebates, and it is anticipated that CMWD customers will continue to participate in turf conversions through this program.

Table 9-4 provides a list of all rebates available and their associated rebate amounts.

Table 9-4: Residential Water Conservation Rebate

Rebate Program Name	Rebate Amount
Indoor Rebates	
Clothes washer rebate	$85
HE toilets	$40
Outdoor Rebates	
Turf removal rebate	$2-$3/sq ft up to 5,000 sq ft
Irrigation controllers	$80
Irrigation nozzles	$2/nozzle - minimum is 30
Rain barrels	$35
Soil moisture sensors	$35/controller station

Commercial Customer Resources

In coordination with MWD's SoCal Water$mart Program and SDCWA's WaterSmart San Diego County program, CMWD provides information on available rebates for CMWD's commercial customers that promote water efficiency for businesses. Table 9-5 displays the rebates and their associated amounts available to commercial customers that were available in recent years.

Table 9-5: Commercial Water Conservation Rebates

Rebate Name	Rebate Amount
Indoor Fixtures	
HE toilet	$40
UL Urinal	$200
Zero Water urinal	$200
Flow valve restrictions	$5/valve (minimum of 10)
Outdoor Fixtures	
Turf removal	$2/sq ft up to $5,000
Irrigation controllers	$35/controller station
Irrigation heads	$2/nozzle (minimum of 30)
Large rotary nozzles	$13/set (minimum of 8)
Flow regulators	$1/regulator (minimum of 25)
Soil moisture sensors	$35/station
Restaurant Fixtures	
Connectionless food steamers	$485
Air-cooled ice machines	$1,000
Commercial/Industrial	
Cooling tower conductivity controllers	$625
Cooling tower pH controllers	$1,750
Dry vacuum pump	$125/0.5 HP
Laminar flow restrictors	$10/restrictor (minimum of 10)

Large Landscape Water Audits

Dedicated Large Landscape customers are offered water audits to provide suggestions on improving water efficiency and to qualify for water conservation rebates. In the past five years, approximately nine water audits have been performed by CMWD staff and an independent contractor.

Contractor Incentive Program

The WaterSmart Contractor Incentive Program offers several incentivized water-efficient devices that when installed in combination, are among the irrigation industry's best management practices. Program requirements, qualifying irrigation devices and rebate amounts are available.

WaterSmart Check-up Program

In coordination with SDCWA, CMWD has and will continue to offer the WaterSmart Check-up Program to top water users each month. During a WaterSmart check-up, a WaterSmart certified irrigation professional visits a property upon request to provide water saving tips and perform a water audit. This audit includes an inventory of water fixtures used indoors and outdoors, replacement of high use water fixtures, evaluating toilets for leaks, and performing a landscape water audit. During the water audit, sprinkler stations are turned on to evaluate inefficiencies and adjustments to watering schedules are made where appropriate. A summary report with additional conservation advertising is left with the customer at the end of the appointment. Over the past five years, 92 audits have been performed.

Landscape Education

WaterSmart Landscaping in San Diego County is an online plant finder found at watersmartsdlandscaping.org. This interactive gardening tool has thousands of pictures of plants and garden designs that are well-suited to the southern California climate. It offers visual tours of beautiful, water-efficient landscapes through photographs with links to plant information screens.

Residential Water Use Calculator

An online home water footprint calculator tool is available to help homeowners understand how and where homes can use less. This calculator takes individualized input by homeowners and shows which of their water uses are efficient and which are not. It also offers tips that save water and energy. The calculator quickly estimates how much water homes use indoors and outdoors, then compares consumption to average and highly efficient homes in the same area with same number of residents. It also suggests where to begin water-use efficiency improvements.

WaterSmart Landscape Makeover Program Workshops

These workshops offer classes and coaching from professionals that teach the basics on how to do a landscape makeover. Topics include soil, design, turf removal, plant selection, planning, irrigation, rainwater catchment and implementation, which are all the elements needed to convert high-water-use turf to a beautiful, water-efficient landscape.

Quality Water Efficient Landscaper (QWEL)

On the WaterSmart website, people can register for free local training courses that will result in Quality Water Efficient Landscaper (QWEL) certification. Providing landscape professionals with 20 hours of education on principles of proper plant selection for the local climate, irrigation system design and maintenance, and irrigation system programming and operation.

Agua Hedionda Lagoon Foundation (AHLF) Demonstration Garden

In the City of Carlsbad, the AHLF hosts the premiere native plant garden in North San Diego County. Visitors can browse through the extensive California Native Plant Garden and accompanying colorful and informative interpretive signage. The landscaping includes 800 native plants featuring over 60 different species for visitors to learn about California's low water use native flora.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

CMWD has completed the AWWA Water Loss Audit Software program and has determined that water losses are within the acceptable industry standard range. Water losses have been incorporated into the appropriate tables in *Section 4 System Use*. CMWD is proactive in reducing unaccounted for water by ensuring water meters are regularly maintained, evaluated for functionality, and replaced well within industry standards.

Reported leaks are investigated and recorded in a tracking database that collects the time of report, leak location, and type of leaking pipe or fitting. Leaks are repaired to the extent that is cost effective and prioritized based on potential water loss. In 2017-2018, a full system leak survey was performed. There were 57 leaks detected throughout the 455 miles of potable distribution lines. An estimated 123.5 AFY was saved after these leaks were repaired.

CMWD also uses the Supervisory Control and Data Acquisition (SCADA) system, a meter replacement program, and advanced metering infrastructure (AMI) and WaterSmart technology to minimize leaks and water waste. These programs help customers conserve water by updating technology and replacing meters to help better monitor leakage.

9.1.6 Water Conservation Program Coordination and Staffing Support

Water conservation staffing is performed by a full time (1 FTE) Water Conservation Specialist and a Supervisor at 25% FTE. The Water Conservation Specialist is responsible for developing, implementing, and monitoring water conservation programs and for conducting water audits. They are also responsible for promoting CMWD's conservation programs. An overview of CMWD's Water Conservation programs can be found at:

https://www.carlsbadca.gov/services/depts/pw/utils/water/default.asp.

9.2 DMM Activity

A summary of the nature and extent of the DMMs implemented by CMWD from 2016 through 2020, along with a summary of continued and planned BMPs, is presented in Table 9-6, organized by DMM.

Table 9-6: Extent of CWMD's DMMs

DMM	2016	2017	2018	2019	2020	Planned Future (2021-2025)
Operation Practices	Ordinance 44	Ordinance 44	Ordinance 44	Ordinance 44	Ordinance 44	Ordinance 44
Water Loss Control	Not Quantified	Not Quantified	Full System Leak Survey Completed 57 Leaks repaired; 123.5 AFY saved	Not Quantified	Not Quantified	Continue to repair leaks in a timely manner. Another full system leak survey is planned for fall 2021.
Metering with Commodity	All accounts metered	All accounts metered	All accounts metered	All accounts metered	All accounts metered	All accounts will continue to be metered. Advanced metering infrastructure is in place system-wide.
Retail Conservation Pricing	Tiered rates in place for all residential customers	Tiered rates in place for all residential customers	Tiered rates in place for all residential customers	Tiered rates in place for all residential customers	Tiered rates in place for all residential customers	Tiered rates will remain in place for all residential customers
School Education Programs	0 water conservation field trips	3 water conservation field trips	5 water conservation field trips	7 water conservation field trips	2 water conservation field trips	Annual funds will continue to be allocated to school education programs to the extent budget is available.
Residential Indoor and Outdoor Water Fixture Efficiency Rebate Programs	501 Rebates	243 Rebates	166 Rebates	137 Rebates	174 Rebates	CMWD hopes to complete an average of 150 residential water efficiency rebates per year.
Commercial Indoor and Outdoor Water Fixture Efficiency Rebate Programs	42 Rebates	4 Rebates	11 Rebates	2 Rebates	11 Rebates	CMWD hopes to complete an average of 14 commercial water efficiency rebates per year.
Turf	148 Rebates	29 Rebates	4 Rebates	24 Rebates	21 Rebates	CMWD hopes to complete an

DMM	2016	2017	2018	2019	2020	Planned Future (2021-2025)
Replacement Rebate Programs						average of 19 turf replacement rebates per year.
Water Use Surveys[1]	68 surveys	33 surveys	107 surveys	53 surveys	25 surveys	CMWD hopes to complete an average of 57 water use surveys per year.

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[1] Includes full audits, irrigation checkups, residential surveys, and irrigation controller visits

9.3 Future DMM Implementation

CMWD plans to continue to provide information about the available array of educational and rebate programs, as funds are available to sustain the programs. The popularity of the Turf Removal Rebate displays a need and desire for residential customers wanting a more permeant option to manage outdoor water use and it is expected that this program will be marketed heavily in the next few years as funding is made available by SDCWA. Although all fixtures for indoor conservation that are now available to California customers are water efficient, CMWD still sees its rebate program as a way to continue to encourage additional conservation through high efficiency devices.

As demonstrated in *Section 5 Baseline and Targets*, CMWD's 2020 GPCD is well below its 2020 target. These savings have been achieved in part due to implementation of the DMMs described in this section, and CMWD is committed to continued demand management through ongoing permanent savings (e.g., from landscape conversions), water waste prohibition and waste prevention ordinances, expansion of recycled water service, and other conservation efforts. In the long-term, CMWD is also considering the implementation of customer-interface software, SmartWorks, that will be used in conjunction with CMWD's existing WaterSmart software in providing on-going demand data and notifications directly to customers via an online portal. This continued demand management will help achieve the new water use objectives for certain water use sectors that will be developed in 2023.

Section 10

Plan Adoption, Submittal, and Implementation

This section of the 2020 UWMP addresses the steps CMWD has taken to adopt this 2020 UWMP, submit it to DWR, and outlines the steps that will be taken should it prove necessary to amend the 2020 UWMP.

10.1 Plan Review and Notification Process

CMWD encouraged community and public involvement in the 2020 UWMP by releasing a draft UWMP for public comment and scheduling a public hearing. The public hearing was on June 8, 2021, and provided an opportunity for CMWD's customers, interested agencies and organizations, and the public to learn about CMWD's current and projected water supply situation, and plans to continue to provide a reliable water supply in the future. The hearing was an opportunity for people to ask questions regarding the current situation and the viability of future plans. The hearing also includes a discussion of CMWD's Water Shortage Contingency Plan and associated annual reporting procedures, and discussion of CMWD's SBx7-7 per capita water use targets and the achievement of the 2020 target.

A 60-day notice of the update to the UWMP and public hearing was provided to San Diego County and adjacent cities and other entities on March 26, 2021. The notification list has been included in **Appendix A**, and notified agencies, cities, and the county are listed in **Table 2-5** in *Section 2 Plan Preparation*, along with their level of involvement with plan development.

Table 10-1: Notification to Cities and Counties

DWR Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
City of Carlsbad	☑	☑
County Name	60 Day Notice	Notice of Public Hearing
San Diego County	☑	☑

Public hearing notifications were published in the San Diego Union Tribune on May 25 and June 1, 2021. In addition, CMWD customers were noticed of plan availability with bill inserts in early May. A copy of the draft 2020 UWMP was made available for public review on the City of Carlsbad's website at www.carlsbadca.gov 30 days before the public hearing. Due to the COVID-19 emergency, no hard copies were made available for review at City offices. A copy of the published Notice of Public Hearing is included in **Appendix A**.

10.2 Plan Adoption and Submittal Process

CMWD's Board of Directors held a public hearing to receive public comments on the UWMP, immediately prior to adoption of the UWMP. Following the public hearing on the document, this Plan was adopted by the Board of Directors on June 8, 2021. A copy of the adoption resolution is provided in Appendix B.

The 2020 UWMP was submitted to DWR, the California State Library, and San Diego County within 30 days after adoption, prior to the CWC's deadline of July 1, 2021. Submitted items include an electronic copy of the 2020 UWMP, along with copies of the required tables submitted through the WUE data online submittal tool to DWR, and one CD with an electronic copy to each of the California State Library and San Diego County, in accordance with the requirements in the 2020 Guidebook. The 2020 UMWP will be available for public review on the City of Carlsbad's website within 30 days of filing a copy with DWR, or by July 30, 2021.

10.3 Plan Implementation

All data used in development of this UWMP are the most current data available, and unless otherwise noted include data for the calendar year. CMWD shall implement the adopted 2020 UWMP in accordance with the schedule described in this Plan. Any amendments made to this Plan will require completion of the same series of notification, public hearing, adoption, and submittals as required in submittal of this original 2020 UWMP.

10.4 WSCP Adoption, Submittal and Availability

The final WSCP was included in the adoption of the 2020 UWMP, as described in the previous sections. However, the WSCP can be amended, as needed, outside of a UWMP update cycle. The processes for approving WSCP amendments and conducting required public hearings are similar to those required for UWMP adoption. CMWD would release a 60-day notice of a public adoption hearing for the amended WSCP. The list of entities that would be notified are provided in Appendix A. The public hearing to receive public comments on the amended WSCP would be held immediately prior to the adoption of the amended WSCP by the Board of Directors. The amended WSCP would be made available for the public on the City of Carlsbad's website within 30 days of the adoption date.

Section 11

References

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Section 8 Water Shortage Contingency Plan

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Appendix A – Notification

Carlsbad
Municipal Water District

March 26, 2021

RE: CARLSBAD MUNICIPAL WATER DISTRICT NOTICE OF REVIEW AND UPDATE: 2020 URBAN WATER MANAGEMENT PLAN

This letter is to notify your agency that the Carlsbad Municipal Water District (CMWD) is reviewing and considering amendments to its Urban Water Management Plan (UWMP). California state law, specifically California Water Code Section 10610-10610.4, requires each urban water supplier to prepare and adopt a UWMP every five years. CMWD is currently preparing an update to its 2015 UWMP. The 2020 UWMP documents CMWD's plans to ensure adequate water supplies to meet existing and future demands for water under a range of water supply conditions, including water shortages.

This letter is also to inform you that CMWD is preparing an attachment to its 2020 UWMP to demonstrate consistency with Delta Plan Policy WR P1, Reduced Reliance on the Delta Through Improved Regional Water Self-Reliance.

Finally, this letter is to inform you that CMWD is preparing a Water Shortage Contingency Plan (WSCP), as a chapter of the 2020 UWMP. California state law, specifically Water Code Section 10632.3, requires every urban water supplier to prepare and adopt a water shortage contingency plan as part of its UWMP that details how the supplier intends to act in the case of a water shortage condition.

In conformance with California Water Code Division 6, Part 2.6, §10621, this letter serves as notification to all city and county agencies, which CMWD provides water, that the UWMP is being reviewed, updated and the WSCP is being prepared. The draft 2020 UWMP and draft WSCP will be available for public review on the City of Carlsbad website (www.carlsbadca.gov) by **Friday, May 7, 2021**.

Notice is hereby given that on **Tuesday, June 8, 2021** at **3:00 P.M.,** at the virtual meeting available at www.carlsbadca.gov, the Board of Directors of CMWD will conduct a public hearing on the draft 2020 UWMP and draft WSCP. Immediately following the public hearing on June 8, 2021, the draft 2020 UWMP and draft WSCP will be considered for adoption by the CMWD Board of Directors.

Per California Executive Order N-29-20, and in the interest of public health and safety, the City of Carlsbad is temporarily taking actions to prevent and mitigate the effects of the COVID-19 pandemic by holding City Council and other public meetings online only. All public meetings will comply with public noticing requirements in the Brown Act and will be made accessible electronically to all members of the public seeking to observe and address the City Council. You may participate by phone by signing up at https://www.carlsbadca.gov/cityhall/clerk/meetings/default.asp by 2 p.m. the day of the meeting to provide comments live by phone. You will receive a confirmation email with instructions about how to call in. If you would like to participate in writing, email comments to clerk@carlsbadca.gov. Comments received by 2 p.m. the day of the meeting will be shared with the City Council prior to the meeting. When e-mailing comments, please identify in the subject line the agenda item to which your comments relate. All comments received will be included as part of the official record. Written comments will not be read out loud. These participation procedures shall remain in place during the period in which state or local health officials have imposed or recommended social distancing measures.

The adopted 2020 UWMP and WSCP must be submitted to the California Department of Water Resources by July 1, 2021.

Please contact Ms. Shoshana Aguilar at 760-814-0241 or at Shoshana.Aguilar@carlsbadca.gov or Mr. David Hull at 760-602-7322 or David.Hull@carlsbadca.gov if you would like additional information or would like to submit comments regarding CMWD's 2020 UWMP and/or WSCP.

Sincerely,

Vicki V. Quiram

Vicki Quiram
General Manage

Agencies Notified of CMWD 2020 UWMP

Company	First	Last	Title	Street Address	Address Line 2	City	State	ZipCode
Olivenhain Municipal Water District	Kimberly	Thorner	General Manager	1966 Olivenhain Road		Encinitas	CA	92024
Rincon del Diablo Municipal Water District	Clint	Baze	General Manager	1920 North Iris Lane		Escondido	CA	92028
San Elijo Joint Powers Authority	Mike	Thornton	General Manager	2695 Manchester Avenue		Cardiff-by-the-Sea	CA	92007
San Diego County Water Authority	Tim	Bombardier	Senior Water Resources Specialist	4677 Overland Avenue		San Diego	CA	92123
San Diego Association of Governments	Coleen	Clementson	Director of Regional Planning	401 B Street	Suite 800	San Diego	CA	92101-4231
City of Encinitas	Lillian	Doherty	Director, Development Services	505 S Vulcan Avenue		Encinitas	CA	92024
County of San Diego	Mark	Wardlaw	Director of Planning and Land Use	5510 Overland Avenue	Suite 310	San Diego	CA	92123
City of San Diego	Shauna	Lorance	Director, Public Utilities	202 C Street		San Diego	CA	92101-4806
City of San Marcos Planning Department	Joseph	Farace	Planning Division Manager	1 Civic Center Drive		San Marcos	CA	92069
San Diego Local Agency Formation Commission	Keene	Simonds	Chief, Governmental Services	9335 Hazard Way	Suite 200	San Diego	CA	92123
City of Carlsbad	Don	Neu	City Planner	1635 Faraday Avenue		Carlsbad	CA	92008
Vallecitos Water District	Glenn	Pruim	General Manager	201 Vallecitos De Oro		San Marcos	CA	92069
Vista Community Development Department	John	Conley	Director	200 Civic Center Drive		Vista	CA	92084
Encina Wastewater Authority	Michael F.	Steinlicht	General Manager	6200 Avenida Encinas		Carlsbad	CA	92011
City of Escondido	Christopher W.	McKinney	Director of Utilities	City Hall, Second Floor	201 North Broadway	Escondido	CA	92025
City of Oceanside Planning Department	Cari	Dale	Water Utilities Director	300 N Coast Highway		Oceanside	CA	92054
Leucadia Wastewater District	Paul J.	Bushee	General Manager	1960 La Costa Avenue		Carlsbad	CA	92009
Metropolitan Water District of Southern California	Jeffrey	Kightlinger	General Manager	P.O. Box 54153		Los Angeles	CA	90054-0153
Santa Fe Irrigation District	Al	Lau	General Manager	P.O. Box 409		Rancho Santa Fe	CA	92067
City of Encinitas	Pamela	Antil	City Manager	505 S Vulcan Avenue		Encinitas	CA	92024
City of San Marcos	Jack	Griffin	City Manager	1 Civic Center Drive		San Marcos	CA	92069
City of Escondido	Jeffrey R.	Epp	City Manager	City Hall, Second Floor	201 North Broadway	Escondido	CA	92025
City of Oceanside	Deanna	Lorson	City Manager	300 N Coast Highway		Oceanside	CA	92054
City of Carlsbad	Scott	Chadwick	City Manager	1200 Carlsbad Village Drive		Carlsbad	CA	92008
City of Vista	Patrick	Johnson	City Manager	200 Civic Center Drive	3rd Floor	Vista	CA	92084
Vallecitos Water District	James H.	Gumpel	District Engineer	201 Vallecitos De Oro		San Marcos	CA	92069
San Dieguito Water District	Isam	Hireish	General Manager	160 Calle Magdalena		Encinitas	CA	92024

PROOF OF PUBLICATION
(2010 & 2011 C.C.P.)

STATE OF CALIFORNIA
County of San Diego

I am a citizen of the United States and a resident of the County aforesaid: 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 of

The San Diego Union Tribune

Formerly known as the North County Times and UT North County and which newspaper has been adjudicated as a newspaper of general circulation by the Superior Court of the County of San Diego, State of California, for the City of Oceanside and the City of Escondido, Court Decree numbers 171349 & 172171, for the County of San Diego, that the notice of which the annexed is a printed copy (set in type not smaller than nonpariel), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

May 25th & June 1st, 2021

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

Dated at **TEMECULA, California this 1st, day June, 2021**

Jane Allshouse

Jane Allshouse

The San Diego Union Tribune Legal Advertising

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that the Carlsbad Municipal Water District, or CMWD, Board of Directors will hold a public hearing on Tues., June 8, 2021 at 3 p.m., at a virtual meeting available at www.carlsbadca.gov on the draft 2020 Urban Water Management Plan (UWMP), draft Water Shortage Contingency Plan (WSCP), and draft 2015 UWMP Amendment. The 2015 UWMP Amendment will not include review of the entire 2015 UWMP but will instead be limited to documenting CMWD's reduced reliance on receiving water from the Sacramento-San Joaquin Delta. This amendment is separate from adoption of the 2020 UWMP and WSCP.

The draft documents noted above, are available for public review on the City of Carlsbad website at https://www.carlsbadca.gov/services/depts/pw/utils/default.asp. Due to the COVID-19 emergency, no hard copies will be made available for review at city or CMWD offices. Also, copies of the staff report will be available on and after Fri., June 4, 2021. If you have questions, please call 760-438-2722 and you will be directed to the appropriate project manager.

Per California Executive Order N-29-20, and in the interest of public health and safety, the CMWD is temporarily taking actions to prevent and mitigate the effects of the COVID-19 pandemic by holding CMWD Board and other public meetings online only. All public meetings will comply with public noticing requirements in the Brown Act and will be made accessible electronically to all members of the public seeking to observe and address the Board. You may participate by phone by signing up at https://www.carlsbadca.gov/cityhall/clerk/meetings/default.asp by 2 p.m. the day of the meeting to provide comments live by phone. You will receive a confirmation email with instructions about how to call in. If you would like to participate in the public hearing in writing, email comments to clerk@carlsbadca.gov. Comments received by 2 p.m. the day of the meeting will be shared with the Board prior to the meeting. When e-mailing comments, please identify in the subject line the agenda item to which your comments relate. All comments received will be included as part of the official record. Written comments will not be read out loud. These participation procedures shall remain in place during the period in which state or local health officials have imposed or recommended social distancing measures.

Upon conclusion of the public hearing, the CMWD Board of Directors may revise, change, modify, adopt and/or adopt with conditions the draft 2020 UWMP, draft WSCP and/or 2015 UWMP Amendment. The 2020 UWMP, WSCP and 2015 UWMP Amendment are scheduled to be adopted on June 8, 2021, immediately following the public hearing.

PUBLISH DATES: MAY 25, 2021 & JUNE 1, 2021
CITY OF CARLSBAD | CARLSBAD MUNICIPAL WATER DISTRICT

Appendix B – UWMP Adoption

RESOLUTION NO. 1656

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CARLSBAD MUNICIPAL WATER DISTRICT, APPROVING THE 2020 URBAN WATER MANAGEMENT PLAN (UWMP) AND AUTHORIZING SUBMITTAL TO THE CALIFORNIA DEPARTMENT OF WATER RESOURCES

WHEREAS, the 2020 Urban Water Management Plan, or UWMP, has been prepared by the Carlsbad Municipal Water District, or CMWD, in conformance with the Urban Water Management Planning Act contained in California Water Code Section 10610 et. seq.; and

WHEREAS, the CMWD's Water Shortage Contingency Plan (WSCP) is a portion of the 2020 UWMP and functions as a stand-alone document that can be amended as needed without amending the UWMP; and

WHEREAS, on March 26, 2021, in conformance with the California Water Code Section 10621, CMWD mailed a 60-day public hearing notification letter to all city and county agencies to which CMWD provides water supplies; and

WHEREAS, Section 10642 of the California Water Code requires that prior to adopting a UWMP, an urban water supplier shall make the UWMP available for public inspection and hold a public hearing to receive public comment regarding the UWMP; and

WHEREAS, on May 7, 2021, CMWD made copies available of the UWMP for review on the City of Carlsbad's website at www.carlsbadca.gov; and

WHEREAS, a notice of public hearing was published via a newspaper ad on May 25, 2021 and June 1, 2021; and

WHEREAS, a public hearing was held on June 8, 2021 to receive public comment regarding the 2020 UWMP; and

WHEREAS, the city planner has determined that the Project is statutorily exempt from the proceedings of the California Environmental Quality Act (CEQA) pursuant to state CEQA Guidelines Article 18, Section 15282 - (v) The preparation and adoption of Urban Water Management Plans pursuant to the provisions of Section 10652 of the Water Code.

NOW, THEREFORE, BE IT RESOLVED by the CMWD Board of the City of Carlsbad, California, as follows:

1. That the above recitations are true and correct.

2. That the Board approves the 2020 UWMP, which is attached hereto as Attachment A, and authorizes its submittal to the California Department of Water Resources.

PASSED, APPROVED AND ADOPTED at a Regular Meeting of the Board of Directors of the Carlsbad Municipal Water District of the City of Carlsbad on the 8th day of June, 2021, by the following vote, to wit:

AYES: Hall, Blackburn, Acosta, Bhat-Patel, Schumacher.
NAYS: None.
ABSENT: None.

Matt Hall

MATT HALL, PRESIDENT

Miriam DeMarzo for

BARBARA ENGLESON, SECRETARY

(SEAL)

ORGANIZED MAR. 22, 1954

RESOLUTION NO. 1657

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CARLSBAD MUNICIPAL WATER DISTRICT APPROVING THE 2015 URBAN WATER MANAGEMENT PLAN AMENDMENT APPENDIX K – REDUCED DELTA RELIANCE, AND AUTHORIZING SUBMITTAL TO THE CALIFORNIA DEPARTMENT OF WATER RESOURCES

WHEREAS, the 2015 Urban Water Management Plan, or UWMP, Amendment Appendix K – Reduced Delta Reliance (Amendment), has been prepared by the Carlsbad Municipal Water District, or CMWD, in conformance with the Urban Water Management Planning Act contained in California Water Code Section 10610 et. seq.; and

WHEREAS, on March 26, 2021, in conformance with the California Water Code Section 10621, CMWD mailed a 60-day public hearing notification letter to all city and county agencies to which CMWD provides water supplies; and

WHEREAS, Sections 10640 and 10642 of the California Water Code require that prior to adopting a plan amendment, an urban water supplier shall make the plan amendment available for public inspection and hold a public hearing to receive public comment regarding the proposed plan amendment; and

WHEREAS, on May 7, 2021, CMWD made copies of the 2015 UWMP Amendment available for review on the City of Carlsbad's website at www.carlsbadca.gov; and

WHEREAS, a notice of public hearing was published via a newspaper ad on May 25, 2021 and June 1, 2021; and

WHEREAS, a public hearing was held on June 8, 2021 to receive public comment regarding the 2015 UWMP Amendment; and

WHEREAS, the city planner has determined that the Project is statutorily exempt from the proceedings of the California Environmental Quality Act (CEQA) pursuant to state CEQA Guidelines Article 18, Section 15282 - (v) The preparation and adoption of Urban Water Management Plans pursuant to the provisions of Section 10652 of the Water Code.

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NOW, THEREFORE, BE IT RESOLVED by the CMWD Board of the City of Carlsbad, California, as follows:

1. That the above recitations are true and correct.

2. That the Board approves the 2015 UWMP Amendment Appendix K – Reduced Delta Reliance, which is attached hereto as Attachment A, and authorizes its submittal to the California Department of Water Resources.

PASSED, APPROVED AND ADOPTED at a Regular Meeting of the Board of Directors of the Carlsbad Municipal Water District of the City of Carlsbad on the 8th day of June, 2021, by the following vote, to wit:

AYES: Hall, Blackburn, Acosta, Bhat-Patel, Schumacher.

NAYS: None.

ABSENT: None.

Matt Hall

MATT HALL, PRESIDENT

M DeMarzo for

BARBARA ENGLESON, SECRETARY

(SEAL)

ORGANIZED MAR. 22, 1954

Appendix C – UWMP Checklist

UWMP Checklist (*Final DWR Guidebook - Appendix F)*

Checklist Arranged by Subject

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities	Introduction and Overview	Chapter 1	Executive Summary, Ch. 4, Ch. 6, Ch. 9
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 bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5	Appendix G - SBx7-7 Verification Form and Section 5.2
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	Appendix G - SBx7-7 Verification Form and Section 5.2.3
10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.7	Appendix G - SBx7-7 Verification Form and Section 5.2.3
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	Sections 5.2 and 5.5.7	N/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	N/A

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10608.4	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	Appendix G - SBx7-7 Verification Form and Section 5.2.3
10631(e)(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 9.2
10631(e)(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	N/A
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	Chapter 10	Section 10.1
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	Appendix A - Notification and Section 10.1
10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4	Section 10.2
10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2,10.3, and10.5	Appendix A - Notification and Section 10.1

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
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	Section 10.2.2	Appendix A - Notification and Section 10.1
10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2	Appendix B and Section 10.2
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	Section 10.2
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	Section 10.2
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	Section 10.2
10645(a)	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	Section 10.2
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency 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	Section 10.2
10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case fillings.	Plan Adoption, Submittal, and Implementation	Section 10.6	N/A

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoptions	Plan Adoption, Submittal, and Implementation	Section 10.7.2	Section 10.4
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	Section 2
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	Section 2
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 and contingency plan.	Plan Preparation	Section 2.6	Appendix A - Notification and Section 2.2 and 2.3
10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information.	Summary	Chapter 1	Executive Summary
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 3.1
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.1.2
10631(a)	Provide population projections for 2025, 2030,2035, 2040 and optionally 2045.	System Description	Section 3.4	Section 3.1.3
10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.1.3
10631(a)	Describe the land uses within the service area.	System Description	Section 3.5	Section 3.1.4

Water Code Section	**Summary as Applies to UWMP**	**Subject**	**2020 Guidebook Location**	**2020 UWMP Location**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections3.4 and 5.4	Section 3.1.3
10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035,2040 and optionally 2045.	System Supplies	Section 6.2.8	Section 6.1
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 6.3
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 6.1 and 6.2	Sections 7.2 and 7.3
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	Section 6.1	Sections 7.2 and 7.3
10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.1	Sections 6
10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1.1	Section 6.1
10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or 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	Section 6.3
10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2.2	Section 6.3

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10631(b)(4)(B)	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	Section 6.3
10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2.2.1	Section 6.3
10631(b)(4)(C)	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 6.2.2.4	Section 6.3
10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2.2	Section 6.3 and Section 6.9
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.2.7	Section 6.6
10631(f)	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 for a period of drought lasting 5 consecutive water years.	System Supplies	Section 6.2.8 and 6.3.7	Section 6.8
10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.2.6	Section 6.5
10631(h)	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 2.6 and 6.1	Section 2.2 and Table 2-4

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10631(h)	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 2.6	N/A
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.2.5	Section 6.7
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 6.2.5	Section 6.7
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5	Section 6.7.4
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 6.2.5	Section 6.7.5
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 6.2.5	Sections 6.7.5 and 6.9
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 6.2.5	Section 6.7.6

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2.5	Section 6.7.6
10631.2(a)	The UWMP must include energy intensity information as stated in the code.	System Supplies, Energy Intensity	Section 6.4 and Appendix O	Section 6.10
10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Sections 4.1 and 4.2	Sections 4.1 and 4.2
10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.1.3	Section 4.1.3
10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.1.3	Section 4.1.3
10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.2.6	Section 4.2
10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections	System Water Use	Section 4.2.6	Section 4.2
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	Section 4.4
10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment	System Water Use	Section 4.5	Section 7.4
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8	Chapter 8

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Chapter 8	Section 8.9
10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2	Section 8.2.1
10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2	Section 8.2.2
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20,30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3	Section 8.3
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.3	Section 8.3 and Table 8-3
10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4	Section 8.3

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4	Section 8.3.1 and Table 8-4
10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4	Section 8.2.5
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4	Section 8.3.1
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4	Section 8.3.1 and Table 8-4
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5	Section 8.8
10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.5, 8.6	Section 8.8.3
10632(a)(6)	Retail suppliers must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Section 8.6	Section 8.4

Water Code Section	**Summary as Applies to UWMP**	**Subject**	**2020 Guidebook Location**	**2020 UWMP Location**
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.7	Section 8.1.1
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7	Section 8.8
10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7	Section 8.8
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Section 8.6
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Section 8.6
10632(a)(8)(C)	Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Water Shortage Contingency Planning	Section 8.8	Section 8.6
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9	Section 8.5

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10	Section 8.5
10632(c)	Make available the Water Shortage Contingency Plan to customers and any city of county where it provides water within 30 days after adopted the plan.	Water Shortage Contingency Planning	Section 8.14	Appendix A - Notification and Sections 8.1.2 and 10.2
10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.11	Section 8.3.1
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 7.2.4	Section 7.3
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	Chapter 7.2	Section 7.1
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3	Section 7.4
10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3	Section 7.4.1

Water Code Section	Summary as Applies to UWMP	Subject	2020 Guidebook Location	2020 UWMP Location
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3	Section 7.4.2
10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3	Section 7.4
10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change condition, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3	Section 7.4

Appendix D – UWMP Required Tables

Submittal Table 2-1 Retail Only: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3710005	Carlsbad Municipal Water District	29,440	13,929
	TOTAL	29,440	13,929

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: This table only reflects potable water connections and deliveries. CMWD’s recycled

Submittal Table 2-2: Plan Identification

Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from 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: CMWD is a member agency of the San Diego County Water Authority.

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier 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)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal 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 Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
San Diego County Water Authority
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	91,694	96,371	98,359	98,760	99,119	100,809

NOTES: Projections used 2018 ACS 5-year estimate data (77.9% of City of Carlsbad population) and 2020-2045 projections from SANDAG Interim Series 14 for CMWD service area. Population was adjusted up to account for additional planned development approved from November 2017 to May 2020, which was not included in Interim Series 14.

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual

Use Type	2020 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[2]
Add additional rows as needed			
Single Family	includes SF w/fire protection	Drinking Water	7,694
Multi-Family	includes duplex	Drinking Water	1,752
Commercial		Drinking Water	2,066
Industrial		Drinking Water	19
Institutional/Governmental		Drinking Water	102
Agricultural irrigation	includes agriculture w/house	Drinking Water	163
Landscape		Drinking Water	1,530
Landscape	Recycled water demands may include agricultural, commercial, irrigation, and industrial customers. Includes temporary recycled water meters.	Other Non-Potable Water	3,764
Losses		Drinking Water	605
		TOTAL	17,693

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

[2]

NOTES: CMWD does not serve raw water to customers; all non-recycled water is potable. Actual potable water demands are based on CMWD's 2020 billing data and the AWWA water loss audit (refer to Appendix F for the complete audit). The AWWA water loss audit was completed for FY2020 as the most recent water loss data available, while billing data are reported in calendar year. CMWD's temporary potable meters billing category was incorporated into the Single Family use type, while the fire protection billing category was incorporated into the Institutional/Governmental use type for consistency with demand projection categories for 2025 through 2045. Non-potable landscape represents recycled water demands, which may include agricultural, commercial, irrigation, and industrial customers. Recycled water demands also includes temporary recycled water meters.

OPTIONAL Table 4-1 Retail: Demands for Potable Water - Actual

Use Type	2020 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*
Add additional rows as needed			
Single Family	includes SF w/fire protection	Drinking Water	7,694
Multi-Family	includes duplex	Drinking Water	1,752
Commercial		Drinking Water	2,066
Industrial		Drinking Water	19
Institutional/Governmental		Drinking Water	102
Agricultural irrigation	includes agriculture w/house	Drinking Water	163
Landscape		Drinking Water	1,530
Losses		Drinking Water	605
		TOTAL	13,929

** Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: See 4-1.

OPTIONAL Table 4-1 Retail: Demands for Non-Potable [1] Water - Actual

Use Type	2020 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 [2]
Add additional rows as needed			
Landscape	Recycled water demands may include agricultural, commercial, irrigation, and industrial customers. Includes temporary recycled water meters.	Other Non-Potable Water	3,764
		TOTAL	3,764

1 Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.

2 Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

NOTES: See 4-1.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected

Use Type	Additional Description (as needed)	Projected Water Use[2] *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		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		8,351	8,538	8,766	8,993	9,268
Multi-Family		1,878	1,920	1,971	2,022	2,084
Commercial		2,887	2,952	3,031	3,109	3,205
Industrial		49	50	51	52	54
Institutional/Governmental		150	154	158	162	167
Agricultural irrigation		182	173	164	160	154
Landscape		1,905	1,948	2,000	2,051	2,114
Landscape	recycled water use	4,218	4,218	4,218	4,218	4,218
Losses		900	921	945	970	999
	TOTAL	20,520	20,873	21,304	21,737	22,263

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of*

NOTES: All non-recycled water is potable. Institutional use includes public buildings, schools, and fire protection. Single Family includes single family, low density single family, and temporary potable meters. Water loss was calculated as 6% of total demand based on five-year average (2016-2020) of AWWA water audits for CMWD's potable system. Some differences may occur due to rounding.

OPTIONAL Table 4-2 Retail: Use for Potable Water - Projected

Use Type	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		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		8,351	8,538	8,766	8,993	9,268
Multi-Family		1,878	1,920	1,971	2,022	2,084
Commercial		2,887	2,952	3,031	3,109	3,205
Industrial		49	50	51	52	54
Institutional/Governmental		150	154	158	162	167
Agricultural irrigation		182	173	164	160	154
Landscape		1,905	1,948	2,000	2,051	2,114
Losses		900	921	945	970	999
	TOTAL	16,302	16,655	17,086	17,519	18,045

** Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:See Table 4-2

OPTIONAL Table 4-2 Retail: Use for Non-Potable[1] Water - Projected

Use Type	Additional Description (as needed)	Projected Water Use[2] 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		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Landscape	recycled water use	4,218	4,218	4,218	4,218	4,218
	TOTAL	4,218	4,218	4,218	4,218	4,218

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

NOTES: See Table 4-2

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	13,929	16,302	16,655	17,086	17,519	18,045
Recycled Water Demand[1] *From Table 6-4*	3,764	4,218	4,218	4,218	4,218	4,218
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	17,693	20,520	20,873	21,304	21,737	22,263

[1] Recycled water demand fields will be blank until Table 6-4 is complete

[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier ***may*** *deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES: Recycled Water Demands are discussed in *Section 6 System Supplies* .

OPTIONAL Table 4-3 Retail: Total Water Use (Potable)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water *From Tables 4-1R and 4-2 R*	13,929	16,302	16,655	17,086	17,519	18,045
TOTAL WATER USE	13,929	16,302	16,655	17,086	17,519	18,045

NOTES: Recycled Water Demands are discussed in *Section 6 System Supplies* .

OPTIONAL Table 4-3 Retail: Total Water Use (Non-Potable)

	2020	2025	2030	2035	2040	2045 (opt)
Recycled Water Demand[1] *From Table 6-4*	3,764	4,218	4,218	4,218	4,218	4,218
Raw and Other Non-potable *From Tables 4-1R and 4-2 R*	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	3,764	4,218	4,218	4,218	4,218	4,218

[1] Recycled water demand fields will be blank until Table 6-4 is complete

[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier ***may*** *deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES: Recycled Water Demands are discussed in *Section 6 System Supplies* .

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
07/2014	765
01/2016	905
01/2017	1305
01/2018	672
01/2019	605

[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.

*[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal 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)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Sections 4.1.5 and 5.2
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

NOTES:

Submittal Table 5-1 Baselines and Targets Summary
From SB X7-7 Verification Form

Retail Supplier or Regional Alliance Only

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1999*	*2008*	*259*	*207*
5 Year	*2003*	*2007*	*255*	

**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*

NOTES: CMWD selected a 10-year baseline period

Submittal Table 5-2: 2020 Compliance
From SB X7-7 2020 Compliance Form
Retail Supplier or Regional Alliance Only

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
134	*0*	*134*	*207*	*Yes*

**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*

NOTES: No adjustments were made to CMWD’s 2020 GPCD.

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
	TOTAL	0	0	0	0	0
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020

☐ There is no wastewater collection system. The supplier will not complete the table below.

100% Percentage of 2020 service area covered by wastewater collection system *(optional)*

100% Percentage of 2020 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 2020 *	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*
City of Carlsbad	Metered	7,128	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Leucadia Wastewater District	Estimated	744	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Vallecitos Water District	Estimated	20	Encina Wastewater Authority	Encina Pollution Control Facility	Yes	Yes
Total Wastewater Collected from Service Area in 2020:		7,892				

**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3* **.**

NOTES: Wastewater flows are reported for Fiscal Year 2020, ending June 30, 2020. In 2015, CMWD estimated that total wastewater flows within its service area are 5-10% higher than those collected by the City of Carlsbad due to LWWD providing sewer collection service to a portion of CMWD's service area (refer to Figure 3-4). The 744 AF was reported by Leucadia for last FY. The Encina Pollution Control Facility is owned and operated by the Encina Wastewater Authority, a joint powers authority that is owned by six agencies, including City of Carlsbad and Leucadia Wastewater District. Vallecitos collects wastewater for 80 homes in the CMWD service area. The agreement estimates that Vallecitos collects 220 gallons per day of wastewater from each home.

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020

☐ **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)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	**2020 volumes** [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Encina Water Pollution Control Facility	Encina Ocean Outfall	Pacific Ocean		Ocean outfall	Yes	Secondary, Undisinfected	26,947	25,970	0	0	n/a
Encina Water Pollution Control Facility	Carlsbad Water Recycling Facility	Carlsbad Water Recycling Facility		Other	Yes	Tertiary	0	0	2,118	0	n/a
Encina Water Pollution Control Facility	Gafner WWTP	Gafner WWTP		Other	Yes	Tertiary	0	0	193	0	n/a
Meadowlark WRF	CMWD	CMWD Customers		Other	Yes	Tertiary	1,760	114	1,646	728	n/a
Total							28,707	26,083	3,957	728	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

Submittal Table 6-4 Retail: 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 Supplier Producing (Treating) the Recycled Water:	Carlsbad Municipal Water District, Vallecitos Water District, Leucadia Wastewater District
Name of Supplier Operating the Recycled Water Distribution System:	Carlsbad Municipal Water District, Leucadia Wastewater District
Supplemental Water Added in 2020 (volume) *Include units*	0 AFY
Source of 2020 Supplemental Water	N/A

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020[1]	2025[1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Agricultural irrigation				Tertiary						
Landscape irrigation (exc golf courses)	Commercial property irrigation, community facilities, highways, HOAs, resort property irrigation, parks, and schools		Commercial property irrigation, community facilities, highways, HOAs, resort property irrigation, parks, and schools	Tertiary	2,996	3,493	3,493	3,493	3,493	3,493
Golf course irrigation	Golf course irrigation		Golf course irrigation	Tertiary	725	725	725	725	725	725
Commercial use	Cooling		Cooling	Tertiary	0	0	0	0	0	0
Industrial use	NRG Power Plant		NRG Power Plant	Tertiary	43	0	0	0	0	0
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)	Public works projects		Public works projects		0	0	0	0	0	0
				Total:	3,764	4,218	4,218	4,218	4,218	4,218
				2020 Internal Reuse						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CMWD does not track recycled water sales for agricultural irrigation purposes; some of the landscape irrigation may capture recycled water used for this purpose. Recycled water for golf course irrigation use declined between 2015 and 2020 due to the adoption of conservation practices in 2016-2018 in response to the drought, followed by a wet hydrologic year which depressed irrigation needs. The NRG power plant is currently being decommissioned. Recycled water for commercial cooling use was projected to be 62 AFY in the 2015 UWMP; however, this is no longer expected as of 2020.

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.	
Beneficial Use Type	**2015 Projection for 2020 [1]**	**2020 Actual Use[1]**
Insert additional rows as needed.		
Agricultural irrigation	23	
Landscape irrigation (exc golf courses)	3,705	2,996
Golf course irrigation[1]	1,033	725
Commercial use	62	0
Industrial use	215	43
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Public Works Projects)	40	0
Total	5,078	3,764

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTES: 1. Use of recycled water for golf course irrigation decreased between 2015 to 2020 because of water conservation measures implemented in 2016 to 2018 in response to the drought, followed by wet years in which the demand for recycled water for irrigation was depressed.

Submittal 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.		
N/A	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			
Rate Controls	Maintain recycled water rates below potable water rates	On-going	
Mandatory Use Ordinance	Requires dual plumbing in new development and use of recycled water if available	1990	
Public Outreach	On-going Outreach and education efforts as part of NSDWRC to educate public on benefits, safety, and proper use of various types of recycled water	On-going	
Phase III Recycled Water Project – Segment 5	Expand recycled water system to meet identified demands	2022	188
		Total	188

Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: The actions included in this table all support increased recycled water use made available and accessible through the Phase III Recycled Water Project.

Submittal 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.

Provide page location of narrative in the UWMP

Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Phase III Recycled Water Project- Long-term demands	No		Expansion of recycled water distribution system	2035	Average Year	Unknown
Groundwater Supply	No		Development of groundwater supplies	--	Average Year	Unknown at this time
NSDWRC Regional Project	Yes	Leucadia, Vallecitos,City of Oceanside, City of Escondido, Olivenhain MWD, Rincon del Diablo MWD, San Elijo joint Powers, Santa Fe Irrigation District, and Vista Irrigation District	Regional recycled water project	2035	Average Year	Supports Phase III Recycled water project
Carlsbad 5 Flow Control Facility and Pressure Reducing Station	Yes	SDCWA	Development of a direct connection to the desalinated seawater pipeline	--	Average Year	Additional 5.21% of any desalinated seawater produced beyond the 48,000 AFY minimum volume produced for SDCWA

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 6-8 Retail: Water Supplies — Actual

Water Supply	Additional Detail on Water Supply	2020		
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				
Purchased or Imported Water	Purchased from SDCWA	11,429	Drinking Water	11,429
Purchased or Imported Water	Local Desalinated Water Purchased from SDCWA via 2016 Agreement	2,500	Drinking Water	2,500
Recycled Water	Carlsbad WRF	2,118	Recycled Water	7,839
Recycled Water	Meadowlark WRF	1,646	Recycled Water	2,989
	Total	17,693		24,757
****Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES:				

OPTIONAL Table 6-8ds: Source Water Desalination

☐ Neither groundwater nor surface water are reduced in salinity prior to distribution.

Plant Name or Well ID	Plant Capacity	Intake Type *Drop down list*	Source Water Type *Drop down list*	Influent TDS	Brine Discharge *Drop down list*	Volume of Water Desalinated				
						2016	2017	2018	2019	2020
Carlsbad Desalination P	56000	open-water intake (screened or unscreened)	sea water	.015 ntu	Brine Line	1250	2500	2500	2500	2500
					Total	1250	2500	2500	2500	2500

**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

Notes: CMWD purchases ocean desalinated water blended with non-desal water from its wholesaler, SDCWA.

Submittal 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		**2025**		**2030**		**2035**		**2040**		**2045** (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											
Purchased or Imported Water	SDCWA	13,802	13,802	14,155	14,155	14,586	14,586	15,019	15,019	15,545	15,545
Recycled Water	Carlsbad WRF	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839
Recycled Water	Meadowlark WRF	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989
Desalinated Water - Surface Water	Carlsbad Desal Plant (Purchased unders SDCWA)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
	Total	20,520	27,130	20,873	27,483	21,304	27,914	21,737	28,347	22,263	28,873

****Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES

OPTIONAL Table 6-9 Retail: Water Supplies — Projected *Potable*

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		**2025**		**2030**		**2035**		**2040**		**2045** (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											
Purchased or Imported Water	SDCWA	13,802	13,802	14,155	14,155	14,586	14,586	15,019	15,019	15,545	15,545
Desalinated Water - Surface Water	Carlsbad Desal Plant (Purchased unders SDCWA)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
	Total	16,302	16,302	16,655	16,655	17,086	17,086	17,519	17,519	18,045	18,045

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

OPTIONAL Table 6-9 Retail: Water Supplies — Projected *Non-Potable*

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		**2025**		**2030**		**2035**		**2040**		**2045** (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											
Recycled Water	Carlsbad WRF	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839	2,318	7,839
Recycled Water	Meadowlark WRF	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989	1,900	2,989
	Total	4,218	10,828	4,218	10,828	4,218	10,828	4,218	10,828	4,218	10,828

***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)

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 2019-2020, use 2020	**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	1986-2018	21339	100%
Single-Dry Year	2015	22805	107%
Consecutive Dry Years 1st Year	2011	22909	107%
Consecutive Dry Years 2nd Year	2012	22991	108%
Consecutive Dry Years 3rd Year	2013	23075	108%
Consecutive Dry Years 4th Year	2014	23159	109%
Consecutive Dry Years 5th Year	2015	23236	109%

Supplier 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 a Supplier 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.

***Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: CMWD selected base years that aligned with SDCWA's 2020 UWMP supply reliability assessment. SDCWA supplies are expected to be reliable through all years of a multiple year drought, with additional carryover supplies available in extended dry periods. As presented here, "% of Average Supply" indicates percent supply available to meet both potable and non-potable demands due to diversification and/or carryover storage.

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	20,520	20,873	21,304	21,737	22,263
Demand totals *(autofill from Table 4-3)*	20,520	20,873	21,304	21,737	22,263
Difference	0	0	0	0	0
NOTES:					

OPTIONAL Table 7-2 Retail: Normal Year Supply and Demand Comparison - Potable

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	16,302	16,655	17,086	17,519	18,045
Demand totals *(autofill from Table 4-3)*	16,302	16,655	17,086	17,519	18,045
Difference	0	0	0	0	0

NOTES:

OPTIONAL Table 7-2 Retail: Normal Year Supply and Demand Comparison - NonPotable

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	4,218	4,218	4,218	4,218	4,218
Demand totals *(autofill from Table 4-3)*	4,218	4,218	4,218	4,218	4,218
Difference	0	0	0	0	0

NOTES:

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	21,929	22,307	22,767	23,230	23,792
Demand totals*	21,929	22,307	22,767	23,230	23,792
Difference	0	0	0	0	0

Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

OPTIONAL Table 7-3 Retail: Single Dry Year Supply and Demand Comparison - Potable					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	17,422	17,799	18,259	18,722	19,284
Demand totals*	17,422	17,799	18,259	18,722	19,284
Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES:					

OPTIONAL Table 7-3 Retail: Single Dry Year Supply and Demand Comparison - Non-Potable

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	4,508	4,508	4,508	4,508	4,508
Demand totals*	4,508	4,508	4,508	4,508	4,508
Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	22,030	22,409	22,871	23,336	23,901
	Demand totals	22,030	22,409	22,871	23,336	23,901
	Difference	0	0	0	0	0
Second year	Supply totals	22,108	22,489	22,953	23,420	23,986
	Demand totals	22,108	22,489	22,953	23,420	23,986
	Difference	0	0	0	0	0
Third year	Supply totals	22,189	22,570	23,036	23,505	24,073
	Demand totals	22,189	22,570	23,036	23,505	24,073
	Difference	0	0	0	0	0
Fourth year	Supply totals	22,270	22,653	23,121	23,591	24,162
	Demand totals	22,270	22,653	23,121	23,591	24,162
	Difference	0	0	0	0	0
Fifth year	Supply totals	22,344	22,728	23,198	23,669	24,242
	Demand totals	22,344	22,728	23,198	23,669	24,242
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

OPTIONAL Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison - Potable

		2020*	2025*	2030*	2035*	2040* (Opt)
First year	Supply totals	17,501	17,880	18,343	18,808	19,372
	Demand totals	17,501	17,880	18,343	18,808	19,372
	Difference	0	0	0	0	0
Second year	Supply totals	17,564	17,944	18,409	18,875	19,442
	Demand totals	17,564	17,944	18,409	18,875	19,442
	Difference	0	0	0	0	0
Third year	Supply totals	17,628	18,009	18,475	18,944	19,512
	Demand totals	17,628	18,009	18,475	18,944	19,512
	Difference	0	0	0	0	0
Fourth year	Supply totals	17,692	18,075	18,543	19,013	19,584
	Demand totals	17,692	18,075	18,543	19,013	19,584
	Difference	0	0	0	0	0
Fifth year	Supply totals	17,751	18,135	18,605	19,076	19,649
	Demand totals	17,751	18,135	18,605	19,076	19,649
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

Units of measure (AF, CCF, MG) *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

OPTIONAL Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison - Non-Potable

		2020*	2025*	2030*	2035*	2040* (Opt)
First year	Supply totals	4,528	4,528	4,528	4,528	4,528
	Demand totals	4,528	4,528	4,528	4,528	4,528
	Difference	0	0	0	0	0
Second year	Supply totals	4,545	4,545	4,545	4,545	4,545
	Demand totals	4,545	4,545	4,545	4,545	4,545
	Difference	0	0	0	0	0
Third year	Supply totals	4,561	4,561	4,561	4,561	4,561
	Demand totals	4,561	4,561	4,561	4,561	4,561
	Difference	0	0	0	0	0
Fourth year	Supply totals	4,578	4,578	4,578	4,578	4,578
	Demand totals	4,578	4,578	4,578	4,578	4,578
	Difference	0	0	0	0	0
Fifth year	Supply totals	4,593	4,593	4,593	4,593	4,593
	Demand totals	4,593	4,593	4,593	4,593	4,593
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Note: Totals can be entered directly or from the Optional Planning Tool available in a different Excel Workbook, available at wuedata.water.ca.gov under Resources in the UWMP

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	19,108
Total Supplies	19,108
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	19,816
Total Supplies	19,816
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	20,524
Total Supplies	20,524
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use	21,231
Total Supplies	21,231
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use	22,116
Total Supplies	22,116
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

If you choose to fill these optional tables, please paste the combined information in the submittal table to the left.

OPTIONAL Table 7-5 Five-year Drought Risk Assessment Tables to address Water Code Section 10635(b) - Potable

2021	Total
Total Water Use - *Potable*	15,344
Total Supplies - *Potable*	15,344
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use [Use Worksheet]	16,052
Total Supplies [Supply Worksheet]	16,052
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	16,306
Total Supplies [Supply Worksheet]	16,306
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use [Use Worksheet]	17,013
Total Supplies [Supply Worksheet]	17,013
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use [Use Worksheet]	17,898
Total Supplies [Supply Worksheet]	17,898
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

OPTIONAL Table 7-5 Five-year Drought Risk Assessment Tables to address Water Code Section 10635(b) - Non-Potable

2021	Total
Total Water Use - Non-potable	3,764
Total Supplies - Non-potable	3,764
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use - Non-potable	3,764
Total Supplies - Non-potable	3,764
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	4,218
Total Supplies - Non-potable	4,218
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use - Non-potable	4,218
Total Supplies - Non-potable	4,218
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use - Non-potable	4,218
Total Supplies - Non-potable	4,218
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description)*
1	Up to 10%	Drought Watch Condition - Reasonable probability that supplies will not meet demands
2	Up to 20%	Drought Watch Condition - Supplies will not be able to meet expected demands
3	Up to 30%	Drought Critical Condition - Supplies not meeting current demands
4	Up to 40%	Drought Critical Condition - Supplies not meeting current demands
5	Up to 50%	Drought Emergency Condition - Major failure of a supply, shortage, or distribution system
6	>50%	Drought Emergency Condition - Major failure of a supply, shortage, or distribution system

NOTES: A water shortage above 40% (including a 50% shortage) triggers Level 4 restrictions, which includes prohibition on outdoor water uses, and provides CMWD the authority to make further restrictions, as necessary, for non-compliant users, as well as for any CMWD customer should water supplies require.

Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1	Landscape - Limit landscape irrigation to specific times	0.90%	Irrigate residential and commercial landscape before 10 a.m. and after 6 p.m.	No
1	CII - Other CII restriction or prohibition	0.20%	Irrigate nursery and commercial grower's products before 10 a.m. and after 6 p.m.	No
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.90%	Repair all water leaks within five days of notification by CMWD	No
1	Expand Public Information Campaign	4.70%	CMWD increased public education and outreach efforts to emphasize increased public awareness of the need to implement water conservation practices	No
1	Offer rebates on indoor and outdoor water use efficiency, turf replacement	4.20%	Ongoing programs	No
2	Landscape - Limit landscape irrigation to specific days	4.20%	Limit residential and commercial landscape irrigation to days assigned by CMWD General Manager	Yes

2	Landscape - Other landscape restriction or prohibition	1.80%	Limit irrigation using sprinklers to length of time determined by CMWD General Manager	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.90%	Repair all water leaks within seventy-two hours of notification by CMWD	Yes
2	Water Features - Restrict water use for decorative water features, such as fountains	5.80%	Stop operating ornamental fountains unless recycled water is used	Yes
3	Landscape - Limit landscape irrigation to specific days	8.30%	Limit residential and commercial landscape irrigation to days assigned by CMWD General Manager	Yes
3	Landscape - Other landscape restriction or prohibition	1.80%	Limit irrigation using sprinklers to time limits determined by CMWD General Manager	Yes
3	Water Features - Restrict water use for decorative water features, such as fountains	1.10%	Stop filing or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life	Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	0.80%	Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems	Yes

3	Moratorium or Net Zero Demand Increase on New Connections	2.80%	No new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service shall be issued, with the exception of the circumstances listed in the Drought Ordinance.	Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.90%	Repair all water leaks within forty-eight hours of notification by CMWD	Yes
4	Landscape - Prohibit all landscape irrigation	22.20%	Stop all landscape irrigation, except crops and landscape products of commercial growers and nurseries, and except for categories specified in the Drought Ordinance (e.g., fire protection, erosion control, rare or essential plants, livestock, environmental mitigation).	Yes
4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0.90%	Repair all water leaks within twenty-four hours of notification by CMWD	Yes
NOTES:				

Submittal Table 8-3: Supply Augmentation and Other Actions

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
3	Transfers	Flexible depending on other actions; can adjust to achieve conservation target	City of Oceanside, Vallecitos Water District, and SDCWA would be a potential source.
3	Stored emergency supply	600 AF	Maerkle Reservoir holds a maximum 600 AF.
3	Other actions (describe)	13%	Suspension of consideration of annexations to CMWD service area
4	Other actions (describe)	Flexible depending on other actions; can adjust to achieve conservation target	Establish a water allocation for property served by CMWD
NOTES:			

Submittal Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Carlsbad	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Diego County	Yes	Yes
NOTES:		

Appendix E – Climate Change Strategies and Vulnerability

SAN DIEGO
Integrated Regional
Water Management

Appendix 7-D:
San Diego IRWM Climate Change Study

SAN DIEGO
Integrated Regional
Water Management

Climate Change Planning Study

Final

Prepared by:

RMC
Water and Environment

May 2013

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Acknowledgements

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Goldy Thach, City of San Diego

Kathy Weldon, City of Encinitas

List of Abbreviations

AB	Assembly Bill
AF	Acre-foot
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CAT	Climate Action Team
CCAR	California Climate Action Registry
CCAS	California Climate Action Strategy
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CNRA	California Natural Resources Agency
CO_2	Carbon Dioxide
DWR	Department of Water Resources
EO	Executive Order
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
HFCs	Hydrofluorocarbons
IRWM	Integrated Regional Water Management
kWh	kilowatt hours
$MMTCO_2E$	Million metric tons carbon dioxide equivalent
MSHCP	Multiple Species Habitat Conservation Plan
N_2O	Nitrous Oxide
NF_3	Nitrogen Trifluoride
OPC	Ocean Protection Council
OPR	Office of Planning and Research
PFCs	Perfluorocarbons
RMS	Resource Management Strategy
SB	Senate Bill
SDCWA	San Diego County Water Authority

SDG&E	San Diego Gas & Electric
SDRIP	San Diego River Improvement Project
SF_6	Sulfur Hexafluoride
SLR	Sea Level Rise
SWP	State Water Project
SWRCB	State Water Resources Control Board
TCR	The California Registry
TMDL	Total Maximum Daily Load
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency
WET-CAT	Water Energy Team of the Climate Action Team

1 Climate Change in Water Resources

This chapter addresses requirements set forth in the Resource Management Strategies (RMS) Standard in the *2012 IRWM Program Guidelines* (DWR 2012). As such, this chapter considers each RMS listed in the *California Water Plan (CWP) Update 2009* (DWR 2009), documents which RMS will help achieve the IRWM Plan Update objectives, presents all RMS considered for the IRWM Plan Update, and includes an evaluation of the adaptability of water management systems in the San Diego IRWM Region to climate change.

1.1 Introduction

Climate change projections have shown that California can expect to be impacted by changes to temperature and precipitation in the future, and even now California is beginning to experience the effects of these impacts. Water resource planners already face challenges interpreting new climate change information and discerning which response methods and approaches will be most appropriate for their planning needs. This Climate Change Planning Study (Study) examines current climate change science, policies, and regulations in terms of how they affect the San Diego Integrated Regional Water Management Region (Region). This Study serves as an initial guide for the Region to begin incorporating climate change adaptation and mitigation measures into its Integrated Regional Water Management (IRWM) Plan, where adaptation is how the Region can respond to climate change effects and mitigation is how the Region can reduce future climate change effects, and includes the following sections:

- Chapter 1: Climate Change in Water Resources
- Chapter 2: Climate Change in IRWM Planning
- Chapter 3: Effects of Climate Change on the Region
- Chapter 4: Vulnerability Analysis
- Chapter 5: Climate Change Management Strategies
- Chapter 6: Recommendations

1.2 Adaptation Relationship

Climate change is expected to directly impact a number of areas related to water resources, in particular temperature, precipitation, and sea level rise. As global temperature increases, seasonal precipitation patterns including the timing, intensity and form of precipitation, are projected to continue to change. Sea level rise, which has risen about seven inches over the last century due to warming, is expected to rise further in the future. In order for the Region to adapt to, or protect against, climate change, it must first identify the impacts climate change is expected to have on the Region.

These impacts are expected to further impact local water resources as follows (DWR, 2011):

- Temperature increases:
    - More winter precipitation falling as rain rather than snow, leading to reduced snowpack water storage, reduced long term soil humidity, reduced groundwater and downstream flows, and reduced imported water deliveries

  - Higher irrigation demands as temperatures alter evapotranspiration rates, and growing seasons become longer
  - Exacerbated water quality issues associated with dissolved oxygen levels, increased algal blooms and increased concentrations of salinity and other constituents
  - Impacted habitats for temperature-sensitive fish and other life forms, and increased susceptibility of aquatic habitats to eutrophication
- Precipitation pattern changes:
  - Increased flooding (both coastal and inland) caused by more intense storms
  - Changes to growth and life cycle patterns caused by shifting weather patterns
  - Threats to soil permeability, adding to increased flood threat and decreased water availability
  - Reduced water supply caused by the inability to capture precipitation from more intense storms, and a projected progressive reduction in average annual runoff (though some models suggest that there may be some offset from tropical moisture patterns increasingly moving northward)
  - Increased turbidity caused by more extreme storm events, leading to increased water treatment needs and impacts to habitat
  - Increased wildfires with less frequent, but more intense rainfall, and possibly differently timed rainfall through the year, potentially resulting in vegetation cover changes
  - Reduction in hydropower generation potential
- Sea level rise:
  - Inundation and erosion of coastal areas (coastal bluffs in particular), including coastal infrastructure
  - Saline intrusion of coastal aquifers
  - Increased risk of storm surges and coastal flooding and erosion during and after storms
  - Changes in near-shore protective biogeography such as loss of sand, tide pools and kelp beds

Although the extent of these changes is uncertain, scientists agree that some level of change is inevitable; therefore, it will be necessary to implement flexible adaptation measures that will allow natural and human systems to respond to these climate change impacts in timely and effective ways. Adaptation measures may be implemented in response to climate change impacts that have already occurred, or expected impacts that are projected to occur. It is important to take note that water resources decisions made in the future will impact the rate of climate change.

In addition to adapting to climate change, the Region has the opportunity to mitigate against climate change by minimizing greenhouse gas emissions emitted by water supply and wastewater activities. The relationship between water resources and greenhouse gas emissions is discussed further in the next section.

1.3 Water-Energy Nexus

To understand how water is related to climate change, it's helpful to understand the connection between water resources planning and energy, which is known as the water-energy nexus. Energy production accounts for between 30% and 40% of total GHG production in California, and can emit a number of different types of GHGs. California's Air Resources Board recognizes and inventories the following GHGs: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF3). These GHGs vary in magnitude in terms of their GHG strength, and therefore are converted to be equivalent to CO2 for the purposes of measuring GHG emissions across the state. CO2 emissions (or the equivalent for other GHGs) are the common measurement for GHG emissions. (CARB, 2013). Currently, statewide water use accounts for nearly 20% of electricity use, and 30% of non-power plant related natural gas consumption (CEC, 2006). Water use and energy are linked in at least three critical ways (CEC, 2011):

1. Water pumping and purification: The amount of energy used to pump water will depend upon the source (e.g., surface versus groundwater), the distance and height the water must be moved, and the treatment requirements. For example, pumping water to San Diego County through the State Water Project, which accounts for nearly 80% of the County's water supply, uses about 4,600 kilowatt hours (kWh) per acre-foot of electricity (DWR, 2012a), while groundwater pumping typically uses 300 kWh/AF (Cohen, 2007).
2. Wastewater treatment: The amount of energy used in wastewater treatment plant typically ranges from 1,100 to 4,600 kWh per million gallons of wastewater treated (CEC, 2006).
3. Water heating: In an average California home, 41 percent of the water is used for dishwashing, faucets, laundry, and bathing water that is often heated.

These amounts, in total, are so significant that we must also count the amount of GHGs from the fossil fuels that are burned to produce the oil, gas, coal and other combustibles which are then burned to produce the electricity. Understanding the water-energy nexus in California provides opportunities to attain significant energy benefits through two primary strategies (CEC, 2006):

1. Conserving water saves the energy that would have been used to convey, treat, and distribute the water, and energy that may have been needed to collect, treat and dispose of the wastewater.
2. Reducing the energy intensity of water operations reduces the total amount of energy consumed in the water sector and ultimately reduces the value of energy embedded in saved water.

By reducing the energy used through the above strategies, GHG production can be reduced.

It should be noted that, at times, the above processes may also be used to generate energy, such as through cogeneration at wastewater treatment plants, or capturing energy as water flows downhill. Concurrently, energy production processes require water for steam production for thermoelectric power and to cool equipment by absorbing waste heat. Energy conservation in the Region can reduce this need.

These strategies are reflected in California's legislation and policy regarding climate change mitigation and greenhouse (GHG) emissions reduction discussed in the remainder of Chapter 1.

1.4 Legislative and Policy Context

In order to address currently-projected climate change impacts to California's water resources, the Department of Water Resources' (DWR's) 2012 IRWM Grant Program Guidelines require that IRWM Plans describe and consider climate change adaptation and mitigation. Below is a summary of State legislation and policy that were considered as part of this IRWM Plan.

Executive Order S-3-05

Executive Order (EO) S-3-05, signed on June 1, 2005 by Governor Arnold Schwarzenegger, is one of the key pieces of legislation that has laid the foundation for California's climate change policy. This piece of legislation recognizes California's vulnerabilities to the impacts of climate change, which include its water-related natural resources. EO S-3-05 established three GHG reduction targets for California:

- By 2010, reduce GHG emissions to 2000 California levels
- By 2020, reduce GHG emissions to 1990 California levels
- By 2050, reduce GHG emissions to 80 percent below 1990 California levels

In addition to establishing GHG reduction targets for California, EO S-3-05 dictates that the Secretary of the California Environmental Protection Agency (CalEPA) establish the Climate Action Team (CAT) for State agencies to coordinate oversight of efforts to meet these targets. As laid out in EO S-3-05, the CAT submits biannual reports to the governor and State legislature describing progress made toward reaching the targets.

There are currently 12 sub-groups within the CAT, one of which is the Water-Energy group (also known as WET-CAT). WET-CAT was tasked with coordinating the study of GHG effects on California's water supply system, including the development of GHG mitigation strategies for energy consumption related to water use. Since the adoption of the Assembly Bill 32 Scoping Plan (see the following section), WET-CAT has been working on the implementation and analyses of six water-related measures identified in the Scoping Plan:

- Water Use Efficiency
- Water Recycling
- Water System Energy Efficiency
- Reuse Urban Runoff
- Increase Renewable Energy Production
- Public Goods Charge for Water

Assembly Bill 32: The California Global Warming Solutions Act of 2006

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 was signed by Governor Schwarzenegger to codify the mid-term GHG reduction target established in EO S-3-05 (reduce GHG emissions to 1990 levels by 2020) through, among other mechanisms, imposing an enforceable cap on GHG emissions. AB 32 directed the California Air Resources Board (CARB) to develop discrete early actions to reduce GHG emissions by 2007, and to adopt regulations to implement early action measures by January 1, 2010.

Climate Change Scoping Plan

AB 32 also required CARB to prepare a Scoping Plan to identify and achieve reductions in GHG emissions in California. The approved Climate Change Scoping Plan, adopted by CARB in December 2008, recommends specific strategies for different business sectors, including water management, to achieve the 2020 GHG emissions limit. The Scoping Plan as it relates to water resources is discussed further in Section 0 below.

Senate Bill 97

Senate Bill 97 (SB 97) directed the Governor's Office of Planning and Research (OPR) to develop amendments to the California Environmental Quality Act (CEQA) Guidelines to determine how climate change is analyzed in documents required by CEQA. On December 31, 2009, the California Natural Resources Agency adopted amendments to the CEQA Guidelines and sent them to the California Office of Administrative Law for approval and filing with the Secretary of State. These CEQA Guideline amendments became effective on March 18, 2010. The CEQA Guidelines are not prescriptive; rather they encourage lead agencies to consider many factors in performing a CEQA analysis, and maintain discretion with lead agencies to make their own determinations based on substantial evidence.

Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water

DWR, in collaboration with the State Water Resources Control Board, other state agencies, and numerous stakeholders, has initiated a number of projects to begin climate change adaptation planning for the water sector. In October 2009, DWR released the first state-level climate change adaptation strategy for water resources in the U.S., and the first adaptation strategy for any sector in California. Entitled Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water, the report details how climate change is currently affecting the state's water supplies, and sets forth ten adaptation strategies to help avoid or reduce climate change impacts to water resources.

Central to these adaptation efforts will be the full implementation of IRWM plans, which address regionally-appropriate management practices that incorporate climate change adaptation. These plans will evaluate and provide a comprehensive, economical, and sustainable water use strategy at the watershed level for California.

Executive Order S-13-08

Given the potentially serious threat of sea level rise to California's water supply and coastal resources, and the subsequent impact it would have on our state's economy, population, and natural resources, Governor Schwarzenegger issued EO S-13-08 to enhance the state's management of climate impacts from sea level rise, increased temperatures, shifting precipitation, and extreme weather events. It requested a California Sea Level Rise Assessment Report to be conducted by the National Academy of Sciences, which was released in June 2012.

California Climate Adaptation Strategy

In response to the passage of EO S-13-08, the California Natural Resources Agency released the report entitled 2009 California Climate Adaptation Strategy that summarizes the best known science on climate change impacts in the state, assesses vulnerabilities, and outlines possible solutions that can be implemented within and across the state agencies to promote resilience to climate change.

GHG Reporting Rule

While California has taken the lead in climate change policy and legislation, there have been several recent important developments at the federal level. On September 22, 2009, the United States Environmental Protection Agency (USEPA) released its final GHG Reporting Rule (Reporting Rule). Starting in 2010, facility owners that emit 25,000 metric tons of CO2 emissions or more per year are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. These activities will dovetail with the AB 32 reporting requirements in California.

Water Code Section 10541

California has included climate change in its water code to ensure that it is considered as part of water management. California Water Code Section 10541 contains requirements for considering climate change in IRWM Plans. Specifically, it states that the guidelines for IRWM Plans are required to include:

- Consideration of GHG emissions of identified programs and projects
- Evaluation of the adaptability to climate change of water management systems in the region

1.5 AB 32 Scoping Plan and CARB Strategies

As stated previously, AB 32 required CARB to prepare a Scoping Plan to identify and achieve reductions in GHG emissions in California, and recommended specific strategies for different business sectors to achieve the 2020 GHG emissions limit. This Scoping Plan was introduced in 2005, and adopted in 2008. Water use is identified in the AB 32 Scoping Plan as a sector requiring significant amounts of energy, and sets a goal to "continue efficiency programs and use cleaner energy sources to move and treat water." This goal recognizes that California has a history of advancing water efficiency and conservation programs.

The Scoping Plan identifies six greenhouse gas emissions reduction (mitigation) measures for the water sector that could reduce GHGs if implemented statewide (please note that not all of these measures may be applicable to the San Diego IRWM Region):

1. Water Use Efficiency: Through increases in water use efficiency measures, reduce total statewide emissions
2. Water Recycling: Through increases in water recycling, reduce total statewide emissions
3. Water system energy efficiency: Through increases in water system energy efficiency, reduce total statewide emissions
4. Reuse of urban runoff: Through reuse of urban runoff, reduce total statewide emissions
5. Increase renewable energy production: Through the increase in renewable energy production, reduce statewide emissions
6. Public goods charge: To be determined

The first three of the measures will reduce energy requirements associated with providing reliable water supplies. The next two measures will reduce the amount of non-renewable electricity associated with conveying and treating water. The final measure (public goods charge) focuses on providing sustainable funding for implementing these actions. Other sectors identified in the Scoping Plan, such as Agriculture and Green Building, recognize that water use efficiency measures will help to decrease GHG emissions as well, but do not calculate water use efficiency savings separately. The Scoping Plan states that to implement these GHG reduction measures, CARB and other State agencies will work with stakeholders and the public to develop regulatory measures and other programs.

1.6 California Climate Action Registry/The Climate Registry

The California Climate Action Registry (CCAR) was a program of the Climate Action Reserve which closed in December 2010. It served as a voluntary GHG registry to promote early actions to reduce GHG emissions by organizations. CCAR members voluntarily measured, verified, and publicly reported their GHG emissions. Members of the CCAR have been transitioned over to The Climate Registry (TCR), which is a nonprofit GHG emissions registry for North America that provides organizations with the tools to help them calculate, verify, report and manage their GHG emissions within a single registry. A number of agencies and organizations in the IRWM Region are voluntary members of TCR, including:

- San Diego County Water Authority
- City of San Diego
- County of San Diego
- Metropolitan Water District of Southern California

TCR's tools and database are particularly useful to those entities required to report their GHG emissions according to the EPA's Greenhouse Gas Reporting Rule (74 FR 56260) which requires reporting of GHG data and other relevant information from large sources and suppliers in the United States, and went into effect in January 2010. Though primarily affecting facilities that supply fossil fuels or industrial GHGs, manufacturers of vehicles and engines, this rule also applies to facilities that are responsible for the emission of 25,000 metric tons or more of GHG emissions per year, and therefore may apply to water and wastewater utilities, and large water purchasers. In addition to meeting USEPA requirements, by becoming a member of TCR, a utility, agency or company may better be able to respond to California's requirements for reporting and reducing GHG emissions.

1.7 Climate Action Plans and Climate Initiatives

Climate action plans are becoming more common among California's cities and counties. A climate action plan, which may also be referred to as a climate mitigation and adaptation plan, is a set of strategies intended to guide efforts for reducing GHG emissions, and typically covers a range of sectors such as energy, transportation, water, wastewater, solid waste, infrastructure, urban forestry and agriculture, and public health. Plans may also include strategies to guide efforts for reducing the impact of climate change effects on the area. Within the Region, the County and a number of cities and agencies have developed or are developing climate action plans and adaptation plans:

- County of San Diego Climate Action Plan
- San Diego County Water Authority Climate Action Plan and Climate Mitigation Plan
- City of San Diego Climate Mitigation and Adaptation Plan

- City of San Diego Long Range Water Resources Plan
- City of Chula Vista Adaptation and Mitigation Plan
- City of Encinitas Climate Action Plan
- City of Escondido Climate Action Plan
- City of San Marcos Climate Action Plan
- Port of San Diego Climate Mitigation and Adaptation Plan
- San Diego Association of Governments (SANDAG) Regional Energy Strategy and Climate Action Strategy
- San Diego Bay Sea Level Rise Adaptation Study
- San Diego Foundation Focus 2050 Study

In addition to the Climate Action Plans developed in the Region, the San Diego Foundation has developed a Climate Initiative to support community awareness about the local impacts of climate change. This initiative aims to educate the community about climate change, support climate change research, partner with local governments to address climate change, and provide technical assistance for climate action planning. As part of this initiative, every jurisdiction in the County has completed a GHG emissions inventory.

2 Climate Change in IRWM Planning

2.1 DWR Requirements

As previously discussed, the California Water Code contain language stating that IRWM Plan guidelines require climate change be considered as part of IRWM Plans. In line with this, DWR has included a Climate Change Standard in the IRWM Guidelines that requires IRWM plans to include a "cursory analysis of the effects on the region due to climate change, with the intent that a more refined analysis be required as additional guidance is made available." To meet these guidelines, DWR has suggested that climate change be included in IRWM Plans as shown in Table 1.

Table 1: IRWM Plan Standards in Relation to Climate Change

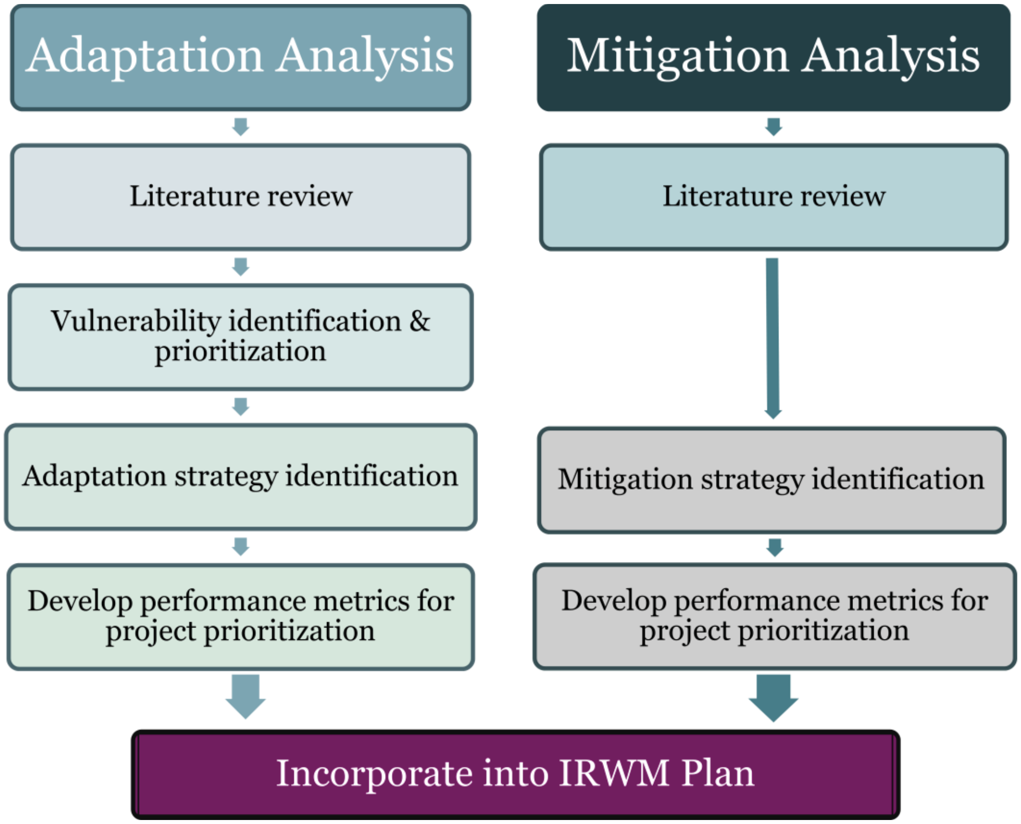
Plan Section According to IRWM Plan Standards	Climate Change Information to Include[1]
Region Description	Language that describes likely climate change impacts on the Region as determined from a vulnerability assessment
Plan Objectives	Adaptation to climate change: • Address adapting to changes in the amount, intensity, timing, quality and variability precipitation, runoff and recharge. • Consider sea level rise effects on water supply and other water resource conditions (e.g., recreation, habitat) and identify suitable adaptation measures. Consider OPC's Sea Level Rise Policy Reducing emissions (mitigation of greenhouse gasses) • Reduce carbon consumption, especially the energy embedded in water use, and ultimately reduce GHG emissions • Consider the strategies adopted by CARB in its AB 32 Scoping Plan, including innovative applications • Consider options for carbon sequestration where such options are integrally(directly or indirectly) tied to supporting IRWM Plan objectives
Resource Management Strategies	Identify and implement adaptation strategies that address region-specific or local climate change contributions or impacts
Project Review Process	Include the following factors: • Contribution of the project to adapting to climate change • Contribution of the project in reducing GHG emissions as compared to project alternatives
Relation to Local Water Planning	Consider and incorporate water management issues and climate change adaptation and mitigation strategies from local plans into the IRWM Plan.
Relation to Local Land Use Planning	Demonstrate information sharing and collaboration with regional land use planning in order to management multiple water demands through the state (as described in CWP Update 2009), adapt water management systems to climate change, and potentially offset climate change impacts to water supply.
Plan Performance and Monitoring	Contain policies and procedures that promote adaptive management.
Coordination	Consider the following: • Stay involved in CNRA's California Adaptation Strategy process • Consider joining The California Registry (www.theclimateregistry.org)

1. Based on information in DWR's 2012 Prop 84 and Prop 1E IRWM Guidelines, Appendix C, Table 7

2.2 Adaptation and Mitigation Analysis

In order to meet the IRWM Plan standards discussed in the previous section, the climate change analysis process shown in Figure 1 was followed. As previously discussed in this Study, climate change includes both adaptation (responding to climate change) and mitigation (reducing GHGs), and therefore is reflected in the analysis process below. While both the adaptation analysis and mitigation analysis include a literature review, strategy identification and performance metrics development, the adaptation analysis includes an extra step to identify and prioritize climate change vulnerabilities. The information gathered through this climate change analysis will be incorporated into the Region's IRWM Plan update. By working through each of these steps, the Region can meet the requirements contained in DWR's IRWM Plan Guidelines.

Figure 1: Climate Change Analysis Process



2.3 San Diego IRWM Region Climate Change Study

To fulfill DWR's requirements and work through the climate change analysis discussed above, the Region established a Climate Change Workgroup (Workgroup) comprised of various water resources and planning representatives that have experience in climate change planning within the Region to work with a consultant to develop this Climate Change Planning Study (Study). In addition, local climate change efforts, in particular the San Diego Foundation Regional Focus 2050 Study which defines Region-specific climate change impacts, were used in the climate change assessment.

3 Effects of Climate Change on Region

3.1 Impacts and Effects on Region

Estimating the impacts of climate change at a regional level is challenging due to the coarse spatial scale of models that project climate change impacts of temperature and rainfall, and due to the long time scale evaluated in many models (to the year 2100). Recently, state and local entities have been working to downscale climate models to allow for climate change planning at a level that can be useful for planning efforts. The timescale used for these models has also been downscaled to provide outputs for the year 2050, and though this is still a longer timescale than is used in IRWM planning, is still useful for assessing climate change.

To incorporate climate change into water resources management, downscaled temperature and precipitation projections are input into other models, such as hydrologic models, to project impacts to water supply, water demand, snow pack, sea level rise, and wildfires. The results of these models have been summarized in a variety of studies and planning documents at the state, regional, and local levels. As part of this Study, a number of these documents were reviewed to determine which best represented the impacts for the Region. These documents include:

- *Regional Focus 2050 Study* (San Diego Foundation, 2008a & 2008b)
- *2010 Urban Water Management Plan* (San Diego County Water Authority, 2011)
- *Using Future Climate Projections to Support Water Resources Decision Making in California,* (California Climate Change Center, 2009)
- *Reconciling Projections of Colorado River Streamflow, Southwest Hydrology* (Hoerling et al., 2009)

Climate change impacts and effects are based on very different climate change assumptions and analysis approaches. Table 2 summarizes the impacts and effects of climate change on the San Diego Region by 2050 (unless otherwise indicated), which are typically based on an average of various climate change analyses. Generally, climate change is expected to increase temperature in the region. Rainfall projections vary with some projections showing that the Region will receive as much as 35% less rainfall and some showing up to 17% more rainfall (San Diego Foundation, 2008a). It's generally accepted that storms will be less frequent, but more intense (San Diego Foundation, 2008a). With higher temperatures and changes in rainfall volume and frequency, additional impacts will be felt in the Region.

Imported water supply from the State Water Project is projected to decrease by up to 25% (California Climate Change Center, 2009), while Colorado River Aqueduct supply may decrease by up to 20% (Hoerling et al, 2009). An overall shortfall of 164,000 acre-feet per year (AFY) in imported water is expected by 2050 (San Diego Foundation, 2008b).

Preliminary analysis of regional water demand trends in the San Diego County Water Authority service area indicate that climate change impacts may result in a slight demand increase, between 0.6 and 1.8%, by the year 2035. (SDCWA, 2011).

In currently accepted models, sea level rise is projected to be at least 12 to 18 inches by 2050, which would both inundate the coast due to the average rise, and impact coastal flood control during storms (San Diego Foundation, 2008a).

The changes to climate are also expected to increase the frequency of wildfires. Studies suggest that there will be a 40% increase in Coastal Sage Scrub acreage burned (San Diego Foundation, 2008a), and that 54% more acreage in the Western U.S. will burn compared to present (San Diego Foundation, 2008a). Increases in wildfires have the potential to increase sedimentation and turbidity of surface waters, and increase flash flooding.

Knowing what climate change impacts and effects are projected to have on the Region, it's possible to determine what water resources in the Region are most vulnerable to climate change. The next sections identify and prioritize the vulnerabilities to determine how to best apply management practices. These effects were presented to and vetted by the Workgroup at a meeting held on June 12, 2012.

Table 2: Impacts and Effects of Climate Change on Region by 2050

Impact	Effect
Temperature	• 1.5°F to 4.5°F average temperature increase
Rainfall	• Variable projections predict between 35% drier and 17% wetter • Increase in variability between years
Supply	• Up to 25% decrease in SWP supply • Up to 20% decrease in Colorado River supply • 164,000 afy average shortfall in imported supply
Demand	• Potential 0.6% to 1.8% increase in demand by 2035
Sea level rise	• 12 to 18 inch rise in mean sea level rise
Wildfires	• 40% increase in California Coastal Shrub acreage burned in Southwestern U.S. • 54% increase in overall acreage burned in Western U.S.

3.2 Identification of Vulnerabilities

Understanding the potential impacts and effects that climate change is projected to have on the Region allows an informed vulnerability assessment to be conducted for the Region's water resources. A climate change vulnerability assessment helps a Region to assess its water resource sensitivity to climate change, prioritize climate change vulnerabilities, and ultimately guides decisions as to what strategies and projects would most effectively adapt to and mitigate against climate change. DWR has identified a series of questions to help regions identify key indicators of potential vulnerability, including (DWR, 2011):

- Currently observable climate change impacts (climate sensitivity)
- Presence of particularly climate sensitive features, such as specific habitats and flood control infrastructure (internal exposure)
- Resiliency of a region's resources (adaptive capacity)

The Workgroup developed an analysis of the Region's vulnerabilities to climate change at the June 12, 2012 climate change workshop by asking a series of questions suggested by DWR in its 2011 *Climate Change Handbook for Regional Water Planning.* Table 3 summarizes the analysis, which includes:

- Vulnerability Question: Taken from Box 4-1 of DWR's *Climate Change Handbook*

- Answer: Provided at June 12, 2012 workshop
- Justification: Why Y (yes) or N (no) was selected
- Vulnerability Issue: What is the climate change vulnerability issue that is identified by asking the question?

Following this analysis, the vulnerability issues were prioritized by the Workgroup. This activity and results are described in Chapter 4.

Table 3: Climate Change Vulnerability Indicator Questions

Vulnerability Question	Answer	Justification	Vulnerability Issue
Water Demand			
Are there major industries that require cooling/process water in your planning region?	Y	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?	Y	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?	Y	The small groundwater basins in the Region tend to decrease resiliency. Increasing impermeability reduces recharge. Sweetwater, Oceanside, Escondido/Vista. Salt water intrusion as water tables drop.	Lack of groundwater storage to buffer drought
Are water use curtailment measures effective in your region?	Y	Shortage management activities currently in place were effective in meeting demands during the last major drought which began in 2007. Management measures not previously considered, such as soil conditions, may provide additional opportunities.	Perceived limited ability to conserve further
Does water use vary by more than 50% seasonally in parts of your region?	Y	Water agencies have peaking factors ranging from 2:1 to 6:1. Some of the higher peaking agencies dependent on imported water will have reduced peaking as agricultural use declines and more development occurs.	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?	N	Most streams are intermittent; however, some agencies that move water between 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?	Y	Imported supplies (SWP, 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?	Y	Approximately 80% of the Region's supplies are imported.	Decrease in imported supply

Vulnerability Question	Answer	Justification	Vulnerability Issue
Would your region have difficulty in storing carryover supply surpluses from year to year?	N	No, the County has sufficient storage capacity, and is currently completing an emergency storage carryover project. It should be noted that there is little transfer market available in California, with a focus of storage in northern California.	Decrease in reliability
Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?	Y	Some brackish groundwater exists 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?	Y	Drought management plans had to be put into effect. It should be noted that the Region 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?	Y	Quagga, Arundo, Tamarisk	Invasives can reduce supply available
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?	Y	Wildfires are a common occurrence in the area, and often cause increased erosion in the Region's watersheds.	Increased erosion and sedimentation
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?	Y	Several water bodies are 303(d) listed for water quality issues related to eutrophication including the Lake Hodges, Famosa Slough, Guajome Lake, Loma Alta Slough, Mission Bay at the mouths of Rose Creek and Tecolote Creek, lower San Diego River, Sal Elijo Lagoon, Santa Margarita Lagoon, Tijuana River, and the Tijuana River Estuary.	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?	Y	At times during the year, the only flow in some streams is irrigation overflow, which in turn increase 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?	Y	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

Vulnerability Question	Answer	Justification	Vulnerability Issue
Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?	Y	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.	Increase in treatment needs and cost
Sea Level Rise			
Has coastal erosion already been observed in your region?	Y	Coastal erosion occurs at unstable bluffs along the coast, for example: Sunset cliff, bluffs along City of San Diego, Encinitas, military infrastructure at Coronado Island and Camp Pendleton..	Decrease in land due to erosion
Do tidal gauges along the coastal parts of your region show an increase over the past several decades?	Y	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?	N	None noted	
Are there coastal structures, such as levees or breakwaters, in your region?	Y	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?	Y	Beach community - wide-spread	
Are there climate-sensitive low-lying coastal habitats in your region?	Y	Habitat type - salt marsh	Damage to ecosystems/habitats
Are there areas in your region that currently flood during extreme high tides or storm surges?	Y	Mission Valley flooded from San Diego river during high tidal events	Storm drains and sewer systems will be inundated
Flooding			
Does critical infrastructure in your region lie within the 200-year floodplain?	Y	There is low-lying water and wastewater infrastructure. Pump stations.	Increases in inland flooding
Does aging critical flood protection infrastructure exist in your region?	Y	San Diego River Flood Improvement project. San Diego River Improvement Project (SDRIP) at Mission Valley.	

Vulnerability Question	Answer	Justification	Vulnerability Issue
Have flood control facilities (such as impoundment structures) been insufficient in the past?	Y	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, Moreno Valley, Ocotillo Wells, Lemon Crest, below San Vicente Reservoir, Ramona, etc.	
Are wildfires a concern in parts of your region?	Y	Wildfires are a common occurrence in the Region.	Increases in flash flooding
Does part of your region lie within the Sacramento-San Joaquin Drainage District?	N	Not applicable	Not applicable
Ecosystem and Habitat			
Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?	Y	Erosion and sedimentation issues in Penasquitos Canyon, San Onofre, Crest Canyon, San Dieguito lagoon, Del Mar area, Encinitas area,	Increased impacts to coastal species
Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?	Y	A number of brackish lagoons exist along the coast including Batiquitos Lagoon, Buena Vista Lagoon, Agua Hedionda Lagoon, and San Elijo Lagoon.	
Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?	Y	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?	Y	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?	Y	A number of endangered and threatened species exist in the Region.	Decrease in available, necessary habitat
Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?	Y	Beach tourism, reservoir recreation, river trails	
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?	Y	Multiple Species Habitat Conservation Plans (MSHCPs) working on ensuring corridors but some need to be created	

Vulnerability Question	Answer	Justification	Vulnerability Issue
Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change?	N	No, the Region is not within any of the ten listed habitats.	
Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?	Y	Some rivers and streams have quantified flow requirements but are primarily related to water rights. There is a bacteria Total Maximum Daily Load (TMDL) 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?	Y	Approximately 10% of electricity provided by SDG&E is hydropower. The Water Authority also produces hydroelectric power which is sold to San Diego Gas & Electric (SDG&E).	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?	Y	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.	

4 Vulnerability Analysis

Once the Workgroup identified the Region's areas of concern in terms of climate change issues, it was able to begin examining the adaptability of its water resources to climate change by prioritizing the vulnerability issues. In prioritizing the vulnerability issues, the Workgroup identified those water resources that are of highest concern to the Region in terms of the significance of the impact of climate change and therefore the level of adaptation that will be needed.

4.1 Vulnerability Prioritization Process

The vulnerabilities identified were then prioritized during an exercise conducted with the Working group. Each member selected five vulnerability issues they determined should have the highest priority in being addressed. In total, the nine members of the Workgroup resulted in 45 votes. Votes were spread across nearly all of the categories, indicating the Workgroup perceived there to be a wide range of climate change vulnerabilities. The vulnerability issues were then grouped into five priority levels ranging from very high to very low according to the number of votes: very high (nine votes), high (three to four votes), medium (two to three votes), low (one to two votes), very low (no votes).

At a subsequent meeting held on July 26, 2012, the Workgroup reviewed the results and made suggestions for refinements that could be made to better align the prioritization with the vulnerabilities identified in planning documents. These suggestions were incorporated into the prioritized vulnerability issues which are shown in the next section.

4.2 Vulnerability Prioritization Results

The Region's list of prioritized vulnerabilities developed by the Workgroup is shown in Table 4, and discussed further below.

Table 4: Prioritized Climate Change Vulnerability Issues

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) • Sea Level Rise: Inundation of storm drains and sewer systems • Ecosystem/Habitat: Decrease in available necessary habitatEcosystem/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: Increased eutrophication • Flooding: Increases in inland flooding • Ecosystem/Habitat: Increased impacts to coastal species

Priority Level	Category and Vulnerability Issue
Very Low	• Water Demand: Limited ability to meet summer demand • Water Supply: Invasives can reduce supply available • Water Quality: Decrease in recreational opportunity • Sea Level Rise: Decrease in land • Sea Level Rise: Damage to ecosystem/habitat • Ecosystem/habitat: Decrease in environmental flows • Hydropower: Decrease in hydropower potential

Very High Prioritization

Water supply: Decrease in imported supply

The water supply vulnerability issue of "decrease in imported supply" was identified by the Workgroup as the highest priority issue. The Region is highly dependent on imported water with nearly 80% of its supplies currently coming from the State Water Project and the Colorado River aqueduct. Given the Region's limited local water supplies and the projected 20% to 25% decrease in imported water supply, a decrease in imported supply with climate change could have a significant impact on the Region and is an issue that needs to be addressed.

High Prioritization

Water Supply: Sensitivity due to higher drought potential

Climate change is expected to increase drought potential in the Region. In past years, water suppliers in the Region have successfully implemented drought management measures in order to lower demand. However, there are limits on the effectiveness of drought management measures. For example, tourists visiting the area are not likely to take part in drought management measures. Taking these issues into account, the Region is expected to be more susceptible to drought conditions. As drought is expected to increase in frequency and severity, more direct/long-term measures may be warranted as well as evaluation of revenue impacts to local water districts.

Water Quality: Increased constituent concentrations

The water quality vulnerability issue of increased constituent concentrations with climate change was ranked highly as water bodies in the area already require treatment to meet water quality standards, such as pathogens and nutrients. Climate change is expected to decrease local water resources in the future, which will increase constituent concentrations leading to difficulty in meeting water quality standards and increases to treatment cost.

Flooding: Increases in flash flooding and inundation (extreme weather)

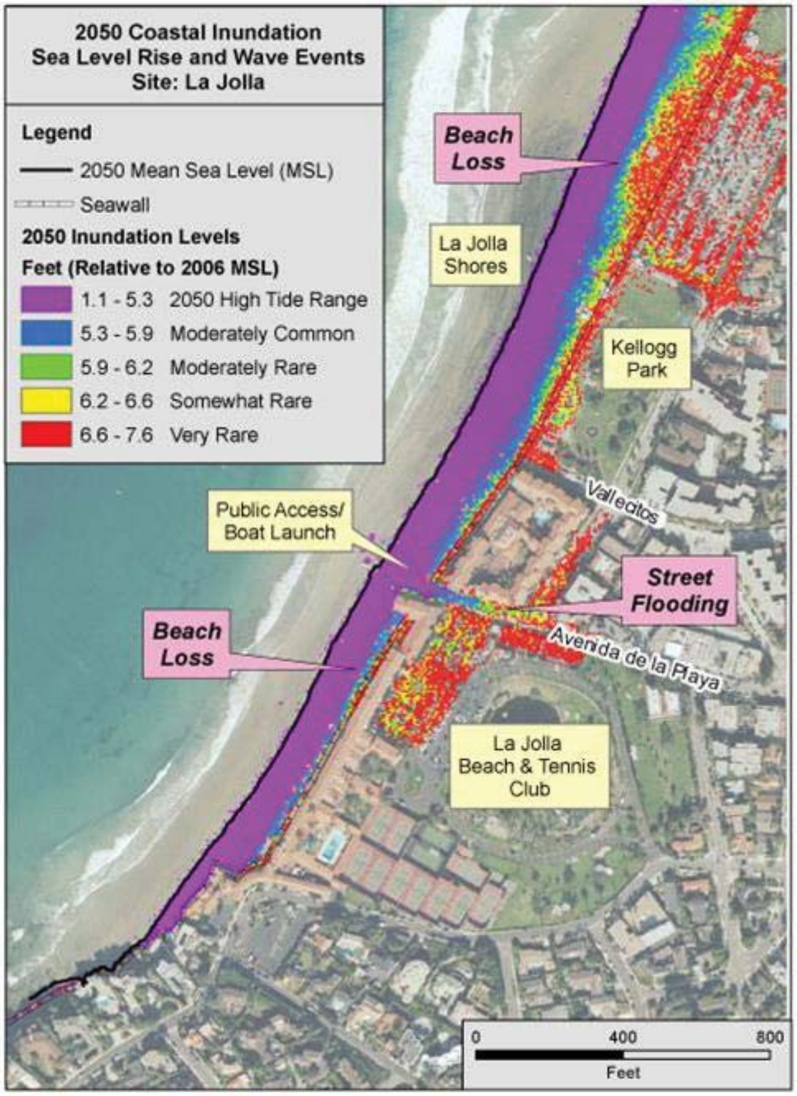
Flash flooding has been an issue for the Region in the past. Foothill areas are especially in danger from flash floods from large seasonal storms, which become a greater concern as the Region is prone to wildfires. Given that more frequent and intense storms are predicted as a consequence of climate change, in addition to increased wildfire risk, increases in flash flooding and inundation are of high concern.

Sea Level Rise: Inundation of storm drains and sewer systems

Regional studies have found that sea level rise is already occurring, and is expected to continue to rise an additional 12 and 18 inches by 2050. This new sea level will inundate a number of low-lying areas along the Region's coast such as Oceanside, La Jolla, Del Mar, Mission Beach, Coronado Island

and Camp Pendleton (Coastal Data Information Program, 2008), and impact their storm drains, wastewater systems, and other facilities and infrastructure. Coastal stormwater infrastructure and wastewater infrastructure that discharge to the ocean will be inundated with increased sea level rise, in particular during coastal storms, causing increased coastal flooding and sewer system overflows. An example of the extent of sea level rise on La Jolla is shown in Figure 2. Concern over aging systems and systems not designed for the increased capacity that will be needed with sea level rise led the group to give this issue a high-priority ranking

Figure 2: Projected 2050 Coastal Inundation with Sea Level Rise in La Jolla



(CDIP, 2008)

Ecosystem/Habitat: Decrease in available necessary habitat

The Region has numerous unique habitat areas extending from the mountains to the oceans which sensitive and endangered species are dependent upon. Anticipated higher temperatures, longer more frequent droughts, and more extreme precipitation events are projected to cause shifts and loss of habitat necessary for these species. Of particular concern to IRWM planning is the shift and loss of riparian and wetland habitat. Riparian habitat will be altered due to decreased flows, increased water temperatures and increased constituent concentrations. These reductions in habitat and associated loss of sensitive and endangered species will, in turn, create biodiversity shifts and increase invasive species.

Ecosystem/Habitat: Decrease in ecosystem services

Ecosystem services provide important functions, such as material cycling and treatment of stormwater runoff that, if decreased, may result in the need for additional water treatment. As discussed above, climate change is expected to decrease available necessary habitat. This reduction in habitat and associated biodiversity shift and increase in invasive species is expected to decrease ecosystem services in the Region, and could result in additional cost.

Medium Prioritization

Water Demand: Increase in agricultural crop water demand per acre

Crop water demands are expected to increase with the increased temperatures caused by climate change. Though the number of acres of agricultural land is expected to decrease slightly in the future, the net demand for irrigation supply on the remaining acres may exceed current demand under climate change conditions. Through current jurisdictional plans, notably the County of San Diego General Plan, it is apparent that agriculture is an important industry to the Region, particularly smaller agricultural productions and urban farms that provide an economic base and community character to the Region. Given that agricultural land is decreasing, the Workgroup has given this climate change vulnerability issue a medium prioritization.

Water Demand: Increase in industrial demand

Industrial demand is expected to increase with temperature increases due to the need for cooling and process water. This vulnerability issue is particularly of concern for industries such as electronics and aerospace manufacturing, energy generation, research development and the pharmaceutical industry. Industrial demand increases are of concern in particular as increased demand in the Region could impact companies’ decision to locate their plants within the Region, which would impact economic development.

Water Supply: Decrease in groundwater supply

Groundwater supply is projected to decline by seven inches per year with climate change. In addition, sea water intrusion caused by rising sea levels also has the potential to impact groundwater supply quality, which will reduce the amount of groundwater available for pumping. Despite these impacts, this vulnerability issue was prioritized as medium since the Region only obtains a small portion of its supplies through groundwater due to the limited size of the groundwater basins. This issue may be of a higher priority in localized areas such as the community of Lakeside, the Marine Corps Base at Camp Pendleton, Pauma Valley, the San Luis Rey River area, and National City where groundwater is a greater portion of supply.

Water Quality: Increase in treatment cost

Total dissolved solids (TDS) levels in reservoirs may increase due to increases in precipitation intensity, particularly after fires, which would in turn increase the cost of water treatment. The Region has a number of reservoirs which are downstream of forested watersheds, and are susceptible to increased turbidity due to runoff from the surrounding area. However, this is not currently a large issues and therefore, the Workgroup rated this vulnerability issue as medium.

Sea Level Rise: Damage to coastal recreation / tourism due to inundation

As discussed previously, sea level rise is already documented as occurring, and is expected to continue to rise to between 12 and 18 inches by 2050. This rise in sea level is expected to cause damage to coastal recreation and tourism areas (such as beaches), though planning efforts such as the *Sea Level Rise Adaptation Strategy for San Diego Bay*, are ongoing. As the Region's economy relies partially on recreation and tourism, this vulnerability issue has been given a medium prioritization.

Low Prioritization

Water Demand: Limited ability to conserve further

The Region has already succeeded in implementing a large amount of water use efficiency measures. These measures have proven to be successful in mitigating against droughts such as in the severe drought that occurred in 2007. With this in mind, the Region may have difficulty in conserving further to meet greater drought frequency and intensity. However, additional savings measures are available and are being incorporated into Urban Water Management Plans and local climate action plans, which allow the Region to classify this issue as low.

Water Supply: Lack of groundwater storage to buffer drought

As mentioned under the water supply issue of decrease in groundwater supply, the Region's groundwater basins are limited in size, meaning there is very limited storage availability in the groundwater basins for use in buffering drought. Despite this, the Region's low reliability on groundwater makes this issue relatively less of a priority.

Water Quality: Increased eutrophication

Several water bodies in the Region are 303(d) listed for water quality issues related to eutrophication, including a number of lagoons, Tecolote Creek, lower San Diego River, and the Tijuana River Estuary. Consequently, it's probable that temperature increases caused by climate change could increase eutrophication of the Region's water bodies. This climate change vulnerability was ranked low, however, relative to other water quality vulnerability issues.

Flooding: Increases in inland flooding

Inland flooding was listed as a low priority for the Region, though there has been localized flooding in low-lying areas caused by insufficient and/or aging flood infrastructure. More extreme storms due to climate change could cause an increase in inland flooding, but as this is not a Region-wide issue, it has been prioritized as low as the Workgroup felt that this issue could best be addressed through local planning efforts.

Ecosystem/Habitat: Increased impacts to coastal species

Coastal dunes, wetlands, marshes and beaches provide unique habitats for the Region's species. Changes to temperature and precipitation have the potential to impact sensitive species. In addition, brackish lagoons provide estuarine habitat that depends on seasonal freshwater flow patterns. Habitat shifts and loss caused by climate change induced sea level rise, coastal erosion, and changes to freshwater flow patterns could also impact coastal species. Because coastal species are already protected and because this is a localized issue, the Workgroup decided to classify it as low priority.

Very Low Prioritization

Water Demand: Limited ability to meet summer demand

Increased seasonal temperatures associated with climate change may create a challenge for the Region in meeting summer demands. However, as this is an issue mainly caused by agricultural and urban irrigation, it is ranked low compared to other vulnerability issues.

Water Supply: Invasives can reduce supply available

Invasive species in the Region such as Arundo, Tamarisk and Quagga mussels have the potential to damage water conveyance facilities. Climate change is expected to increase invasive species in the region, which has the potential to impact water supplies in the future. However, this is not currently an issues affecting the Region's water supply infrastructure, and therefore is ranked very low.

Water Quality: Decrease in recreational opportunity

As previously discussed, climate change is expected to increase constituent concentrations in the Region's reservoirs and beaches, a number of which are frequently used for recreation. The Regional already experiences beach closures due to poor stormwater quality which deposits contaminants in near shore areas. A decrease in water quality could impact this beneficial use of these water resources. However, because this is a localized issue, it is ranked very low.

Sea Level Rise: Decrease in land

Coastal erosion is already occurring in the Region along bluffs and cliffs. The continued rise of sea level with climate change is expected to continue to erode land along the Region's coast, and could eventually begin to impact water and wastewater facilities near to the coast, but is a localized issue.

Sea Level Rise: Damage to ecosystem/habitat

As discussed under the vulnerability issue of *increased impacts to coastal species*, sea level rise can be expected to damage coastal ecosystems and habitats. This may occur both through loss of land and through alterations to freshwater flow patterns. Again though, this is a localized issue.

Ecosystem/habitat: Decrease in environmental flows

Aquatic and wetland species often depend upon a minimum flow to survive, and could be impacted with a decrease in minimum flow caused by climate change. In addition, a reduction in flows may increase constituent concentrations in the Region's waters that could stress aquatic life. There are a number of known water quality issues that have the potential to impact species should they worsen in the future, however, there are currently no minimum environmental flows in the Region's rivers and streams,

Hydropower: Decrease in hydropower potential

The Region currently generates 40 megawatts of peak hydropower at the Olivenhain Reservoir and additional hydropower at the Rancho Peñasquitos Pressure Control Hydroelectric Facility, and is examining potential for construction of hydropower facilities elsewhere. Alterations to the Region's hydrology could decrease hydropower generation potential, however, hydropower generation within the Region is not currently a major electricity source.

Vulnerabilities Summary

As can be seen in the above discussion, the Region is faced with a wide range of climate change vulnerability issues. Should the Region not implement strategies to adapt to these, it would face a number of risks, such as:

- Insufficient water supply if current dependence on imported supply is maintained
- Inability to meet demand during droughts given increased overall seasonal demands without increases in long-term operational storage
- Poorer water quality that further impacts beneficial uses and increases treatment needs
- Damage from increased flash flooding and inland flooding
- Coastal flooding and inundation of storm drains and sewer systems due to sea level rise
- Damage to coastal ecosystems and habitats, and associated impacts to sensitive species due to reduced terrestrial flows and sea level rise

5 Climate Change Management Strategies

The next step in conducting the Region's climate change analysis is to identify appropriate strategies for adapting to the climate change vulnerability issues identified and prioritized in Chapter 4. The strategies selected will help the region to respond to or prevent future impacts of climate change on water resources. These strategies also have the potential to mitigate against further climate change by reducing the energy used to treat or convey water supplies and reducing GHG emissions, and some have the potential to provide carbon sequestration. This chapter details how the Workgroup identified, evaluated and prioritized adaptation and mitigation strategies relevant to the Region.

5.1 Identification of Strategies

Strategies were identified through the review of relevant climate change related documents. These documents include:

- California Water Plan (DWR, 2009)
- Managing an Uncertain Future (DWR, 2008)
- Climate Change Scoping Plan (CARB, 2006)
- Climate Action Team Biennial Report (CalEPA, 2010)
- Resolution on Sea Level Rise (OPC, 2010)
- California Climate Extremes Workshop Report (Scripps, 2011)

The California Water Plan contains Resource Management Strategies (RMS) that provide the primary list of strategies used for this Study. The remaining documents in the above list were reviewed for additional and/or more detailed versions of the strategies. The Workgroup reviewed the strategies from the above documents, and discussed them relative to each strategy's potential for addressing the vulnerability issues prioritized above and mitigating GHG emissions.

5.2 Strategy Prioritization

A series of criteria were used by the Workgroup to refine and prioritize the list of strategies. The Workgroup first determined which strategies may be infeasible or not currently relevant to the Region at this time, or were determined not to be desired by the Region, and were not considered further in the strategy identification process.

Following the acceptance screening process, the strategies were analyzed further by evaluating each strategy according to the following questions:

- Is the strategy a "no regret" strategy?
- Does the strategy help to adapt to the vulnerability issues identified and evaluated in Chapters 3 and 4 of this Study?
- Does the strategy help the Region to mitigate GHGs?

By definition, "no regret" strategies are those strategies that would provide benefits today while also reducing vulnerability to climate change impacts. "No regret" strategies are desirable for immediate implementation as they will provide some benefit even under the uncertainty of climate change projections. The strategies were cross referenced with the vulnerability issues discussed in Chapters 2 and 3 to determine the number and type of climate change vulnerabilities that can be addressed. In addition, a strategy received a higher priority if it addresses vulnerability issues vulnerable determined to be high priority. Finally, the strategies were evaluated to determine whether they would mitigate GHG emissions through energy efficiency, emissions reduction, and/or carbon sequestration. Appendix A shows the results of this evaluation.

Using this evaluation, an initial prioritization was completed based on the criteria shown in Table 5.

Table 5: Initial Strategy Prioritization Criteria

Tier	Criteria
Tier 1	• Considered "no regret" • Mitigates GHGs/is GHG neutral • Addresses the imported water (very high) vulnerability
Tier 2	• Included in other local climate change documents • Mitigates GHGs/is GHG neutral • Addresses at least 3 vulnerability areas
Tier 3	• Addresses at least 1 vulnerability or mitigates GHGs

This initial prioritization was then presented to the Workgroup at the August 23, 2012 meeting where the listing of strategies and prioritization were further refined to best represent the needs of the Region. The final list of prioritized climate change management strategies and definitions is shown in Table 6, Table 7 and

Table 8 as Tier 1, 2, and 3 strategies. Strategies that were not prioritized as they were determined to be infeasible or irrelevant for the Region, or would have opposition, are shown Table 9. By prioritizing these strategies, the Region can better define the types of projects and targets that will help respond to climate change.

Table 6: Tier 1 Climate Change Management Strategies

Strategy	Description
Reduce Water Demand	
Urban water use efficiency	Technological and behavioral improvements that decrease indoor and outdoor residential, commercial, industrial and institutional water use.
Crop idling for water transfers	Remove lands from irrigation (with the aim of returning the lands to irrigation at a later time) in order to make water available for transfer.
Education	Implement outreach program to educate urban and agricultural water users in water demand reduction practices.
Gray water use	Implement gray water use systems to reduce water supply demand.
Rainfed agriculture	Transfer crop consumptive use to be supplied directly by rainfall.
Improve Operational Efficiency/Transfers	
Conveyance - Regional/local	Improvements to regional and local conveyance facilities that improve conveyance capacity, including locating and widening narrow points that constrict the movement of water to increase the water transmission capacity of the entire system, and improve operational flexibility.
System Reoperation	Change existing operation and management procedures for existing reservoirs and conveyance facilities to increase water related benefits from these facilities. May improve the efficiency of existing water uses or may increase the emphasis of one use over another.
Increase Water Supply	
Conjunctive Management & Groundwater Storage	Coordinate and plan use and management of both surface and groundwater resources to maximize the available and reliability of supplies.
Recycled Municipal Water	Increase supply of recycled water through additional wastewater treatment, and/or expand conveyance of recycled water to end users.
Improve Water Quality	
Drinking Water Treatment and Distribution	Develop and maintain adequate water treatment and distribution facilities, and protect the quality and safety of the raw water supply.
Groundwater/Aquifer Remediation	Remove contaminants that affect the beneficial use of groundwater. Can include passive or active methods.
Pollution Prevention	Prevent pollution of local surface waters and groundwater using tools that prevent point and non-point sources of pollution. Examples include water management actions and projects such as the increase of local flows, recharge area protection, etc.
Salt and Salinity Management	Manage salt and salinity in surface and/or groundwater. Examples of methods include dilution and displacement, desalination, and salt collection and storage. The Region is currently working to meet State Salinity/Nutrient Management Planning Guidelines, and will help to implement this strategy.
Urban Runoff Management	Prevent pollution of local surface waters by implementing best management practices (BMPs) designed to reduce the pollutant loading and reduce the volumes and velocities of urban runoff discharged to surface waters.
Improve Flood Management	
Flood Risk Management	Enhance flood protection through projects and programs that assist in the management of flood flows and to prepare for, respond to, and recover from a flood.
Practice Resource Stewardship	

Strategy	Description
Agricultural Lands Stewardship	Conserve natural resources and protect the environment by conserving and improving land for food, fiber and biofuels production, watershed functions, soil, air, energy, plant and other conservation purposes. Can also protect open space and the traditional characteristics of rural communities.
Economic Incentives (Loans, Grants, Water Pricing)	Provide incentives such as financial assistance, water pricing, and water market policies intended to influence water management in order to influence amount of use, time of use, wastewater volume, and source of supply.
Ecosystem Restoration	Improve the condition of modified natural landscapes and biological communities to provide for their sustainability and for their use and enjoyment by current and future generations.
Land Use Planning and Management	Integrate land use and water management for the planning of housing and economic development needs of a growing population while providing for the efficient use of water, water quality, energy and other resources.
Recharge area protection	Protect recharge areas to ensure that areas suitable for recharge continue to be capable of adequate recharge rather than covered by urban infrastructure, and prevent pollutants from entering groundwater.
Water-dependent recreation protection	Incorporate planning for water-dependent recreation activities in water project, and implement project that protect/create water-dependent recreation opportunities.
Watershed/Soils/Forest management	Create and implement plans, programs, projects and activities to restore, sustain, and enhance watershed functions, soil functions, and forests.
Water-dependent cultural resources and practices preservation	Create and implement plans, programs, projects and activities to preserve water-dependent cultural resources and practices
Increase urban forest management	Encourage the planting of trees in urban areas to improve urban water quality and local supplies.
Sea Level Rise	
Building water facilities in coordination with land use/sea level rise (SLR) planning	Integrate water/wastewater resources planning with land use/sea level rise planning.

Table 7: Tier 2 Climate Change Management Strategies

Strategy	Description
Improve Operational Efficiency/Transfers	
Conduct emissions inventory and target	Create inventory of all emission coming from water/wastewater operations, and develop a target for reduction of emissions.
Increase use of renewable energy sources	Use renewable energy sources for the treatment and conveyance of water and wastewater.
Increase Water Supply	
Surface Storage - Regional/local	Add or increase the storage capacity of surface storage reservoirs to increase carryover storage and optimize supplies in drought situations.
Improve Flood Management	
Protective Infrastructure	Construct flood management facilities to reduce the impact of climate change enhanced flooding.
Sediment Management	Implement sediment management practices to reduce the impact of climate change enhanced flash flooding.
Sea Level Rise	
Protect water facilities through the relocation or removal of vulnerable structures	Relocate or remove water/wastewater facilities that may be impacted by sea level rise.
Protect resources and facilities by constructing seawalls or levees	Construct seawalls or levees to protect from sea level rise caused by climate change.
Protect/restore/create coastal wetlands	Protect, restore or create coastal wetlands to prevent the loss of wetland due to sea level rise.

Table 8: Tier 3 Climate Change Management Strategies

Strategy	Description
Reduce Water Demand	
Water Meters Installation	Installation of water meters in order to bill customers volumetrically.
Improve Operational Efficiency/Transfers	
Treatment and Distribution Efficiency	Improve treatment and distribution efficiency or water/wastewater systems in order to reduce energy usage.
Water Transfers	Transfer or exchange of water or water rights that result in temporary or long-term change in the point of diversion, place of use, or purpose of use.
Localized Treatment	Implement localized (or decentralized) treatment of water/wastewater to reduce the energy required for conveyance.
Shift water use to off-peak hours	Implement policies that will shift water use (e.g. irrigation) to off-peak hours to reduce evaporative loss.
Optimize Sewer Systems	Optimize sewer systems (wastewater or stormwater) to adapt to increased precipitation caused by climate change.
Increase Water Supply	
Desalination (Seawater or Brackish Groundwater)	Construct desalination plant to treat seawater or brackish groundwater.
Indirect Potable Reuse/ Potable Reuse	Implement program that will use recycled water to recharge groundwater, or use advanced treated recycled water to augment drinking water supplies.

Table 9: Additionally Reviewed Climate Change Management Strategies

Strategy
Reduce Water Demand
Irrigated Land Retirement
Improve Operational Efficiency/Transfers
Conveyance - Delta
Increase Water Supply
Waterbag Transport/Storage Technology
Precipitation Enhancement
Surface Storage – CALFED
Dewvaporation or Atmospheric Pressure Desalination
Fog Collection
Matching Quality to Use
Sea Level Rise
Rolling Easements
Expendable/Movable Structures in Risk Areas

5.3 Performance Measures/Metrics for Adaptation and Mitigation Strategies

The set of strategies evaluated in the previous section were determined to be those that will best help the Region in responding to and reducing climate change impacts. When implementing these strategies, it will be necessary to develop performance measures or metrics to assess the effectiveness of a project in meeting the Region's goals. Though specific measures and metrics will be defined according a specific project or portfolio of projects, Table 10 provides examples of how these measures or metrics might be defined according to general water resource perspective. It should be noted that several of the strategies (the no regret strategies) may apply to additional objectives in the Region's IRWM Plan, and not solely to adapting to and/or mitigating climate change. Without specific metrics, it would be difficult to assess the effectiveness of strategies in responding to climate change. Moreover, some of the strategies implemented to adapt to climate change are "good planning" for future vulnerabilities and may not be immediately measurable. Many of the effects of climate change are anticipated past the planning horizon of the IRWM Plan. To respond to this uncertainty, the Region should update this climate change analysis during each IRWM Plan update, and implement adaptive management measures which will be discussed in the next chapter.

Table 10: Sample Performance Measures/Metrics

Strategy Category	Sample Performance Measures/Metrics
Reduce Water Demand	• Average (annual) water demand reduction • Peak (seasonal, monthly) water demand reduction
Improve Operational Efficiency	• Additional supply • Supply reliability
Increase Water Supply	• Additional supply • Potable demand offset • Supply reliability
Improve Water Quality	• Salt line migration • Stream temperature • Dissolved oxygen • Turbidity • Pollutant concentrations
Improve Flood Management	• Acres of a certain habitat or floodplain function restored/protected • Volume of natural flood storage provided • Storm return period used for planning • Expected damage resulting for a certain return period storm
Practice Resource Stewardship	• Presence/absence of key indicator species • Acres of a certain habitat or floodplain function restored/protected • Volume of natural flood storage provided • Acres of recharge area protected
Sea Level Rise	• Acres of coastal wetlands created/restored/protected • Miles of pipeline or number of facilities relocated away from coastlines • Length of coastline protected by seawalls or levees

6 Recommendations

The Region has taken the first steps in planning for climate change by examining current climate change projections to determine potential impacts, assessing water resource vulnerabilities, and developing a series of strategies that can be used in projects to adapt to climate change and mitigate GHGs. Chapter 6 discussed recommendations that may be used to successfully implement these strategies, including: use of adaptive management, objectives and targets for inclusion in the IRWM Plan, and project selection considerations for including climate change.

6.1 Adaptive Management

There is a level of uncertainty in projecting the effects and impacts of climate change. To respond to this, DWR recommends the use of adaptive management in implementing climate change strategies (DWR, 2011). Adaptive management consists of identifying and monitoring the most important uncertainties and translating them into risk triggers or early warning indicators. This allows for a flexible path of actions to take as triggers occur. DWR's *Climate Change Handbook* recommends the following steps in developing an adaptive management plan:

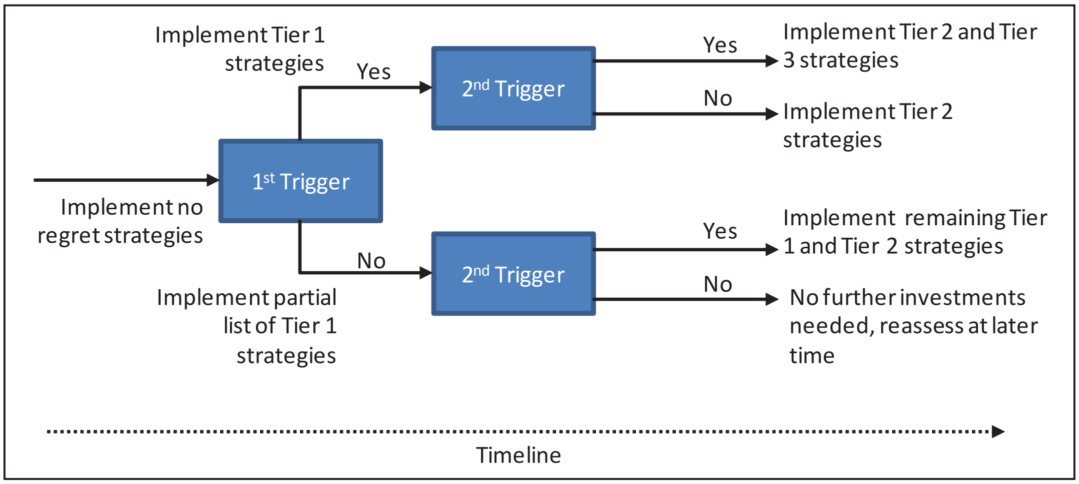
1. Identify risk triggers associated with important vulnerabilities or uncertainties
2. Quantify impacts and uncertainties
3. Evaluate strategies and define flexible implementation paths of action that allows for multiple options at specific triggers
4. Monitor performance and critical variables in the system
5. Implement or reevaluate strategies when triggers are reached

Under Step 1, the Region identifies risk triggers in order to monitor the Region's response to climate change. Risk triggers can be established deterministically (e.g., a threshold) or probabilistically (e.g. frequency of exceedance). The quantification of risk triggers are developed in Step 2, and serve as the basis for the definition of a path for plan implementation under Step 3.

Step 3 involves the definition of an implementation path for the evaluated strategies, and is central to the adaptive management process. The implementation path incorporates risk triggers over the course of time to allow the Region to determine what level of climate change adaptation/mitigation strategy should be implemented. Step 4 of the process, performance monitoring, incorporates performance measures and metrics used to evaluate water resources projects, and will help to define whether a risk trigger has been reached. Step 4 leads into the final step of implementing or reevaluating strategies, Step 5. The general structure of an adaptive management plan can be seen in Figure 3.

The key to successfully implementing the adaptive management process over time is continued active participation by stakeholders, and a clear understanding of project objectives. This should involve ongoing identification, monitoring, and updating of the most important impacts and uncertainties, and re-evaluation of the Region's vulnerabilities (DWR, 2011).

Figure 3: General Adaptive Management Plan



6.2 Climate Change Related Objectives and Targets

DWR requires that climate change be incorporated in the development of IRWM Plan objectives in terms of both climate change adaptation and GHG mitigation (DWR, 2012b). The strategies developed in Chapter 4 include both adaptation and mitigation, and therefore can be incorporated into climate change related objectives and targets that will meet DWR's requirement. The following objective and targets are recommended for inclusion in the IRWM Plan:

> **Objective: Effectively address climate change through adaptation and mitigation in water resource management.**
>
> Target 1: Encourage development of cost-effective carbon-efficient strategies for water management projects.
>
> Target 2: Incorporate adaptation strategies to respond to sea-level rise, rainfall variability, and temperature variability in planning for water and wastewater management.
>
> Target 3: Reduce or neutralize GHG emissions in all areas of water resource management.

6.3 Climate Change in Project Selection Considerations

In order for the Region to adapt to and mitigate against climate change, it will be necessary to ensure that projects utilize strategies identified in this study as helping the Region to adapt to and mitigate against climate change. It is recommended that the Region consider using the strategy priority levels discussed in Chapter 5 to assess the adaptation capacity of the project, and also consider whether the project helps the Region to mitigate GHGs. Oftentimes, a project that implements multiple strategies has the potential to increase the level of benefits provided while reducing the unit cost.

A recommended prioritization approach is presented in Table 11. In these prioritization criteria, projects are given higher priority for utilizing Tier 1 strategies and lower priority for Tier 3 strategies. Additionally, projects that contribute to two or more GHG measures, including energy efficiency, emissions reduction and carbon sequestration, are prioritized more highly. Projects that contribute to one of these mitigation measures receive higher prioritization, and projects that would increase GHGs receive reduce prioritization. In the future, it is recommended that the Region define a threshold for GHG production or remediation to be used in the prioritization of projects. A worksheet to assist the Region in scoring projects according to the number of strategies utilized can be found in Appendix B. In this way, the Region can ensure that projects will help it to both adapt to climate change vulnerabilities of high concern, and will mitigate against climate change.

Table 11: Climate Change Project Prioritization Criteria

Adaptation	Mitigation[1]	Priority
Tier 1 Strategy	Contributes to 2 out of 3 mitigation measures	High
	Contributes to 1 out of 3 mitigation measures	High
	Increases greenhouse gasses	Medium or Low
Tier 2 Strategy	Contributes to 2 out of 3 mitigation measures	High
	Contributes to 1 out of 3 mitigation measures	Medium
	Increases greenhouse gasses	Low
Tier 3 Strategy	Contributes to 2 out of 3 mitigation measures	Medium
	Contributes to 1 out of 3 mitigation measures	Low
	Increases greenhouse gasses	Low

1. Mitigation measures referred to are: energy efficiency, emissions reduction, and carbon sequestration

References

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Scripps, 2011. *California Climate Extremes Workshop Report.*

Appendix F – AWWA Water Audit

AWWA Free Water Audit Software:
Reporting Worksheet

American Water Works Association.

? Click to

\+ Click to add a

Water Audit Report for: Carlsbad Municipal Water District (3710005)
Reporting Year: 2019 | 1/2019 - 12/2019

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

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where

<----------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:		Value:	
Volume from own sources:	n/a		acre-ft/yr				acre-ft/yr
Water imported:	7	14,019.400	acre-ft/yr	10		-10.650	acre-ft/yr
Water exported:	n/a		acre-ft/yr				acre-ft/yr
WATER SUPPLIED:		**14,030.050**	acre-ft/yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ?
for help using option

				Pcnt:	Value:	
Billed metered:	9	13,389.600	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	35.075	acre-ft/yr		35.075	acre-ft/yr
AUTHORIZED CONSUMPTION:		**13,424.675**	acre-ft/yr			

Use buttons to select
percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption)

605.375 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		35.075	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:	9	214.952	acre-ft/yr	1.58%		acre-ft/yr
Systematic data handling errors:	5	33.474	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: **283.501** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **321.874** acre-ft/yr

WATER LOSSES: **605.375** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **640.450** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	10	466.1	miles
Number of active AND inactive service connections:	10	30,297	
Service connection density:		65	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line:

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	78.0	psi

COST DATA

Total annual cost of operating water system:	10	$41,608,496	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$4.40	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$1,305.30	$/acre-ft ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 75 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: Water imported

2: Variable production cost (applied to Real Losses)

3: Unauthorized consumption

Appendix G – SBx7-7 Verification and Compliance Forms

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 Submittal 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	24,460	Acre Feet
	2008 total volume of delivered recycled water	3,877	Acre Feet
	2008 recycled water as a percent of total deliveries	16%	**See Note 1**
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1999	▨
	Year ending baseline period range[3]	2008	▨
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	▨
	Year ending baseline period range[4]	2007	▨

[1] *If the 2008 recycled water delivery is less than 10 percent of total water deliveries, then the 10-15year baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater of total deliveries, the 10-15 year baseline period is a continuous 10- to 15-year period.*

[2] *The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] *The ending year for the 10-15 year baseline period must be between December 31, 2004 and December 31, 2010.*

[4] *The ending year for the 5 year baseline period 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) or **American Community Survey** (ACS)
☐	**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	1999	60,154
Year 2	2000	61,261
Year 3	2001	64,372
Year 4	2002	68,007
Year 5	2003	69,916
Year 6	2004	71,459
Year 7	2005	72,975
Year 8	2006	75,672
Year 9	2007	77,619
Year 10	2008	79,400
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2003	69,916
Year 2	2004	71,459
Year 3	2005	72,975
Year 4	2006	75,672
Year 5	2007	77,619

NOTES:

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Acre Feet
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	Annual Gross Water Use
10 to 15 Year Baseline - Gross Water Use								
Year 1	1999	17,313			-		-	17,313
Year 2	2000	19,952			-		-	19,952
Year 3	2001	18,884			-		-	18,884
Year 4	2002	20,586			-		-	20,586
Year 5	2003	20,278			-		-	20,278
Year 6	2004	21,222			-		-	21,222
Year 7	2005	20,163			-		-	20,163
Year 8	2006	21,206			-		-	21,206
Year 9	2007	22,099			-		-	22,099
Year 10	2008	21,187			-		-	21,187
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**20,289**
5 Year Baseline - Gross Water Use								
Year 1	2003	20,278			-		-	20,278
Year 2	2004	21,222			-		-	21,222
Year 3	2005	20,163			-		-	20,163
Year 4	2006	21,206			-		-	21,206
Year 5	2007	22,099			-		-	22,099
5 year baseline average gross water use								**20,994**

*** Units of measure** (AF, MG , or CCF) 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	SDCWA
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[1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	17,313		17,313
Year 2	2000	19,952		19,952
Year 3	2001	18,884		18,884
Year 4	2002	20,586		20,586
Year 5	2003	20,278		20,278
Year 6	2004	21,222		21,222
Year 7	2005	20,163		20,163
Year 8	2006	21,206		21,206
Year 9	2007	22,099		22,099
Year 10	2008	21,187		21,187
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2003	20,278		20,278
Year 2	2004	21,222		21,222
Year 3	2005	20,163		20,163
Year 4	2006	21,206		21,206
Year 5	2007	22,099		22,099

[1] ***Units of measure*** *(AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Desalinated Seawater
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 [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999			0
Year 2	2000			0
Year 3	2001			0
Year 4	2002			0
Year 5	2003			0
Year 6	2004			0
Year 7	2005			0
Year 8	2006			0
Year 9	2007			0
Year 10	2008			0
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	2003			0
Year 2	2004			0
Year 3	2005			0
Year 4	2006			0
Year 5	2007			0

[1] ***Units of measure*** *(AF, MG , or CCF) must remain consistent throughout the UWMP, as reported in Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

☐

SB X7-7 Table 5: Baseline 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	1999	60,154	17,313	257
Year 2	2000	61,261	19,952	291
Year 3	2001	64,372	18,884	262
Year 4	2002	68,007	20,586	270
Year 5	2003	69,916	20,278	259
Year 6	2004	71,459	21,222	265
Year 7	2005	72,975	20,163	247
Year 8	2006	75,672	21,206	250
Year 9	2007	77,619	22,099	254
Year 10	2008	79,400	21,187	238
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**259**

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	2003	69,916	20,278	259
Year 2	2004	71,459	21,222	265
Year 3	2005	72,975	20,163	247
Year 4	2006	75,672	21,206	250
Year 5	2007	77,619	22,099	254
5 Year Average Baseline GPCD				**255**

NOTES:

SB X7-7 Table 6: Baseline GPCD *From Table SB X7-7 Table 5*	*Summary*
10-15 Year Baseline GPCD	259
5 Year Baseline GPCD	255

NOTES:

SB X7-7 Table 7: 2020 Target Method

Select Only One

Target Method		Supporting Tables
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator *Located in the WUE Data Portal at wuedata.water.ca.gov* Resources *button*

NOTES:

SB X7-7 Table 7-A: Target Method 1

20% Reduction

10-15 Year Baseline GPCD	**2020 Target GPCD**
259	**207**

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[1]	**Calculated 2020 Target** [2]			**Confirmed 2020 Target**[4]
		As calculated by supplier in this SB X7-7 Verification Form	**Special Situations**[3]		
			Prorated 2020 Target	Population Weighted Average 2020 Target	
255	242	207			**207**

[1] ***Maximum 2020 Target*** *is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.*

[2] ***Calculated 2020 Target*** *is the target calculated by the Supplier based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target. Supplier may only enter one calculated target.*

[3] ***Prorated targets and population weighted target*** *are allowed for special situations only. These situations are described in Appendix P, Section P.3*

[4] ***Confirmed Target*** *is the lesser of the Calculated 2020 Target (C5, D5, or E5) or the Maximum 2020 Target (Cell B5)*

NOTES:

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population

2020 Compliance Year Population	
2020	91,694

NOTES:

SB X7-7 Table 4: 2020 Gross Water Use

Compliance Year 2020	2020 Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	2020 Deductions					2020 Gross Water Use
		Exported Water *	Change in Dist. System Storage* (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use*	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	13,929			-	163	-	**13,766**

* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source SDCWA

This water source is *(check one)* **:**

☐ The supplier's own water source

☑ A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
	11,429	-	11,429

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source Desalinated Seawater

This water source is *(check one)* **:**

☑ The supplier's own water source

☐ A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
	2,500		2,500

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

☐

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)

2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
13,766	91,694	**134**

NOTES:

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD					2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*		
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
134	-	-	-	-	134	207	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Appendix H – Energy Intensity Tables

Urban Water Supplier: *Carlsbad MWD*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

Table O-1A: Recommended Energy Reporting - Water Supply Process Approach

Enter Start Date for Reporting Period: 10/1/2019

End Date: 9/30/2020

☐ Is upstream embedded in the values reported?

		Urban Water Supplier Operational Control							
		Water Management Process						**Non-Consequential Hydropower (if applicable)**	
	Water Volume Units Used	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process	AF	*13,170*	*331*	*0*	*0*	*13,170*	*26,671*	*4,952*	*31,623*
Energy Consumed (kWh)	*N/A*	*-325,608*	*0*	*0*	*0*	*0*	*-325,608*		*-325,608*
Energy Intensity (kWh/vol. converted to MG)	*N/A*	*-75.9*	*0.0*	*#DIV/0!*	*#DIV/0!*	*0.0*	*-37.5*	*0.0*	*-31.6*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

Volume of water entering process is derived from SDCWA invoices for the amount of water purchased. Energy consumed is derived from SDG&E bills documenting the amount of power needed to serve CMWD equipment.

Narrative:

CMWD water management processes which require energy are chorination equipment, pumping, and SCADA monitoring equipment. CMWD utilizes hydropower generated from the pressure difference of purchased SDCWA water and CMWD operational pressures. Only one of the four SDCWA connections has hydropower generation.

Urban Water Supplier: *Carlsbad MWD*

Table O-2: Recommended Energy Reporting - Wastewater & Recycled Water

Enter Start Date for Reporting Period 1/1/2020

End Date 12/31/2020

☐ Is upstream embedded in the values reported?

Volume of Water Units Used AF

	Urban Water Supplier Operational Control			
	Water Management Process			
	Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Wastewater Entering Process (volume units selected above)	*7,630*	*0*	*0*	*7,630*
Wastewater Energy Consumed (kWh)	*1,187,352*	*0*	*0*	*1,187,352*
Wastewater Energy Intensity (kWh/volume)	*477.6*	*#DIV/0!*	*#DIV/0!*	*477.6*
Volume of Recycled Water Entering Process (volume units selected above)	*0*	*3,029*	*3,764*	*6,793*
Recycled Water Energy Consumed (kWh)	*0*	*895,619*	*11,159*	*906,778*
Recycled Water Energy Intensity (kWh/volume converted to MG)	*#DIV/0!*	*907.4*	*9.1*	*409.7*

Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Metered Data

Data Quality Narrative:

Energy consumed is derived from SDG&E bills documenting the amount of power needed to serve City of Carlsbad wastewater equipment.

Narrative:

Energy is needed in recycled water and wastewater processes primarily to pump water and SCADA monitoring. Waste water flows approximated from annual data in the 2019 sewer master plan.

Appendix I – CMWD Drought Ordinance No. 44 and 46

Exhibit 1

ORDINANCE NO. 44

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE CARLSBAD MUNICIPAL WATER DISTRICT ADOPTING A DROUGHT RESPONSE PLAN AND WATER CONSERVATION PROGRAM AND REPEALING ORDINANCE NO 35

WHEREAS, article 10, section 2 of the California Constitution declares that waters of the State are to be put to beneficial use, that waste, unreasonable use, or unreasonable method of use of water be prevented, and that water be conserved for the public welfare; and

WHEREAS, conservation of current water supplies and minimization of the effects of water supply shortages that are the result of drought are essential to the public health, safety and welfare; and

WHEREAS, regulation of the time of certain water use, manner of certain water use, design of rates, method of application of water for certain uses, installation and use of water-saving devices, provide an effective and immediately available means of conserving water; and

WHEREAS, California Water Code sections 375 et seq. authorize water suppliers to adopt and enforce a comprehensive water conservation program; and

WHEREAS, adoption and enforcement of a comprehensive water conservation program will allow the Carlsbad Municipal Water District (CMWD) to delay or avoid implementing measures such as water rationing or more restrictive water use regulations pursuant to a declared water shortage emergency as authorized by California Water Code sections 350 et seq.; and

WHEREAS, San Diego County is a semi-arid region and local water resources are scarce. The region is dependent upon imported water supplies provided by the San Diego County Water Authority, which obtains a substantial portion of its supplies from the Metropolitan Water District of Southern California. Because the region is dependent upon imported water supplies, weather and other conditions in other portions of this State and of the Southwestern United States affect the availability of water for use in San Diego County; and

WHEREAS, the San Diego County Water Authority has adopted an Urban Water Management Plan that includes water conservation as a necessary and effective component of the Water Authority's programs to provide a reliable supply of water to meet the needs of the Water Authority's 24 member public agencies, including the CMWD. The Water Authority's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This ordinance is consistent with the Water Authority's Urban Water Management Plan; and

WHEREAS, as anticipated by its Urban Water Management Plan, the San Diego County Water Authority, in cooperation and consultation with its member public agencies, has adopted a Drought Management Plan, which establishes a progressive program for responding to water supply limitations resulting from drought conditions. This ordinance is intended to be consistent with and to implement the Water Authority's Drought Management Plan; and

WHEREAS, the Water Authority's Drought Management Plan contains three stages containing regional actions to be taken to lessen or avoid supply shortages. This ordinance contains drought response levels that correspond with the Drought Management Plan stages; and

WHEREAS, the CMWD, due to the geographic and climatic conditions within its territory and its dependence upon water imported and provided by the San Diego County Water Authority, may experience shortages due to drought conditions, regulatory restrictions enacted upon imported supplies and other factors. The Board of Directors of CMWD has adopted an Urban Water Management Plan that includes water conservation as a necessary and effective component of its programs to provide a reliable supply of water to meet the needs of the public within its service territory. The CMWD's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This ordinance is consistent with the Urban Water Management Plan adopted by the Board of Directors of CMWD; and

WHEREAS the water conservation measures and progressive restrictions on water use and method of use identified by this ordinance provide certainty to water users and enable CMWD to control water use, provide water supplies, and plan and implement water management measures in a fair and orderly manner for the benefit of the public;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Carlsbad Municipal Water District of the City of Carlsbad, California, as follows:

1. That the above recitations are true and correct.

2. The Board of Directors of the Carlsbad Municipal Water District of the City of Carlsbad, California, hereby ordains as follows:

SECTION 1.0 DECLARATION OF NECESSITY AND INTENT

(a) This ordinance 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 CMWD 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) This ordinance 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 supplies.

(c) Level 1 condition drought response measures are voluntary and will be reinforced through local and regional public education and awareness measures that may be funded in part by CMWD.

(d) During drought response condition Levels 2 through 4, all conservation measures and water-use restrictions are mandatory and become increasingly restrictive in order to attain escalating conservation goals.

SECTION 2.0 DEFINITIONS

(a) The following words and phrases whenever used in this chapter shall have the meaning defined in this section:

1. "Grower" refers to those 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 Water Authority Special Agricultural Rate programs.

2. "Water Authority" or "CWA" means the San Diego County Water Authority.

3. "DMP" means the Water Authority's Drought Management Plan in existence on the effective date of this ordinance and as readopted or amended from time to time, or an equivalent plan of the Water Authority to manage or allocate supplies during shortages.

4. “Metropolitan” or “MWD” means the Metropolitan Water District of Southern California.

5. “Person” means any natural 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 CMWD.

6. “District” or “CMWD” means the Carlsbad Municipal Water District.

SECTION 3.0 WATER WASTE PROHIBITIONS

The following water conservation measures will be in effect at all times:

1. Washing down impervious surfaces, including but not limited to sidewalks, driveways, parking lots, tennis courts, or patios with water from a pressurized source, such as a garden hose, except when it is necessary to alleviate safety or sanitation hazards. When used in this section impervious surface means any surface covered with non-porous material.

2. Water waste resulting from inefficient landscape irrigation, such as runoff, low head drainage, or overspray, etc. is prohibited. Water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures is prohibited.

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

4. Use re-circulated water to operate ornamental fountains.

5. Wash vehicles using a bucket and a hand-held hose with positive shut-off nozzle or a mobile high pressure/low volume wash system.

6. Serve and refill water in restaurants and other food service establishments only upon request.

7. Offer guests in hotels, motels, and other commercial lodging establishments the option of not laundering towels and linens daily.

8. Use recycled or non-potable water for construction purposes when available.

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

10. The excess use, loss or escape of water through breaks, leaks or other, malfunctions in the water user’s plumbing or distribution system for any period of time after such escape of water could have reasonably been discovered and corrected.

SECTION 4.0 APPLICATION

(a) The provisions of this ordinance apply to any person in the use of any water provided by the CMWD.

(b) This ordinance is intended solely to further the conservation of water. It is not intended to implement any provision of federal, State, or local statutes, ordinances, or regulations relating to protection of water quality or control of drainage or runoff. Refer to the local jurisdiction or Regional Water Quality Control Board for information on any stormwater ordinances and stormwater management plans.

(c) Nothing in this ordinance is intended to affect or limit the ability of the CMWD to declare and respond to an emergency, including an emergency that affects the ability of the CMWD to supply water.

(d) The provisions of this ordinance do not apply to use of water from private wells or to recycled water.

(e) Nothing in this ordinance shall apply to use of water that is subject to a special supply program, such as the Metropolitan 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 person using water subject to a special supply program and other water provided by the CMWD is subject to this ordinance in the use of the other water.

SECTION 5.0 AUTHORIZATION

The District General Manager, or a designated representative, is hereby authorized and directed to implement the provisions of this ordinance.

SECTION 6.0 DROUGHT RESPONSE LEVEL 1 – DROUGHT WATCH CONDITION

(a) A Drought Response Level 1 condition is also referred to as a "Drought Watch" condition. A Level 1 condition may apply when the Water Authority notifies its member agencies that due to drought or other supply reductions, there is a reasonable probability there will be supply shortages 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. The Executive Manager upon recommendation of the General Manager shall declare the existence of a Drought Response Level 1 and take action to implement the Level 1 conservation practices identified in this ordinance.

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

1. Irrigate residential and commercial landscape before 10 a.m. and after 6 p.m. only.

2. Irrigate nursery and commercial grower's products before 10 a.m. and after 6 p.m. only. Watering is permitted at any time with a hand-held hose equipped with a positive shut-off nozzle, a bucket, or when a drip/micro-irrigation system/equipment is used. Irrigation of nursery propagation beds is permitted at any time. Watering of livestock is permitted at any time.
3. Repair all water leaks within five (5) days of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

SECTION 7.0 DROUGHT RESPONSE LEVEL 2 – DROUGHT ALERT CONDITION

(a) A Drought Response Level 2 condition is also referred to as a "Drought Alert" condition. A Level 2 condition may apply when the Water Authority notifies its member agencies that due to cutbacks caused by drought or other reduction in supplies, a consumer demand reduction of up to 20 percent is required in order to have sufficient supplies available to meet anticipated demands. The CMWD Board of Directors shall declare the existence of a Drought Response Level 2 condition and implement the mandatory Level 2 conservation measures identified in this ordinance.

(b) All persons using CMWD water shall comply with Level 1 Drought Watch water conservation practices during a Level 2 Drought Alert, and shall also comply with the following additional conservation measures:

1. Limit residential and commercial landscape irrigation to no more than three (3) assigned days per week on a schedule established by the General Manager and posted by the CMWD. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established by the General Manager and posted by the CMWD. This section shall not apply to commercial growers or nurseries.

2. Limit lawn watering and landscape irrigation using sprinklers to no more than ten (10) minutes per watering station per assigned day. This provision does not apply to landscape irrigation systems using water efficient devices, including but not limited to: weather based controllers, drip/micro-irrigation systems and stream rotor sprinklers.

3. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 5 (b) (1), on the same schedule set forth in section 5 (b) (1) by using a bucket, hand-held hose with positive shut-off nozzle, or low-volume non-spray irrigation.

4. Repair all leaks within seventy-two (72) hours of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

5. Stop operating ornamental fountains or similar decorative water features unless recycled water is used.

SECTION 8.0 DROUGHT RESPONSE LEVEL 3 – DROUGHT CRITICAL CONDITION

(a) A Drought Response Level 3 condition is also referred to as a "Drought Critical" condition. A Level 3 condition may apply when the Water Authority notifies its member agencies that due to increasing cutbacks caused by drought or other reduction of supplies, a consumer demand reduction of up to 40 percent is required in order to have sufficient supplies available to meet anticipated demands. The CMWD Board of Directors shall declare the existence of a Drought Response Level 3 condition and implement the Level 3 conservation measures identified in this ordinance.

(b) All persons using CMWD water shall comply with 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 residential and commercial landscape irrigation to no more than two (2) assigned days per week on a schedule established by the General Manager and posted by the CMWD. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established by the General Manager and posted by the CMWD.

2. Limit lawn watering and landscape irrigation using sprinklers to no more than ten (10) minutes per watering station per assigned day. This section shall not apply to commercial growers or nurseries.

3. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 6 (b) (1), on the same schedule set forth in section 6 (b) (1) by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation.

4. Stop filling or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to declaration of a drought response level under this ordinance.

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

6. Repair all leaks within forty-eight (48) hours of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

(c) Upon the declaration of a Drought Response Level 3 condition, no new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) shall be issued, except under the following circumstances:

1. A valid, unexpired 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 applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s).

This provision shall not be construed to preclude the resetting or turn-on of meters to provide continuation of water service or to restore service that has been interrupted for a period of one year or less.

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

(e) The Board of Directors of CMWD may establish a water allocation for property served by the CMWD taking into consideration a method that does not penalize persons for the implementation of conservation methods or the installation of water saving devices. If the Board of Directors of CMWD establishes a water allocation notice of the allocation shall be provided by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the CMWD customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the Board of Directors of CMWD, any person that uses water in excess of the allocation shall be subject to a penalty in the amount equal to the penalty rate established by the Metropolitan Water District for each billing unit of water in excess of the allocation. The penalty for excess water usage shall be cumulative to any other remedy or penalty that may be imposed for violation of this ordinance.

SECTION 9.0 DROUGHT RESPONSE LEVEL 4 – DROUGHT EMERGENCY CONDITION

(a) A Drought Response Level 4 condition is also referred to as a "Drought Emergency" condition. A Level 4 condition may apply when the Water Authority Board of Directors declares a water shortage emergency pursuant to California Water Code section 350 and notifies its member agencies that Level 4 requires a demand reduction of more than 40 percent in order for the CMWD to have maximum supplies available to meet anticipated demands. The CMWD Board of Directors shall declare a Drought Emergency in the manner and on the grounds provided in California Water Code section 350.

(b) All persons using CMWD water shall comply with 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 shall not apply to the following categories of use unless the CMWD has determined that recycled water is available and may be lawfully applied to the use.

    A. Maintenance of trees and shrubs that are watered on the same schedule set forth in section 6 (b) (1) by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation;

    B. Maintenance of existing landscaping necessary for fire protection as specified by the Fire Marshal of the local fire protection agency having jurisdiction over the property to be irrigated;

    C. Maintenance of existing landscaping for erosion control;

    D. Maintenance of plant materials identified to be rare 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 (2) days per week according to the schedule established under section 6 (b) (1);

    F. Watering of livestock; and

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

2. Repair all water leaks within twenty-four (24) hours of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

3. The District may install a flow restricting device for services of up to one and one-half inch (1-1/2") size and comparatively sized restrictors for larger services upon a prior determination that the customer has repeatedly violated the provisions of this Ordinance and that such action is reasonably necessary to assure compliance with this ordinance.

Any willful tampering with or removal of any flow restriction devise may result in termination of service for a period to be determined in writing by the General Manager.

Prior to any restoration of service, the customer may pay all District charges for any restriction of service and its restoration as provided for in the District's rules governing water service.

(c) The CMWD may establish a water allocation for property served by the CMWD. If the CMWD establishes a water allocation it shall provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the CMWD customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the CMWD, any person that uses water in excess of the allocation shall be subject to a penalty in the amount equal to the penalty rate established by the Metropolitan Water District for each billing unit of water in excess of the allocation. The penalty for excess water usage shall be cumulative to any other remedy or penalty that may be imposed for violation of this ordinance.

SECTION 10.0 CORRELATION BETWEEN DROUGHT MANAGEMENT PLAN AND DROUGHT RESPONSE LEVELS

(a) The correlation between the Water Authority's DMP stages and the CMWD's drought response levels identified in this ordinance is described herein. Under DMP Stage 1, the CMWD may implement Drought Response Level 1 actions. Under DMP Stage 2, the CMWD may implement Drought Response Level 1 or Level 2 actions. Under DMP Stage 3, the CMWD may implement Drought Response Level 2, Level 3, or Level 4 actions.

(b) The drought response levels identified in this ordinance correspond with the Water Authority DMP as identified in the following table:

Drought Response Levels	Use Restrictions	Conservation Target	DMP Stage
1 - Drought Watch	Voluntary	Up to 10%	Stage 1 or 2
2 - Drought Alert	Mandatory	Up to 20%	Stage 2 or 3
3 - Drought Critical	Mandatory	Up to 40%	Stage 3
4 - Drought Emergency	Mandatory	Above 40%	Stage 3

SECTION 11.0 PROCEDURES FOR DETERMINATION AND NOTICATION OF DROUGHT RESPONSE LEVEL

(a) The existence of a Drought Watch condition may be declared by the Executive Manager upon a written determination of the existence of the facts and circumstances supporting the determination. A copy of the written determination shall be filed with the Secretary of the CMWD and provided to the CMWD Board of Directors. The CMWD may publish a notice of the determination of existence of Drought Response Level 1 condition in one or more newspapers, including a newspaper of general circulation within the CMWD. The CMWD may also post notice of the condition on their website.

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(b) The existence of Drought Response Level 2 or Level 3 conditions may be declared by resolution of the CMWD Board of Directors adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation measures applicable to Drought Response Level 2 or Level 3 conditions shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, the CMWD shall publish a copy of the resolution in a newspaper used for publication of official notices.

(c) The existence of a Drought Response Level 4 condition may be declared 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 shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, the CMWD shall publish a copy of the resolution in a newspaper used for publication of official notices. If the CMWD establishes a water allocation, it shall provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the CMWD customarily mails the billing statement for fees or charges for on-going water service. Water allocation shall be effective on the fifth (5) day following the date of mailing or at such later date as specified in the notice.

(d) The CMWD Board of Directors may declare an end to a Drought Response Level by the adoption of a resolution at any regular or special meeting held in accordance with State law.

SECTION 12.0 HARDSHIP VARIANCE

(a) If, due to unique circumstances, a specific requirement of this ordinance would result in undue hardship to a person using agency water or to property upon which agency water is used, that is disproportionate to the impacts to CMWD water users generally or to similar property or classes of water uses, then the person 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 person using agency water or to property upon with agency water is used, that is disproportionate to the impacts to CMWD water users generally or to similar property or classes of water use due to specific and unique circumstances of the user or the user's property.

1. Application. Application for a variance shall be a form prescribed by the General Manager of the CMWD and shall be accompanied by a non-refundable processing fee in an amount set by resolution of the CMWD Board of Directors.

2. Supporting Documentation. The application shall be accompanied by photographs, maps, drawings, and other information, including a written statement of the applicant.

3. Required Findings for Variance. An application for a variance shall be denied unless the General Manager 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 CMWD, all of the following:

    A. That the variance does not constitute a grant of special privilege inconsistent with the limitations upon other CMWD customers.

B. That because of special circumstances applicable to the person, property or its use, the strict application of this ordinance would have a disproportionate impact on the person, property or use that exceeds the impacts to customers generally.

C. That the authorizing of such variance will not be of substantial detriment to adjacent properties, and will not materially affect the ability of the CMWD to effectuate the purpose of this chapter and will not be detrimental to the public interest.

D. That the condition or situation of the subject person, property or the intended use of the property for which the variance is sought is not common, recurrent or general in nature.

4. Approval Authority. The General Manager or Designee shall exercise approval authority and act upon any completed application no later than 10 days after submittal and may approve, conditionally approve, or deny the variance. The applicant requesting the variance shall be promptly notified in writing of any action taken. 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.

5. Appeals to CMWD Executive Manager or Designee(s). An applicant may appeal a decision or condition of the General Manager on a variance application to the CMWD Executive Manager or Designee(s) within 10 days of the decision upon written request for a hearing. The request shall state the grounds for the appeal. At the appeal hearing, the CMWD Executive Manager or Designee(s) shall act as the approval authority and review the appeal de novo by following the regular variance procedure. The decision of the CMWD Executive Manager or Designee(s) is final.

SECTION 13.0 VIOLATIONS AND PENALTIES

(a) Any person, who uses, causes to be used, or permits the use of water in violation of this ordinance is guilty of an offense punishable as provided herein.

(b) Each day that a violation of this ordinance occurs is a separate offense.

(c) Administrative fines may be levied for each violation of a provision of this ordinance as follows:

1. For the first violation by any customer of any of the provisions of this Ordinance the District shall verbally notice the fact of such violation to the customer.

2. For a second violation by any customer of any of the provisions of this Ordinance the District shall issue a written notice of the fact of such violation to the customer.

3. For a third violation by a customer of any provision of this Ordinance the District may install a flow restricting device of one gallon per minute (1 GPM) capacity for services of up to one and one-half inch (1-1/2") size and comparatively sized restrictors for larger services upon a prior determination that the customer has repeatedly violated the provisions of this Ordinance regarding the conservation of water and that such action is reasonably necessary to assure compliance with this Ordinance regarding the conservation of water. In addition, the District may levy an administrative fine of one hundred dollars.

4. Two hundred dollars for a fourth violation of any provision of this ordinance within one year.

5. Five hundred dollars for each additional violation of this ordinance within one year.

(d) If determined by General Counsel to be necessary and appropriate, in lieu of administrative remedies above, each violation of this ordinance may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than thirty (30) days or by a fine not exceeding $1,000, or by both as provided in Water Code section 377.

(e) Willful violations of the mandatory conservation measures and water use restrictions as set forth in Section 7.0 and applicable during a Stage 4 Drought Emergency condition may be enforced by discontinuing service to the property at which the violation occurs as provided by Water Code section 356.

(f) All remedies provided for herein shall be cumulative and not exclusive.

(g) Any customer against whom a penalty is levied pursuant to this section shall have the right to appeal as follows:

1. The request must be in writing and received by the General Manager within ten (10) calendar days of the mailing of the notice of the action to the customer. Any determination not timely appealed shall be final. The written request shall include:

A. a description of the issue,
B. evidence supporting the claim, and
C. a request for resolution of the dispute.

The General Manager will review the material submitted and make an indepedent determination of the issue, which shall be mailed out within fifteen (15) calendar days of receipt of the appeal.

2. The General Manager's determination may be appealed in writing within ten (10) calendar days of the mailing of the notice of determination to the Board of Directors of the CMWD by filing with the Secretary of the CMWD a written notice of such appeal. The Secretary shall set the matter for a hearing before the Board of Directors at an upcoming Board meeting. Notice of the hearing shall be mailed out at least ten (10) calendar days prior to the date of the appeal. The Board may, in its discretion, affirm, reverse or modify the determination.

3. Fees for filing an appeal under this section shall be established by a resolution of the Board of Directors of the CMWD.

SECTION 14.0 REPEAL OF ORDINANCE NO. 35

Ordinance No. 35 of the Carlsbad Municipal Water District relating to the Necessity for and Adopting a Drought Response Conservation Program is hereby repealed in its entirety.

SECTION 15.0 EFFECTIVE DATE

This ordinance is effective immediately upon adoption.

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INTRODUCED AND FIRST READ at a Special Meeting of the Carlsbad Municipal Water District Board on the 16th day of December, 2008, and thereafter.

PASSED, APPROVED AND ADOPTED at a Special Meeting of the Carlsbad Municipal Water District Board, on the 6th day of January, 2009, by the following vote to wit:

AYES: Board Members Lewis, Kulchin, Hall, Packard and Blackburn.

NOES: None.

ABSENT: None.

ABSTAIN: None.

APPROVED AS TO FORM AND LEGALITY

Ronald R. Ball

RONALD R. BALL, General Counsel

1-6-09

Claude A Lewis

CLAUDE A LEWIS, President

ATTEST:

, Deputy

LORRAINE M. WOOD, Secretary

(SEAL)

ORGANIZED MAR. 22, 1954

EXHIBIT 1

ORDINANCE NO. 46

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE CARLSBAD MUNICIPAL WATER DISTRICT AMENDING ORDINANCE NO. 44. TO AUTHORIZE THE GENERAL MANAGER TO SET WATERING SCHEDULES

WHEREAS, article 10, section 2 of the California Constitution declares that waters of the State are to be put to beneficial use, that waste, unreasonable use, or unreasonable method of use of water be prevented, and that water be conserved for the public welfare; and

WHEREAS, conservation of current water supplies and minimization of the effects of water supply shortages that are the result of drought are essential to the public health, safety and welfare; and

WHEREAS, regulation of the time of certain water use, manner of certain water use, design of rates, method of application of water for certain uses, installation and use of water-saving devices, provide an effective and immediately available means of conserving water; and

WHEREAS, California Water Code sections 375 et seq. authorize water suppliers to adopt and enforce a comprehensive water conservation program; and

WHEREAS, adoption and enforcement of a comprehensive water conservation program will allow the Carlsbad Municipal Water District (CMWD) to delay or avoid implementing measures such as water rationing or more restrictive water use regulations pursuant to a declared water shortage emergency as authorized by California Water Code sections 350 et seq.; and

WHEREAS, San Diego County is a semi-arid region and local water resources are scarce. The region is dependent upon imported water supplies provided by the San Diego County Water Authority, which obtains a substantial portion of its supplies from the Metropolitan Water District of Southern California. Because the region is dependent upon imported water supplies, weather and other conditions in other portions of this State and of the Southwestern United States affect the availability of water for use in San Diego County; and

WHEREAS, the San Diego County Water Authority has adopted an Urban Water Management Plan that includes water conservation as a necessary and effective component of the Water Authority's programs to provide a reliable supply of water to meet the needs of the

Water Authority's 24 member public agencies, including the CMWD. The Water Authority's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This ordinance is consistent with the Water Authority's Urban Water Management Plan; and

WHEREAS, as anticipated by its Urban Water Management Plan, the San Diego County Water Authority, in cooperation and consultation with its member public agencies, has adopted a Drought Management Plan, which establishes a progressive program for responding to water supply limitations resulting from drought conditions. This ordinance is intended to be consistent with and to implement the Water Authority's Drought Management Plan; and

WHEREAS, the Water Authority's Drought Management Plan contains three stages containing regional actions to be taken to lessen or avoid supply shortages. This ordinance contains drought response levels that correspond with the Drought Management Plan stages; and

WHEREAS, the CMWD, due to the geographic and climatic conditions within its territory and its dependence upon water imported and provided by the San Diego County Water Authority, may experience shortages due to drought conditions, regulatory restrictions enacted upon imported supplies and other factors. The Board of Directors of CMWD has adopted an Urban Water Management Plan that includes water conservation as a necessary and effective component of its programs to provide a reliable supply of water to meet the needs of the public within its service territory. The CMWD's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This ordinance is consistent with the Urban Water Management Plan adopted by the Board of Directors of CMWD; and

WHEREAS the water conservation measures and progressive restrictions on water use and method of use identified by this ordinance provide certainty to water users and enable CMWD to control water use, provide water supplies, and plan and implement water management measures in a fair and orderly manner for the benefit of the public;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Carlsbad

Municipal Water District of the City of Carlsbad, California, as follows:

1. That the above recitations are true and correct.

2. The Board of Directors of the Carlsbad Municipal Water District of the City of Carlsbad, California, hereby ordains as follows:

SECTION 7.0 DROUGHT RESPONSE LEVEL 2 – DROUGHT ALERT CONDITION

(a) A Drought Response Level 2 condition is also referred to as a “Drought Alert” condition. A Level 2 condition may apply when the Water Authority notifies its member agencies that due to cutbacks caused by drought or other reduction in supplies, a consumer demand reduction of up to 20 percent is required in order to have sufficient supplies available to meet anticipated demands. The CMWD Board of Directors shall declare the existence of a Drought Response Level 2 condition and implement the mandatory Level 2 conservation measures identified in this ordinance.

(b) All persons using CMWD water shall comply with Level 1 Drought Watch water conservation practices during a Level 2 Drought Alert, and shall also comply with the following additional conservation measures:

1. Limit residential and commercial landscape irrigation to assigned days per week on a schedule established by the General Manager. Within five (5) days following the declaration of the response level, the CMWD shall publish a notice of the assigned days in one or more newspapers, including a newspaper of general circulation within the CMWD. The CMWD may also post notice of the condition on its website. This section shall not apply to commercial growers and nurseries.

2. Limit lawn watering and landscape irrigation using sprinklers to time limits per watering station per assigned day as established by the General Manager. Within five (5) days following the declaration of the response level, the CMWD shall publish a notice of the assigned time limits in one or more newspapers, including a newspaper of general circulation within the CMWD. The CMWD may also post notice of the condition on its website. This provision does not apply to landscape irrigation systems using water efficient devices, including but not limited to: weather based controllers, drip/micro-irrigation systems and stream rotor sprinklers.

3. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 5 (b) (1), on the same schedule set forth in section 5 (b) (1) by using a bucket, hand-held hose with positive shut-off nozzle, or low-volume non-spray irrigation.

4. Repair all leaks within seventy-two (72) hours of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

5. Stop operating ornamental fountains or similar decorative water features unless recycled water is used.

SECTION 8.0 DROUGHT RESPONSE LEVEL 3 – DROUGHT CRITICAL CONDITION

(a) A Drought Response Level 3 condition is also referred to as a “Drought Critical” condition. A

Level 3 condition may apply when the Water Authority notifies its member agencies that due to increasing cutbacks caused by drought or other reduction of supplies, a consumer demand reduction of up to 40 percent is required in order to have sufficient supplies available to meet anticipated demands. The CMWD Board of Directors shall declare the existence of a Drought Response Level 3 condition and implement the Level 3 conservation measures identified in this ordinance.

(b) All persons using CMWD water shall comply with 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 lawn watering and landscape irrigation using sprinklers to time limits per watering station per assigned day as established by the General Manager. Within five (5) days following the declaration of the response level, the CMWD shall publish a notice of the assigned days in one or more newspapers, including a newspaper of general circulation within the CMWD. The CMWD may also post notice of the condition on its website. This section shall not apply to commercial growers or nurseries.

2.Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 6 (b) (1), on the same schedule set forth in section 6 (b) (1) by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation.

3.Stop filling or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to declaration of a drought response level under this ordinance.

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

5.Repair all leaks within forty-eight (48) hours of notification by the CMWD unless other arrangements are made with the General Manager or Designee.

(c) Upon the declaration of a Drought Response Level 3 condition, no new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) shall be issued, except under the following circumstances:

1. A valid, unexpired 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 applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s).

This provision shall not be construed to preclude the resetting or turn-on of meters to provide continuation of water service or to restore service that has been interrupted for a period of one year or less.

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

(e) The Board of Directors of CMWD may establish a water allocation for property served by the CMWD taking into consideration a method that does not penalize persons for the implementation of conservation methods or the installation of water saving devices. If the Board of Directors of CMWD establishes a water allocation notice of the allocation shall be provided by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the CMWD customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the Board of Directors of CMWD, any person that uses water in excess of the allocation shall be subject to a penalty in the amount equal to the penalty rate established by the Metropolitan Water District for each billing unit of water in excess of the allocation.
The penalty for excess water usage shall be cumulative to any other remedy or penalty that may be imposed for violation of this ordinance.

EFFECTIVE DATE: This ordinance shall be effective thirty days after its adoption; and the Secretary shall certify the adoption of this ordinance and cause it to be published at least once in a newspaper of general circulation in the City of Carlsbad within fifteen days after its adoption.

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INTRODUCED AND FIRST READ at a Special Meeting of the Carlsbad Municipal Water District Board of Directors on the 10th day of November 2009, and thereafter;

PASSED, APPROVED AND ADOPTED at a Special Meeting of the Board of Directors of the Carlsbad Municipal Water District on the 1st day of December 2009 by the following vote to wit:

AYES:	Board Members Lewis, Kulchin, Hall, Packard and Blackburn.
NOES:	None.
ABSENT:	None.
ABSTAIN:	None.

APPROVED AS TO FORM AND LEGALITY

RONALD R. BALL, General Counsel
12/2/2009.

CLAUDE A. LEWIS, President

ATTEST:

, Assistant Secretary
LORRAINE M. WOOD, Secretary

(SEAL)

ORGANIZED MAR. 22, 1954

Appendix J – 2018 Hazard Mitigation Plan

1.1 City of Carlsbad

The City of Carlsbad (Carlsbad) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. In addition, LPGs were supplied with exposure/loss estimates for Carlsbad summarized in Table 5.3-1. See Section 4.0 for additional details.

Table 5.3-1
Summary of Potential Hazard-Related Exposure/Loss in Carlsbad

		Residential		**Commercial**		**Critical Facilities**	
Hazard Type	**Exposed Population**	**Number of Residential Buildings**	**Potential Exposure/Loss for Residential Buildings (x$1,000)**	**Number of Commercial Buildings**	**Potential Exposure/Loss for Commercial Buildings (x$1,000)**	**Number of Critical Facilities**	**Potential Exposure for Critical Facilities (x$1,000)**
Coastal Storm / Erosion	25	0	0	0	0	1	964
Sea Level Rise	876	66	18,579	47	16,588	32	32,889
Dam Failure	4531	1,951	549,207	49	219,603	12	1,775
Earthquake (Annualized Loss - Includes shaking, liquefaction and landslide components)	10,495*	4,456*	1,254,364*	5,344*	1,870,237*	41*	61,257*
Flood (Loss)							
100 Year	2,346	650	182,975	101	35,416	43	33,960
500 Year	2407	650	182,975	101	35.416	44	36,311
Rain-Induced Landslide							
High Risk	464	24	6,756	4	1,231	0	0
Moderate Risk	0	0	0	0	0	0	0
Tsunami	520	106	29,839	10	3,584	29	26,531
Wildfire / Structure Fire							
Fire Regime II & IV	99,892	43,157	12,148,696	29,541	10,339,342	525	1,889,061

* Represents 500-year earthquake value under three earthquake scenarios (shake only, shake and liquefaction, and shake and landslide).

After reviewing the localized hazard maps and exposure/loss table above, the following hazards were identified by the Carlsbad LPG as their top five. A brief rational for including each of these is included.

- Structural Fire/Wildfire: The potential of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities can be significant. The continuing drought and likely implications of climate change exacerbate the fire threat.

- Earthquake: The potential for loss of life, injuries, and damage to property, as well as disruption of services, is significant.

- Hazardous Materials: One major freeway and one major railway pass through the community. The community also hosts an airport and several fixed facilities that utilize hazardous materials.

- Flooding: There are several areas of the community, which are near natural creek crossings and channels, coastal areas as well as lagoons.

- Severe Weather: Heavy rains can cause erosion and trigger slope instability in habitat areas of Carlsbad damaged during the May 2014 Poinsettia wildfire. Erosion and slope instability can cause damage to infrastructure, systems and facilities. High winds can also cause damage to infrastructure, systems and facilities.

1.1.1 Capabilities Assessment

The City of Carlsbad local planning group (LPG) for emergency planning is the Carlsbad Emergency Management Administrative Team (CEMAT). The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Carlsbad's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

1.1.2 Existing Institutions, Plans, Policies and Ordinances

The following is a summary of existing departments in Carlsbad and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Carlsbad, as shown in Table 5.3-2, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

The 2010 Multi-Jurisdictional Hazard Mitigation Plan was incorporated into the General Plan (approved September 22, 2015).

Table 5.3-2
City of Carlsbad: Administrative and Technical Capacity

Staff/Personnel Resources	Y/N	Department/Agency and Position
A. Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Community and Economic Development, Public Works, Housing and Neighborhood Services, Parks and Recreation Department
B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Public Works and Community and Economic Development
C. Planners or Engineer(s) with an understanding of natural and/or manmade hazards	Y	Community and Economic Development, Public Works, Fire Prevention, Environmental Programs
D. Floodplain manager	Y	Public Works, Community and Economic Development
E. Surveyors	Y	Community and Economic Development
F. Staff with education or expertise to assess the community's vulnerability to hazards	Y	CEMAT, Fire Prevention, Community and Economic Development, Environmental Programs, Parks and Recreation Department
G. Personnel skilled in GIS and/or HAZUS	Y	GIS Staff in IT
H. Scientists familiar with the hazards of the community	N	
I. Emergency manager	Y	City Manager, Public Safety Chiefs, Emergency Preparedness Manager
J. Grant writers	Y	Various Departments throughout City of Carlsbad

The legal and regulatory capabilities of Carlsbad are shown in Table 5.3-3, which presents the existing ordinances and codes that affect the physical or built environment of Carlsbad. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordnances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

Table 5.3-3
City of Carlsbad: Legal and Regulatory Capability

Regulatory Tools (ordinances, codes, plans)	Local Authority (Y/N)	Does State Prohibit? (Y/N)
A. Building code	Y	N
B. Zoning ordinance	Y	N
C. Subdivision ordinance or regulations	Y	N
D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Y	N
E. Growth management ordinances (also called "smart growth" or anti-sprawl programs)	Y	N
F. Site plan review requirements	Y	N
G. General or comprehensive plan	Y	N
H. A capital improvements plan	Y	N
I. An economic development plan	Y	
J. An emergency response plan	Y	N
K. A post-disaster recovery plan	Y	N
L. A post-disaster recovery ordinance	N	
M. Real estate disclosure requirements	Y	N
N. Habitat Management Plan	Y	N
O. Master Drainage, Sewer, Water, & Reclaimed Water	Y	N
P. Redevelopment Master Plan	Y	N

1.1.3 Fiscal Resources

Table 5.3-4 shows specific financial and budgetary tools available to Carlsbad such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 5.3-4
City of Carlsbad: Fiscal Capability

Financial Resources	Accessible or Eligible to Use Yes/No
A. Community Development Block Grants (CDBG)	Yes
B. Capital improvements project funding	Yes
C. Authority to levy taxes for specific purposes	Limited (Voter Approval)
D. Fees for water, sewer, gas, or electric service	Yes
E. Impact fees for homebuyers or developers for new developments/homes	Yes
F. Incur debt through general obligation bonds	Limited (Voter Approval)
G. Incur debt through special tax and revenue bonds	Limited (Voter Approval)
H. Incur debt through private activity bonds	Yes

I. Withhold spending in hazard-prone areas	Yes

1.1.4 Goals, Objectives and Actions

Listed below are Carlsbad's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.
The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or OES to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Representatives of numerous City departments involved in hazard mitigation planning, including Fire, Police, and Public Works provided input to the Carlsbad LPG. The original Carlsbad LPG members were Carlsbad Emergency Management Administrative Team (CEMAT) members: Mike Davis, David Harrison, Neil Gallucci, Marc Reno, Joan Mabrouk, Maria Callander, Don Wasko, Joe Garuba, Val Brown, Lori Swenck, Glynn Birdwell, Michele Masterson and Kurt Musser. Once developed, City staff presented them to the City of Carlsbad City Council for their approval.

Public input was solicited through Carlsbad's Community Emergency Response Team (CERT), National University Emergency Management and Homeland Security students at the Carlsbad campus, and through the City of Carlsbad's web page.

The following sections present the hazard-related goals, objectives and actions as prepared by Carlsbad's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

1.1.4.1 Goals

The City of Carlsbad has developed the following 8 Goals for their Hazard Mitigation Plan (See Attachment A for Goal 8).

Goal 1. Increase public understanding and support for effective hazard mitigation.

Goal 2. Build and maintain local capacity and commitment to hazard mitigation goals.

Goal 3. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to flooding/dam failure.

Goal 4. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to earthquakes**.**

Goal 5: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to structural fire/wildfire.

Goal 6. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to hazardous materials-related hazards

Goal 7. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to severe weather and/or climate change where appropriate.

Goal 8. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to information technology-related vulnerabilities and cyber insecurities.

1.1.4.2 Objectives and Actions

The City of Carlsbad developed the following broad list of objectives and actions to assist in the implementation of each of their eight identified goals. The City of Carlsbad developed objectives to assist in achieving their hazard mitigation goals. For each of these objectives, specific actions were developed that would assist in their implementation. A discussion of the prioritization and implementation of the action items is provided in Section 5.3.5

Goal 1: Increase public understanding and support for effective hazard mitigation.	**Applies to New Existing or Both**
Objective 1.A: Educate the public to increase awareness of hazards and opportunities for mitigation actions.	Both
Action 1.A.1 Carlsbad Emergency Management Administrative Team (CEMAT) develop hazard mitigation public awareness strategies.	
Action 1.A.2 Publicize and encourage the adoption of appropriate hazard mitigation actions.	Both
Objective 1B: Promote partnerships between the state, counties, and local jurisdictions and agencies to identify, prioritize, and implement mitigation actions.	Both
Action 1.B.1 Continue to participate in regional hazard mitigation activities as a member of the San Diego County Unified Disaster Council (UDC).	Both
Action 1.B.2 Support public sector symposiums and public education opportunities.	
Objective 1C: Work with Chamber of Commerce, businesses and other local agencies to promote hazard mitigation in the local community.	Both
Action 1.C.1 Increase awareness and knowledge of hazard mitigation principles and practices.	Both
Action 1.C.2 Encourage businesses to develop and implement hazard mitigation actions.	
Action 1.C.3 Support private sector symposiums and public education opportunities.	

Goal 2: Build and maintain local capacity and commitment to hazard mitigation goals.	**Applies to New Existing or Both**
Objective 2.A: Increase awareness and knowledge of hazard mitigation principles and practice among local officials.	Both
Action 2.A.1 CEMAT liaison with city departments to increase awareness and knowledge of hazard mitigation plan, principles and goals,	Both
Objective 2.B: Implement actions associated with hazard mitigation plan.	Both

Goal 2: Build and maintain local capacity and commitment to hazard mitigation goals.		**Applies to New Existing or Both**
Action 2.B.1	CEMAT coordinate and monitor action plan milestones.	Both
2.B.2	CEMAT seek training opportunities, through Regional Training Manager, https://sduasi.org, and other resources, to expand staff emergency management training	Both
2.B.3	CEMAT review and update EOC position staffing rosters and oversee staff member cross-training for multiple EOC positions.	Both
Objective 2.C: Continue GIS mapping of potential hazard areas.		Both
Action 2.C.1	Update GIS mapping as appropriate.	Both

Goal 3: Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to flooding/dam failure.		**Applies to New Existing or Both**
Objective 3.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to flooding/dam failure.		Both
Action 3.A.1	Update inundation maps every 10 years.	Both
Action 3.A.2	Review and compare existing flood control standards, zoning and building requirements.	
Action 3.A.3	Review and update policies that discourage growth in flood-prone areas.	
Action 3.A.4	Review and update city-wide Evacuation Plan.	
Action 3.A.5	Periodically exercise flooding/dam failure response actions.	
Objective 3.B: Protect existing assets with the highest relative vulnerability to the effects of a flooding (100 year floodplain)/dam failure.		Both
Action 3.B.1	Identify hazard-prone structures and areas.	Both
Action 3.B.2	Maintain Storm Water System.	
Action 3.B.3	Maintain materials for building water barriers.	
Objective 3.C: Coordinate with and support existing efforts to mitigate dam failure (e.g., US Army Corps of Engineers, US Bureau of Reclamation, California Department of Water Resources).		Both
Action 3.C.1	Incorporate and maintain valuable wetlands in open space preservation programs.	Both
Objective 3.D: Protect floodplains from inappropriate development.		Both
Action3 .D.1	Plan and zone for open space, recreational, agricultural, or other low-intensity uses within floodway fringes.	Both

Goal 4: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to earthquakes.		**Applies to New Existing or Both**
Objective 4.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to earthquakes.		Both
Action 4.A.1	Update earthquake response actions in Emergency Operations Plan (EOP).	Both
Action 4.A.2	Continue periodic updates of local building codes, public works construction codes, zoning and grading ordinances to reflect legislative changes.	
Action 4.A.3	Review and update city-wide Evacuation Plan.	Both
Action 4.A.4	Periodically exercise earthquake response actions.	
Objective 4.B: Protect existing assets with the highest relative vulnerability to the effects of earthquakes.		Both
Action 4.B.1	CEMAT review local vulnerability to ground motion, landslides and liquefaction impacts on facilities and infrastructure.	Both
Objective 4.C: Coordinate with and support existing efforts to mitigate earthquake hazard		Both
Action 4.C.1	Identify projects for pre-disaster mitigation funding.	Both
Objective 4.D: Community Outreach		Both
Action 4.D.1	Encourage participation in state-wide earthquake preparedness exercises.	Both

Goal 5: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to structural fire/wildfire.		**Applies to New, Existing or Both**
Objective5.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.		Both
Action 5.A.1	Update structural fire/wildfire response actions in Emergency Operations Plan (EOP) and/or Wildland fire plans.	Both
Action 5.A.2	Review and update city-wide Evacuation Plan.	
Action 5.A.3	Periodically exercise structural fire/wildfire response actions.	
Action 5.A.4	Participate in amendments to Fire Protection programs, policies, and requirements; ref. Section IV.F. City Landscape Manual.	
Action 5.A.5	Continue with Hosp Grove trimming and replanting efforts.	
Action 5.A.6	Continue to provide for annual vegetation management/maintenance, as necessary, in Hosp Grove defensible space.	
Objective5.B: Coordinate with and support existing efforts to mitigate structural fire/wildfire.		Both

Goal 5: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to structural fire/wildfire.	**Applies to New, Existing or Both**
Action 5.B.1 Continue to maintain the City's weed abatement ordinance to facilitate the removal of annual weeds/vegetation or habitat. Action 5.B.2 Provide increased vegetation management oversight to developments or HOA's bordering on open space or in Very High Fire Hazard Severity Zones.	Both
Objective5.C: Maintain GIS mapping to best reflect potential vulnerability of assets from structural fire/wildfire.	Both
Action 5.C.1 GIS maintain mapped fire risk areas.	Both
Objective5.D: Maintain adequate emergency response capability.	Both
Action 5.D.1 Continue to evaluate service level impacts and needs as part of City Council goals, Standards of Cover reviews, and Annual Operating Budget and Capital Improvement Program.	Both

Goal 6. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to hazardous materials-related hazards	**Applies to New, Existing or Both**
Objective 6.A.1 Develop a comprehensive approach to reducing the possibility of damage and losses due to hazardous materials-related hazards	Both
Action 6.A.1 GIS develop and maintain mapped hazardous materials facilities and risks for the City of Carlsbad. Action 6.A.2 Fire Prevention maintain library of hazardous materials plans for Carlsbad hazardous materials facilities. Action 6.A.3 Fire Prevention coordinate with GIS the development of mobile data computer based hazardous materials preplans associated with mapped facilities.	Both
Objective 6.B.1 Increase awareness and knowledge of hazardous materials mitigation principles and practice among local officials.	Both
Action 6.B.1 Periodically exercise coordinated hazardous materials response actions. Action 6.B.2 Support private sector symposiums and public education opportunities.	Both

Goal 7. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to severe weather and/or climate change where appropriate.	**Applies to New, Existing or Both**
Objective 7.A.1 Develop a comprehensive approach to reducing the possibility of damage and losses due to severe weather and/or climate change.	Both
Action 7.A.1 Update and adopt Local Coastal Program (LCP) to include assessment of impacts and vulnerabilities associated with sea level rise, such as inundation, flooding, wave impacts, erosion, and saltwater intrusion. LCP will identify strategies and adaptation measures to minimize risks.	Both
Objective 7.B.1 Increase awareness and knowledge of severe weather and/or climate change among senior city leadership and/or local officials.	Both

Goal 7. Reduce the possibility of damage and losses to existing assets, including people, facilities and infrastructure due to severe weather and/or climate change where appropriate.		**Applies to New, Existing or Both**
Action 7.B.1	Adopt a Climate Action Plan, which contains information about the impacts of climate change and a comprehensive strategy to reduce the community's greenhouse gas emissions that are contributing to climate change.	Both
Objective 7.C.1 Increase public awareness and knowledge of damages and losses due to severe weather and/or climate change through community awareness		Both
Action 7.C.1	Increase public awareness and knowledge of damages and losses due to severe weather and/or climate change through public outreach and education, including social media.	Both

Goal 8. Reduce the possibility of damage and losses to existing assets, including services, funds, facilities, infrastructure and possibly people due to <u>information technology-related vulnerabilities and cyber insecurities</u>.		**Applies to New, Existing or Both**
Objective 8.A Develop a comprehensive approach to reducing the possibility of damage and losses due to severe weather and/or climate change.		Both
Action 8.A.1 Action 8.A.2	Coordinate city information technology and cyber security planning with County Cyber Security Planning Group. Attend regional cybersecurity planning meetings.	Both
Objective 8.B Increase awareness and knowledge of information technology-related vulnerabilities and cyber insecurities among city staff, including senior city leadership and/or local officials.		Both
Action 8.B.1	Participate in regional cyber security training and exercises.	Both
Objective 8.C Prepare cyber security plans and policy		Both
Action 8.C.1 Action 8.C.2	Conduct security audit. Using San Diego County Office of Emergency Services cyber security plan as a reference, develop Carlsbad cybersecurity plan.	Both

1.1.5 Prioritization and Implementation of Action Items

Once the comprehensive list of jurisdictional goals, objectives, and action items listed above was developed, the proposed mitigation actions were prioritized. This step resulted in a list of acceptable and realistic actions that address the hazards identified in each jurisdiction. This prioritized list of action items was formed by the LPG weighing STAPLEE criteria

The Disaster Mitigation Action of 2000 (at 44 CFR Parts 201 and 206) requires the development of an action plan that not only includes prioritized actions but one that includes information on how the prioritized actions will be implemented. Implementation consists of identifying who is responsible for which action, what kind of funding mechanisms and other resources are available or will be pursued, and when the action will be completed.

The prioritized actions below reflect progress in local mitigation efforts as well as changes in development.

The top 10 prioritized mitigation actions as well as an implementation strategy for each are:

Action Item #1: Carlsbad Emergency Management Administrative Team (CEMAT) develop hazard mitigation public awareness strategies.

Coordinating Individual/Organization: CEMAT

Potential Funding Source: General Fund

Implementation Timeline: On-going

Action Item #2: Continue with Hosp Grove trimming and replanting efforts.

Coordinating Individual/Organization: Parks and Recreation Planning

Potential Funding Source: Grant Funding and General Fund

Implementation Timeline: On-going

Action Item #3: Continue to maintain the City's weed abatement ordinance to facilitate the removal of annual weeds/vegetation or habitat.

Coordinating Individual/Organization: Fire Prevention

Potential Funding Source: General Fund

Implementation Timeline: On-going

Action Item #4: Investigate feasibility of maintaining hazardous materials business plans in Mobile Data Computer.

Coordinating Individual/Organization: Fire Department

Potential Funding Source: General Fund

Implementation Timeline: FY 2015-2020

Action Item #5: Continue periodic updates of local building codes, public works construction codes, zoning and grading ordinances to reflect legislative changes.

Coordinating Individual/Organization: Fire Department Community and Economic Development

Potential Funding Source: General Fund

Implementation Timeline: FY 2015-2020

Action Item #6: Update hazardous material business plan library.

Coordinating Individual/Organization: Fire Prevention

Potential Funding Source: General Fund

Implementation Timeline: FY 2015-2020

Action Item #7: Provide information to the public on the City website and through public education opportunities.

Coordinating Individual/Organization: CEMAT

Potential Funding Source: General Fund

Implementation Timeline: FY 2015-2020

Action Item #8: Update and adopt Local Coastal Program (LCP) to include assessment of impacts and vulnerabilities associated with sea level rise, such as inundation, flooding, wave impacts and erosion. LCP will identify strategies and adaptation measures to minimize risks.
Coordinating Individual/Organization: Community and Economic Development Department
Potential Funding Source: General Fund, state grants
Implementation Timeline: 2017

Action #9: Adopt Climate Action Plan, which contains information about the impacts of climate change and a comprehensive strategy to reduce the community's greenhouse gas emissions that are contributing to climate change.
Coordinating Individual/Organization: Community and Economic Development, Public Works
Potential Funding Source: General Fund, federal, state grants, private sources
Implementation Timeline: 2015

Action Item #10: Coordinate city information technology and cyber security planning with County Cyber Security Planning Group.
Coordinating Individual/Organization: Information Technology Department
Potential Funding Source: General Fund
Implementation Timeline: 2015

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Appendix K – Demonstration of Reduced Delta Reliance

Appendix K – Reporting on Reduced Delta Reliance

Regulatory Background

Urban water suppliers that anticipate participating in or receiving water from a proposed project, such as a multiyear water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) are required to demonstrate reduced reliance on the Delta in their 2015 and 2020 Urban Water Management Plans (UWMPs) that can then be used in the certification of consistency process to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (California Code Regulations, Title 23, §5003).[1] The Delta Plan Policy WR P1 identifies the UWMP as the tool to demonstrate consistency with the state policy that suppliers that carry out or take part in covered actions must reduce their reliance on the Delta.[2]

Carlsbad Municipal Water District's (CMWD) information on its reduced reliance on the Delta is documented below and can be used in future certifications of consistency with WR P1 for potential future water supply covered actions in the Delta.

Carlsbad Municipal Water District Reliance on Delta Watershed

CMWD currently has two local water supplies, recycled water and desalinated seawater. The remainder of CMWD's potable water supply is purchased from the San Diego County Water Authority (Water Authority). In 2020, approximately 82% of CMWD's potable water was imported water supplied by the Water Authority. The Water Authority's imported water supplies are primarily sourced from the Colorado River via transfers from Imperial Irrigation District (IID), and from the State Water Project (SWP) and Central Valley Project (CVP) via Metropolitan Water District of Southern California (MWD).

CMWD's only imported water supplies that originate in the Delta watershed are imported water supplies delivered by the Water Authority via MWD. Recognizing that the Delta supplies are threatened by uncertain long-term reliability issues associated with drought shortages, climate change, seismic events, environmental impacts, and flow restrictions, and that imported water purchases are becoming increasingly expensive, CMWD has taken actions to reduce demand for imported water from the Water Authority as supplied by MWD, and is continuing to explore future opportunities to continue to reduce its reliance on imported water.

As part of its *Draft 2020 UWMP*, the Water Authority completed a Delta Reliance analysis to evaluate reduced Delta reliance consistent with Appendix C in the California Department of Water Resources' (DWR) *Draft UWMP Guidebook 2020* (DWR Guidebook). Given that CMWD's only potential source of water from the Delta watershed is water purchased from the Water Authority, CMWD relies on the Water Authority's Delta reliance analysis to also demonstrate reduced regional reliance on the Delta.

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[1] *Draft Urban Water Management Plan Guidebook 2020*, California Department of Water Resources, August 2020, p. C-1.

[2] *Ibid.*, p. C-2.

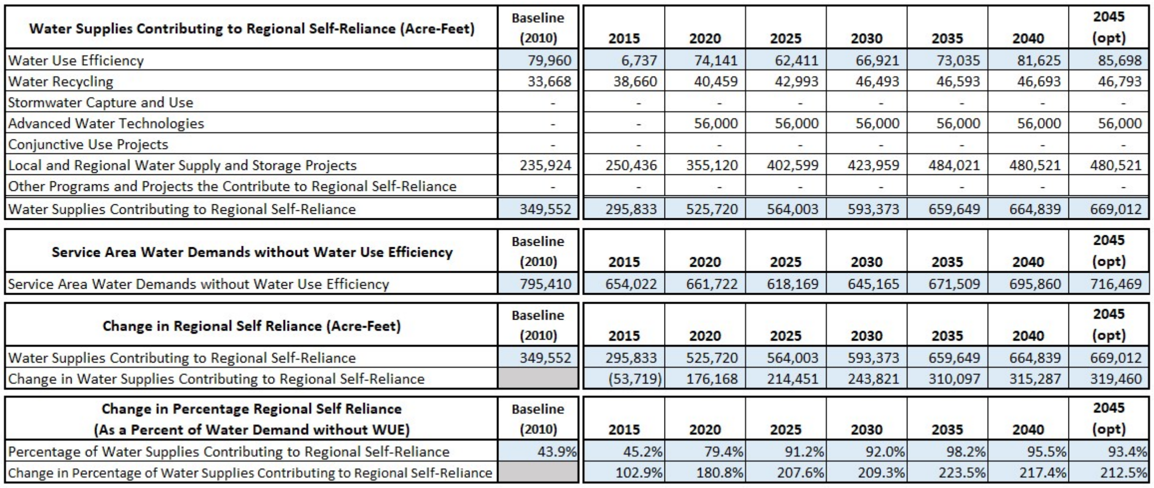
Water Authority Reduced Reliance on Delta Watershed

The Water Authority's *Draft 2020 UWMP* documents consistency with WR P1 by quantifying the water supplies that contribute to regional self-reliance and demonstrating reduced reliance on the Delta watershed, as summarized below.

Quantification of Water Supplies that Contribute to Regional Self-Reliance

Water suppliers must report the expected outcome for measurable improvement in regional self-reliance as a reduction in water used from the Delta watershed. **Table 1** lists the sources of water supplies and volumes that contribute to regional self-reliance.[3] As shown in the table, the Water Authority's reliance on the Delta watershed, and consequently CMWD's reliance on the Delta watershed, decreases over time as the percent of water supplies that contribute to regional self-reliance increase over time. CMWD's individual supplies that contribute to regional self- reliance can be found in Chapter 6 Water Supplies in CMWD's 2020 UWMP.

Table 1 – Calculation of Supplies Contributing to Regional Self-Reliance



Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Water Use Efficiency	79,960	6,737	74,141	62,411	66,921	73,035	81,625	85,698
Water Recycling	33,668	38,660	40,459	42,993	46,493	46,593	46,693	46,793
Stormwater Capture and Use	-	-	-	-	-	-	-	-
Advanced Water Technologies	-	-	56,000	56,000	56,000	56,000	56,000	56,000
Conjunctive Use Projects	-	-	-	-	-	-	-	-
Local and Regional Water Supply and Storage Projects	235,924	250,436	355,120	402,599	423,959	484,021	480,521	480,521
Other Programs and Projects the Contribute to Regional Self-Reliance	-	-	-	-	-	-	-	-
Water Supplies Contributing to Regional Self-Reliance	349,552	295,833	525,720	564,003	593,373	659,649	664,839	669,012

Service Area Water Demands without Water Use Efficiency	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Service Area Water Demands without Water Use Efficiency	795,410	654,022	661,722	618,169	645,165	671,509	695,860	716,469

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Water Supplies Contributing to Regional Self-Reliance	349,552	295,833	525,720	564,003	593,373	659,649	664,839	669,012
Change in Water Supplies Contributing to Regional Self-Reliance		(53,719)	176,168	214,451	243,821	310,097	315,287	319,460

Change in Percentage Regional Self Reliance (As a Percent of Water Demand without WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Percentage of Water Supplies Contributing to Regional Self-Reliance	43.9%	45.2%	79.4%	91.2%	92.0%	98.2%	95.5%	93.4%
Change in Percentage of Water Supplies Contributing to Regional Self-Reliance		102.9%	180.8%	207.6%	209.3%	223.5%	217.4%	212.5%

Demonstration of Reduced Reliance on Water Supplies from the Delta Watershed

Water suppliers are required to report on the expected outcomes for measurable reductions in water supplies from the Delta watershed. For CMWD, the only potential source of water from the Delta watershed is water purchased from the Water Authority via MWD. Because water provided by the Water Authority via MWD can include supplies that comingle Delta watershed and CVP supplies, and because MWD has not provided the anticipated methodology approved by the DSC, the Water Authority (and therefore CMWD) has incorporated the MWD's forecast in its entirety as a reasonable methodology to forecast the percent of MWD water supply from the Delta watershed and the CVP. **Table 2** calculates the reduced reliance on the Delta watershed within the entirety of the MWD service area, to serve as a regional approach for this requirement.[4]

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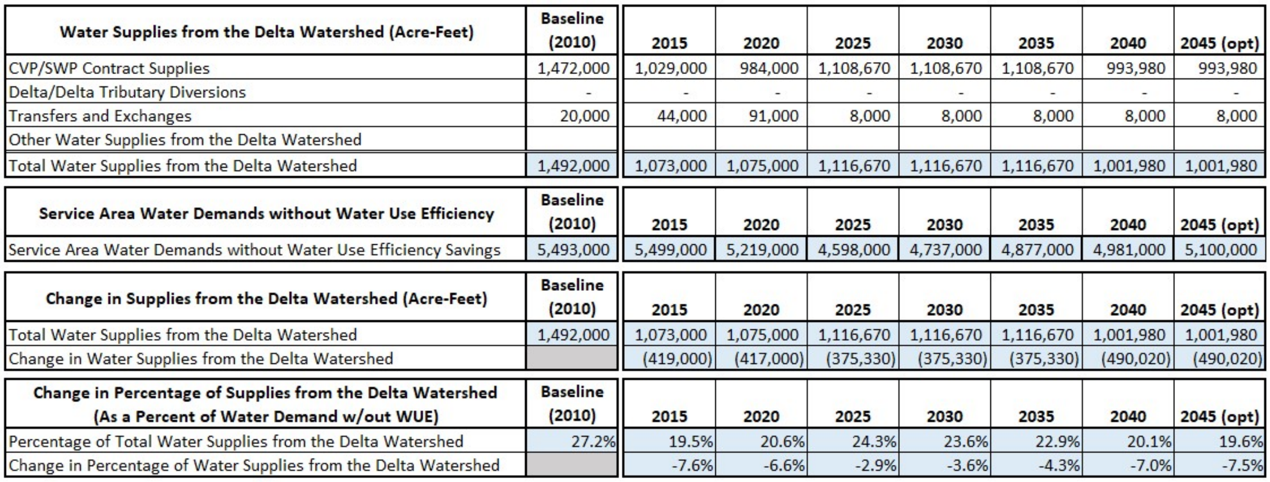
[3] *Draft 2020 UWMP*, San Diego County Water Authority, March 2021, Appendix J, Table 2.

[4] *Draft 2020 UWMP*, Metropolitan Water District of Southern California, February 2021, Appendix 11, Table A.11-3.

Table 2 – Calculation of Reliance on Water Supplies from Delta Watershed [5]



Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,108,670	1,108,670	1,108,670	993,980	993,980
Delta/Delta Tributary Diversions	-	-	-	-	-	-	-	-
Transfers and Exchanges	20,000	44,000	91,000	8,000	8,000	8,000	8,000	8,000
Other Water Supplies from the Delta Watershed								
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,116,670	1,116,670	1,116,670	1,001,980	1,001,980

Service Area Water Demands without Water Use Efficiency	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Service Area Water Demands without Water Use Efficiency Savings	5,493,000	5,499,000	5,219,000	4,598,000	4,737,000	4,877,000	4,981,000	5,100,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,116,670	1,116,670	1,116,670	1,001,980	1,001,980
Change in Water Supplies from the Delta Watershed		(419,000)	(417,000)	(375,330)	(375,330)	(375,330)	(490,020)	(490,020)

Change in Percentage of Supplies from the Delta Watershed (As a Percent of Water Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Percentage of Total Water Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.3%	23.6%	22.9%	20.1%	19.6%
Change in Percentage of Water Supplies from the Delta Watershed		-7.6%	-6.6%	-2.9%	-3.6%	-4.3%	-7.0%	-7.5%

The CVP/SWP contract supplies in **Table 2** include MWD's SWP Table A and Article 21 supplies.[6] The values in **Table 2** do not include supplies from San Luis Carryover storage or Central Valley storage programs. The transfers and exchanges of supplies from the Delta watershed shown in **Table 2** include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, and other generic SWP and Central Valley transfers and exchanges. Additional information can be found in Section 3.2 and Appendix 3 of MWD's *Draft 2020 UWMP*.[7]

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[5] Metropolitan Water District of Southern California, *Draft 2020 UWMP*, February 2021, Appendix 11, Table A.11-3.

[6] *Ibid.*, p. A.11-7.

[7] *Ibid.*, pgs. A.11-7 – 11-8.

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