2020 Urban Water Management Plan

Final

June 2021

2020 URBAN WATER MANAGEMENT PLAN

Prepared for:

Trabuco Canyon Water District

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ACRONYMS AND ABBREVIATIONS

%	Percent
20x2020	20% water use reduction in GPCD by year 2020
Act	Urban Water Management Planning Act of 1983
ADU	Accessory Dwelling Unit
AF	Acre-Feet
AFY	Acre-Feet per Year
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
Biops	Biological Opinions
BMP	Best Management Practice
CCC	California Coastal Commission
CDR	Center for Demographic Research at California State University Fullerton
CEE	Consortium for Energy Efficiency
CII	Commercial/Industrial/Institutional
CRA	Colorado River Aqueduct
CTE	Career Technical Education
CVP	Central Valley Project
DAC	Disadvantaged Communities
DCP	Delta Conveyance Project
Delta	Sacramento-San Joaquin River Delta
District	Trabuco County Water District
DMM	Demand Management Measure
DOF	Department of Finance
DRA	Drought Risk Assessment
DVL	Diamond Valley Lake
DWR	California Department of Water Resources
FY	Fiscal Year
GAP	Green Acres Project
GHG	Greenhouse Gas
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
gpf	Gallons per Flush
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWRS	Groundwater Replenishment System
HECW	High Efficiency Clothes Washer
HEN	High Efficiency Nozzle
HET	High Efficiency Toilet

IPR	Indirect Potable Reuse
IRP	Integrated Water Resources Plan
JADU	Junior Accessory Dwelling Unit
kWh	Kilowatt-Hour
LBCWD	Laguna Beach County Water District
LRP	Local Resources Program
LTFP	Long-Term Facilities Plan
MAF	Million Acre-Feet
MAFY	Million Acre-Feet per Year
MCL	Maximum Contaminant Level
MET	Metropolitan Water District of Southern California
MGD	Million Gallons per Day
MHI	Median Household Income
MNWD	Moulton Niguel Water District
MWDOC	Municipal Water District of Orange County
MWELO	Model Water Use Efficiency Landscape Ordinance
NDMA	N-nitrosodimethylamine
NRW	Non-Revenue Water
OC Basin	Orange County Groundwater Basin
OCWD	Orange County Water District
ORP	On-Site Retrofit Program
PFAS	Per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfanate
Poseidon	Poseidon Resources LLC
PPCP	Pharmaceuticals and Personal Care Product
ppt	parts per trillion
QWEL	Qualified Water Efficient Landscaper
RA	Replenishment Assessment
RHNA	Regional Housing Needs Assessment
RUWMP	Regional Urban Water Management Plan
SARCCUP	Santa Ana River Conservation and Conjunctive Use Project
SBx7-7	Senate Bill 7 as part of the Seventh Extraordinary Session
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCWD	South Coast Water District
SDCWA	San Diego County Water Authority
SDP	Seawater Desalination Program
sf	square feet
SMWD	Santa Margarita Water District

STEAM	Science Technology Engineering Arts and Mathematics
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TAF	Thousand Acre-Feet
TAFY	Thousand Acre-Feet per Year
TDS	Total Dissolved Solids
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act of 1983
Water Code	California Water Code
WBIC	Weather-Based Irrigation Controller
WF-21	Water Factory 21
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water Savings Incentive Program
WUO	Water Use Objective

EXECUTIVE SUMMARY

INTRODUCTION AND UWMP OVERVIEW

Trabuco Canyon Water District (District) prepared this 2020 Urban Water Management Plan (UWMP or Plan) to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (Act or UWMP Act) and subsequent California Water Code (Water Code) requirements. The District is a retail water supplier that provides water to its residents and other customers using the raw and potable imported water supply obtained from its regional wholesaler, Municipal Water District of Orange County (MWDOC), local groundwater from San Juan Groundwater Basin, which is managed by San Juan Basin Authority (SJBA), local surface water from Irvine Lake and recycled wastewater from District's Robinson Ranch Wastewater Treatment Plant (RRWWTP) and Santa Margarita Water District's (SMWD) Chiquita Water Treatment Plant (CWWRP). The District, as one of MWDOC's 28 member agencies, prepared this 2020 UWMP in collaboration with MWDOC, Metropolitan Water District of Southern California (MET), SJBA, SMWD and other key agencies.

UWMPs are comprehensive documents that present an evaluation of a water supplier's reliability over a long-term (20-25 year) horizon. This 2020 UWMP provides an assessment of the present and future water supply sources and demands within the District's service area. It presents an update to the 2015 UWMP on the District's water resource needs, water use efficiency programs, water reliability assessment and strategies to mitigate water shortage conditions. It also presents a new 2020 Water Shortage Contingency Plan (WSCP) designed to prepare for and respond to water shortages. This 2020 UWMP contains all elements to meet compliance of the new requirements of the Act as amended since 2015.

UWMP PREPARATION

The District coordinated the preparation of this 2020 UWMP with other key entities, including MWDOC's (regional wholesaler of imported water for Orange County), MET (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), and SJBA (San Juan Groundwater Basin manager), and South Orange County Waste Authority (a Joint Powers Authority with ten member agencies, working to facilitate and manage the collection, transmission, treatment and disposal of wastewater and production of recycled water). The District also coordinated with other entities, which provided valuable data for the analyses prepared in this UWMP, such as the Center for Demographic Research (CDR) at California State University Fullerton for population projections, through MWDOC's assistance.

SYSTEM DESCRIPTION

The District was organized on February 26, 1962, under Division XII of the California Water Code. Governed by a five-member Board of Directors, the District provides water, wastewater treatment and recycled water services for its service area.

The District encompasses an area of approximately 8,200 acres in the southeastern portion of Orange County at the foothills of the Santa Ana Mountains and its service area includes communities within the City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo, Trabuco Canyon and other areas of unincorporated Orange County. The District operates one water treatment plant, two wells, nine pump stations, eight treated water storage reservoirs and manages 66-mile water distribution system with approximately 4,118 service connections.

Lying in the South Coast Air Basin (SCAB), its climate is characterized by Southern California's "Mediterranean" climate with mild winters, warm summers and moderate rainfall. In terms of land use, the District's service area can be described as a predominantly single and multi-family residential community with several parks, a golf course, and a regional park. The District currently has over 40 developments in some stage of planning. These developments are projected to generate a daily demand of approximately 1.3 MGD by 2035. New developments beyond 2020 may potentially also include accessory dwelling units (ADUs). The current population of 12,921 is projected to increase by 23.9% over the next 25 years.

WATER USE CHARACTERIZATION

Water use within the District's service area has been relatively stable in the past decade with an annual average of 3,365 AF. The potable and non-potable water use accounts for an average of 80% and 20% of total District water use, respectively. In FY2019-20, the District's water use was 2,301 AF of potable water (groundwater and imported) and 672 AF of direct recycled water for landscape irrigation. In FY 2019-20, the District's potable water use profile was comprised of 72.2% residential use, 3.4% commercial, industrial, and institutional (CII), and 13.7% large landscape/irrigation, with non-revenue water comprising 2.4% and other uses comprising about 8.4%.

WATER USE PROJECTIONS: 5-YEAR AND 25-YEAR

Potable water demand is likely to increase 6.2% over the next 5 years. In the longer term, potable water demand is projected to increase 5.9% from 2025 through 2045. The projected water use for 2045 is 2,588 AF for potable water and 701 AF for recycled water. This demand projection considers such factors as current and future demographics, future water use efficiency measures, and long-term weather variability.

CONSERVATION TARGET COMPLIANCE

Retail water suppliers are required to comply with the requirements of Water Conservation Act of 2009, also known as SBx7-7 (Senate Bill 7 as part of the Seventh Extraordinary Session), which was signed into law in 2010 and requires the State of California to reduce urban water use by 20% by 2020 from a 2013 baseline.

The retail water suppliers can comply individually or as a region in collaboration with other retail water suppliers, in order to be eligible for water related state grants and loans. The District is part of the Orange County 20x2020 Regional Alliance created in collaboration with MWDOC, its retail member agencies as well as the Cities of Anaheim, Fullerton and Santa Ana. The Alliance was created to assist OC retail agencies in complying with SBx7-7.

The District met its 2020 water use target and is in compliance with SBx7-7; the actual 2020 consumption was 159 gallons per capita per day (GPCD), which is below its 2020 target of 200 GPCD.

WATER SUPPLY CHARACTERIZATION

The District meets its demands with a combination of imported water, recycled water, and – when available – groundwater. The District works together with two primary agencies, MET and MWDOC, to ensure a safe and reliable water supply that will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include water from the Colorado River and the State Water Project (SWP), provided by MET and delivered through MWDOC.

In FY 2019-20, the District relied on 56% untreated imported water, 23% recycled water, 11% treated imported water, and 10% groundwater.

It is projected that by 2045, the water supply portfolio will shift to 64% untreated imported water, 21% recycled water, and 15% treated imported water. Note that these representations of supply match the projected demand. However, the District can purchase more MET water through MWDOC, should the need arise. Additionally, due to the seasonal fluctuations of groundwater availability, the District pumps groundwater when available, but does not rely on or plan on it as a water supply source.

The District owns and operates a water distribution system, a wastewater collection system, and a recycled water system. The District owns and operates the RRWWTP that provides collection and treatment for developments on the east side of the District's service area. In the eastern portion of the District, 100% of the wastewater is recycled at the RRWWTP. The central portion of the District is on septic and cannot be recycled and the western portion of the District's wastewater is blended with flows from Irvine Ranch Water District (IRWD) and SMWD and sent to the CWWRP for treatment and disposal.

WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

Every urban water supplier is required to assess the reliability of their water service to its customers under a normal year, a single dry year, and a drought period lasting five consecutive years. The water service reliability assessment compares projected supply to projected demand for the three hydrological conditions between 2025 and 2045. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for as part of the assessment.

The District depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. MET's and MWDOC's 2020 UWMPs conclude that they can meet full-service demands of their member agencies through 2045 during normal years, single-dry years, and multiple-dry years. Consequently, the District is projected to meet full-service demands through 2045 for the same scenarios.

The Drought Risk Assessment (DRA) evaluates the District's near-term ability to supply water assuming the District is experiencing a drought over the next five years. Even under the assumption of a drought over the next five years, MET's 2020 UWMP concludes a surplus of water supplies would be available to all of its member agencies, including MWDOC and in effect, the District, should the need for additional supplies arise to close any local supply gap. Additionally, the District partakes in various efforts to reduce its reliance on imported water supplies such as increasing its use of recycled water.

WATER SHORTAGE CONTINGENCY PLANNING

Water shortage contingency planning (WSCP) is a strategic planning process that the District engages in to prepare for and respond to water shortages. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as water supply quality changes, climate change, drought, and catastrophic events (e.g., earthquake). The District's WSCP provides real-time water supply availability assessment and structured steps designed to respond to actual conditions. This level of detailed planning and preparation will help maintain reliable supplies and reduce the impacts of supply interruptions.

The WSCP serves as the operating manual that the District will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The WSCP contains the

processes and procedures that will be deployed when shortage conditions arise so that the District's governing body, its staff, and its retail agencies can easily identify and efficiently implement pre-determined steps to mitigate a water shortage to the level appropriate to the degree of water shortfall anticipated.

DEMAND MANAGEMENT MEASURES

The District, along with other Retail water agencies throughout Orange County, recognizes the need to use existing water supplies efficiently. This ethic of efficient use of water has evolved as a result of the development and implementation of water use efficiency programs that make good economic sense and reflect responsible stewardship of the region's water resources. The District works closely with MWDOC to promote regional efficiency by participating in the regional water savings programs, leveraging MWDOC local program assistance, and applying the findings of MWDOCs research and evaluation efforts.

PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The Water Code requires the UWMP to be adopted by the Supplier's governing body. Before the adoption of the UWMP, the District notified the public and the cities and counties within its service area per the Water Code and held a public hearing to receive input from the public on the UWMP. Post adoption, the District submitted the UWMP to DWR and other key agencies and made the document available for public review no later than 30 days after filing with DWR.

1 INTRODUCTION AND UWMP OVERVIEW

Trabuco Canyon Water District (District) prepared this 2020 Urban Water Management Plan (UWMP or Plan) to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (Act or UWMP Act) and subsequent California Water Code (Water Code) requirements. The District is a retail water supplier that provides water to its residents and other customers using the raw and potable imported water supply obtained from its regional wholesaler, Municipal Water District of Orange County (MWDOC), local groundwater from San Juan Groundwater Basin, which is managed by San Juan Basin Authority (SJBA), local surface water from Irvine Lake and recycled wastewater from District's Robinson Ranch Wastewater Treatment Plant (RRWWTP) and Santa Margarita Water District's (SMWD) Chiquita Water Treatment Plant (CWWRP). The District, as one of MWDOC's 28 member agencies, prepared this 2020 UWMP in collaboration with MWDOC, Metropolitan Water District of Southern California (MET), SJBA, SMWD and other key agencies.

UWMPs are comprehensive documents that present an evaluation of a water supplier's reliability over a long-term (20-25 year) horizon. In response to the changing climatic conditions and regulatory updates since the 2015 UWMP, the District has been proactively managing its water supply and demand. The water loss audit program, water conservation measures and efforts for increased self-reliance in order to reduce dependency on imported water from the Sacramento-San Joaquin Delta (the Delta) are some of the water management efforts that the District is a part of to maintain the reliability of water supply for its service area.

This 2020 UWMP provides an assessment of the present and future water supply sources and demands within the District's service area. It presents an update to the 2015 UWMP on District's water resource needs, water use efficiency programs, water reliability assessment and strategies to mitigate water shortage conditions. It presents a new 2020 Water Shortage Contingency Plan (WSCP) designed to prepare for and respond to water shortages. This 2020 UWMP contains all elements to meet compliance of the new requirements of the Act as amended since 2015.

1.1 Overview of Urban Water Management Plan Requirements

The UWMP Act enacted by California legislature requires every urban water supplier (Supplier) providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to prepare, adopt, and file an UWMP with the DWR every five years in the years ending in zero and five.

For this 2020 UWMP cycle, DWR placed emphasis on achieving improvements for long term reliability and resilience to drought and climate change in California. Legislation related to water supply planning in California has evolved to address these issues, namely Making Conservation a Way of Life [Assembly Bill (AB) 1668 and Senate Bill (SB) 606] and Water Loss Performance Standard SB555. New UWMP requirements in 2020 are a direct result of these new water regulations. Two complementary components were added to the 2020 UWMP. First is the WSCP to assess the Supplier's near term 5-year drought risk assessment (DRA) and provide a structured guide for the Supplier to deal with water shortages. Second is the Annual Water Supply Demand Assessment (WSDA) to assess the current year plus one dry year i.e., short-term demand/supply outlook. Analyses over near- and long-term horizons together will

provide a more complete picture of Supplier's reliability and will serve to inform appropriate actions it needs to take to build up capacity over the long term.

The various key new additions in the 2020 UWMP included as a result of the most recent water regulations are:

- **Water Shortage Contingency Plan (WSCP) –** WSCP helps a Supplier to better prepare for drought conditions and provides the steps and water use efficiency measures to be taken in times of water shortage conditions. WSCP now has more prescriptive elements, including an analysis of water supply reliability; the water use efficiency measures for each of the six standard water shortage levels, that correspond to water shortage percentages ranging from 0-10% to greater than 50%; an estimate of potential to close supply gap for each measure; protocols and procedures to communicate identified actions for any current or predicted water shortage conditions; procedures for an annual water supply and demand assessment; monitoring and reporting requirements to determine customer compliance; reevaluation and improvement procedures for evaluating the WSCP.
- **Drought Risk Assessment –** The Suppliers are now required to compare their total water use and supply projections and conduct a reliability assessment of all their sources for a consecutive five-year drought period beginning 2021.
- **Five Consecutive Dry-Year Water Reliability Assessment** - The three-year multiple dry year reliability assessment in previous UWMPs has now been extended from three to five consecutive dry years to include a more comprehensive assessment of the reliability of the water sources to improve preparedness of Suppliers for extended drought conditions.
- **Seismic Risk –** The UWMP now includes a seismic risk assessment of the water supply infrastructure and a plan to mitigate any seismic risks on the water supply assets.
- **Groundwater Supplies Coordination –** The UWMP should be in accordance with the Sustainable Groundwater Management Act of 2014 and consistent with the Groundwater Sustainability Plans, wherever applicable.
- **Lay Description** – To provide a better understanding of the UWMP to the general public, a lay description of the UWMP is included, especially summarizing the Supplier's detailed water service reliability assessment and the planned management steps and actions to mitigate any possible shortage scenarios.

1.2 UWMP Organization

This UWMP is organized into 10 main sections aligned with the DWR Guidebook recommendations. The subsections are customized to tell the District's story of water supply reliability and ways to overcome any water shortages over a planning horizon of the next 25 years.

Section 1 Introduction and UWMP Overview gives an overview of the UWMP fundamentals and briefly describes the new additional requirements passed by the Legislature for 2020 UWMP.

Section 2 UWMP Preparation identifies this UWMP as an individual planning effort of the District, lists the type of year and units of measure used and introduces the coordination and outreach activities conducted by the District to develop this UWMP.

Section 3 System Description gives a background on the District's water system and its climate characteristics, population projection, demographics, socioeconomics and predominant current and projected land uses of its service area.

Section 4 Water Use Characterization provides historical, current, and projected water use by customer category for the next 25 years within the District's service area and the projection methodology used by MWDOC to develop the 25-year projections**.**

Section 5 Conservation Target Compliance reports the SB X7-7 water use conservation target compliance of the District (individually and as a member of the OC 20x2020 Regional Alliance).

Section 6 Water Supply Characterization describes the current water supply portfolio of the District as well as the planned and potential water supply projects and water exchange and transfer opportunities.

Section 7 Water Service Reliability and Drought Risk Assessment assesses the reliability of the District's water supply service to its customers for a normal year, single dry year, and five consecutive dry years scenarios. This section also includes a DRA of all the supply sources for a consecutive five-year drought period beginning 2021.

Section 8 Water Shortage Contingency Planning is a brief summary of the standalone WSCP document (Appendix H) which provides a structured guide for the District to deal with water shortages, incorporating prescriptive information and standardized action levels, lists the appropriate actions and water use efficiency measures to be taken to ensure water supply reliability in times of water shortage conditions, along with implementation actions in the event of a catastrophic supply interruption.

Section 9 Demand Management Measures provides a comprehensive description of the water conservation programs that the District has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets.

Section 10 Plan Adoption, Submittal, and Implementation provides a record of the process the District followed to adopt and implement its UWMP.

2 UWMP PREPARATION

The District's 2020 UWMP is an individual UWMP for the District to meet the Water Code compliance as a retail water supplier. While the District opted to prepare its own UWMP and meet Water Code compliance individually, the development of this UWMP involved close coordination with its whole supplier, MWDOC along with other key entities within the region.

2.1 Individual Planning and Compliance

The District opted to prepare its own UWMP (Table 2-1) and comply with the Water Code individually, while closely coordinating with MWDOC and various key entities as discussed in Section 2.2 to ensure regional integration. The UWMP Checklist was completed to confirm the compliance of this UWMP with the Water Code (Appendix A).

One consistency with MWDOC and the majority of its other retail member agencies is that the District selected to report demands and supplies using fiscal year (FY) basis (Table 2-2).

Table 2-1: Plan Identification

DWR Submittal 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	Orange County 20x2020 Regional Alliance
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Table 2-2: Supplier Identification

DWR 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)	
7/1	
Units of measure used in UWMP (select from drop down)	
Unit	AF
NOTES: The energy intensity data is reported in calendar year consistent with the Greenhouse Gas Protocol.	

2.2 Coordination and Outreach

2.2.1 Integration with Other Planning Efforts

The District, as a retail water supplier, coordinated this UWMP preparation effort with other key entities, including MWDOC (regional wholesale supplier for OC), MET (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), SJBA (San Juan Basin Groundwater Basin manager) and SMWD (provider of a portion of District's recycled wastewater supply). The District also developed this Plan in conjunction with other MWDOC-led efforts such as population projection from the Center for Demographic Research at California State University Fullerton (CDR).

Some of the key planning and reporting documents that were used to develop this UWMP are:

- **MWDOC's 2020 UWMP** provides the basis for the projections of the imported supply availability over the next 25 years for the District's service area.
- **MWDOC's 2020 WSCP** provides a water supply availability assessment and structured steps designed to respond to actual conditions that will help maintain reliable supplies and reduce the impacts of supply interruptions.

- **2021 OC Water Demand Forecast for MWDOC and OCWD Technical Memorandum (Demand Forecast TM)** provides the basis for water demand projections for MWDOC's member agencies as well as Anaheim, Fullerton, and Santa Ana.
- **MET's 2020 Draft Integrated Water Resources Plan (IRP)** is a long-term planning document to ensure water supply availability in Southern California and provides a basis for water supply reliability in Orange County.
- **MET's 2020 UWMP** was developed as a part of the 2020 IRP planning process and was used by MWDOC as another basis for the projections of supply capability of the imported water received from MET.
- **MET's 2020 WSCP** provides a water supply assessment and guide for MET's intended actions during water shortage conditions.
- **Local Hazard Mitigation Plan** provides the basis for the seismic risk analysis of the water system facilities.
- **Orange County Local Agency Formation Commission's 2020 Municipal Service Review for MWDOC Report** provides comprehensive review of the municipal services provided by MWDOC.
- **Water Master Plan** of the District provides information on water infrastructure planning projects and plans to address any required water system improvements.
- **Groundwater Management Plan of San Juan Groundwater Basin** provide the groundwater sustainability goals for the San Juan Groundwater Basin and the programs, actions, and strategies activities that support those goals.

Statewide Water Planning

In addition to regional coordination with various agencies described above, the District as a MWDOC member agency is currently a part of MET's statewide planning effort to reduce reliance on the water imported from the Delta.

It is the policy of the State of California to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. This policy is codified through the Delta Stewardship Council's Delta Plan Policy WR P1 and is measured through Supplier reporting in each Urban Water Management Planning cycle. WR P1 is relevant to water suppliers that plan to participate in multi-year water transfers, conveyance facilities, or new diversions in the Delta.

Through significant local and regional investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts, the District has demonstrated a reduction in Delta reliance and a subsequent improvement in regional self-reliance. For a detailed description and documentation of the District's consistency with Delta Plan Policy WR P1 see Section 7.4 and Appendix C.

2.2.2 Wholesale and Retail Coordination

The District developed its UWMP in conjunction with MWDOC's 2020 UWMP. The District provided its historical water use and initial water use projections data to MWDOC (Table 2-3). MWDOC facilitated in refining the projections of the District's water demand and the imported supply from MWDOC over the next 25 years.

The District also has been taking part in many regional programs administered by MWDOC to assist retail agencies meet various State compliance, such as the OC Regional Alliance for SBx7-7 compliance, regional water loss program for SB555 compliance, and regional water use efficiency programs. Sections 5 and 9 provide detailed information on these programs.

Table 2-3: Retail: Water Supplier Information Exchange

DWR 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
Municipal Water District of Orange County
Santiago Aqueduct Commission
NOTES:

2.2.3 Public Participation

For further coordination with other key agencies and to encourage public participation in the review and update of this Plan, the District held a public hearing and notified key entities and the public per the Water Code requirements. Sections 10.2 and 10.3 describe these efforts in detail.

3 SYSTEM DESCRIPTION

The District was organized on February 26, 1962, under Division XII of the California Water Code. Governed by a five-member Board of Directors, the District provides water, wastewater treatment and recycled water services for its service area.

The District encompasses an area of approximately 8,200 acres in the southeastern portion of Orange County at the foothills of the Santa Ana Mountains and its service area includes communities within the City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo, Trabuco Canyon and other areas of unincorporated Orange County. The District operates one water treatment plant, two wells, nine pump stations, eight treated water storage reservoirs and manages 66-mile water distribution system with approximately 4,118 service connections.

Lying in the South Coast Air Basin (SCAB), its climate is characterized by Southern California's "Mediterranean" climate with mild winters, warm summers and moderate rainfall. In terms of land use, the District's service area can be described as a predominantly single and multi-family residential community with several parks, a golf course, and a regional park. The District currently has over 40 developments in some stage of planning. These developments are projected to generate a daily demand of approximately 1.3 MGD by 2035. New developments beyond 2020 may potentially also include accessory dwelling units (ADUs). The current population of 12,921 is projected to increase by 23.9% over the next 25 years.

3.1 Agency Overview

This section provides information on the formation and history of the District, its organizational structure, roles, and relationship to MWDOC.

3.1.1 Formation and Purpose

The District is a water district organized and operating pursuant to Section 30000, and following, of the Water Code of the State of California. The District was organized on February 26, 1962, under Division XII of the California Water Code. The District currently employs approximately 25 individuals in the Administration, Water, Wastewater, and Maintenance Departments.

Shortly after its formation, the District constructed a major transmission line into the central Trabuco Canyon area to provide water service to the few hundred residences along its route and in the canyon area. The western and eastern portions of the District both began urbanizing in the early to mid-1980's with the development of Robinson Ranch and Portola Hills located in the southern portion of Orange County.

In addition to water service, the District was later enabled to provide wastewater treatment and recycled water service. The District constructed sewer collection facilities and acquired treatment capacity from SMWD in the CWWRP for the western portion of the District. In the central portion of the District, consisting of areas within unincorporated Orange County, unincorporated areas are regulated by the County of Orange and primarily consist of individual septic systems. The eastern portion of the District is served through District-owned sewer system, wastewater treatment facilities, and recycled water facilities. The District treats the collected wastewater at the RRWWTP and has the capability to divert or convey

wastewater to SMWD for treatment at their CWWRP. The District recycles the treated effluent from RRWWTP by pumping treated and stored flows to the recycled water customers.

3.1.2 Board of Directors

The District is governed by a five-member Board of Directors elected to alternating four year terms at elections held every two years. The current members of the Board of Directors are:

- Don Chadd - President
- Stephen Dopudja - Vice President
- Glenn Acosta - Director
- Edward Mandich - Director
- Michael Safranski - Director

3.1.3 Relationship to MWDOC

The District is one of MWDOC's 28 member agencies purchasing imported water from MWDOC, Orange County's wholesale water supplier and a member agency of MET. The District's location within MWDOC's service is shown on Figure 3-1.

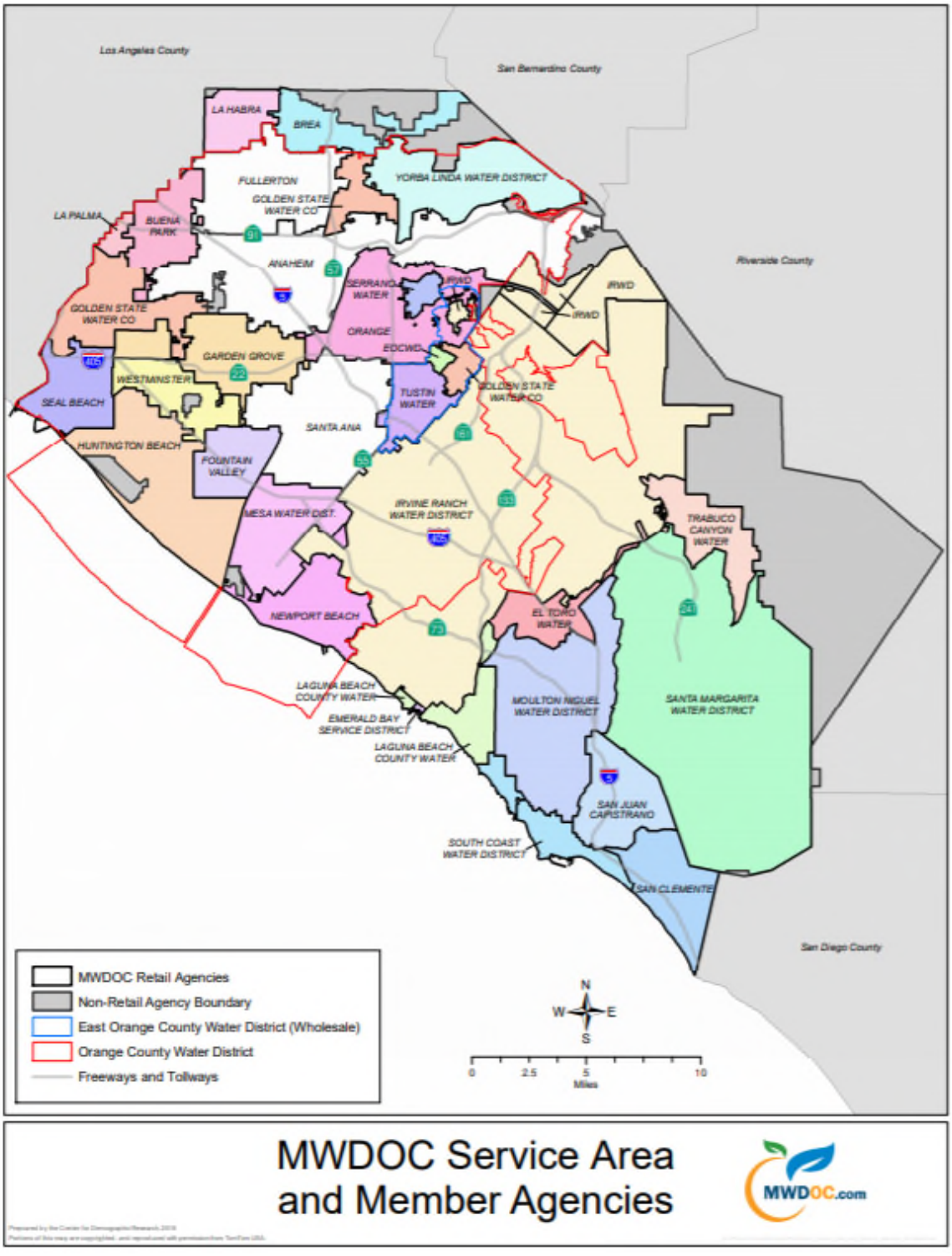

Figure 3-1: Regional Location of Trabuco Canyon Water District and Other MWDOC Member Agencies

3.2 Water Service Area and Facilities

3.2.1 Water Service Area

The District is located in the southeastern portion of Orange County at the foothills of the Santa Ana Mountains and encompasses approximately 8,200 acres. The service area includes communities within the City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo, Trabuco Canyon and other areas of unincorporated Orange County.

Prior to 2000, the District was entirely within the unincorporated area of Orange County. In 2000, the City of Rancho Santa Margarita was incorporated and now covers the eastern portion of the District. The eastern portion of the District is accessed via Santa Margarita Parkway or Antonio Parkway and Plano Trabuco Road with the western portion of the District being accessed via El Toro Road or Santiago Canyon Road. Live Oak Canyon Road/Trabuco Canyon Road is the main artery through the central portion of the District between El Toro Road and Plano Trabuco Road.

The terrain is generally steep hills and canyons throughout the central area of the District. The east and west sides consist of more gentle terrain made up primarily of rolling hills. Elevations within the District range from approximately 985 feet above mean sea level in the lower Aliso Creek area and the southern area of Dove Canyon, to nearly 2,400 feet in the northeasterly portion of the District adjacent to the Cleveland National Forest. A map of the District's water service area is shown as Figure 3-2.

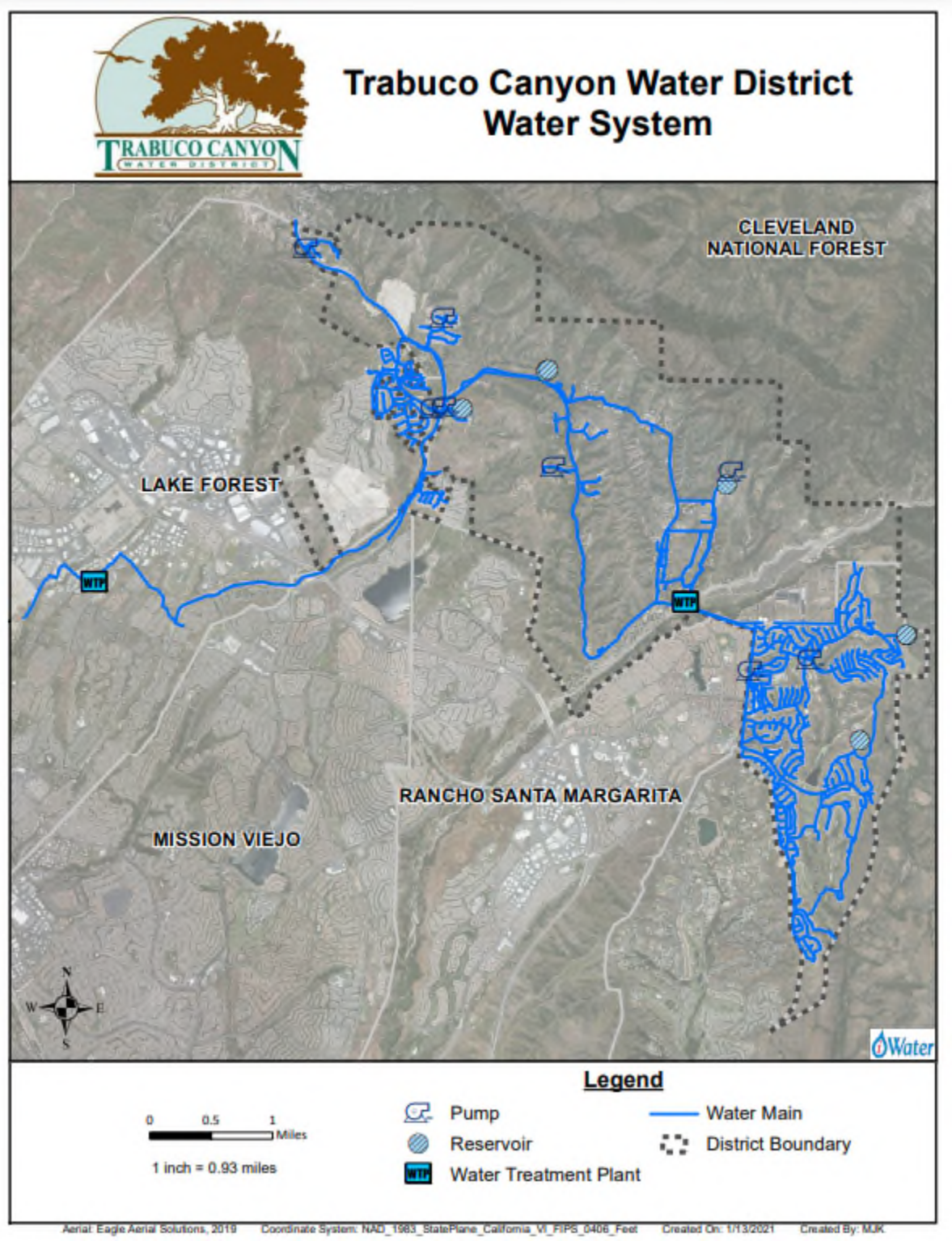

Figure 3-2: Trabuco Canyon Water District Water Service Area

3.2.2 Water Facilities

The District imports both raw and treated surface water to its service area which is augmented with groundwater from the Arroyo Trabuco Creek, part of the San Juan Groundwater Basin, and non-potable recycled water from the RRWWTP. To treat the imported surface water, the District owns and operates the Dimension Water Treatment Plant. To treat the groundwater supply, the District constructed the Trabuco Creek Wells Facility which houses both the Rose Canyon Well and Lang Well as well as the treatment facilities.

To distribute the treated water throughout the distribution system, the District has nine pump stations, eight treated water storage reservoirs, and approximately 66 miles of pipelines.

District wastewater facilities include RRWWTP, a 0.85 million gallons per day (MGD) water reclamation facility, eight sewer lift stations and approximately 47 miles of sewers (gravity/force mains) and interceptors. Recycled water from the RRWWTP is stored at the RRWWTP Reclaimed Water Reservoir. The RRWWTP Reclaimed Water Reservoir has an approximate storage capacity of 130 AF. The District's recycled water system is supplied with recycled water from the RRWWTP and supplemented with urban runoff captured and stored in Dove Lake. Dove Lake captures local runoff from the surrounding communities of Dove Canyon, Robinson Ranch, and Trabuco Highlands. In addition, the District's Dry Season Water Recovery Project captures urban runoff and stores it in Dove Lake for use in augmenting the District's non-potable irrigation system.

The District currently serves drinking water to an estimated 4,118 connections within the District. It provides sewer service to 3,688 connections within its boundaries plus 213 connections in the SMWD and up to 1,647 connections in the Irvine Ranch Water District (IRWD) service areas. The District provides recycled water service to Dove Canyon golf course, Dove Canyon Master Association, the Trabuco Highlands Community Association, the Robinson Ranch Homeowners Association, Sakaida Nursery, and TY Nursery.

The system connections and water volume supplied are summarized in Table 3-1.

Table 3-1: Retail Only: Public Water Systems

DWR 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 (AF)
CA3010094	Trabuco Canyon Water District	4,118	2,973
	TOTAL	4,118	2,973
NOTES:			

3.3 Climate

The District is located within the SCAB that encompasses all of OC, and the urban areas of Los Angeles, San Bernardino, and Riverside counties. The SCAB climate is characterized by Southern California's "Mediterranean" climate: a semi-arid environment with mild winters, warm summers and moderate rainfall.

Local rainfall has limited impacts on reducing water demand in the District, except for landscape irrigation demand. Water that infiltrates into the soil may enter groundwater supplies depending on the local geography. However, due to the large extent of impervious cover in Southern California, rainfall runoff quickly flows to a system of concrete storm drains and channels that lead directly to the ocean.

MET's water supplies come from the State Water Project (SWP) and the Colorado River Aqueduct (CRA), influenced by climate conditions in northern California and the Colorado River Basin, respectively. The years 2000-2018 have been the driest 19-year period in the history and both regions have been receiving record low precipitation which directly impact water supplies to Southern California. Due to the prolonged drought conditions since 2000, storage within the Colorado River system has declined to half of its reservoir capacity and has been fluctuating at that level (DWR, January 2020).

3.4 Population, Demographics, and Socioeconomics

3.4.1 Service Area Population

According to CDR, the District's service area has a 2020 population of 12,921, an increase from the 2015 population of 12,747. Overall, the population is projected to increase with a growth of 23.9% over the 25-year period from 2020 to 2045. Table 3-2 shows the population projections in five-year increments out to 2045 within the District's service area.

Table 3-2: Retail: Population - Current and Projected

DWR Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045
	12,921	13,843	14,612	16,088	16,115	16,015
NOTES: Source - Center for Demographic Research at California State University, Fullerton, 2020						

3.4.2 Demographics and Socioeconomics

As shown in Table 3-3 below, the total number of dwelling units in the District is expected to increase by 24% in the next 25 years from 4,147 in 2020 to 5,146 in 2045. Table 3-3 also shows a breakdown of the total dwelling units by type for the 25-year period from 2020 to 2045.

Table 3-3: Trabuco Canyon Water District Service Area Dwelling Units by Type

Trabuco Canyon Water District Service Area Dwelling Units by Type						
Dwelling Units	2020	2025	2030	2035	2040	2045
Total	**4,147**	**4,448**	**4,673**	**5,129**	**5,138**	**5,146**
Single Family	3,730	3,856	3,926	4,287	4,287	4,287
All Other *	417	592	747	842	851	859

Source: Center for Demographic Research at California State University, Fullerton, 2020

*Includes duplex, triplex, apartment, condo, townhouse, mobile home, etc. Yachts, houseboats, recreational vehicles, vans, etc. are included if is primary place of residence. Does not include group quartered units, cars, railroad box cars, etc.

In addition to the types and proportions of dwelling units, various socio-economic factors such as age distribution, education levels, general health status, income and poverty levels affect District's water management and planning. Based on the U.S. Census Bureau's QuickFacts, Orange County has about 15.3% of population of 65 years and over, 21.7% under the age of 18 years and 5.8% under the age of 5 years. 85.5% of the OC's population with an age of more than 25 years has a minimum of high school graduate and 40.6% of this age group has at least a bachelor's degree.

3.4.3 CDR Projection Methodology

The District obtains its services area population and dwelling unit data from MWDOC via CDR. MWDOC contracts with CDR to update the historic population estimates for 2010 to the current year and provide an annual estimate of population served by each of its retail water suppliers within its service area. CDR uses GIS and data from the 2000 and 2010 U.S. Decennial Censuses, State Department of Finance (DOF) population estimates, and the CDR annual population estimates. These annual estimates incorporate annual revisions to the DOF annual population estimates, often for every year back to the most recent Decennial Census. As a result, all previous estimates were set aside and replaced with the most current set of annual estimates. Annexations and boundary changes for water suppliers are incorporated into these annual estimates.

In the summer of 2020, projections by water supplier for population and dwelling units by type were estimated using the 2018 Orange County Projections dataset. Growth for each of the five-year increments was allocated using GIS and a review of the traffic analysis zones (TAZ) with a 2019 aerial photo. The growth was added to the 2020 estimates by water supplier.

3.5 Land Uses

3.5.1 Current Land Uses

The District's service area can best be described as a predominantly single and multi-family residential community located in southern Orange County. There are several parks, a golf course, and a regional park in the District. Based on the zoning designation collected and aggregated by Southern California Association of Governments (SCAG) around 2018, the current land use within the District's service area can be categorized as follows:

- Single family residential – 14.7%
- Multi-family residential – 0.3%
- Commercial – 3%
- Industrial – 1.8%
- Institutional/Governmental – 4.4%
- Agriculture – 3%
- Open space and parks – 21.6%
- Other – 51.1% (e.g., Undevelopable or Protected Land, Water, and Vacant)

3.5.2 Projected Land Uses

The District currently has over 40 developments (Figure 3-3) in some stage of planning. These developments are projected to generate a daily demand of approximately 1.3 MGD by 2035.

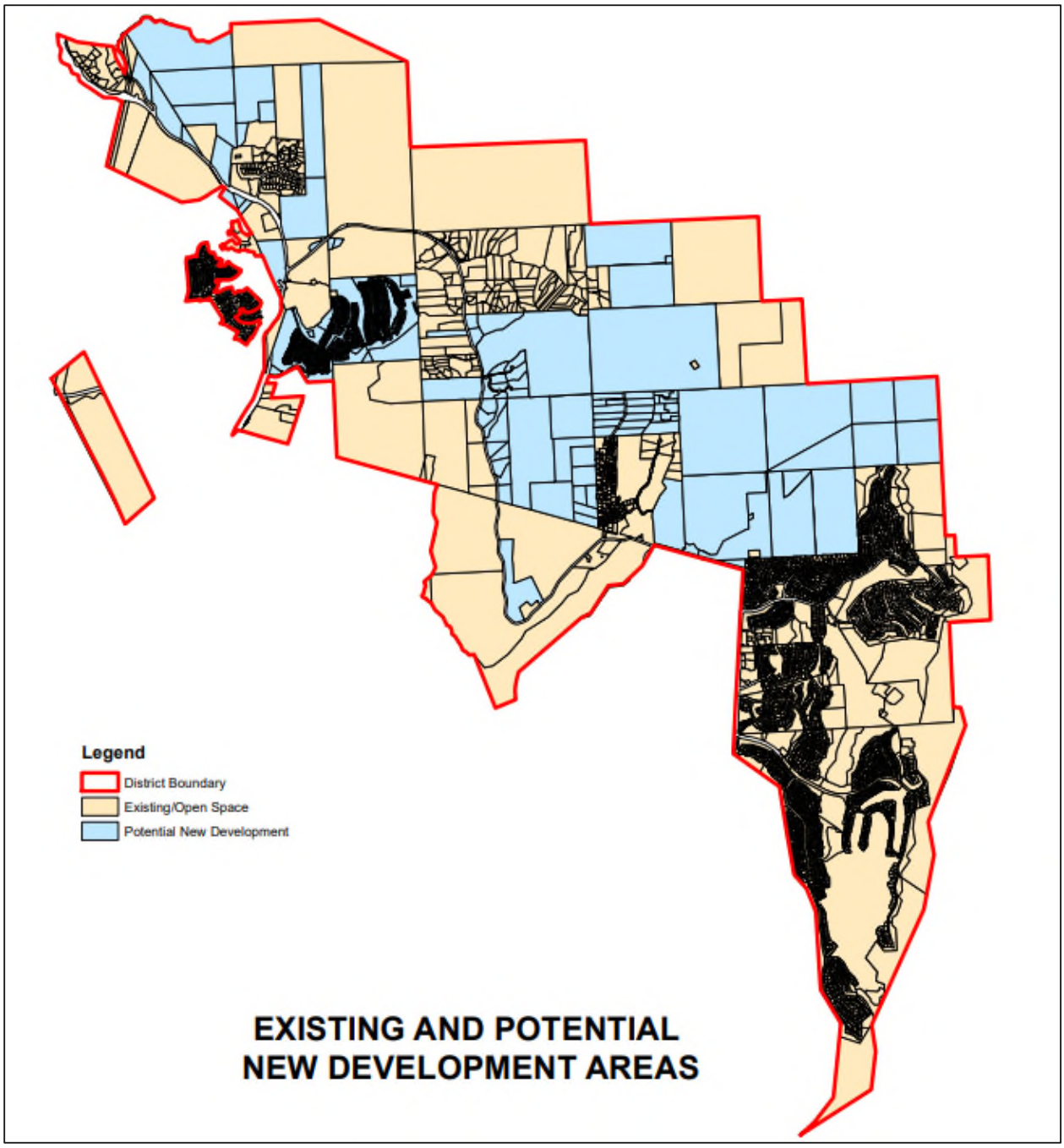

Figure 3-3: Trabuco Canyon Water District's New Developments Location

In addition to the above developments, the new developments may potentially also include accessory dwelling units (ADUs) beyond 2020, which are separate small dwellings embedded within residential properties. There has been an increase in the construction of ADUs in California in response to the rise in interest to provide affordable housing supply. The Legislature updated the ADU law effective January 1,

2020 to clarify and improve various provisions to promote the development of ADUs. (AB-881, "Accessory dwelling units," and AB-68, "Land use: accessory dwelling units") These include:

- allowing ADUs and Junior Accessory Dwelling Units (JADUs) to be built concurrently with a single-family dwelling. JADUs max size is 500 square feet (sf).
- opening areas where ADUs can be created to include all zoning districts that allow single-family and multi-family uses
- maximum size cannot be less than 850 sf for a one-bedroom ADU or 1,000 sf for more than one bedroom (California Department of Housing and Community Development, 2020).

About 92% of the ADUs in California are being built in the single family zoned parcels (University of California Berkeley, 2020). The increase in ADUs implies an increase in number of people per dwelling unit which potentially translates to higher water demand.

4 WATER USE CHARACTERIZATION

4.1 Water Use Overview

Water use within the District's service area has been relatively stable in the past decade with an annual average of 3,365 AF. The potable and non-potable water use accounts for an average of 80% and 20% of total District water use, respectively. In FY 2019-20, the District's water use was 2,301 AF of potable water (groundwater and imported) and 672 AF of direct recycled water for landscape irrigation. In FY 2019-20, the District's potable water use profile was comprised of 72.2% residential use, 3.4% commercial, industrial, and institutional (CII), and 13.7% large landscape/irrigation, with non-revenue water comprising 2.4% and other uses comprising about 8.4%. As described in Section 3, the District's service area is almost completely built-out and is projected to add minimum land use and small population increase. Potable water demand is likely to increase 6.2% over the next 5 years. In the longer term, potable water demand is projected to increase 5.9% from 2025 through 2045. The projected water use for 2045 is 2,588 AF for potable water and 701 AF for recycled water. The passive savings are anticipated to continue for the next 25 years and are considered in the water use projections. Permanent water conservation requirements and water conservation strategies are discussed in Section 8 and 9 of this document.

4.2 Past and Current Water Use

Water use within the District's service area has been relatively stable in the past decade with an annual average of 3,365 AF. A stable trend is expected because the District is essentially built-out and the rate of population growth is expected to average less than 0.96% per year for the next 25 years. Water conservation efforts also kept per capita water use down.

As a result of Governor Jerry Brown's mandatory water conservation order in 2014, the District's water use in the last five years decreased below the 10-year average. Between FY 2015-16 and FY 2019-20, water use within the District's service area ranged from 2,866 to 3,757 acre-feet per year (AFY) (potable and non-potable combined). In the past decade, between FY 2010-11 and FY 2019-20, potable and non-potable water use accounts for an average of 80% and 20% of total District water use, respectively. Potable water uses include demands from residential, CII, and large landscape irrigation. Non-potable use includes the use of recycled water for large landscape and golf course irrigation.

As of FY 2019-20 there are 4,118 active service connections in the District's water distribution system. Of these, 25 are recycled water accounts. Table 4-1: summarizes the District's total water demand for potable water for FY 2019-20. The District has a mix of commercial uses (markets, restaurants, etc.) and office complexes. Single and multi- family residential water demand combined accounts for 72.1% of the total water demand. Commercial use accounts for 3.4% of total demand, while landscape (irrigation) accounts for 13.7% of total demand. Non-revenue water and other uses account for about 2.4% and 8.4% respectively.

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

DWR Submittal Table 4-1 Retail: Demands for Potable Water[1] - Actual			
Use Type	2020 Actual		
	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2] (AF)
Single Family		Drinking Water	1,631
Multi-Family		Drinking Water	29
Commercial		Drinking Water	78
Landscape	Represents large landscape (with irrigation meters) served by potable water and not recycled water	Drinking Water	316
Losses	Non revenue water	Drinking Water	54
Other	Agricultural	Drinking Water	186
Other	Construction	Drinking Water	7
		TOTAL	2,301

[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: This table only represents potable water; recycled water projections are shown in Table 4-4 (DWR Submittal Tables 4-3) and Table 6-8 (DWR Submittal Tables 6-4).

Source – CDM Smith, 2021

4.3 Water Use Projections

A key component of this 2020 UWMP is to provide an insight into the District's future water demand outlook. This section discusses the considerations and methodology used to estimate the 25-year water use projection. Overall, total water demand is projected to increase ~3.8% between 2020 and 2045. While the volume of water used for single family residential applications is projected to increase between 2025 and 2045, usage slightly decreases as a percentage of total potable demand during that timeframe. Multifamily residential and CII usage is projected to increase. The volume of projected use for landscape applications stays constant at 503 AF between 2025 and 2045 (a slight decrease as a percentage of total potable demand). Projections for NRW remain steady during that timeframe (~8.3% of total potable demand).

4.3.1 Water Use Projection Methodology

In 2021, MWDOC and OCWD, in collaboration with their member agencies, led the effort to update water demand projections originally done as part of the 2021 OC Water Demand Forecast for MWDOC and OCWD. The updated demand projections, prepared by CDM Smith, were for the Orange County region as a whole, and provided retail agency specific demands. The projections span the years of 2025-2050 and are based upon information surveyed from each Orange County water agency.

The forecast methodology began with a retail water agency survey that asked for FY 2017-18, FY 2018-19 and FY 2019-20 water use by major sector, including number of accounts. If a member agency provided recycled water to customers that information was also requested. Given that FY 2017-18 was a slightly above-normal demand year (warmer/drier than average) and FY 2018-19 was a slightly below-normal demand year (cooler/wetter than average), water use from these two years were averaged to represent an average-year base water demand.

For the residential sectors (single-family and multifamily) the base year water demand was divided by households in order to get a total per unit water use (gallons per home per day). In order to split household water use into indoor and outdoor uses, three sources of information were used, along with CDM Smith's expertise. The sources of information included: (1) *the Residential End Uses of Water* (Water Research Foundation, 2016); (2) California's plumbing codes and landscape ordinances; and (3) CA DWR's Model Water Efficient Landscape Ordinance (MWELO) calculator.

Three different periods of residential end uses of water were analyzed as follows:

- **Pre-2010 efficiency levels** – Has an average indoor water use that is considered to be moderately efficient, also does not include the most recent requirements for MWELO.
- **High-efficiency levels** – Includes the most recent plumbing codes that are considered to be highly efficient, and also includes the most recent requirements for MWELO.
- **Current average efficiency levels** – Represents the weighted average between pre-2010 efficiency and high efficiency levels, based on average age of homes for each retail water agency.

For outdoor residential water use, the indoor per capita total was multiplied by each member agency-specific persons per household in order to get an indoor residential household water use (gallons per day

per home), and then was subtracted from the base year total household water use for single-family and multifamily for each agency based on actual water use as reported by the agency surveys.

For existing residential homes, the current average indoor and outdoor water use for each member agency were used for the year 2020. It was assumed that indoor water uses would reach the high efficiency level by 2040. Based on current age of homes, replacement/remodeling rates, and water utility rebate programs it is believed this assumption is very achievable. It was also assumed that current outdoor water use would be reduced by 5% by 2050.

For new homes, the indoor high efficiency level was assumed for the years 2025 through 2050. Outdoor uses for new homes were assumed to be 25% and 30% lower than current household water use for single-family and multifamily homes, respectively. This methodology is illustrated in Figure 4-1 below.

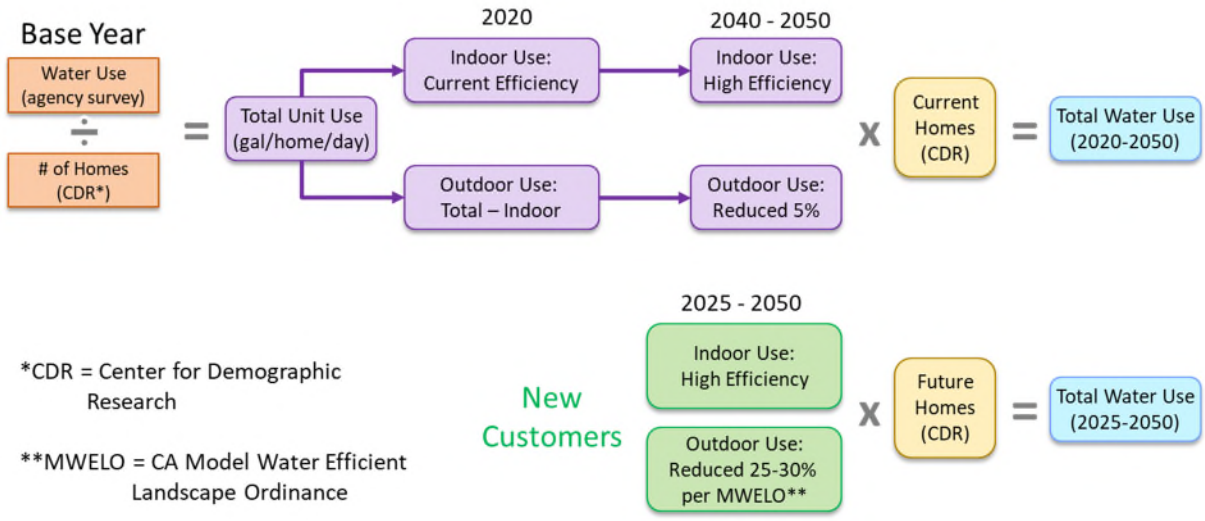

Figure 4-1: Water Use Projection Methodology Diagram

Existing and projected population, single-family and multifamily households for each retail water agency were provided by CDR under contract by MWDOC and OCWD. CDR provides historical and future demographics by census tracts for all of Orange County (Section 3.4). Census tract data is then clipped to retail water agency service boundaries in order to produce historical and projected demographic data by agency.

For the CII water demands, which have been fairly stable from a unit use perspective (gallons/account/day), it was assumed that the unit demand in FY 2019-20 would remain the same from 2020-2025 to represent COVID-19 impacts. Reviewing agency water use data from FY 2017-18 through FY2019-20 revealed that residential water use increased slightly in FY 2019-20 while CII demands decreased slightly as a result of COVID-19. From 2030 to 2050, the average CII unit use from FY 2017-18 and 2018-19 was used. These unit use factors were then multiplied by an assumed growth of CII accounts under three broad scenarios:

- Low Scenario – assuming no growth in CII accounts
- Mid Scenario – assuming 0.5% annual growth in CII accounts

- High Scenario – assuming 1.5% annual growth in CII accounts

For most retail agencies, the Mid Scenario of CII account growth was used, but for those retail agencies that have had faster historical growth the High Scenario was used. For those retail agencies that have had relatively stable CII water demand, the Low Scenario was used. For TCWD, the mid-scenario was used.

For those agencies that supply recycled water for non-potable demands, MWDOC used agency-specified growth assumptions. Most agencies have already maximized their recycled water and thus are not expecting for this category of demand to grow. However, a few agencies in South Orange County do expect moderate growth in recycled water customers.

For large landscape customers served currently by potable water use, MWDOC assumed these demands to be constant through 2050, except for agencies that have growing recycled water demands. For the agencies that have growing recycled water demands, large landscape demands served by potable water reduced accordingly. For non-revenue water, which represents the difference in total water production less all water billed to customers, this percentage was held constant through 2050. Note that 2050 data was not presented in the UWMP.

A member agency's water use demand projection is the summation of their residential water demand, CII demands, large landscape and recycled water demands, and water losses all projected over the 25-year time horizon. These demands were provided to each of the Orange County water agencies for their review, feedback, and revision before being finalized.

The MWDOC regional water demand projection was collaboratively developed between MWDOC and its member agencies. MWDOC's projections were built upon the same model developed by CDM Smith, and took into consideration specific assumptions and projections provided to MWDOC by its member agencies.

4.3.1.1 Weather Variability and Long-Term Climate Change Impacts

In any given year water demands can vary substantially due to weather. In addition, long-term climate change can have an impact on water demands into the future. For the 2014 OC Water Reliability Study, CDM Smith developed a statistical model of total water monthly production from 1990 to 2014 from a sample of retail water agencies. This model removed impacts from population growth, the economy and drought restrictions in order to estimate the impact on water use from temperature and precipitation.

The results of this statistical analysis are:

- Hot/dry weather demands will be 5.5% greater than current average weather demands
- Cooler/wet weather demands will be 6% lower than current average weather demands
- Climate change impacts will increase current average weather demands by:
    - 2% in 2030
    - 4% in 2040
    - 6% in 2050

4.3.2 25-Year Water Use Projection

The projected demand values were provided by MWDOC and reviewed by the District as part of the UWMP effort. As the regional wholesale supplier for much of Orange County, MWDOC works in collaboration with each of its retail agencies as well as MET, its wholesaler, to develop demand projections for imported water. The District has been proactively decreasing its reliance on imported water by pursuing a variety of water conservation strategies and increasing recycled water availability and use within the service area. Future water savings and low-income water use are included in these projected values.

4.3.2.1 Water Use Projections for 2021-2025

The water use projection for normal year conditions without drought for 2021-2025 is presented in Table 4-2Table 4-2. This table will be adjusted to estimate the five-years' cumulative drought effects as described in the five-year DRA in Section 7. A linear increase in total water demand is expected over the next 5 years.

Table 4-2: Water Use Projections for 2021 to 2025

Retail: Total Water Demand					
FY Ending	2021	2022	2023	2024	2025
Total Water Demand (AF)	3,007	3,042	3,076	3,111	3,145
NOTES:					

4.3.2.2 Water Use Projections for 2025-2045

Table 4-3 is a projection of the District's water demand from 2025 to 2045. CII projections for 2025 through 2045 were broken down into commercial, industrial, and institutional/governmental using proportions reported for each billing sector in FY 2019-20. While the volume of water used for single family residential applications is projected to increase between 2025 and 2045, usage slightly decreases as a percentage of total potable demand during that timeframe. Multifamily residential and CII usage is projected to increase. The volume of projected use for landscape applications stays constant at 503 AF between 2025 and 2045 (a slight decrease as a percentage of total potable demand). Projections for NRW remain steady during that timeframe (~8.3% of total potable demand).

The demand data presented in this section accounts for passive savings in the future. Passive savings are water savings as a result of codes, standards, ordinances and public outreach on water conservation and higher efficiency fixtures. Passive savings are anticipated to continue through 2045 and will result in continued water saving and reduced consumption levels. Permanent water conservation requirements and water conservation strategies are discussed in Section 8 and 9 of this document.

Table 4-3 Retail: Use for Potable and Non-Potable Water – Projected

DWR Submittal Table 4-2 Retail: Use for Potable Water[1] - Projected						
Use Type	Additional Description	Projected Water Use[2] (AF)				
		2025	2030	2035	2040	2045
Single Family		1,595	1,594	1,688	1,663	1,656
Multi-Family		62	81	94	94	95
Commercial		81	114	117	120	120
Landscape		503	503	503	503	503
Losses	Non revenue water	203	207	217	215	215
TOTAL		2,443	2,499	2,618	2,594	2,588

[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: This table only represents potable water; recycled water projections are shown in Table 4-4 (DWR Submittal Tables 4-3) and Table 6-8 (DWR Submittal Tables 6-4).

Source – CDM Smith, 2021

Based on the information provided above, the total demand for potable and non-potable water is listed below in Table 4-4. The District currently provides recycled water in its service area and is projected to grow its use.

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

DWR Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045
Potable Water, Raw, Other Non-potable	2,301	2,443	2,499	2,618	2,594	2,588
Recycled Water Demand	672	701	701	701	701	701

DWR Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045
Optional Deduction of Recycled Water Put Into Long-Term Storage[1]						
TOTAL WATER USE	2,973	3,145	3,200	3,320	3,296	3,290
*[1] 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:						

Table 4-5: Retail Only: Inclusion in Water Use Projections

DWR 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)	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.	Section 8 and 9
Are Lower Income Residential Demands Included in Projections?	Yes
NOTES:	

4.3.2.3 Water Use Projections for Lower Income Households

Since 2010, the UWMP Act has required retail water suppliers to include water use projections for single-family and multi-family residential housing for lower income and affordable households. This will assist the District in complying with the requirement under Government Code Section 65589.7 granting priority for providing water service to lower income households. A lower income household is defined as a household earning below 80% of the Median Household Income (MHI).

DWR recommends retail suppliers rely on the housing elements of city or county general plans to quantify planned lower income housing with the District 's service area (DWR, 2020). RHNA assists jurisdictions in updating general plan's housing elements section. The RHNA identifies additional housing needs and

assesses households by income level for the District through 2010 decennial Census and 2005-2009 American Community Survey data. The sixth cycle of the RHNA covers the planning period of October 2021 to October 2029. The SCAG adopted the RHNA Allocation Plan for this cycle on March 4, 2021. The California Department of Housing and Community Development reviewed the housing elements data submitted by jurisdictions in the SCAG region and concluded the data meets statutory requirements for the assessment of current housing needs.

RHNA classifies low income housing into two categories for each jurisdiction: very low income (<30% - 50% MHI), and low income (51% - 80% MHI). The District's service area includes communities within the City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo, Trabuco Canyon and other areas of unincorporated Orange County. The relevant allocations included in the SCAG sixth cycle are presented in Table 4-6 below.

Table 4-6: SCAG Sixth Cycle RHNA Allocation

Jurisdiction	RHNA Household Allocation				
	Total	Very Low Income	Low Income	Moderate Income	Above-Moderate Income
City of Rancho Santa Margarita	680	209	120	125	226
City of Lake Forest	3,236	956	543	559	1,178
City of Mission Viejo	2,217	674	401	397	745
Unincorporated Orange County	10,406	3,139	1,866	2,040	3,361

The District does not anticipate any low income housing in its service area for the next 25 years. It is expected that the low-income RHNA allocations for relevant jurisdictions will most likely occur outside of TCWD's service area, dependent on city discretion. Therefore, Table 4-7 is consistent with this projection.

The projected total SF and MF residential demand for 2025 through 2045 was obtained from the Demand Forecast TM completed in 2021 (Appendix E).

Table 4-7: Projected Water Use for Housing Needed for Low Income Households (AF)

Water Use Sector	FY Ending				
	2025	2030	2035	2040	2045
Total Residential Demand (AF)	1,656	1,675	1,782	1,757	1,751
Single-Family Residential Demand - Low Income Households (AF)	0	0	0	0	0
Multi-Family Residential Demand - Low Income Households (AF)	0	0	0	0	0
Total Low Income Households Demand (AF)	0	0	0	0	0

4.4 Water Loss

The District has conducted annual water loss audit since 2015 per the American Water Works Association (AWWA) methodology per SB 555 to understand the relationship between water loss, operating costs and revenue losses. Non-revenue water for FY2014/15 – CY2019 (Figure 4-2) consists of three components: real losses (e.g. leakage in mains and service lines, and storage tank overflows), apparent losses (unauthorized consumption, customer metering inaccuracies and systematic data handling errors), and unbilled water (e.g. hydrant flushing, firefighting, and blow-off water from well start-ups). The District's real losses ranged from 10 AFY to 185 AFY and apparent losses ranged from 27 AFY to 70AFY in the last five years. The unbilled water ranged from 1AFY to 4 AFY in the last five years.

Table 4-7 summarizes the last five years of water loss audit reporting. In the latest water loss audit (CY 2019), the District's total water loss was 57 AFY (Table 4-8), compared to the total water use of 3,176 AF in FY 2019-20. The total water loss consists of real loss of 10 AFY and apparent loss of 47 AFY in CY 2019. The non-revenue water was 59 AFY. The active and inactive service connections were relatively consistent in the last five years with 3,968 connections in CY 2019. The real loss performance indicator was 2 gals/connection/day in CY 2019. Figure 4-3 presents the performance indicators of gallons of real and apparent loss per connection per day. Understanding and controlling water loss from a distribution system is an effective way for the District to achieve regulatory standards and manage their existing resources. The California State Water Resources Control Board is still developing water loss performance standards; these standards have not yet been adopted.

Table 4-8: Retail: Five Year Water Loss Audit Reporting

DWR Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date	Volume of Water Loss [1,2]
07/2014	235
01/2016	107
01/2017	138
01/2018	193
01/2019	57
[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: Water loss in AFY	

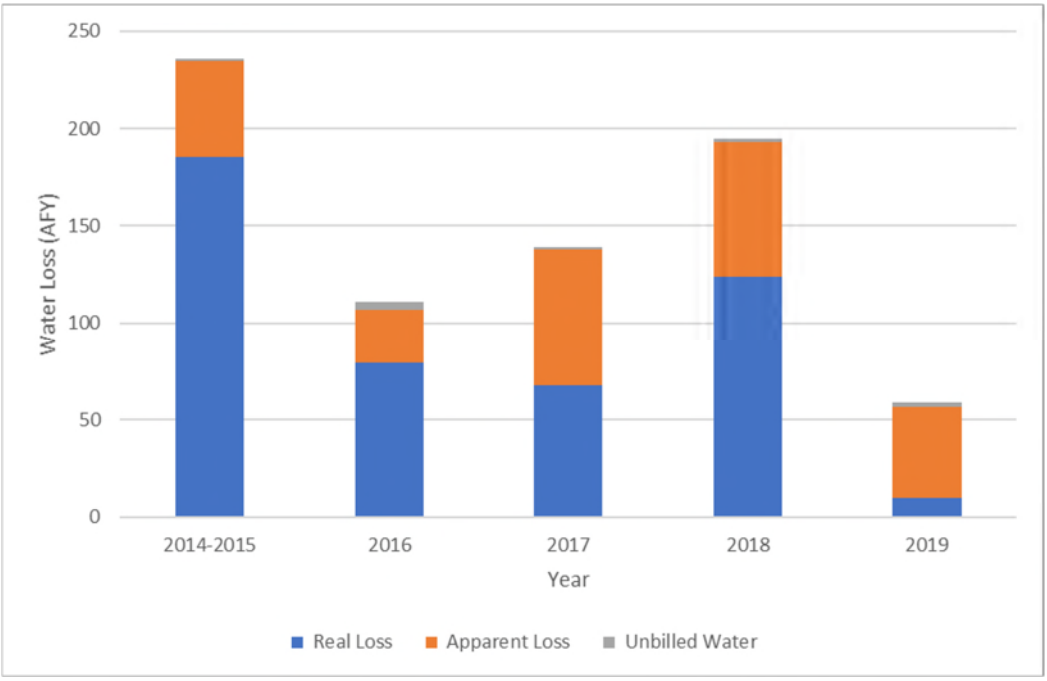

Figure 4-2: Water Loss Audit for FY 2014-15 to CY 2019

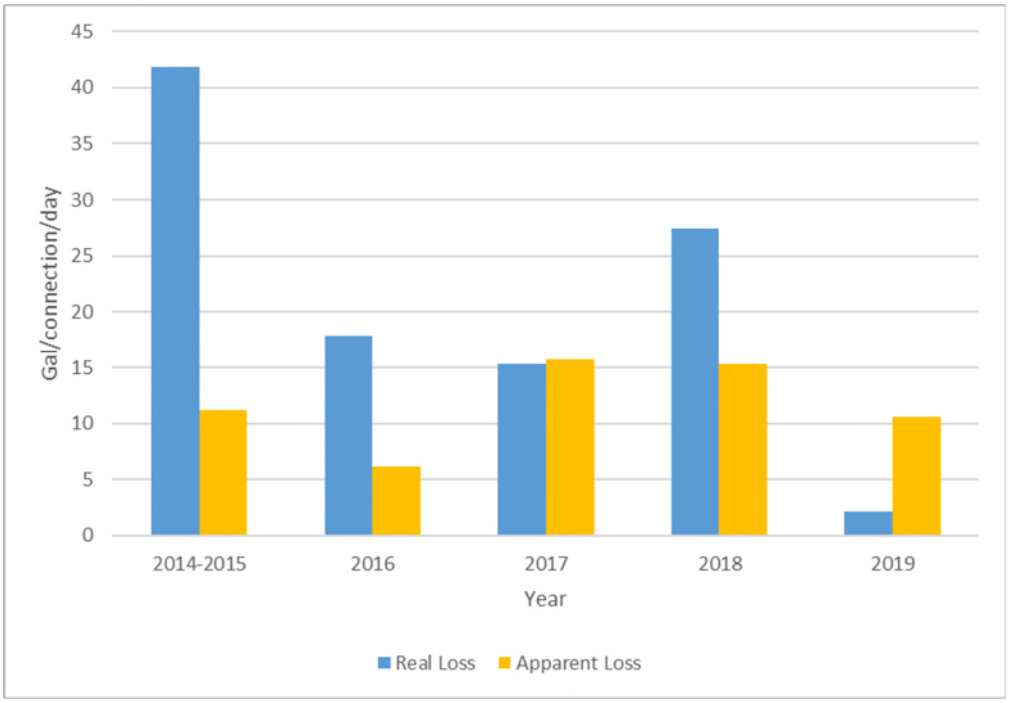

Figure 4-3: Water Loss Performance Indicators for FY 2014-15 to CY 2019

5 CONSERVATION TARGET COMPLIANCE

The Water Conservation Act of 2009, also known as SBx7-7 (Senate Bill 7 as part of the Seventh Extraordinary Session), signed into law on February 3, 2010, requires the State of California to reduce urban water use by 20% by the year 2020 (20x2020). To achieve this each retail urban water supplier must determine baseline water use during their baseline period and target water use for the years 2015 and 2020 to meet the state's water reduction goal. Retail water suppliers are required to comply with SBx7-7 individually or as a region in collaboration with other retail water suppliers, or demonstrate they have a plan or have secured funding to be in compliance, in order to be eligible for water related state grants and loans on or after July 16, 2016.

The District's actual 2020 water use is lower than its 2020 water use target, therefore, demonstrating compliance with SBx7-7. In its 2015 UWMP, the District revised its baseline per capita water use calculations using 2010 U.S. Census data. Changes in the baseline calculations resulted in updated per capita water use targets.

The following sections describe the efforts by the District to comply with the requirements of SBx7-7 and efforts by MWDOC to assist retail agencies, including the formation of a Regional Alliance to provide additional flexibility to all water suppliers in Orange County. A discussion of programs implemented to support retail agencies in achieving their per capita water reduction goals is covered in Section 9 – Demand Management Measures of this UWMP.

Complimentary to information presented in this section are SBx7-7 Verification and Compliance Forms, a set of standardized tables required by DWR to demonstrate compliance with the Water Conservation Act in this 2020 UWMP (Appendix D).

5.1 Baseline Water Use

The baseline water use is the District's gross water use divided by its service area population, reported in GPCD. Gross water use is a measure of water that enters the distribution system of the supplier over a 12-month period with certain allowable exclusions. These exclusions are:

- Recycled water delivered within the service area
- Indirect recycled water
- Water placed in long term storage
- Water conveyed to another urban supplier
- Water delivered for agricultural use
- Process water

Water suppliers must report baseline water use for two baseline periods, the 10- to 15-year baseline (baseline GPCD) and the five-year baseline (target confirmation) as described below.

5.1.1 Ten to 15-Year Baseline Period (Baseline GPCD)

The first step to calculating the District's water use targets is to determine its base daily per capita water use (baseline water use). The baseline water use is calculated as a continuous (rolling) 10-year average during a period, which ends no earlier than December 31, 2004 and no later than December 31, 2010. Water suppliers whose recycled water made up 10% or more of their 2008 retail water delivery can use up to a 15-year average for the calculation. Recycled water use was 31% of the District's retail delivery in 2008; therefore, a 15-year baseline period is used.

The District's baseline water use is 267 GPCD, obtained from the 15-year period July 1, 1990 to June 30, 2005.

5.1.2 Five-Year Baseline Period (Target Confirmation)

Water suppliers are required to calculate water use, in GPCD, for a five-year baseline period. This number is used to confirm that the selected 2020 target meets the minimum water use reduction requirements. Regardless of the compliance option adopted by the District, it will need to meet a minimum water use target of 5% reduction from the five-year baseline water use. This five-year baseline water use is calculated as a continuous five-year average during a period, which ends no earlier than December 31, 2007 and no later than December 31, 2010. The District's five-year baseline water use is 210 GPCD, obtained from the five-year period July 1, 2003 to June 30, 2008. The minimum target it needs to meet is 200 GPCD.

5.1.3 Service Area Population

The District's service area boundaries correspond with the boundaries for a city or census designated place. This allows the District to use service area population estimates prepared by the DOF. CDR is the entity which compiles population data for Orange County based on DOF data. The calculation of the District's baseline water use and water use targets in the 2010 UWMP was based on the 2000 U.S. Census population numbers obtained from CDR. The baseline water use and water use targets in the 2015 UWMP were revised based on the 2010 U.S. Census population obtained from CDR in 2012. That baseline remained in use in the 2020 calculations.

5.2 SBx7-7 Water Use Targets

In the 2020 UWMP, the District may update its 2020 water use target by selecting a different target method than what was used previously. The target methods and determination of the 2015 and 2020 targets are described below. The District selected Option 1 consistent with 2015 and maintained the same 2020 target water uses as reported in its 2015 UWMP.

5.2.1 SBx7-7 Target Methods

DWR has established four target calculation methods for urban retail water suppliers to choose from.

The District is required to adopt one of the four options to comply with SBx7-7 requirements. The four options include:

- *Option 1* requires a simple 20% reduction from the baseline by 2020 and 10% by 2015.
- *Option 2* employs a budget-based approach by requiring an agency to achieve a performance standard based on three metrics
  - Residential indoor water use of 55 GPCD
  - Landscape water use commensurate with the Model Landscape Ordinance
  - 10% reduction in baseline commercial/industrial/institutional (CII) water use
- *Option 3* is to achieve 95% of the applicable state hydrologic region target as set forth in the State's 202020 Water Conservation Plan.
- *Option 4* requires the subtraction of Total Savings from the baseline GPCD:
  - Total savings includes indoor residential savings, meter savings, CII savings, and landscape and water loss savings.

With MWDOC's assistance in the calculation of the District's base daily per capita use and water use targets, the District selected to comply with Option 1 consistent with the option selected in 2010 and 2015.

5.2.2 2020 Targets and Compliance

Under Compliance Option 1, the simple 20% reduction, the District's 2020 target is 213 GPCD. However, the confirmed 2020 target needs to meet a minimum of 5% reduction from the five-year baseline water use, therefore, the District's confirmed 2020 target is 200 GPCD as summarized in Table 5-1.

Table 5-1: Baselines and Targets Summary

DWR Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1991*	*2005*	*267*	*200*
5 Year	*2004*	*2008*	*210*	
**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:				

The District's actual 2020 consumption is 159 GPCD which is below its 2020 target of 200 GPCD (Table 5-2). The District met its 2020 water use target and is in compliance with SBx7-7.

Table 5-2: 2020 Compliance

DWR Submittal Table 5-2: 2020 Compliance From SB X7-7 2020 Compliance Form				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020?
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD*		
159	0	159	200	Y
**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:				

5.3 Orange County 20x2020 Regional Alliance

A retail supplier may choose to meet the SBx7-7 targets on its own or it may form a regional alliance with other retail suppliers to meet the water use target as a region. Within a Regional Alliance, each retail water supplier will have an additional opportunity to achieve compliance under both an individual target and a regional target.

- If the Regional Alliance meets its water use target on a regional basis, all agencies in the alliance are deemed compliant.
- If the Regional Alliance fails to meet its water use target, each individual supplier will have an opportunity to meet their water use targets individually.

The District is a member of the Orange County 20x2020 Regional Alliance formed by MWDOC, its wholesaler. This regional alliance consists of 29 retail agencies in Orange County as described in MWDOC's 2020 UWMP. MWDOC provides assistance in the calculation of each retail agency's baseline water use and water use targets.

In 2015, the regional baseline and targets were revised to account for any revisions made by the retail agencies to their individual 2015 and 2020 targets. The regional water use target is the weighted average of the individual retail agencies' targets (by population). The Orange County 20x2020 Regional Alliance weighted 2020 target is 158 GPCD. The actual 2020 water use in the region is 109 GPCD, i.e., the region met its 2020 GPCD goal.

6 WATER SUPPLY CHARACTERIZATION

As a counterpart to Section 4's Water Use Characterization, this section characterizes the District's water supply. This section includes identification and quantification of water supply sources through 2045, descriptions of each water supply source and their management, opportunities for exchanges and transfers, and discussion regarding any planned future water supply projects. This section also includes the energy intensity of the water service, a new UWMP requirement.

6.1 Water Supply Overview

The District meets all of its demands with a combination of imported water, local groundwater, recycled water, and surface water. The District works together with two primary agencies, MET and MWDOC, to ensure a safe and reliable water supply that will continue to serve the community in periods of drought and shortage. The sources of imported water supplies include water from the Colorado River and the SWP provided by MET and delivered through MWDOC.

The District's main source of water supply is imported water from MET. Groundwater from the San Juan Basin, recycled water, and surface water from Irvine Lake make up the rest of the District's water supply portfolio. In FY 2019-20, the District relied on 56% untreated imported water, 23% recycled water, 11% treated imported water, and 10% groundwater (Table 6-1).

It is projected that by 2045, the water supply portfolio will change to approximately 64% untreated imported water, 21% recycled water, and 15% treated imported water (Table 6-2 and Figure 6-1). Note that these representations of supply match the projected demand. However, the District can purchase more MET water through MWDOC, should the need arise. Additionally, due to the seasonal fluctuations of groundwater availability, the District pumps groundwater when available, but does not rely on it as a water supply source. The District's ten-year annual average of groundwater production is 196 AFY.

The following subsections provide a detailed discussion of the District's water sources as well as the future water supply portfolio for the next 25 years.

Table 6-1: Retail: Water Supplies – Actual

Submittal Table 6-8 Retail: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	2020	
		Actual Volume (AF)	Water Quality
Groundwater (not desalinated)	San Juan Groundwater Basin	312	Drinking Water
Purchased or Imported Water	MWDOC (Treated)	317	Drinking Water
Purchased or Imported Water	MWDOC (Untreated)*	1,672	Drinking Water
Recycled Water		672	Recycled Water
	Total	2,973	

NOTES:
Source - Water Production Reports (TCWD, 2020)

*May include surface water from Irvine Lake.

Table 6-2: Retail: Water Supplies – Projected

DWR Submittal Table 6-9 Retail: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply (AF)				
		2025	2030	2035	2040	2045
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Purchased or Imported Water	MWDOC (Treated)*	344	399	519	495	489
Purchased or Imported Water	MWDOC (Untreated) conveyed through SAC line**	2,100	2,100	2,100	2,100	2,100
Recycled Water		701	701	701	701	701
	Total	3,145	3,200	3,320	3,296	3,290

NOTES:
Source - CDM Smith, 2021 and discussions with TCWD Staff
This table only considers direct use of recycled water - this does not include indirect potable recharge. Imported water includes both treated and untreated water from MWDOC. Due to the seasonal fluctuations of groundwater availability, the District pumps groundwater when available, but does not plan to receive water from this water source. The District's ten-year annual average of groundwater production is 196 AFY.
*May include occasional purchases from IRWD and SMWD through interconnections
**May include surface water from Irvine Lake

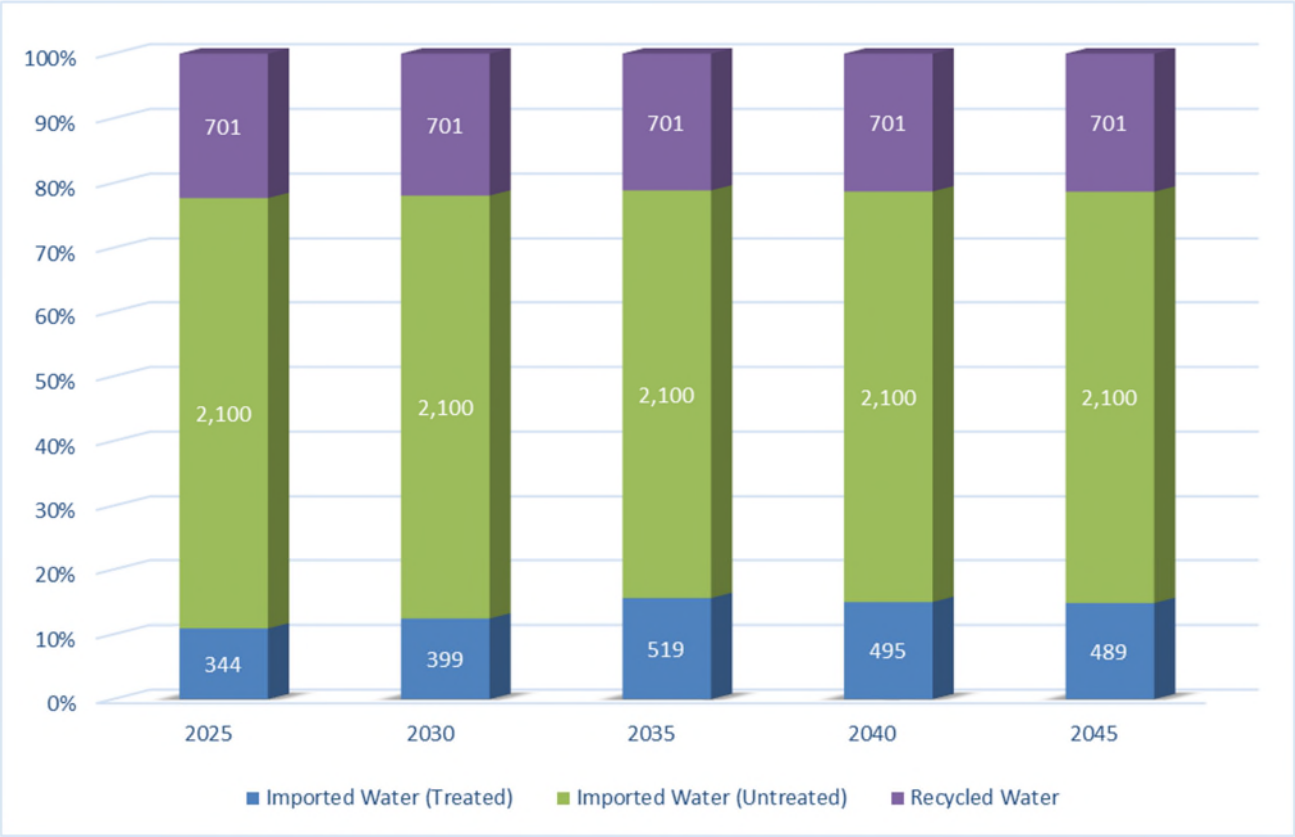

Figure 6-1: District's Projected Water Supply Sources (AF)

6.2 Imported Water

The District supplements its local water supply with imported water purchased from MET through MWDOC. In FY 2019-20, the District relied on approximately 1,989 AFY – approximately 67% of the District's water supply portfolio for FY 2019-20 – of imported water from MET / MWDOC. Of this 1,989 AF total, 1,672 AF was attributed to untreated water and 317 AF was attributed to treated water.

MET's principal sources of water are the Colorado River via the CRA and the Lake Oroville watershed in Northern California through the SWP. As introduced above, most of the imported wholesale water the District receives is untreated. The Colorado River water is treated at the District's Dimension Water Treatment Plant. As for the treated imported water the District receives, the water is treated at the Robert B. Diemer Filtration Plant located in Yorba Linda. Typically, the Diemer Filtration Plant receives a blend of Colorado River water from Lake Mathews through the MET Lower Feeder and SWP water through the Yorba Linda Feeder. The treated water is conveyed through the Allen McColloch pipeline (AMP) to the District. The District has an annual capacity of 4,343 AFY in the AMP.

6.2.1 Colorado River Supplies

Background

The Colorado River was MET's original source of water after MET's establishment in 1928. The CRA, which is owned and operated by MET, transports water from the Colorado River to its terminus Lake Mathews, in Riverside County. The actual amount of water per year that may be conveyed through the CRA to MET's member agencies is subject to the availability of Colorado River water. Approximately 40 million people rely on the Colorado River and its tributaries for water with 5.5 million acres of land using Colorado River water for irrigation. The CRA includes supplies from the implementation of the Quantification Settlement Agreement and its related agreements to transfer water from agricultural agencies to urban uses. The 2003 Quantification Settlement Agreement enabled California to implement major Colorado River water conservation and transfer programs, in order to stabilize water supplies and reduce the state's demand on the river to its 4.4 MAF entitlement. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 million acre-feet (MAF) on an as-needed basis. Water from the Colorado River or its tributaries is available to users in California, Arizona, Colorado, Nevada, New Mexico, Utah, Wyoming, and Mexico. California is apportioned the use of 4.4 MAF of water from the Colorado River each year plus one-half of any surplus that may be available for use collectively in Arizona, California, and Nevada. In addition, California has historically been allowed to use Colorado River water apportioned to, but not used by, Arizona or Nevada. MET has a basic entitlement of 550,000 AFY of Colorado River water, plus surplus water up to an additional 662,000 AFY when the following conditions exists (MET, 2021):

- Water is unused by the California holders of priorities 1 through 3
- Water is saved by the Palo Verde land management, crop rotation, and water supply program
- When the U.S. Secretary of the Interior makes available either one or both of the following:
    - Surplus water

- Colorado River water that is apportioned to but unused by Arizona and/or Nevada.

Current Conditions and Supply

MET has not received surplus water for a number of years. The Colorado River supply faces current and future imbalances between water supply and demand in the Colorado River Basin due to long-term drought conditions. Analysis of historical records suggests a potential change in the relationship between precipitation and runoff in the Colorado River Basin. The past 21 years (1999-2020) have seen an overall drying trend, even though the period included several wet or average years. The river basin has substantial storage capacity, but the significant reduction in system reservoir storage in the last two decades is great enough to consider the period a drought (DWR, 2020a). At the close of 2020, system storage was at or near its lowest since 2000, so there is very little buffer to avoid a shortage from any future period of reduced precipitation and runoff (MET, 2021). Looking ahead, the long-term imbalance in the Colorado River Basin's future supply and demand is projected to be approximately 3.2 MAF by the year 2060 (USBR, 2012).

Over the years, MET has helped fund and implement various programs to improve Colorado River supply reliability and help resolve the imbalance between supply and demand. Implementation of such programs have contributed to achievements like achieving a record low diversion of the Colorado River in 2019, a level not seen since the 1950s. Colorado River water management programs include:

- **Imperial Irrigation District / MET Conservation Program** – Under agreements executed in 1988 and 1989, this program allows MET to fund water efficiency improvements within Imperial Irrigation District's service area in return for the right to divert the water conserved by those investments. An average of 105,000 AFY of water has been conserved since the program's implementation.
- **Palo Verde Land Management, Crop Rotation, and Water Supply Program** – Authorized in 2004, this 35-year program allows MET to pay participating farmers to reduce their water use, and for MET to receive the saved water. Over the life of the program, an average of 84,500 AFY has been saved and made available to MET.
- **Bard Seasonal Fallowing Program** – Authorized in 2019, this program allows MET to pay participating farmers in Bard to reduce their water use between the late spring and summer months of selected years, which provides up to 6,000 AF of water to be available to MET in certain years.
- **Management of MET-Owned Land in Palo Verde** – Since 2001, MET has acquired approximately 21,000 acres of irrigable farmland that are leased to growers, with incentives to grow low water-using crops and experiment with low water-consumption practices. If long-term water savings are realized, MET may explore ways to formally account them for Colorado River supplies.
- **Southern Nevada Water Authority (SNWA) and MET Storage and Interstate Release Agreement** – Entered in 2004, this agreement allows SNWA to store its unused, conserved water with MET, in exchange for MET to receive additional Colorado River water supply. MET has relied on the additional water during dry years, especially during the 2011-2016 California drought, and SNWA is not expected to call upon MET to return water until after 2026.

- **Lower Colorado Water Supply Projects** – Authorized in 1980s, this project provides up to 10,000 AFY of water to certain entities that do not have or have insufficient rights to use Colorado River water. A contract executed in 2007 allowed MET to receive project water left unused by the project contractors along the River – nearly 10,000 AF was received by MET in 2019 and is estimated for 2020.
- **Exchange Programs** – MET is involved in separate exchange programs with the United States Bureau of Reclamation, which takes place at the Colorado River Intake and with San Diego County Water Authority (SDCWA), which exchanges conserved Colorado River water.
- **Lake Mead Storage Program** – Executed in 2006, this program allows MET to leave excessively conserved water in Lake Mead, for exclusive use by MET in later years.
- **Quagga Mussel Control Program** – Developed in 2007, this program introduced surveillance activities and control measures to combat quagga mussels, an invasive species that impact the Colorado River's water quality.
- **Lower Basin Drought Contingency Plan** – Signed in 2019, this agreement incentivizes storage in Lake Mead through 2026 and overall, it increases MET's flexibility to fill the CRA as needed (MET, 2021).

Future Programs / Plans

The Colorado River faces long-term challenges of water demands exceeding available supply with additional uncertainties due to climate change. Climate change impacts expected in the Colorado River Basin include the following:

- More frequent, more intense, and longer lasting droughts, which will result in water deficits
- Continued dryness in the Colorado River Basin, which will increase the likelihood of triggering a first-ever shortage in the Lower Basin
- Increased temperatures, which will affect the percentage of precipitation that falls as rain or snow, as well as the amount and timing of mountain snowpack (DWR, 2020b)

Acknowledging the various uncertainties regarding reliability, MET plans to continue ongoing programs, such as those listed earlier in this section. Additionally, MET supports increasing water recycling in the Colorado River Basin and is in the process of developing additional transfer programs for the future (MET, 2021).

6.2.2 State Water Project Supplies

Background

The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR and is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water. Water from the SWP originates at Lake Oroville, which is located on the Feather River in Northern California. Much of the SWP water supply passes through the Delta. The SWP is the largest state-built, multipurpose, user-financed water project in the United States. Nearly two-thirds of residents in California receive at

least part of their water from the SWP, with approximately 70% of SWP's contracted water supply going to urban users and 30% to agricultural users. The primary purpose of the SWP is to divert and store water during wet periods in Northern and Central California and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California (MET, 2021).

The Delta is key to the SWP's ability to deliver water to its agricultural and urban contractors. All but five of the 29 SWP contractors receive water deliveries below the Delta (pumped via the Harvey O. Banks or Barker Slough pumping plants). However, the Delta faces many challenges concerning its long-term sustainability such as climate change posing a threat of increased variability in floods and droughts. Sea level rise complicates efforts in managing salinity levels and preserving water quality in the Delta to ensure a suitable water supply for urban and agricultural use. Furthermore, other challenges include continued subsidence of Delta islands, many of which are below sea level, and the related threat of a catastrophic levee failure as the water pressure increases, or as a result of a major seismic event.

Current Conditions and Supply

"Table A" water is the maximum entitlement of SWP water for each water contracting agency. Currently, the combined maximum Table A amount is 4.17 million acre-feet per year (MAFY). Of this amount, 4.13 MAFY is the maximum Table A water available for delivery from the Delta. On average, deliveries are approximately 60% of the maximum Table A amount (DWR, 2020b).

SWP contractors may receive Article 21 water on a short-term basis in addition to Table A water if requested. Article 21 of SWP contracts allows contractors to receive additional water deliveries only under specific conditions, generally during wet months of the year (December through March). Because a SWP contractor must have an immediate use for Article 21 supply or a place to store it outside of the SWP, there are few contractors like MET that can access such supplies.

Carryover water is SWP water allocated to an SWP contractor and approved for delivery to the contractor in a given year, but not used by the end of the year. The unused water is stored in the SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Turnback pool water is Table A water that has been allocated to SWP contractors that has exceeded their demands. This water can then be purchased by another contractor depending on its availability.

SWP Delta exports are the water supplies that are transferred directly to SWP contractors or to San Luis Reservoir storage south of the Delta via the Harvey O. Banks pumping plant. Estimated average annual Delta exports and SWP Table A water deliveries have generally decreased since 2005, when Delta export regulations affecting SWP pumping operations became more restrictive due to federal biological opinions (Biops). The Biops protect species listed as threatened or endangered under the federal and state Endangered Species Acts (ESAs) and affect the SWP's water delivery capability because they restrict SWP exports in the Delta and include Delta outflow requirements during certain times of the year, thus reducing the available supply for export or storage.

Before being updated by the 2019 Long-Term Operations Plan, the prior 2008 and 2009 Biops resulted in an estimated reduction in SWP deliveries of 0.3 MAF during critically dry years to 1.3 MAF in above normal water years as compared to the previous baseline. However, the 2019 Long-Term Operations Plan and Biops are expected to increase SWP deliveries by an annual average of 20,000 AF as compared to the previous Biops (MET, 2021). Average Table A deliveries decreased in the

2019 SWP Final Delivery Capability Report compared to 2017, mainly due to the 2018 Coordinated Operation Agreement (COA) Addendum and the increase in the end of September storage target for Lake Oroville. Other factors that also affected deliveries included changes in regulations associated with the Incidental Take Permit (ITP) and the Reinitiation of Consultation for Long-Term Operations (RoC on LTO), a shift in Table A to Article 21 deliveries which occurred due to higher storage in SWP San Luis, and other operational updates to the SWP and federal Central Valley Project (CVP) (DWR, 2020b). Since 2005, there are similar decreasing trends for both the average annual Delta exports and the average annual Table A deliveries (Table 6-3**Error! Reference source not found.**).

Table 6-3: MET SWP Program Capabilities

Year	Average Annual Delta Exports (MAF)	Average Annual Table A Deliveries (MAF)
2005	2.96	2.82
2013	2.61	2.55
2019	2.52	2.41
Percent Change*	-14.8%	-14.3%

*Percent change is between the years 2019 and 2005.

Ongoing regulatory restrictions, such as those imposed by the Biops on the effects of SWP and the CVP operations on certain marine life, also contribute to the challenge of determining the SWP's water delivery reliability. In dry, below-normal conditions, MET has increased the supplies delivered through the California Aqueduct by developing flexible CVP/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Harvey O. Banks pumping plant capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions. In addition, the California State Water Resources Control Board (SWRCB) has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level.

The following factors affect the ability to estimate existing and future water delivery reliability:

- **Water availability at the source:** Availability can be highly variable and depends on the amount and timing of rain and snow that fall in any given year. Generally, during a single-dry year or two, surface and groundwater storage can supply most water deliveries, but multiple-dry years can result in critically low water reserves. Fisheries issues can also restrict the operations of the export pumps even when water supplies are available.
- **Water rights with priority over the SWP:** Water users with prior water rights are assigned higher priority in DWR's modeling of the SWP's water delivery reliability, even ahead of SWP Table A water.
- **Climate change:** Mean temperatures are predicted to vary more significantly than previously expected. This change in climate is anticipated to bring warmer winter storms that result in less

snowfall at lower elevations, reducing total snowpack. From historical data, DWR projects that by 2050, the Sierra snowpack will be reduced from its historical average by 25 to 40%. Increased precipitation as rain could result in a larger number of "rain-on-snow" events, causing snow to melt earlier in the year and over fewer days than historically, affecting the availability of water for pumping by the SWP during summer. Furthermore, water quality may be adversely affected due to the anticipated increase in wildfires. Rising sea levels may result in potential pumping cutbacks on the SWP and CVP.

- **Regulatory restrictions on SWP Delta exports:** The Biops protect special-status species such as delta smelt and spring- and winter-run Chinook salmon and imposed substantial constraints on Delta water supply operations through requirements for Delta inflow and outflow and export pumping restrictions. Restrictions on SWP operations imposed by state and federal agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year (DWR, 2020b).
- **Ongoing environmental and policy planning efforts:** Governor Gavin Newsom ended California WaterFix in May 2019 and announced a new approach to modernize Delta Conveyance through a single tunnel alternative. The EcoRestore Program aims to restore at least 30,000 acres of Delta habitat, with the near-term goal of making significant strides toward that objective by 2020 (DWR, 2020b).
- **Delta levee failure:** The levees are vulnerable to failure because most original levees were simply built with soils dredged from nearby channels and were not engineered. A breach of one or more levees and island flooding could affect Delta water quality and SWP operations for several months. When islands are flooded, DWR may need to drastically decrease or even cease SWP Delta exports to evaluate damage caused by salinity in the Delta.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. New Biops for listed species under the Federal ESA or by the California Department of Fish and Game's issuance of incidental take authorizations under the Federal ESA and California ESA might further adversely affect SWP and CVP operations. Additionally, new litigation, listings of additional species or new regulatory requirements could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations.

Future Programs / Plans

MET's Board approved a Delta Action Plan in June 2007 that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta Action Plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Delta while a long-term solution is implemented. Currently, MET is working towards addressing four elements: Delta ecosystem restoration, water supply conveyance, flood control protection, and storage development.

In May 2019, Governor Newsom ended California WaterFix, announced a new approach to modernize Delta Conveyance through a single tunnel alternative, and released Executive Order 10-19 that directed state agencies to inventory and assess new planning for the project. DWR then withdrew all project

approvals and permit applications for California WaterFix, effectively ending the project. The purpose of the Delta Conveyance Project (DCP) gives rise to several project objectives (MET, 2021). In proposing to make physical improvements to the SWP Delta conveyance system, the project objectives are:

- To address anticipated rising sea levels and other reasonably foreseeable consequences of climate change and extreme weather events.
- To minimize the potential for public health and safety impacts from reduced quantity and quality of SWP water deliveries, and potentially CVP water deliveries, south of the Delta resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which existing pumping plants operate.
- To protect the ability of the SWP, and potentially the CVP, to deliver water when hydrologic conditions result in the availability of sufficient amounts, consistent with the requirements of state and federal law.
- To provide operational flexibility to improve aquatic conditions in the Delta and better manage risks of further regulatory constraints on project operations.

6.2.3 Untreated Imported Water – Baker Treatment Plant

The Baker Treatment Plant is a 28.1 MGD drinking water treatment plant at the site of the former Baker Filtration Plant in Lake Forest. The facility is operated by IRWD and is a joint regional project by five South Orange County water districts: ETWD, IRWD, MNWD, SMWD, and TCWD, who have capacity rights of 3.2 MGD, 6.8 MGD, 8.4 MGD, 8.4 MGD, and 1.3 MGD, respectively. In 2017, TCWD entered into an agreement with the City of San Clemente to sell and deliver a minimum of 1,200 AFY of water treated from the Baker Treatment Plant to the City of San Clemente.

The plant has multiple water supply sources that increase water supply reliability, including imported untreated water from MET through the Santiago Lateral and local surface water from Irvine Lake. It provides a reliable local drinking water supply during emergencies or extended facility shutdowns on the MET delivery system and increases operational flexibility by creating redundancy within the water conveyance system. The facility has supplied South Orange County with high quality water since it was placed into operation in January 2017. A location map of the Baker Treatment Plant and surrounding agencies is provided on Figure 6-2.

Figure 6-2: Baker Treatment Plant Location Map

6.2.4 Storage

Storage is a major component of MET's dry year resource management strategy. MET's likelihood of having adequate supply capability to meet projected demands, without implementing its Water Supply Allocation Plan (WSAP), is dependent on its storage resources. Due to the pattern of generally drier hydrology, the groundwater basins and local reservoirs have dropped to low operating levels and remain below healthy storage levels. For example, the Colorado River Basin's system storage at the close of 2020, was at or near its lowest since 2000, so there is very little buffer to avoid a shortage from any future period of reduced precipitation and runoff (MET, 2021).

MET stores water in both DWR and MET surface water reservoirs. MET's surface water reservoirs are Lake Mathews, Lake Skinner, and Diamond Valley Lake, which have a combined storage capacity of over 1 MAF. Approximately 650,000 AF are stored for seasonal, regulatory, and drought use, while approximately 370,000 AF are stored for emergency use.

MET also has contractual rights to DWR surface Reservoirs, such as 65 thousand acre-feet (TAF) of flexible storage at Lake Perris (East Branch terminal reservoir) and 154 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir) that provides MET with additional options for managing SWP deliveries to maximize the yield from the project. This storage can provide MET with up to 44 TAF of additional supply over multiple dry years, or up to 219 TAF to Southern California in a single dry year (MET, 2021).

MET endeavors to increase the reliability of water supplies through the development of flexible storage and transfer programs including groundwater storage (MET, 2021). These include:

- **Lake Mead Storage Program:** Executed in 2006, this program allows MET to leave excessively conserved water in Lake Mead, for exclusive use by MET in later years. MET created "Intentionally Created Surplus" (ICS) water in 2006-2007, 2009-2012, and 2016-2019, and withdrew ICS water in 2008 and 2013-2015. As of January 1, 2021, MET had a total of 1.3 MAF of Extraordinary Conservation ICS water.
- **Semitropic Storage Program:** The maximum storage capacity of the program is 350 TAF, and the minimum and maximum annual yields available to MET are 34.7 TAF and 236.2 TAF, respectively. The specific amount of water MET can expect to store in and subsequently receive from the program depends on hydrologic conditions, any regulatory requirements restricting MET's ability to export water for storage and demands placed by other program participants. During wet years, MET has the discretion to use the program to store portions of its SWP supplies which are in excess, and during dry years, the Semitropic Water Storage District returns MET's previously stored water to MET by direct groundwater pump-in or by exchange of surface water supplies.
- **Arvin-Edison Storage Program:** The storage program is estimated to deliver 75 TAF, and the specific amount of water MET can expect to store in and subsequently receive from the program depends on hydrologic conditions and any regulatory requirements restricting MET's ability to export water for storage. During wet years, MET has the discretion to use to program to store portions of its SWP supplies which are in excess, and during dry years, the Arvin-Edison Water Storage District returns MET's previously stored water to MET by direct groundwater pump-in or by exchange of surface water supplies.

- **Antelope Valley-East Kern (AVEK) Water Agency Exchange and Storage Program:** Under the exchange program, for every two AF MET receives, MET returns 1 AF back to AVEK, and MET will also be able to store up to 30 TAF in the AVEK's groundwater basin, with a dry-year return capability of 10 TAF.
- **High Desert Water Bank Program:** Under this program, MET will have the ability to store up to 280 TAF of its SWP Table A or other supplies in the Antelope Valley groundwater basin, and in exchange will provide funding for the construction of monitoring and production wells, turnouts from the California Aqueduct, pipelines, recharge basins, water storage, and booster pump facilities. The project is anticipated to be in operation by 2025.
- **Kern-Delta Water District Storage Program:** This groundwater storage program has 250 TAF of storage capacity, and water for storage can either be directly recharged into the groundwater basin or delivered to Kern-Delta Water District farmers in lieu of pumping groundwater. During dry years, the Kern-Delta Water District returns MET's previously stored water to MET by direct groundwater pump-in return or by exchange of surface water supplies.
- **Mojave Storage Program:** MET entered into a groundwater banking and exchange transfer agreement with Mojave Water Agency that allows for the cumulative storage of up to 390 TAF. The agreement allows for MET to store water in an exchange account for later return.

6.2.5 Planned Future Sources

Beyond the programs highlighted in Sections 6.2.1 through 6.2.3, MET continues to invest in efforts to meet its goal of long-term regional water supply reliability, focusing on the following:

- Continuing water conservation
- Developing water supply management programs outside of the region
- Developing storage programs related to the Colorado River and the SWP
- Developing storage and groundwater management programs within the Southern California region
- Increasing water recycling, groundwater recovery, stormwater and seawater desalination
- Pursuing long-term solutions for the ecosystem, regulatory and water supply issues in the California Bay-Delta (MET, 2021).

6.3 Groundwater

The District owns two wells that pump from the San Juan Groundwater Basin: the Rose Canyon Well and Lang Well. These two wells pump water from a maximum depth of about 40 feet from the Arroyo Trabuco aquifer that is part of the San Juan Basin. The Rose Canyon Well has been a District-owned facility since the mid-1960s, and the District has owned the Lang Well since the early 1980s. These wells were originally privately owned and were dedicated to the District for the beneficial use of its customers.

This groundwater source is highly desirable in terms of water quality, cost, and local energy resources. The water pumped from these wells contributes to decreasing Southern California's dependence on imported water supplies. However, because the aquifer is shallow, it is subject to dry conditions and is not

a reliable source of pumping. Therefore, the District cannot be certain of future production and conservatively assumes it will not produce groundwater through FY 2044-45. In FY 2019-20, the District relied on 312 AFY – approximately 10% of the District's water supply portfolio for FY 2019-20 – from the San Juan Groundwater Basin to meet its demands.

6.3.1 San Juan Basin Characteristics

Per DWR's designation, the San Juan Basin is a non-adjudicated, very low-priority basin (DWR, 2019). The San Juan Basin is located in the San Juan Creek Watershed and is comprised of four principal groundwater basins: 1) Lower Basin, 2) Middle Basin, 3) Upper Basin, and 4) Arroyo Trabuco. A map of the four principal groundwater basins is shown in Figure 6-3. The Middle Basin, Lower Basin, and Lower Trabuco consists of approximately 5.9 square miles of water bearing alluvium. Groundwater occurs in the relatively thin alluvial deposits along the valley floors and within the major stream channels. The younger alluvial deposits within the San Juan Basin consists of a heterogeneous mixture of sand, silts, and gravel.

Groundwater production occurs primarily within the Lower Arroyo Trabuco, the Middle Basin, and the Lower Basin due to lack of storage and production capacity in the Upper Basin. Groundwater production within the San Juan Basin faces additional challenges including shallow bedrock conditions, elevated dissolved solids content of the water, riparian habitat constraints on groundwater level drawdown, permit limits, and climate changes or drought conditions.

The physical boundaries of the San Juan Basin include the Santa Ana Mountain to the north, sedimentary rock formations to the sides of the Upper Basin and Arroyo Trabuco, and the Pacific Ocean to the south.

The San Juan Basin is recharged through a variety of sources such as:

- Streambed infiltration in San Juan Creek, Horno Creek, Oso Creek, and Arroyo Trabuco.
- Subsurface inflows along boundaries at the head of the tributaries upstream and other minor subsurface inflows from other boundaries.
- Precipitation and applied water.
- Flow from fractures and springs.

Discharge of groundwater from the San Juan Basin occurs from a variety of sources such as:

- Groundwater production
- Rising groundwater
- Evapotranspiration
- Outflow to Pacific Ocean

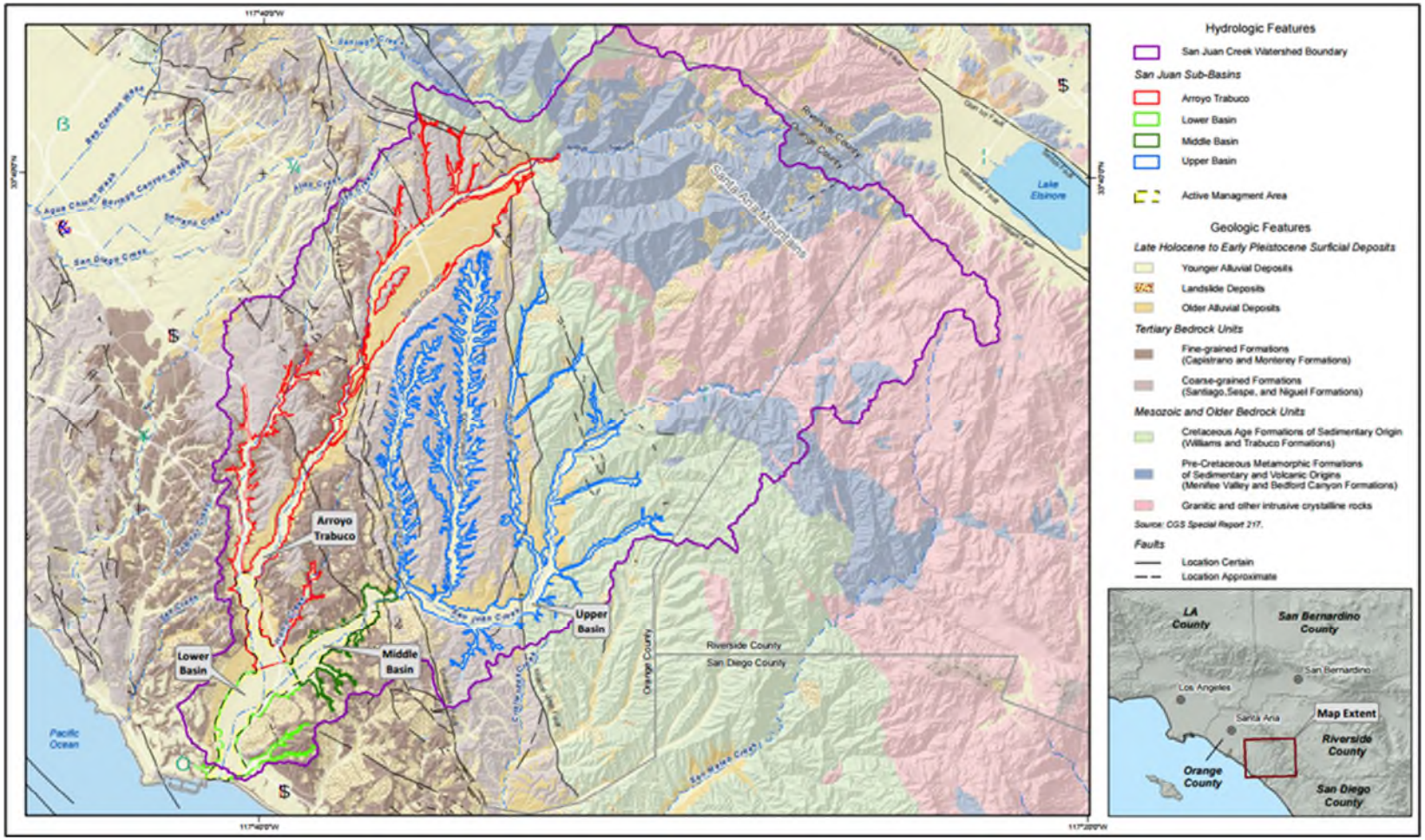

Figure 6-3: Principal Groundwater Basins for the San Juan Groundwater Basin

Currently, three agencies, have groundwater rights to the San Juan Basin and use this water for either municipal purposes or for irrigation. The agencies with groundwater rights to the Basin and their 2020 pumping allocations are listed below (Wildermuth Environmental, Inc., 2020):

- South Coast Water District: 1,300 AFY
- San Juan Basin Authority (SJBA): 12,500 AFY
- City of San Juan Capistrano: 6,150 AFY of SJBA's water rights, including 5,800 AFY at the Alipaz well field and Tirador well and up to 350 AFY for the San Juan Hills Golf Club

Basin Management

The SWRCB has determined that the San Juan Creek watershed is not a groundwater basin but is rather a surface and underground flowing stream. Therefore, it is subject to SWRCB jurisdiction and its processes with respect to the appropriation and use of waters within the watershed. The SJBA is a joint powers agency comprised of representatives from four local jurisdictions formed in 1971 to manage the watershed. Member agencies include SCWD, City of San Juan Capistrano, MNWD, and SMWD. Both the SJBA and SCWD have their own SWRCB Permit for Diversion and Use of Water: Permit No. 21074 and Permit No. 21138, respectively (Wildermuth Environmental, Inc., 2020).

The San Juan Basin does not strictly follow the term "safe yield" in preventing undesirable results occurring as a result of over-production of groundwater. The SJBA adopted the concept of "adaptive management" of the Basin to vary pumping from year to year based on actual basin conditions derived from monitoring efforts, with the groundwater management implication that during dry periods groundwater pumping will be lower than in wet periods. SJBA serves as the "Basin Manager" responsible for annually determining the amounts of adapted "available safe yield" so that SJBA and SCWD can pump pursuant to their water rights, so that 80% of water available for pumping goes to SJBA (up to a maximum of 12,500 AFY), and 20% goes to SCWD (up to a maximum of 1,300 AFY) (Wildermuth Environmental, Inc., 2020).

Following the recommendations of the San Juan Basin Groundwater and Facilities Management Plan (Appendix G1), SJBA began developing adaptive pumping management (APM) plans to annually determine the water available for pumping. The first APM plan was the 2016 plan and the most current at the time of this writing is the 2020 plan. The plans are updated each April, after most of the rainy season has passed, to define an initial pumping allocation for the subsequent 12-month period (May to April) based on current Basin conditions. Adjustments to the initial allocation are made as appropriate. Based on climate conditions and groundwater levels in the Inland and Stonehill management zones, the Basin is near full, indicating that the initial 2020 pumping allocations may be set at the maximum limits (Wildermuth Environmental, Inc., 2020).

The APM plan also discusses the various efforts SJBA leads in order to support the continued sustainable production from the Basin. Examples of such efforts include aquifer testing to better understand Basin characteristics and monthly water quality and water level monitoring programs (Wildermuth Environmental, Inc., 2020). For the full text of the 2020 APM plan, refer to Appendix G2.

The storage in the groundwater basin is small, at an estimated 41,400 AF, relative to recharge and production. The range of natural yield of the San Juan Basin is 7,000 AFY to 11,000 AFY. Instream recharge along both San Juan Creek and Arroyo Trabuco Creek is the only viable largescale recharge

method for the San Juan Basin due to the lack of suitable off-stream sites for stormwater storage and recharge, and the inability of the basin to accept large amounts of recharge at a specific site (SJBA, 2016).

6.3.2 Historical Groundwater Production

Due to drought conditions, the District did not produce any local groundwater in FY 2015-16 and FY 2017-18, and produced groundwater at relatively similar rates in FY 2016-17, 2018-19, and 2019-20 (Table 6-4).

Table 6-4: Groundwater Volume Pumped (AF)

DWR Submittal Table 6-1 Retail: Groundwater Volume Pumped (AF)						
☐	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	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	Arroyo Trabuco Aquifer, within the San Juan Groundwater Basin	0	347	0	415	312
	TOTAL	0	347	0	415	312
NOTES: Source - OC Retail Water Usage FY 2015 to FY 2020 (MWDOC, 2020)						

6.3.3 Planned Future Sources

At the time of this writing, the District does not have concrete plans to increase groundwater. However, the District regularly looks for such opportunities.

6.4 Surface Water

Depending on hydrological conditions, the District purchases surface water from Irvine Lake from IRWD. When available, the water is treated at the Baker Treatment Plant.

6.4.1 Existing Sources

Santiago Reservoir, or Irvine Lake, is the largest surface water reservoir in Orange County. Irvine Lake was built in 1931 and captures runoff from the upper Santiago Creek Watershed, as well as stores imported water (Orange County Local Agency Formation Commission, 2020). The 700-acre Irvine Lake is co-owned by IRWD and Serrano Water. The lake holds more than 9 billion gallons of water and is

contained by the 810-foot-tall Santiago Dam. IRWD uses water from Irvine Lake as a source of water for non-drinking purposes such as irrigation and as a source of water for the Baker Treatment Plant, which is a water source for the District (Section 6.2.3). Serrano Water District also uses Irvine Lake to provide treated drinking water to its customers in the City of Villa Park and parts of the City of Orange. Both agencies balance the benefits of storing water in Irvine Lake with minimizing evaporation and preserving the ability to capture rainwater from the surrounding hills. During years with less rainfall, IRWD and Serrano Water District also add imported water from MET to the lake (IRWD, 2021).

6.4.2 Planned Future Sources

As of 2021, there are no additional surface water sources planned in the District's service area.

6.5 Stormwater

6.5.1 Existing Sources

The District manages a network of stormwater and dry weather recovery facilities, including three existing pump stations, for non-potable irrigation uses.

6.5.2 Planned Future Sources

The District is considering adding an additional pump station to the District's recycled water system, specifically in the Robinson Ranch community. This project is in the conceptual stage.

6.6 Wastewater and Recycled Water

The District is directly involved in wastewater services through its ownership and operation of the wastewater collection system in its service area. The District owns and operates the Robinson Ranch Wastewater Treatment Plant (RRWWTP) that provides collection and treatment for developments on the east side of the service area. A full description of the District's wastewater collection and treatment is provided in the following sections.

Recycled water is wastewater that is treated through primary, secondary and tertiary processes and is acceptable for most non-potable water purposes such as irrigation, and commercial and industrial process water per Title 22 requirements. Recycled water opportunities have continued to grow in Southern California as public acceptance and the need to expand local water resources continues to be a priority. Recycled water also provides a degree of flexibility and added reliability during drought conditions when imported water supplies are restricted. The following sections expand on the existing agency collaboration involved in these efforts as well as the District's projected recycled water use over the next 25 years.

6.6.1 Agency Coordination

There are several water agencies in south Orange County that provide potable water service as well as wastewater collection and treatment to recycled water standards. These agencies have been in the forefront of recycled water development to diversify water supplies because they depend on imported

water for most of their potable water supplies and groundwater supplies are limited due to the local geography. Each of these agencies provides recycled water where feasible.

The District's non-potable water supply consists of urban runoff and recycled wastewater from the eastern and main portion of the District. In the eastern portion of the District, 100% of the wastewater is recycled at the RRWWTP. The central portion of the District is on septic and cannot be recycled and the western portion of the District's wastewater is blended with flows from IRWD and SMWD and sent to the CWWRP for treatment and disposal.

6.6.2 Wastewater Description and Disposal

The District's wastewater collection system includes approximately 36 miles of sewers and interceptors ranging from 8 inches to 15 inches in diameter, 8 sewer lift stations, and 9 miles of force mains.
The existing wastewater collection system consists of two separate areas/systems on the east and west. Wastewater collected in these areas are sent to one of two treatment plants based on location.
The District's service area is shown on Figure 6-4.

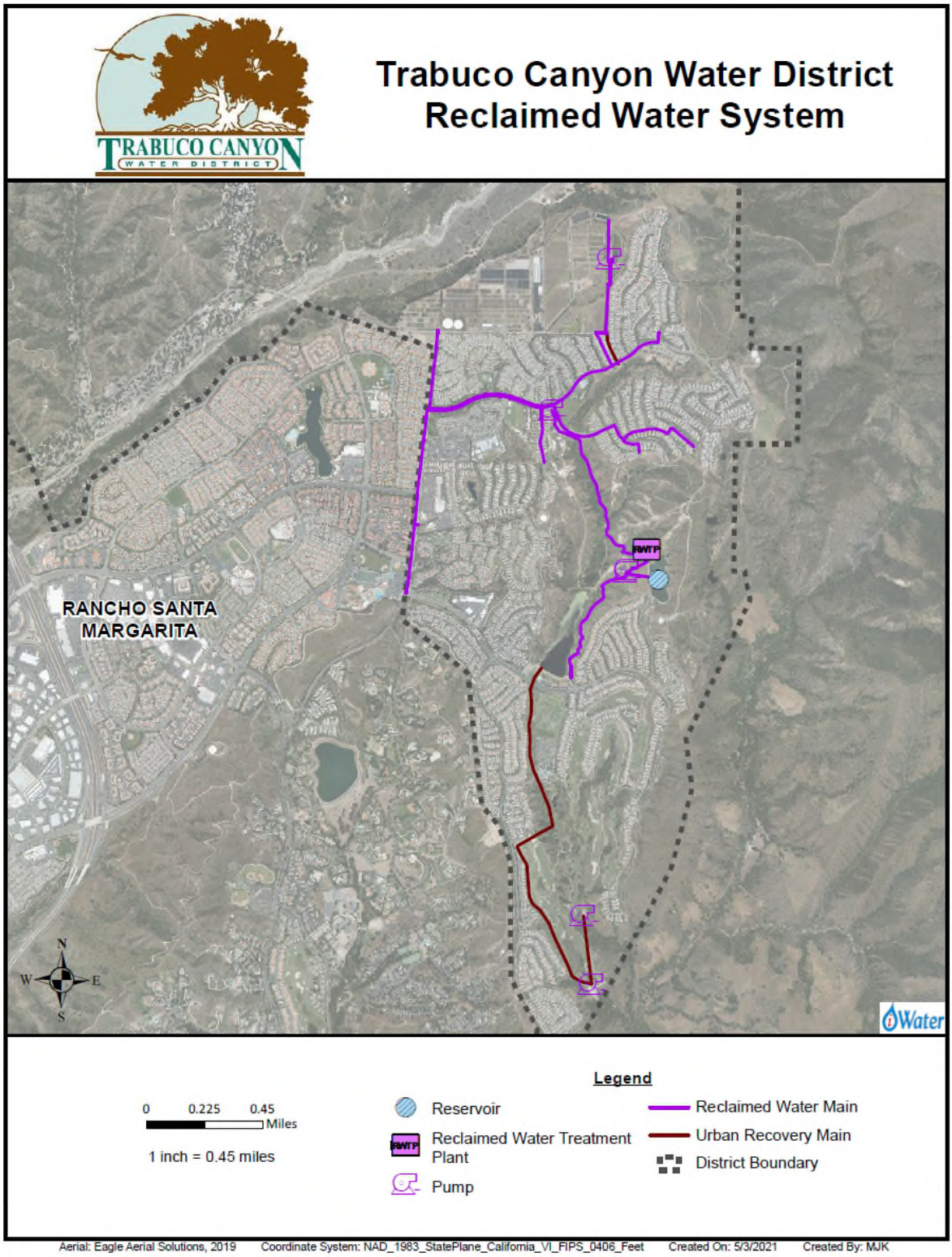

Figure 6-4: Reclaimed Water System

The District owns and operates the RRWWTP that provides collection and treatment for developments on the east side of the service area. The RRWWTP is in the Robinson Ranch development shown on Figure 6-4, has a treatment capacity of 0.85 MGD, and the tertiary treated water is fed into the recycled water reservoir that has a storage capacity of 130 AF.

The wastewater from the west side of the District's service area is sent to SMWD's CWWRP located in the City of San Juan Capistrano for treatment and disposal. The CWWRP has a capacity of 9 MGD, of which 5 MGD is recycled each day and distributed for irrigation in SMWD's service area. The District owns 125,000 GPD of capacity at the CWWRP. Effluent from the CWWRP is treated to secondary or tertiary levels depending on the disposal method, ocean outfall or beneficial reuse. The tertiary treated water is reused, while secondary effluent is conveyed to the San Juan Creek Ocean Outfall.

Table 6-5 summarizes the wastewater collected by the District in its collection system in 2020. Table 6-6 shows the amount of the District’s wastewater treated, recycled, and disposed of by the District and SMWD in 2020.

Table 6-5: Retail: Wastewater Collected Within Service Area in 2020

DWR 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.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	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?	Volume of Wastewater Collected from UWMP Service Area 2020 (AF)	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? *(optional)*
TCWD	Estimated	567	TCWD	Robinson Ranch Wastewater Treatment Plant	Yes	
TCWD	Estimated	217	SMWD	Chiquita Water Reclamation Plant	No	
Total Wastewater Collected from Service Area in 2020:		845				

NOTES:
Based on raw influent flows from FY 2019-20

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

DWR 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)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2020 volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Robinson Ranch Wastewater Treatment Plant	No discharge	No discharge		Other	No	Tertiary	672	0	672	0	
Chiquita Water Treatment Plant	San Juan Creek Ocean Outfall	Dana Point/ Laguna Beach		Ocean outfall	Yes	Tertiary	173	0	0	173	
						Total	845	0	672	173	0
NOTES:											

6.6.3 Current Recycled Water Uses

The District distinguishes between urban runoff and recycled water reclaimed at the treatment plant by designating the treated wastewater as reclaimed, and urban and captured runoff as recycled. This supply is used in the District's non-domestic water system. The District's recycled water system is supplied with tertiary treated water from the RRWWTP that is blended with urban runoff from Dove Lake as part of the District's Dry Season Water Recovery Project, also referred to as Urban Runoff Capture and Reuse Project. The local runoff from a section of Trabuco Highlands is captured at the Shadow Rock Detention Basin and conveyed to Dove Lake or sent to the adjacent nursery. The remaining section of Trabuco Highlands plus most of Dove Canyon and Robinson Ranch is captured and stored in Dove Lake to augment the non-potable irrigation system. Aeration and vegetation controls in the lake improve the water quality. The urban runoff supply from FY 2020 was approximately 124 AF. The two non-potable supplies are blended in the recycled water storage reservoir prior to distribution or blended and treated and pumped into the recycled water distribution system.

Recycled water is used to irrigate parks, golf courses, and greenbelts in Robinson Ranch, Trabuco Highlands, and Dove Canyon Communities and offsets demand on imported potable water. The District’s recycled water is delivered via pipelines to customers within the District service area. The District’s recycled water distribution system consists of 5.1 miles of pipeline, two sets of booster pump stations with a total pumping capacity of 6,270 gpm, and two open reservoirs with a combined capacity of 545 million gallons.

The District annually produced an average of 706 AF of recycled water for their service area for three fiscal years ending 2020. This includes non-potable production from the Robinson Ranch treatment plant, urban runoff, and non-potable amounts pumped from Dove Lake.

6.6.4 Projected Recycled Water Uses

The District currently uses water from their recycled water system for direct non-potable reuse such as landscape irrigation and golf courses. The current and projected recycled water use are summarized in Table 6-7. Recycled water for 2020 was projected higher in the 2015 UWMP than the actual recycled water use in 2020. At the time of this writing, there are no new projected recycled water uses planned for the District. However, the District routinely looks for new opportunities. The projected FY 2019-20 recycled water use from the District's 2015 UWMP are compared to the FY 2019-20 actual use in Table 6-8. Recycled water for 2020 was projected higher in the 2015 UWMP than the actual recycled water use in 2020.

Table 6-7: Retail: Recycled Water Direct Beneficial Uses Within Service Area

DWR 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:		TCWD									
Name of Supplier Operating the Recycled Water Distribution System:		TCWD									
Supplemental Water Added in 2020 (volume)											
Source of 2020 Supplemental Water											
Beneficial Use Type	Potential Beneficial Uses of Recycled Water (Describe)	Amount of Potential Uses of Recycled Water (Quantity)	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045 *(opt)*
Agricultural irrigation	Nursery	See projections	Nursery	Tertiary	5	17	17	17	17	17
Landscape irrigation (excludes golf courses)	Parks and greenbelts	See projections	Parks and greenbelts	Tertiary	373	384	384	384	384	384
Golf course irrigation	Golf course	See projections	Golf course	Tertiary	294	300	300	300	300	300
				Total:	672	701	701	701	701	701
**IPR - Indirect Potable Reuse*											
NOTES:											

Table 6-8: Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

DWR 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.		
Use Type		**2015 Projection for 2020**	**2020 Actual Use**
Agricultural irrigation		140	5
Landscape irrigation (excludes golf courses)		400	373
Golf course irrigation		410	294
Total		950	672
NOTES:			

6.6.5 Potential Recycled Water Uses

Conversion customers are those that currently use potable water for demands that can also be met with recycled water such as landscape irrigation. Conversion customers are assessed based on their economical proximity to recycled water facilities. By 2030, Sakaida Nursery and TY Nursery may be developed to medium density developments that use recycled water for common area landscape. Medium density developments use approximately 0.42 AF per dwelling unit per year of water, based on the District's 2016 Domestic Water Storage and Reservoir Siting Study.

6.6.6 Optimization Plan

In Orange County, the majority of recycled water is used for irrigating golf courses, parks, schools, businesses, and communal landscaping. Future recycled water use can be increased by requiring dual piping in new developments, retrofitting existing landscaped areas and constructing recycled water pump stations and transmission pipelines to reach areas that are further from treatment plants. Gains in implementing some of these projects have been made throughout the county. However, additional costs, large energy requirements, and capital costs for facilities all contribute to the high costs of such projects.

To determine if additional projects are feasible, studies must be performed to decide if the project should be pursed. Feasibility studies should include evaluation of alternatives with a present worth analysis consisting of capital costs (design, environmental reviews, construction, etc.) and operations and maintenance costs (electrical costs for pumps and equipment and maintenance required for the system). The District will continue to conduct feasibility studies for recycled water and seek out creative solutions such as funding, regulatory requirements, institutional arrangement, and public acceptance for recycled water use with MWDOC, MET and other cooperative agencies.

6.7 Desalination Opportunities

In 2001, MET developed a Seawater Desalination Program (SDP) to provide incentives for developing new seawater desalination projects in MET's service area. In 2014, MET modified the provisions of their Local Resources Program (LRP) to include incentives for locally produced seawater desalination projects that reduce the need for imported supplies. To qualify for the incentive, proposed projects must replace an existing demand or prevent new demand on MET's imported water supplies. In return, MET offers three incentive formulas under the program:

- Sliding scale incentive up to $340 per AF for a 25-year agreement term, depending on the unit cost of seawater produced compared to the cost of MET supplies.
- Sliding scale incentive up to $475 per AF for a 15-year agreement term, depending on the unit cost of seawater produced compared to the cost of MET supplies.
- Fixed incentive up to $305 per AF for a 25-year agreement term.

Developing local supplies within MET's service area is part of their IRP goal of improving water supply reliability in the region. Creating new local supplies reduce pressure on imported supplies from the SWP and Colorado River.

On May 6th, 2015, the SWRCB approved an amendment to the state's Water Quality Control Plan for the Ocean Waters of California (California Ocean Plan) to address effects associated with the construction and operation of seawater desalination facilities (Desalination Amendment). The amendment supports the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality. The California Ocean Plan now formally acknowledges seawater desalination as a beneficial use of the Pacific Ocean and the Desalination Amendment provides a uniform, consistent process for permitting seawater desalination facilities statewide.

If the following projects are developed, MET's imported water deliveries to Orange County could be reduced. These projects include the Huntington Beach Seawater Desalination Project and the Doheny Desalination Project.

Brackish groundwater is groundwater with a salinity higher than freshwater, but lower than seawater. Brackish groundwater typically requires treatment using desalters.

6.7.1 Ocean Water Desalination

Huntington Beach Seawater Desalination Project – Poseidon Resources LLC (Poseidon), a private company, is developing the Huntington Beach Seawater Desalination Project to be co-located at the AES Power Plant in the City of Huntington Beach along Pacific Coast Highway and Newland Street. The proposed project would produce up to 50 MGD (56,000 AFY) of drinking water to provide approximately 10% of Orange County's water supply needs.

Over the past several years, Poseidon has been working with OCWD on the general terms and conditions for selling the water to OCWD. OCWD and MWDOC have proposed a few distribution options to agencies in Orange County. The northern option proposes the water be distributed to the northern agencies closer to the plant within OCWD's service area with the possibility of recharging/injecting a portion of the product water into the Orange County Groundwater Basin (OC Basin). The southern option builds on the northern option by delivering a portion of the product water through the existing OC-44 pipeline for conveyance to the south Orange County water agencies. A third option is also being explored that includes all of the product water to be recharged into the OC Basin. Currently, a combination of these options could be pursued.

The Huntington Beach Seawater Desalination project plant capacity of 56,000 AFY would be the single largest source of new, local drinking water available to the region. In addition to offsetting imported demand, water from this project could provide OCWD with management flexibility in the OC Basin by augmenting supplies into the Talbert Seawater Barrier to prevent seawater intrusion.

In May 2015, OCWD and Poseidon entered into a non-binding Term Sheet that provided the overall partner structure in order to advance the project. Based on the initial Term Sheet, which was updated in 2018, Poseidon would be responsible for permitting, financing, design, construction, and operations of the treatment plant while OCWD would purchase the production volume, assuming the product water quality and quantity meet specific contract parameters and criteria. Furthermore, OCWD would then distribute the water in Orange County using one of the proposed distribution options described above.

Currently, the project is in the regulatory permit approval process with the Regional Water Quality Control Board and the California Coastal Commission. Once all of the required permits are approved, Poseidon will then work with OCWD and interested member agencies in developing a plan to distribute the water.

Subsequent to the regulatory permit approval process, and agreement with interested parties, Poseidon estimates that the project could be online as early as 2027.

Under guidance provided by DWR, the Huntington Beach Seawater Desalination Plant's projected water supplies are not included in the supply projections due to its current status within the criteria established by State guidelines (DWR, 2020c).

Doheny Desalination Project – South Coast Water District (SCWD) is proposing to develop an ocean water desalination facility in Dana Point. SCWD intends to construct a facility with an initial capacity of up to 5 million gallons per day (MGD). The initial up to 5 MGD capacity would be available for SCWD and potential partnering water agencies to provide a high quality, locally-controlled, drought-proof water supply. The desalination facility would also provide emergency backup water supplies, should an earthquake, system shutdown, or other event disrupt the delivery of imported water to the area. The Project would consist of a subsurface slant well intake system (constructed within Doheny Beach State Park), raw (sea) water conveyance to the desalination facility site (located on SCWD owned property), a seawater reverse osmosis (SWRO) desalination facility, brine disposal through an existing wastewater ocean outfall, solids handling facilities, storage, and potable water conveyance interties to adjacent local and regional distribution infrastructure.

The Doheny Ocean Desalination Project has been determined as the best water supply option to meet reliability needs of SCWD and south Orange County. SCWD is pursuing the Project to ensure it meets the water use needs of its customers and the region by providing a drought-proof potable water supply, which diversifies SCWD's supply portfolio and protects against long-term imported water emergency outages and supply shortfalls that could have significant impact to our coastal communities, public health, and local economy. Phase I of the Project (aka, the "Local" Project) will provide SCWD and the region with up to 5 MGD of critical potable water supply that, together with recycled water, groundwater, and conservation, will provide the majority of SCWD's water supply through local reliable sources. An up to 15 MGD capacity project has been identified as a potential future "regional" project that could be phased incrementally, depending on regional needs.

On June 27, 2019, SCWD certified the final EIR and approved the Project. The Final EIR included considerable additional information provided at the request of the Coastal Commission and the Regional Board, including an updated coastal hazard analysis, updated brine discharge modeling, and updated groundwater modeling, updated hydrology analysis. The approval of the Project also included a commitment to 100 percent carbon neutrality through a 100 percent offset of emissions through the expansion of Project mitigation and use of renewable energy sources. SCWD is currently in the permitting process and finalizing additional due diligence studies. If implemented, SCWD anticipates an online date of 2025.

Under guidance provided by DWR, the Doheny Seawater Desalination Project's projected water supplies are not included in the supply projections due to its current status within the criteria established by State guidelines (DWR, 2020c).

6.7.2 Groundwater Desalination

The District's Trabuco Creek Wells Facility pumps and treats local and fresh or non-brackish groundwater, when available. The local groundwater is a fresh water source available on a seasonal

basis and heavily reliant on precipitation. The District does not have any plans for groundwater desalination of a brackish water supply but is supportive of such projects that reduce the region's reliance on imported water and provide a local source of supply.

6.8 Water Exchanges and Transfers

Interconnections with other agencies result in the ability to share water supplies during short term emergency situations or planned shutdowns of major imported water systems. However, beyond short-term outages, transfers can also be involved with longer term water exchanges to deal with droughts or water allocation situations. The following subsections describe the District's existing and planned exchanges and transfers.

6.8.1 Existing Exchanges and Transfers

The District has the capability to transfer and exchange water to and from the District with neighboring districts, SMWD, IRWD, and ETWD. Through various arrangements, water can be transferred/exchanged to and from these and other districts for short durations such as emergencies or water transmission line breaks. TCWD usually supplements water from IRWD and SMWD during the summers or if the Baker Treatment Plant is out of service for maintenance. TCWD also transfers 2 CFS of its Baker Treatment Plant capacity to the City of San Clemente pursuant to a 2017 agreement between the two parties.

6.8.2 Planned and Potential Exchanges and Transfers

As of 2021, the District currently has no plans for contractually committing to any additional future short term or long term water transfers or exchanges due to current availability of supplies.

6.9 Summary of Future Water Projects

The District continually reviews practices that will provide its customers with adequate and reliable supplies. Trained staff continue to ensure the water quality is safe and the water supply will meet present and future needs in an environmentally and economically responsible manner.

Although the District has various projects planned to maintain and improve the water system, there are currently no District-specific planned projects that have both a concrete timeline and a quantifiable increase in supply.

6.9.1 District Initiatives

The District anticipates water demand in the District to increase slightly over the next 25 years. Any new water supply sources will be developed primarily to increase redundancy, rather than to support population growth and new development.

In its FY 2020-21 proposed CIP budget, the District identified valve, pump, meter, and turbidimeter replacement programs to improve its water supply reliability and enhance the operations of the District (TCWD, 2020). Refer to the District's website for additional planned projects.

6.9.2 Regional Initiatives

Beyond District-specific projects, the District consistently coordinates its long-term water shortage planning with MWDOC. MWDOC has identified the following future regional projects, some of which can indirectly benefit the District to further increase local supplies and offset imported supplies (CDM Smith, 2019):

Poseidon Huntington Beach Ocean Desalination Project – Poseidon proposes to construct and operate the Huntington Beach Ocean Desalination Plant on a 12-acre parcel adjacent to the AES Huntington Beach Generating Station. The facility would have a capacity of 50 MGD and 56,000 AFY, with its main components consisting of a water intake system, a desalination facility, a concentrate disposal system, and a product water storage tank. This project would provide both system and supply reliability benefits to the SOC, the OC Basin, and Huntington Beach. The capital cost in the initial year for the plant is $1.22 billion.

Doheny Ocean Desalination Project – SCWD is proposing to construct an ocean water desalination facility in Dana Point at Doheny State Beach. The facility would have an initial up to 5 MGD capacity, with the potential for future expansions up to 15 MGD. The project's main components are a subsurface water intake system, a raw ocean water conveyance pipeline, a desalination facility, a seawater reverse osmosis (SWRO) desalination facility, a brine disposal system, and a product water storage tank.

San Juan Watershed Project – SMWD and other project partners have proposed a multi-phased project within the San Juan Creek Watershed to capture local stormwater and develop, convey, and recharge recycled water into the San Juan Groundwater Basin and treat the water upon pumping it out of the basin. The first phase includes the installation of three rubber dams within San Juan Creek to promote in-stream recharge of the basin, with an anticipated production of 700 AFY on average. The second phase would develop additional surface water and groundwater management practices by using stormwater and introducing recycled water for infiltration into the basin and has an anticipated production of 2,660 to 4,920 AFY. The third phase will introduce recycled water directly into San Juan Creek through live stream recharge, with an anticipated production of up to 2,660 AFY (SMWD, 2021).

Cadiz Water Bank – SMWD and Cadiz, Inc. are developing this project to create a new water supply by conserving groundwater that is currently being lost to evaporation and recovering the conserved water by pumping it out of the Fenner Valley Groundwater Basin to convey to MET's CRA. The project consists of a groundwater pumping component that includes an average of 50 thousand acre-feet per year (TAFY) of groundwater that can be pumped from the basin over a 50-year period, and a water storage component that allows participants to send surplus water supplies to be recharged in spreading basins and held in storage.

South Orange County Emergency Interconnection Expansion – MWDOC has been working with the South Orange County (SOC) agencies on improvements for system reliability primarily due to the risk of earthquakes causing outages of the MET imported water system as well as extended grid outages. Existing regional interconnection agreements between IRWD and SOC agencies provides for the delivery of water through the IRWWD system to participating SOC agencies in times of emergency. MWDOC and IRWD are currently studying an expansion of the program, including the potential East Orange County

Feeder No. 2 pipeline and an expanded and scalable emergency groundwater program, with a capital cost of $867,451.

SARCCUP – SARCCUP is a joint project established between MET, MWDOC, Eastern MWD, Western MWD, Inland Empire Utilities Agency, and OCWD that can provide significant benefits in the form of additional supplies during dry years for Orange County. Surplus SWP water from San Bernardino Valley Water District (SBVMWD) can be purchased and stored for use during dry years. This water can even be considered an extraordinary supply under MET allocation Plan, if qualified under MET's extraordinary supply guidelines. OCWD has the ability to store 36,000 AF of SARCCUP water and if excess water is available MWDOC has the ability to purchase additional water. Further details remain to be developed between OCWD, retail agencies, and MWDOC in how the water will be distributed in Orange County and who participates.

Moulton Niguel Water District (MNWD) / OCWD Pilot Storage Program - OCWD entered into an agreement with MNWD to develop a pilot program to explore the opportunity to store water in the OC Basin. The purpose of such a storage account would provide MNWD water during emergencies and/or provide additional water during dry periods. As part of the agreement, OCWD hired consultants to evaluate where and how to extract groundwater from the OC Basin with several options to pump the water to MNWD via the East Orange County Feeder No. 2; as well as a review of existing banking/exchange programs in California to determine what compensation methodologies could OCWD assess for a storage/banking program.

6.10 Energy Intensity

A new requirement for this 2020 UWMP is an energy intensity analysis of the Supplier's water, wastewater, and recycled water systems, where applicable for a 12-month period. The District owns and operates a water distribution system, a wastewater collection system, and a recycled water system. Unlike other sections of the report that show financial year data, this section reports the energy intensity for each system using data from CY2019. Calendar year analysis is standard for energy intensity reporting as it reduces issues related to variable start dates for financial years.

Water and energy resources are inextricably connected. Known as the "water-energy nexus", the California Energy Commission estimates the transport and treatment of water, treatment and disposal of wastewater, and the energy used to heat and consume water account for nearly 20% of the total electricity and 30% of non-power plant related natural gas consumed in California. In 2015, California issued new rules requiring 50% of its power to come from renewables, along with a reduction in greenhouse gas (GHG) emissions to 40% below 1990 levels by 2030. Consistent with energy and water conservation, renewable energy production, and GHG mitigation initiatives, the District reports the energy intensity of its water and wastewater operations.

The methodology for calculating water energy intensity outlined in Appendix O of the UWMP Guidebook was adapted from the California Institute for Energy Efficiency exploratory research study titled "Methodology for Analysis of the Energy Intensity of California's Water Systems" (Wilkinson 2000). The study defines water energy intensity as the total amount of energy, calculated on a whole-system basis, required for the use of a given amount of water in a specific location.

UWMP reporting is limited to available energy intensity information associated with water processes occurring within an urban water supplier's direct operational control. Operational control is defined as authority over normal business operations at the operational level. Any energy embedded in water supplies imparted by an upstream water supplier (e.g., water wholesaler) or consequently by a downstream water purveyor (e.g., retail water provider) is not included in the UWMP energy intensity tables. The District's calculations conform to methodologies outlined in the UWMP Guidebook and Wilkinson study.

6.10.1 Water Supply Energy Intensity

In CY 2019, the District consumed 1,336.3 kilowatt-hour (KWh) per AF for water extraction, treatment, and delivery services (Table 6-9). Most retail agencies in Orange County do not have water treatment so it is important not to compare TCWD's water energy intensity directly to an agency that only extracts and delivers water. The basis for calculations is provided in more detail in the following subsections.

Table 6-9: Recommended Energy Intensity – Multiple Water Delivery Products

Urban Water Supplier: *Trabucco Canyon WD*

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: 1/1/2019

End Date: 12/31/2019

☐ 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	*1,747.7*	*0*	*0*	*1,960*	*1,960*	*1960*	*0*	*1960*
Energy Consumed (kWh)	*N/A*	*503,727*	*0*	*0*	*1,200,872*	*914,469*	*2619068*		*2619068*
Energy Intensity (kWh/vol.)	*N/A*	*0.0*	*0.0*	*0.0*	*612.7*	*466.6*	*1336.3*	*0.0*	*1336.3*

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

Combination of Estimates and Metered Data

Data Quality Narrative:

Volume of Water Entering Process: Extraction data based MWDOC Compiled Water Audits "Volume From Own Sources" and Distribution data based on MWDOC Compiled Water Audits "Authorized Consumption." Non Revenue Water is not considered in this calculation – the energy efficiency is based on water delivered to customers.
Energy Consumed: Based on metered data.

Narrative:

TCWD relies on imported water, local groundwater, and recycled water to meet their customers' water needs. Operational control is limited to groundwater wells, treatment facilities and potable water booster stations. This table does not include upstream embedded energy consumed prior to TCWD taking control.

6.10.1.1 Operational Control and Reporting Period

As described throughout the report, the District is a retail agency that relies on groundwater and imported water.

Water supply energy intensity was calculated for the 2019 calendar year. This is a standard for energy and GHG reporting to the Climate Registry, California Air Resources Board and the United States Environmental Protection Agency. Calendar year reporting provides consistency when assessing direct and indirect energy consumption within a larger geographical context, as FY starting dates can vary between utilities and organizations.

6.10.1.2 Volume of Water Entering Processes

According to MWDOC's Compiled Water Audits, in 2019, the District extracted 1747.7 AF of water from the San Juan Groundwater Basin and distributed 1960 AF of water to customers (made up of the 1747.7 AF of ground water and additional imported potable water). Water volume used in these calculations is based on water audit data.

6.10.1.3 Energy Consumption and Generation

According to Southern California Edison (SCE) Electricity Bills, groundwater wells consumed 503,727 kilowatt hours (kWh) of electricity. This number includes well pumping and water treatment at the wells that shares a meter with the pumps. The separate Dimension WTP consumed 1,200,872 kWh of electricity for water treatment, and pump stations along the distribution system consumed 914,469 kWh of electricity. Currently, the District does not generate renewable energy. Energy consumption is based on metered data. As noted earlier in this section, TCWD is unique among retail water agencies in Orange County because of the treatment facilities it operates. Therefore, it's important not to compare TCWD energy intensity directly with other local retail agencies.

6.10.2 Wastewater and Recycled Water Energy Intensity

In CY2019, the District consumed 807.1 kWh/AF for wastewater services and 1878.4 kWh/AF for recycled water services (Table 6-10). The basis for calculations is provided in more detail in the following subsections.

Table 6-10: Recommended Energy Intensity – Wastewater & Recycled Water

Urban Water Supplier: *Trabuco Canyon WD*

Table O-2: Recommended Energy Reporting - Wastewater & Recycled Water					
Enter Start Date for Reporting Period	1/1/2019	Urban Water Supplier Operational Control			
End Date	12/31/2019	Water Management Process			
☐ Is upstream embedded in the values reported?		Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Water Units Used	AF				
Volume of Wastewater Entering Process (volume units selected above)		*845*	*845*	*0*	*845*
Wastewater Energy Consumed (kWh)		*682,010*	*0*	*0*	*682010*
Wastewater Energy Intensity (kWh/volume)		*807.1*	*0.0*	*0.0*	*807.1*
Volume of Recycled Water Entering Process (volume units selected above)		*0*	*845*	*845*	*845*
Recycled Water Energy Consumed (kWh)		*0*	*1,045,366*	*541,914*	*1587280*
Recycled Water Energy Intensity (kWh/volume)		*0.0*	*1237.1*	*641.3*	*1878.4*

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)*

Combination of Estimates and Metered Data

Data Quality Narrative:

Volume of Water Entering Process: Estimated based potable water consumption in the service area.
Wastewater Energy Consumed: Based on metered data.

Narrative:

TCWD operates the local wastewater collection system and one wastewater treatment facility which feeds into the local recycled water system. Operational control includes wastewater lift stations, wastewater treatment, and recycled water pump stations.

6.10.2.1 Operational Control and Reporting Period

The District's sewer system is made up of a network of gravity sewers and eight wastewater lift stations. Similar to the water supply energy intensity, wastewater energy intensity was calculated for the 2019 calendar year.

6.10.2.2 Volume of Wastewater Entering Processes

In CY2019, the District collected an estimated 845 AF of wastewater. This wastewater was then treated and redistributed to customers as part of the District's recycled water program. Wastewater volume was estimated based on potable water deliveries in the service area.

6.10.2.3 Energy Consumption and Generation

According to Southern California Edison Electricity Bills, the District's eight sewer lift stations consumed 682,010 kWh of electricity. Treatment of this wastewater to bring it to a level where it could be used as part of the recycled water system consumed 1,045,366 kWh of electricity and then the five recycled water pump stations consumed 541,914 kWh of electricity. Energy consumption data is based on metered data.

6.10.3 Key Findings and Next Steps

Calculating and disclosing direct operationally-controlled energy intensities is another step towards understanding the water-energy nexus. However, much work is still needed to better understand upstream and downstream (indirect) water-energy impacts. When assessing water supply energy intensities or comparing intensities between providers, it is important to consider reporting boundaries as they do not convey the upstream embedded energy or impacts energy intensity has on downstream users. Engaging one's upstream and downstream supply chain can guide more informed decisions that holistically benefit the environment and are mutually beneficial to engaged parties. Suggestions for further study include:

- Supply-chain engagement – The District relies on a variety of water sources for their customers. While some studies have used life cycle assessment tools to estimate energy intensities, there is a need to confirm this data. The 2020 UWMP requirement for all agencies to calculate energy intensity will help the District and neighboring agencies make more informed decisions that would benefit the region as a whole regarding the energy and water nexus. A similar analysis could be performed with upstream supply chain energy, for example, with State Project Water.
- Internal benchmarking and goal setting – With a focus on energy conservation and a projected increase in water demand despite energy conservation efforts, the District's energy intensities will likely decrease with time. Conceivably, in a case where water demand decreases, energy intensities may rise as the energy required to pump or treat is not always proportional to water delivered. In the course of exploring the water-energy nexus and pursuing renewable energy goals, there is a need to assess whether energy intensity is a meaningful indicator or if it makes sense to use a different indicator to reflect the District's commitment to energy and water conservation.

- Regional sustainability – Water and energy efficiency are two components of a sustainable future. Efforts to conserve water and energy, however, may impact the social, environmental, and economic livelihood of the region. In addition to the relationship between water and energy, over time, it may also be important to consider and assess the connection these resources have on other aspects of a sustainable future.

7 WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

Building upon the water supply identified and projected in Section 6, this key section of the UWMP examines the District's projected water supplies, water demand, and the resulting water supply reliability. Water service reliability reflects the District's ability to meet the water needs of its customers under varying conditions. For the UWMP, water supply reliability is evaluated in two assessments: 1) the Water Service Reliability Assessment and 2) the DRA. The Water Service reliability assessment compares projected supply to projected demand in 2025 through 2045 for three hydrological conditions: a normal year, a single dry year, and a drought period lasting five consecutive years. The DRA, a new UWMP requirement, assesses near-term water supply reliability. It compares projected water supply and demand assuming the City experiences a drought period for the next five consecutive years. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for in the assessment.

7.1 Water Service Reliability Overview

Every urban water supplier is required to assess the reliability of their water service to its customers under normal, single-dry, and multiple-dry water years. The District depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. Development of local supplies augments the reliability of the water system. There are various factors that may impact reliability of supplies such as legal, environmental, water quality and climatic which are discussed below. MET's and MWDOC's 2020 UWMPs conclude that they are able to meet, full-service demands of their member agencies starting 2025 through 2045 during normal years, a single-dry year, and multiple-dry years. Consequently, the District is projected to meet full-service demands through 2045 for the same scenarios.

MET's 2020 IRP update describes the core water resources that will be used to meet full-service demands at the retail level under all foreseeable hydrologic conditions from 2025 through 2045. The foundation of MET's resource strategy for achieving regional water supply reliability has been to develop and implement water resources programs and activities through its IRP preferred resource mix. This preferred resource mix includes conservation, local resources such as water recycling and groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance and infrastructure improvements.

Table 7-1 shows the basis of water year data used to predict drought supply availability. The average (normal) hydrologic condition for the MWDOC service area, which the District is a part of, is represented by FY 2017-18 and FY 2018-19 and the single-dry year hydrologic condition by FY 2013-14. The five consecutive years of FY 2011-12 to FY 2015-16 represent the driest five-consecutive year historic sequence for MWDOC's service area. Locally, Orange County rainfall for the five-year period totaled 36 inches, the driest on record.

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

DWR Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	Base Year	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	2018-2019	-	100%
Single-Dry Year	2014	-	109%
Consecutive Dry Years 1st Year	2012	-	109%
Consecutive Dry Years 2nd Year	2013	-	109%
Consecutive Dry Years 3rd Year	2014	-	109%
Consecutive Dry Years 4th Year	2015	-	109%
Consecutive Dry Years 5th Year	2016	-	109%
NOTES: Assumes an increase of 9% above average year demands in dry and multiple dry years based on the Demand Forecast TM (CDM Smith, 2021). 109% represents the percent of average supply needed to meet demands of a single-dry and multiple-dry years. Since the District is able to meet demand with imported water from MWDOC / MET (on top of local groundwater andrecycled water) the percent of average supply value reported is equivalent to the percent of average demand under the corresponding hydrologic condition.			

The following sections provide a detailed discussion of the District's water source reliability. Additionally, the following sections compare the District's projected supply and demand under various hydrological conditions, to determine the District's supply reliability for the 25-year planning horizon.

7.2 Factors Affecting Reliability

In order to prepare realistic water supply reliability assessments, various factors affecting reliability were considered. These include climate change and environmental requirements, regulatory changes, water quality impacts, and locally applicable criteria.

7.2.1 Climate Change and the Environment

Changing climate patterns are expected to shift precipitation patterns and affect water supply availability. Unpredictable weather patterns will make water supply planning more challenging. Although climate change impacts are associated with exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners (MET, 2021). These areas include:

- A reduction in Sierra Nevada Mountain snowpack.
- Increased intensity and frequency of extreme weather events.
- Prolonged drought periods.
- Water quality issues associated with increase in wildfires.
- Changes in runoff pattern and amount.
- Rising sea levels resulting in:
    - Impacts to coastal groundwater basins due to seawater intrusion.
    - Increased risk of damage from storms, high-tide events, and the erosion of levees.
    - Potential pumping cutbacks to the SWP and CVP.

Other important issues of concern due to global climate change include:

- Effects on local supplies such as groundwater.
- Changes in urban and agricultural demand levels and patterns.
- Increased evapotranspiration from higher temperatures.
- Impacts to human health from water-borne pathogens and water quality degradation.
- Declines in ecosystem health and function.
- Alterations to power generation and pumping regime.
- Increases in ocean algal blooms affected seawater desalination supplies.

The major impact in California is that without additional surface storage, the earlier and heavier runoff (rather than snowpack retaining water in storage in the mountains), will result in more water being lost to the oceans. A heavy emphasis on storage is needed in California.

In addition, the Colorado River Basin supplies have been inconsistent since about the year 2000, with precipitation near normal while runoff has been less than average in two out of every three years. Climate models are predicting a continuation of this pattern whereby hotter and drier weather conditions will result in continuing lower runoff, pushing the system toward a drying trend that is often characterized as long-term drought.

Dramatic swings in annual hydrologic conditions have impacted water supplies available from the SWP over the last decade. The declining ecosystem in the Delta has also led to a reduction in water supply deliveries, and operational constraints, which will likely continue until a long-term solution to these problems is identified and implemented (MET, 2021).

Legal, environmental, and water quality issues may have impacts on MET supplies. It is felt, however, that climatic factors would have more of an impact than legal, water quality, and environmental factors. Climatic conditions have been projected based on historical patterns, but severe pattern changes are still a possibility in the future (MET, 2021).

7.2.2 Regulatory and Legal

Ongoing regulatory restrictions, such as those imposed by the Biops on the effects of SWP and the federal CVP operations on certain marine life, also contributes to the challenge of determining water delivery reliability. Endangered species protection and conveyance needs in the Delta have resulted in operational constraints that are particularly important because pumping restrictions impact many water resources programs – SWP supplies and additional voluntary transfers, Central Valley storage and transfers, and in-region groundwater and surface water storage. Biops protect special-status species listed as threatened or endangered under the ESAs and imposed substantial constraints on Delta water supply operations through requirements for Delta inflow and outflow and export pumping restrictions.

In addition, the SWRCB has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level. SWRCB plans to fully implement the new Lower San Joaquin River (LSJR) flow objectives from the Phase 1 Delta Plan amendments through adjudicatory (water rights) and regulatory (water quality) processes by 2022. These LSJR flow objectives are estimated to reduce water available for human consumptive use. New litigation, listings of additional species under the ESAs, or regulatory requirements imposed by the SWRCB could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage, or other operational changes impacting water supply operations.

The difficulty and implications of environmental review, documentation, and permitting pose challenges for multi-year transfer agreements, recycled water projects, and seawater desalination plants. The timeline and roadmap for getting a permit for recycled water projects are challenging and inconsistently implemented in different regions of the state. Indirect potable reuse (IPR) projects face regulatory restraints such as treatment, blend water, retention time, and Basin Plan Objectives, which may limit how much recycled water can feasibly be recharged into the groundwater basins. New regulations and permitting uncertainty are also barriers to seawater desalination supplies, including updated Ocean Plan Regulations, Marine Life Protected Areas, and Once-Through Cooling Regulations (MET, 2021).

7.2.3 Water Quality

The following sub-sections include narratives on water quality issues experienced in various water supplies, if any, and the measures being taken to improve the water quality of these sources.

7.2.3.1 Imported Water

MET is responsible for providing high quality potable water throughout its service area. Over 300,000 water quality tests are performed per year on MET's water to test for regulated contaminants and additional contaminants of concern to ensure the safety of its waters. MET's supplies originate primarily from the CRA and from the SWP. A blend of these two sources, proportional to each year's availability of the source, is then delivered throughout MET's service area.

MET's primary water sources face individual water quality issues of concern. The CRA water source contains higher total dissolved solids (TDS) and the SWP contains higher levels of organic matter, lending to the formation of disinfection byproducts. To remediate the CRA's high level of salinity and the SWP's high level of organic matter, MET blends CRA and SWP supplies and has upgraded all of its

treatment facilities to include ozone treatment processes. In addition, MET has been engaged in efforts to protect its Colorado River supplies from threats of uranium, perchlorate, and chromium VI while also investigating the potential water quality impact of the following emerging contaminants: N-nitrosodimethylamine (NDMA), pharmaceuticals and personal care products (PPCP), microplastics, per- and polyfluoroalkyl substances (PFAS), and 1,4-dioxane (MET, 2021). While unforeseeable water quality issues could alter reliability, MET's current strategies ensure the delivery of high-quality water.

The presence of quagga mussels in water sources is a water quality concern. Quagga mussels are an invasive species that was first discovered in 2007 at Lake Mead, on the Colorado River. This species of mussels forms massive colonies in short periods of time, disrupting ecosystems and blocking water intakes. They can cause significant disruption and damage to water distribution systems. MET has had success in controlling the spread and impacts of the quagga mussels within the CRA, however the future could require more extensive maintenance and reduced operational flexibility than current operations allow. It also resulted in MET eliminating deliveries of CRA water into Diamond Valley Lake (DVL) to keep the reservoir free from quagga mussels (MET, 2021).

7.2.3.2 Groundwater

Water quality in the San Juan Basin ranges from good to poor, as the deep lower basins contain brackish water that requires treatment, while the shallower upper subbasin has lower total dissolved solids (TDS) concentration. Groundwater quality from the San Juan Basin was determined through the analyses of available data from production and monitoring wells. Constituents of concern within the San Juan Basin include TDS, nitrate nitrogen, manganese, and iron. SJBA performs monthly water quality tests to ensure the safety of the water.

TDS consists of inorganic salts dissolved in water, with the major ions being sodium, potassium, calcium, magnesium, bicarbonates, chlorides, and sulfates under Title 22. The California secondary maximum contaminant level (MCL) for TDS is 500 mg/L. Four wells were tested for TDS and all of the wells exceeded the secondary MCL for TDS. The lower portion of the San Juan Basin exhibits relatively higher TDS levels due to irrigation return flows, fertilizer use, consumptive use, and dissolution of ions from weathered rock surfaces and salts (Wildermuth Environmental, Inc., 2013).

Chloride concentration levels vary across the basin. As of March 2020, concentrations at 220 mg/L, which is at the bottom of the range of observed concentrations since water quality returned to pre-seawater intrusion conditions in 2017 whereas others have concentrations at 1,600 mg/L, which is higher than the maximum observed chloride concentration of 1,200 mg/L at the seawater intrusion event in 2014. Based on available information, it is not possible to know if the high chloride concentrations currently observed are from a prior seawater intrusion event or representative of an active occurrence of seawater intrusion following a different preferential path than was observed in 2014. (Wildermuth Environmental, Inc., 2020).

Nitrate within groundwater can be both naturally occurring and can also be associated with agriculture and other synthetic production. The primary MCL for nitrate in drinking water is 10 mg/L. Most groundwater wells monitored for nitrate exhibited levels below MCL except for two wells.

Manganese is a naturally occurring inorganic constituent dissolved in water. Manganese is an essential micronutrient at low concentrations, but at higher concentrations in drinking water, manganese may lead to objectionable aesthetic qualities such as bitter taste and staining of clothes. The California secondary

MCL for manganese is 0.5 mg/L. Most wells monitored for manganese exceeded the secondary MCL for manganese by as much as 40 times with the exception of two wells in the Oso and Lower Trabuco area (Wildermuth Environmental, Inc., 2013).

Iron is a naturally-occurring inorganic constituent dissolved in water. Similar to manganese, iron in low concentrations is an essential micronutrient, but iron in higher concentrations in drinking water leads to the same objectionable aesthetic qualities as those of manganese. The California secondary drinking water MCL for iron is 0.3 mg/L. With the exception of one groundwater well in the Oso area, all wells exceeded the secondary MCL for iron by as much as 60 times (SJBA, 2013).

7.2.4 Locally Applicable Criteria

Within Orange County, there are no significant local applicable criteria that directly affect reliability. Through the years, the water agencies in Orange County have made tremendous efforts to integrate their systems to provide flexibility to interchange with different sources of supplies. There are emergency agreements in place to ensure all parts of the County have an adequate supply of water. In the northern part of the County, agencies are able to meet a majority of their demands through groundwater with very little limitation, except for the OCWD basin pumping percentage (BPP). For the agencies in southern Orange County, most of their demands are met with imported water where their limitation is based on the capacity of their system, which is very robust.

However, if a major earthquake on the San Andreas Fault occurs, it will be damaging to all three key regional water aqueducts and disrupt imported supplies for up to six months. The region would likely impose a water use reduction ranging from 10-25% until the system is repaired. However, MET has taken proactive steps to handle such disruption, such as constructing DVL, which mitigates potential impacts. DVL, along with other local reservoirs, can store a six to twelve-month supply of emergency water (MET, 2021).

7.3 Water Service Reliability Assessment

This Section assesses the District's reliability to provide water services to its customers under various hydrological conditions. This is completed by comparing the projected long-term water demand (Section 4) to the projected water supply sources available to the District (Section 6), in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years.

7.3.1 Normal Year Reliability

The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3, to project the 25-year demand for Orange County water agencies, also isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The explanatory variables of population, temperature, precipitation, unemployment rate, drought restrictions, and conservation measures were used to create the statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the average condition. The average (normal) demand is represented by the average water demand of FY 2017-18 and FY 2018-19 (CDM Smith, 2021).

The District is 100% reliable for normal year demands from 2025 through 2045 (Table 7-2) due to diversified supply and conservation measures. For simplicity, the table shows supply to balance demand in the table. However, the District can purchase more MET water through MWDOC, should the need arise. The District has entitlements to receive imported water from MET through MWDOC via connections to MET's regional distribution system.. All imported water supplies are assumed available to the District from existing water transmission facilities, as per MET's and MWDOC's 2020 UWMPs.

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

DWR Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	3,145	3,200	3,320	3,296	3,290
Demand totals (AF)	3,145	3,200	3,320	3,296	3,290
Difference (AF)	0	0	0	0	0
NOTES: This table compares the projected demand and supply volumes determined in Sections 4.3.2 and 6.1, respectively.					

7.3.2 Single Dry Year Reliability

A single dry year is defined as a single year of minimal to no rainfall within a period where average precipitation is expected to occur. The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3) isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the normal year condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a nine percent increase in demand for the South County region where the District's service area is located (CDM Smith, 2021). Detailed information of the model is included in Appendix E.

The District has documented that it is 100 percent reliable for single dry year demands from 2025 through 2045 with a demand increase of nine percent from normal demand with significant reserves held by MET, local groundwater supplies, and conservation. A comparison between the supply and the demand in a single dry year is shown in Table 7-3. For simplicity, the table shows supply to balance demand in the table. However, the District can purchase more MET water through MWDOC, should the need arise.

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

DWR Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	3,428	3,488	3,619	3,593	3,586
Demand totals (AF)	3,428	3,488	3,619	3,593	3,586
Difference (AF)	0	0	0	0	0
NOTES: It is conservatively assumed that a single dry year demand is 9% greater than each respective year's normally projected total water demand from Table 7-2. Recycled water uses provide additional local supply (Section 6.6) and based on MET's and MWDOC's UWMPs, imported water is available to close any local water supply gap (Section 7.5.1).					

7.3.3 Multiple Dry Year Reliability

Assessing the reliability to meet demand for five consecutive dry years is a new requirement for the 2020 UWMP, as compared to the previous requirement of assessing three or more consecutive dry years. Multiple dry years are defined as five or more consecutive dry years with minimal rainfall within a period of average precipitation. The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3) isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the normal year condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a nine percent increase in demand for the South County region where the District's service area is located (CDM Smith, 2021). It is conservatively assumed that a five consecutive dry year scenario is a repeat of the single dry year over five consecutive years.

Even with a conservative demand increase of nine percent each year for five consecutive years, the District is capable of meeting all customers' demands from 2025 through 2045 (Table 7-4), with significant reserves held by MET and conservation. For simplicity, the table shows supply to balance demand in the table. However, the District can purchase more MET water through MWDOC, should the need arise.

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

DWR Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045
First year	Supply totals	3,278	3,439	3,514	3,613	3,591
	Demand totals	3,278	3,439	3,514	3,613	3,591
	Difference	0	0	0	0	0
Second year	Supply totals	3,315	3,451	3,540	3,608	3,589
	Demand totals	3,315	3,451	3,540	3,608	3,589
	Difference	0	0	0	0	0
Third year	Supply totals	3,353	3,463	3,566	3,602	3,588
	Demand totals	3,353	3,463	3,566	3,602	3,588
	Difference	0	0	0	0	0
Fourth year	Supply totals	3,390	3,476	3,592	3,597	3,587
	Demand totals	3,390	3,476	3,592	3,597	3,587
	Difference	0	0	0	0	0
Fifth year	Supply totals	3,427	3,488	3,618	3,592	3,585
	Demand totals	3,427	3,488	3,618	3,592	3,585
	Difference	0	0	0	0	0

NOTES:
The multiple dry-year projections conservatively estimate a 9% increase on total normal water demand. The 2025 column assesses supply and demand for FY 2020-21 through FY 2024-25; the 2030 column assesses FY 2025-26 through FY 2029-30 and so forth, in order to end the water service reliability assessment in FY 2044-45.

Recycled water uses provide additional local supply (Section 6.6) and based on MET's and MWDOC's UWMPs, imported water is available to close any local water supply gap (Section 7.5.1).

7.4 Management Tools and Options

Existing and planned water management tools and options for the District and MWDOC's service area that seek to maximize local resources and result in minimizing the need to import water are described below.

- **Reduced Delta Reliance:** MET has demonstrated consistency with Reduced Reliance on the Delta Through Improved Regional Water Self-Reliance (Delta Plan policy WR P1) by reporting the expected outcomes for measurable reductions in supplies from the Delta. MET has improved its self-reliance through methods including water use efficiency, water recycling, stormwater capture and reuse, advanced water technologies, conjunctive use projects, local and regional water supply and storage programs, and other programs and projects. In 2020, MET had a 602,000 AF change in supplies contributing to regional-self-reliance, corresponding to a 15.3% change, and this amount is projected to increase through 2045 (MET, 2021). For detailed information on the Delta Plan Policy WR P1, refer to Appendix C.

- **The continued and planned use of groundwater:** The water supply resources within MWDOC's service area are enhanced by the existence of groundwater basins that account for the majority of local supplies available and are used as reservoirs to store water during wet years and draw from storage during dry years, subsequently minimizing MWDOC's reliance on imported water. Groundwater basins are managed within a safe basin operating range so that groundwater wells are only pumped as needed to meet water use. Although MWDOC does not produce or manage recycled water, MWDOC supports and partners in recycled water efforts, including groundwater recharge.

- **Groundwater storage and transfer programs:** MWDOC and OCWD's involvement in SARCCUP includes participation in a conjunctive use program that improves water supply resiliency and increases available dry-year yield from local groundwater basins. The groundwater bank has 137,000 AF of storage (OCWD, 2020b). Additionally, MET has numerous groundwater storage and transfer programs in which MET endeavors to increase the reliability of water supplies, including the AVEK Waster Agency Exchange and Storage Program and the High Desert Water Bank Program. The IRWD Strand Ranch Water Banking Program has approximately 23,000 AF stored for IRWD's benefit, and by agreement, the water is defined to be an "Extraordinary Supply" by MET and counts essentially 1:1 during a drought/water shortage condition under MET's WSAP. In addition, MET has encouraged storage through its cyclic and conjunctive use programs that allow MET to deliver water into a groundwater basin in advance of agency demands, such as the Cyclic Storage Agreements under the Main San Gabriel Basin Judgement.

- **Water Loss Program:** The water loss audit program reduces MWDOC's dependency on imported water from the Delta by implementing water loss control technologies after assessing audit data and leak detection.

- **Increased use of recycled water:** MWDOC partners with local agencies in recycled water efforts, including OCWD to identify opportunities for the use of recycled water for irrigation purposes, groundwater recharge and some non-irrigation applications. OCWD's Groundwater

Replenishment System (GWRS) and Green Acres Project (GAP) allow Southern California to decrease its dependency on imported water and create a local and reliable source of water that meet or exceed all federal and state drinking level standards. Expansion of the GWRS is currently underway to increase the plant's production to 130 MGD, and further reduce reliance on imported water.

- **Implementation of demand management measures during dry periods:** During dry periods, water reduction methods to be applied to the public through the retail agencies, will in turn reduce MWDOC's overall demands on MET and reliance on imported water. MWDOC is assisting its retail agencies by leading the coordination of Orange County Regional Alliance for all of the retail agencies in Orange County. MWDOC assists each retail water supplier in Orange County in analyzing the requirements of and establishing their baseline and target water use, as guided by DWR. The District's specific demand management measures (DMMs) are further discussed in Section 9.

7.5 Drought Risk Assessment

Water Code Section 10635(b) requires every urban water supplier include, as part of its UWMP, a DRA for its water service as part of information considered in developing its DMMs and water supply projects and programs. The DRA is a specific planning action that assumes the District is experiencing a drought over the next five years and addresses the District's water supply reliability in the context of presumed drought conditions. Together, the water service reliability assessment (Sections 7.1 through 7.3), DRA, and WSCP (Section 8 and Appendix H) allow the District to have a comprehensive picture of its short-term and long-term water service reliability and to identify the tools to address any perceived or actual shortage conditions.

Water Code Section 10612 requires the DRA to be based on the driest five-year historic sequence of the District's water supply. However, Water Code Section 10635 also requires that the analysis consider plausible changes on projected supplies and demands due to climate change, anticipated regulatory changes, and other locally applicable criteria.

The following sections describe the District's methodology and results of its DRA.

7.5.1 DRA Methodology

The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3) isolated the impacts that weather and future climate can have on water demand through the use of a statistical model. The impacts of hot/dry weather condition are reflected as a percentage increase in water demands from the average condition (average of FY 2017-18 and FY 2018-19). For a single dry year condition (FY 2013-14), the model projects a nine percent increase in demand for the South County region encompassing the District's service area (CDM Smith, 2021).

Locally, the five-consecutive years of FY 2011-12 through FY 2015-16 represent the driest five-consecutive year historic sequence for the District's water supply. This period that spanned water years 2012 through 2016 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5% of average). It was marked by extraordinary heat: 2014, 2015 and 2016 were California's first, second and third warmest year in terms

of statewide average temperatures. Locally, Orange County rainfall for the five-year period totaled 36 inches, the driest on record.

As explained in Section 6, the District relies on, and will continue to rely on, two main water sources: local recycled waterand imported water supply from MWDOC / MET. The District maximizes local water supply use before the purchase of imported water. The difference between total forecasted potable demands and local water supply projections is the demand on MWDOC's imported water supplies, which are supplied by MET. The District's DRA focuses on the assessment of imported water from MWDOC / MET, which will be used to close any local water supply gap. This assessment aligns with the DRA presented in MWDOC's 2020 UWMP.

Water Demand Characterization

All of MWDOC's water supplies are purchased from MET, regardless of hydrologic conditions. As described in Section 6.2, MET's supplies are from the Colorado River, SWP, and in-region storage. In its 2020 UWMP, MET's DRA concluded that even without activating WSCP actions, MET can reliably provide water to all of their member agencies, including MWDOC, and in effect the District, assuming a five-year drought from FY 2020-21 through FY 2024-25. Beyond this, MET's DRA indicated a surplus of supplies that would be available to all of its member agencies, including MWDOC, should the need arise. Therefore, any increase in demand that is experienced in MWDOC's service area, which includes the District, will be met by MET's water supplies.

Based on the Demand Forecast TM, in a single dry year, demand is expected to increase by nine percent above a normal year. Both MWDOC and the District's DRA conservatively assumes a drought from FY 2020-21 through FY 2024-25 is a repeat of the single dry year over five consecutive years.

The District's demand projections were developed as part of the Demand Forecast TM, led by MWDOC. As part of the study, MWDOC first estimated total retail demands for its service area. This was based on estimated future demands using historical water use trends, future expected water use efficiency measures, additional projected land-use development, and changes in population. The District's projected water use, linearly interpolated per the demand forecast, is presented annually for the next five years in Table 4-2. Next, MWDOC estimated the projections of local supplies derived from current and expected local supply programs from their member agencies. Finally, the demand model calculated the difference between total forecasted demands and local supply projections. The resulting difference between total demands net of savings from conservation and local supplies is the expected regional demands on MWDOC from their member agencies, such as the District.

Water Supply Characterization

MWDOC's assumptions for its supply capabilities are discussed and presented in 5-year increments under its 2020 UWMP water reliability assessment. For MWDOC's DRA, these supply capabilities are further refined and presented annually for the years 2021 to 2025 by assuming a repeat of historic conditions from FY 2011-12 to FY 2015-16. For its DRA, MWDOC assessed the reliability of supplies available to MWDOC through MET using historical supply availability under dry-year conditions. MET's supply sources under the Colorado River, SWP, and in-region supply categories are individually listed and discussed in detail in MET's UWMP. Future supply capabilities for each of these supply sources are also individually tabulated in Appendix 3 of MET's UWMP, with consideration for plausible changes on projected supplies under climate change conditions, anticipated regulatory changes, and

other factors. MWDOC's supplies are used to meet consumptive use, surface water and groundwater recharge needs that are in excess of locally available supplies. In addition, MWDOC has access to supply augmentation actions through MET. MET may exercise these actions based on regional need, and in accordance with their WSCP, and may include the use of supplies and storage programs within the Colorado River, SWP, and in-region storage.

7.5.2 Total Water Supply and Use Comparison

The District's DRA reveals that its supply capabilities are expected to balance anticipated total water use and supply, assuming a five-year consecutive drought from FY 2020-21 through FY 2024-25 (Table 7-5). For simplicity, the table shows supply to balance the modeled demand in the table. However, the District can purchase more MET water from MWDOC, should the need arise.

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

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	3,278
Total Supplies	3,278
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	**Total**
Total Water Use	3,315
Total Supplies	3,315
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2023	**Total**
Total Water Use	3,353
Total Supplies	3,353
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	**Total**
Total Water Use	3,390
Total Supplies	3,390
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	**Total**
Total Water Use	3,427
Total Supplies	3,427
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

Note: Recycled water uses provide additional local supply (Section 6.6) and based on MET's and MWDOC's UWMPs, imported water is available to close any local water supply gap (Section 7.5.1).

7.5.3 Water Source Reliability

Locally, a significant amount of the District's water supply can rely on water recycled at the RRWWTP. The ability to continue producing water locally greatly improves the District's water supply reliability. Due to the seasonal fluctuations of groundwater availability, the District pumps groundwater when available, but, conservatively, does not rely on it as a water supply source. Moreover, although they would not normally be considered part of the District's water portfolio, the emergency interconnections the District has with IRWD, SMWD, and ETWD could help mitigate any water supply shortages, though shortages are not expected. Emergency interconnections are described in Section 6.8.

The District's DRA concludes that its water supplies meet total water demand, assuming a five-year consecutive drought from FY 2020-21 through FY 2024-25 (Table 7-5). For simplicity, the table shows supply to balance the modeled demand in the table. However, the District can purchase more MET water from MWDOC, should the need arise.

As detailed in Section 8, the District has in place a robust WSCP and comprehensive shortage response planning efforts that include demand reduction measures and supply augmentation actions. However, since the District's DRA shows a balance between water supply and demand, no water service reliability concern is anticipated and no shortfall mitigation measures are expected to be exercised over the next five years. The District and its wholesale supplier, MWDOC, will periodically revisit its representation of the supply sources and of the gross water use estimated for each year, and will revise its DRA if needed.

8 WATER SHORTAGE CONTINGENCY PLANNING

8.1 Layperson Description

Water shortage contingency planning is a strategic planning process that the District engages to prepare for and respond to water shortages. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as water supply quality changes, climate change, drought, and catastrophic events (e.g., earthquake). The District's WSCP provides real-time water supply availability assessment and structured steps designed to respond to actual conditions. This level of detailed planning and preparation will help maintain reliable supplies and reduce the impacts of supply interruptions.

The Water Code Section 10632 requires that every urban water supplier that serves more than 3,000 AFY or have more than 3,000 connections prepare and adopt a standalone WSCP as part of its UWMP. The WSCP is required to plan for a greater than 50% supply shortage. This WSCP due to be updated based on new requirements every five years, and will be adopted as a current update for submission to DWR by July 1, 2021.

8.2 Overview of the WSCP

The WSCP serves as the operating manual that the District will use to prevent catastrophic service disruptions through proactive, rather than reactive, mitigation of water shortages. The WSCP contains processes and procedures documented in the WSCP, which are given legal authority through the WSCP Response Ordinance. This way, when shortage conditions arise, the District's governing body, its staff, and the public can easily identify and efficiently implement pre-determined steps to mitigate a water shortage to the level appropriate to the degree of water shortfall anticipated. Figure 8-1 illustrates the interdependent relationship between the three procedural documents related to planning for and responding to water shortages.

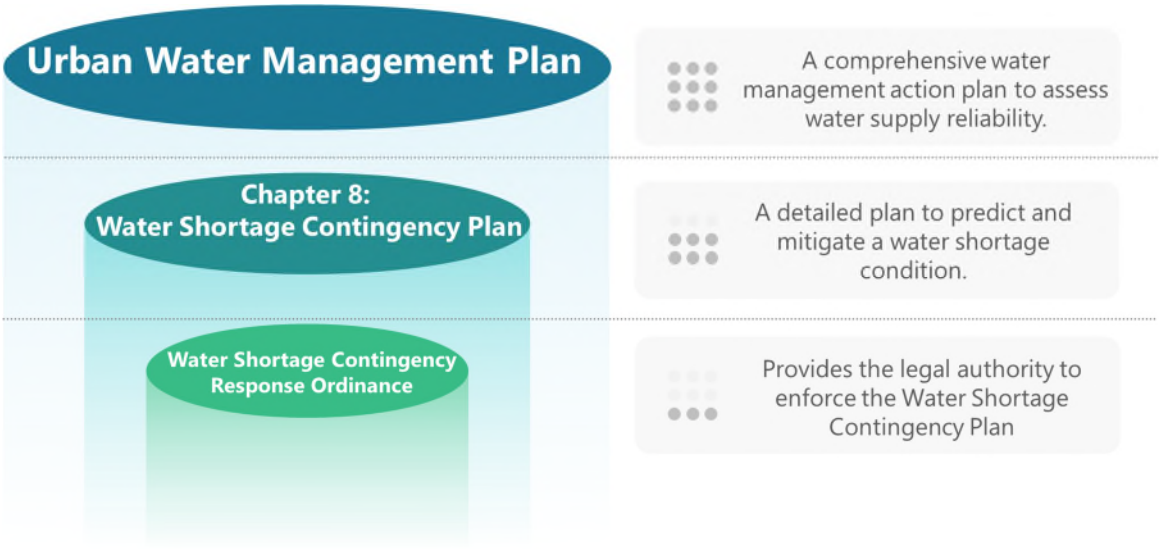

Figure 8-1: UWMP Overview

A copy of the District's WSCP is provided in Appendix H and includes the steps to assess if a water shortage is occurring, and what level of shortage drought actions to trigger the best response as appropriate to the water shortage conditions. WSCP has prescriptive elements, including an analysis of water supply reliability; the drought shortage actions for each of the six standard water shortage levels, that correspond to water shortage percentages ranging from 10% to greater than 50%; an estimate of potential to close supply gap for each measure; protocols and procedures to communicate identified actions for any current or predicted water shortage conditions; procedures for an annual water supply and demand assessment; monitoring and reporting requirements to determine customer compliance; reevaluation and improvement procedures for evaluating the WSCP.

8.3 Summary of Water Shortage Response Strategy and Required DWR Tables

This WSCP is organized into three main sections, with Section 3 aligned with the Water Code Section 16032 requirements.

Section 1 Introduction and WSCP Overview gives an overview of the WSCP fundamentals.

Section 2 Background provides a background on the District's water service area.

Section 3.1 Water Supply Reliability Analysis provides a summary of the water supply analysis and water reliability findings from the 2020 UWMP.

Section 3.2 Annual Water Supply and Demand Assessment Procedures provide a description of procedures to conduct and approve the Annual Assessment.

Section 3.3 Six Standard Water Shortage Stages explains the WSCP's six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, 50, and more than 50% shortages.

Section 3.4 Shortage Response Actions describes the WSCP's shortage response actions that align with the defined shortage levels.

Section 3.5 Communication Protocols addresses communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding any current or predicted shortages and any resulting shortage response actions.

Section 3.6 Compliance and Enforcement describes customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions.

Section 3.7 Legal Authorities is a description of the legal authorities that enable the District to implement and enforce its shortage response actions.

Section 3.8 Financial Consequences of the WSCP provides a description of the financial consequences of and responses for drought conditions.

Section 3.9 Monitoring and Reporting describes monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements**.**

Section 3.10 WSCP Refinement Procedures addresses reevaluation and improvement procedures for monitoring and evaluating the functionality of the WSCP.

Section 3.11 Special Water Feature Distinction is a required definition for inclusion in a WSCP per the Water Code.

Section 3.12 Plan Adoption, Submittal, and Implementation provides a record of the process the District followed to adopt and implement its WSCP.

The WSCP is based on adequate details of demand reduction and supply augmentation measures that are structured to match varying degrees of shortage will ensure the relevant stakeholders understand what to expect during a water shortage situation. The District has adopted water shortage levels consistent with the requirements identified in Water Code Section 10632 (a)(3)(A) (Table 8-1**Error! Reference source not found.**).

The supply augmentation actions that align with each shortage level are described in DWR Table 8-3 (Appendix B). These augmentations represent short-term management objectives triggered by the WSCP and do not overlap with the long-term new water supply development or supply reliability enhancement projects.

The demand reduction measures that align with each shortage level are described in DWR Table 8-2 (Appendix B). This table also estimates the extent to which that action will reduce the gap between supplies and demands to demonstrate to the that choose suite of shortage response actions can be expected to deliver the expected outcomes necessary to meet the requirements of a given shortage level.

Table 8-1: Water Shortage Contingency Plan Levels

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions**
0	0% (Normal)	Normal Conditions (No shortage exists) – The District proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local District goals for water supply reliability. Permanent water waste prohibitions are in place as stipulated in the District's Water Conservation Ordinance 2021-22.
1	Up to 10%	Level 1 Water Shortage – Condition exists when the District notifies its water users that due to drought or other supply reductions, a consumer demand reduction of up to 10% is necessary to make more efficient use of water and respond to existing water conditions. The District shall implement the mandatory Level 1 conservation measures identified in this ordinance. The type of event that may prompt the District to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider calls for extraordinary water conservation.
2	11% to 20%	Level 2 Water Shortage – Condition exists when the District notifies its water users that due to drought or other supply reductions, a consumer demand reduction of up to 20% is necessary to make more efficient use of water and respond to existing water conditions. Upon declaration of a Level 2 Water Supply Shortage condition, the District shall implement the mandatory Level 2 conservation measures identified in this ordinance.
3	21% to 30%	Level 3 Supply Shortage – Condition exists when the District declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 30% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The District must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions**
4	31% to 40%	Level 4 Water Shortage - Condition exists when the District declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 40% consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The District must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
5	41% to 50%	Level 5 Water Shortage - Condition exists when the District declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that up to 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The District must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
6	>50%	Level 6 Water Shortage – Condition exists when the District declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its residents and businesses that greater than 50% or more consumer demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. The District must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
NOTES:		

Water shortage contingency planning is a strategic planning process to prepare for and respond to water shortages. Detailed planning and preparation can help maintain reliable supplies and reduce the impacts of supply interruptions. This chapter provides a structured plan for dealing with water shortages, incorporating prescriptive information and standardized action levels, along with implementation actions in the event of a catastrophic supply interruption.

A well-structured WSCP allows real-time water supply availability assessment and structured steps designed to respond to actual conditions, to allow for efficient management of any shortage with predictability and accountability. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons,

such as population growth, climate change, drought, and catastrophic events. The WSCP is the District's operating manual that is used to prevent catastrophic service disruptions through proactive, rather than reactive, management. This way, if and when shortage conditions arise, the District's governing body, its staff, and the public can easily identify and efficiently implement pre-determined steps to manage a water shortage.

9 DEMAND MANAGEMENT MEASURES

The District, along with other Retail water agencies throughout Orange County, recognizes the need to use existing water supplies efficiently. This ethic of efficient use of water has evolved as a result of the development and implementation of water use efficiency programs that make good economic sense and reflect responsible stewardship of the region's water resources. The District works closely with MWDOC to promote regional efficiency by participating in the regional water savings programs, leveraging MWDOC local program assistance, and applying the findings of MWDOCs research and evaluation efforts. This chapter communicates the District's efforts to promote conservation and to reduce demand on water supplies. A detailed description of demand management measures is available in Appendix J.

9.1 Demand Management Measures for Retail Suppliers

The goal of the DMM section is to provide a comprehensive description of the water conservation programs that a supplier has implemented, is currently implementing, and plans to implement in order to meet its urban water use reduction targets. The reporting requirements for DMM has been significantly modified and streamlined in 2014 by Assembly Bill 2067. Additionally, this section of the UWMP will report on the role of MWDOC's programs in meeting new state regulations for complying with the SWRCB's new Conservation Framework. These categories of demand management measures are as follows:

- Water waste prevention ordinances;
- Metering;
- Conservation pricing;
- Public education and outreach;
- Programs to assess and manage distribution system real loss;
- Water conservation program coordination and staffing support;
- Other DMMs that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented;
- Programs to assist retailers with Conservation Framework Compliance.

9.1.1 Water Waste Prevention Ordinances

The District's Board of Directors adopted the Water Conservation Ordinance No. 2008-18 on December 18, 2008. This Ordinance is scheduled to be updated in 2021 to Water Conservation Ordinance 2021-22 (Ordinance) which will supersede Ordinance 2008-18. The Ordinance established the *Permanent Water Conservation Requirements – Prohibition Against Waste* (Permanent Provisions) that are effective at all times while the Ordinance is in effect. The Permanent Provisions are as follows:

- **Limits on Watering Hours:**
    - Watering or irrigating of landscape with potable water is prohibited between the hours of 9:00 a.m. and 6:00 p.m.
- **Limit on Water Duration:**

  - Watering or irrigating of landscape with potable water that is not continuously attended, is limited to no more than ten minutes per station, per day.

- **No Watering While Raining:**
  - Watering or irrigating while raining is expressly prohibited.
- **No Excessive Water Flow or Runoff:**
  - Watering or irrigation of any landscaped area in a manner that allows excessive flow onto an adjacent hard surface is expressly prohibited.
- **No Washing Down Hard or Paved Surfaces:**
  - Prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of hand-held bucket or hose equipped with an automatic shut off nozzle.
- **Limits on Washing Vehicles:**
  - Using water to wash or clean a vehicle is prohibited except by use of hand-held bucket or hose equipped with an automatic shutoff nozzle.
- **Swimming Pools and Spas:**
  - No person shall empty and refill a swimming pool except to prevent or repair structural damage or to comply with public health regulations, or upon written recommendation of a pool maintenance repair professional.
- **No Indiscriminate Use:**
- No person shall cause or permit the indiscriminate running of water not otherwise prohibited above which is wasteful and without reasonable purpose.
- **Obligation to Fix Leaks or Malfunctions:**
  - Excessive 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 should have reasonably been discovered and corrected is prohibited. If unattended malfunctions are observed, the District may turn off the irrigation to the affected area until such time the property owner can respond to correct.
- **Water Fountains and/or Decorative Water Features:**
  - Must have a re-circulation water system.
- **Washing of Equipment and Machinery:**
  - Prohibited except with a hose equipped with an automatic shutoff nozzle – District notes National Pollution Discharge Elimination System (NPDES) requirement with City or County may apply.
- **Cleaning of Structures:**
  - Prohibited except with a hose equipped with an automatic shutoff nozzle – District notes NPDES requirements with City or County may apply.

- **Drinking Water Served Upon Request in Restaurants:**
  - Restaurants are only to serve and/or refill water upon request from patrons.
- **Commercial Car Wash**
  - Installation of non-recirculating water systems is prohibited in new commercial conveyor car wash.

The ordinance also established three stages of water supply shortage and response actions to be implemented during times of declared water shortage or declared water shortage emergency, with increasing restrictions on water use in response to worsening drought or emergency conditions and decreasing supplies. The provisions and water conservation measures to be implemented in response to each shortage level are described in the WSCP located in Appendix H of this 2020 UWMP. The District's water conservation ordinance is included in Appendix B of the WSCP.

9.1.2 Metering

All customer connections are metered and billed by volume of use. The District records daily production and demand data, by zones, and reads all meters on a monthly basis. All metered sales and other system verifiable uses, e.g., backwash, flush water, and operations and maintenance, are recorded. In 2021, the District was awarded a grant to convert the meters to Advanced Metering Infrastructure (AMI). The AMI Program will begin in July 2021 and is expected to take approximately two years to complete.

The District has a 15-year meter replacement or rebuilding program for one-inch and smaller meters. The District tests a random sample set of meters less than 2 inches and 15 of the District's large meters (i.e., 75% of all large meters). In addition, the District's Utility Billing System (UBS) demonstrates when a meter is outside of its normal consumption range and alarms customer service that maintenance is necessary.

All landscape irrigation is metered. The District has implemented an Advanced Meter Reading program for all new developments.

9.1.3 Conservation Pricing

All of the District's water connections are metered and billed based on commodity rates. The District's water rate structure consists of a flat rate based on meter size and a commodity charge based on metered usage. The most recent pricing became effective on January 1, 2021. Commodity rates for single family residential customers are based on a four-tier structure. Other customers are charged a uniform rate (Table 9-1).

Table 9-1: Water Usage Rates

Customer Sector	Pricing ($/CCF)
Single-family Residential	
Tier 1 (0 – 8 ccf)	$2.50
Tier 2 (9 -18 ccf)	$3.18
Tier 3 (19 – 30 ccf)	$6.04
Tier 4 (above 30 ccf)	$7.85
Non-SRF (Uniform)	
Agriculture	$5.28
Multi-Family	$2.93
Commercial	$3.22
Construction	$3.72
Irrigation	$4.16

9.1.4 Public Education and Outreach

The District's public education and outreach program is administered by MWDOC, its wholesale supplier. MWDOC develops, coordinates, and delivers a substantial number of public information, education, and outreach programs aimed at elevating water agency and consumer awareness and understanding of current water issues as well as efficient water use and water-saving practices, sound policy, and water reliability investments that are in the best interest of the region. These efforts encourage good water stewardship that benefit all District residents, businesses, and industries across all demographics. Several examples are included below:

Print and Electronic Materials

MWDOC offers a variety of print and electronic materials that are designed to assist District water users of all ages in discovering where their water comes from, what the District and other water industry professionals are doing to address water challenges, how to use water most efficiently, and more. Through the District's robust social media presence, award-winning website, eCurrents newsletter, media tool kits, public service announcements, flyers, brochures, and other outreach materials, MWDOC ensures that stakeholders are equipped with sufficient information and subject knowledge to assist them in making good behavioral and civic choices that ultimately affect the quality and quantity of the region's water supply.

Public Events

Each year, MWDOC hosts an array of public events intended to engage a diverse range of water users in targeted discussions and actions that homes in on their specific interests or needs. Some of these public events include:

- **MWDOC Water Policy Forums and Orange County Water Summit** are innovative and interactive symposiums that bring together hundreds of business professionals, elected officials, water industry stakeholders, and community leaders from throughout the state for a discussion on new and ongoing water supply challenges, water policy issues, and other important topics that impact our water supply, economy, and public health.
- **Inspection Trips** of the state's water supply systems are sponsored each year by MWDOC and MET. Orange County elected officials, residents, business owners, and community leaders are invited to tour key water facilities throughout the state and learn more about the critical planning, procurement, and management of Southern California's water supply, as well as the issues surrounding delivery and management of our most precious natural resource – water.
- **Community Events and Events Featuring MWDOC Mascot Ricky the Rambunctious Raindrop** provide opportunities to interact with Orange County water users in a fun and friendly way, offer useful water-related information or education, and engage them in important discussions about the value of water and how their decisions at home, at work, and as tax- or ratepayers may impact Orange County's quality and quantity of water for generations to come.

Education Programs and Initiatives

Over the past several years, MWDOC has amplified its efforts in water education programs and activities for Orange County's youngest water users. This is accomplished by continuing to grow professional networks and partnerships that consist of leading education groups, advisors, and teachers, and by leading the way for the MWDOC and its 28 member agencies to be key contributors of both Southern California and Orange County water-centric learning. Several key water education programs and initiatives include:

- **Environmental Literacy** is an individual's awareness of the interconnectedness and interdependency between people and natural systems, being able to identify patterns and systems within their communities, while also gathering evidence to argue points and solve problems. By using the environment as the context for learning, K-12 students gain real-world knowledge by asking questions and solving problems that directly affect them, their families, and their communities. This approach to K-12 education builds critical thinking skills and promotes inquiry, and is the foundation for all MWDOC education programs, initiatives, and activities.
- **MWDOC Choice School Programs** have provided Orange County K-12 students water-focused learning experiences for nearly five (5) decades. Interactive, grade-specific lessons invite students to connect with, and learn from, their local ecosystems, guiding them to identify and solve local water-related environmental challenges affecting their communities. Choice School Programs are aligned with state standards, and participation includes a dynamic in-class or virtual presentation, and pre- and post-activities that encourage and support Science Technology Engineering Arts and Mathematics (STEAM)-based learning and good water stewardship.

- **Water Energy Education Alliance (WEEA)** is a coalition of education and water and energy industry professionals led by MWDOC that works together to build and bolster Career Technical Education programs (CTE) for Southern California high school students. These CTEs focus on workforce pathways in the Energy, Environment, and Utility Sectors, and connections established through this powerful Southern California alliance assist stakeholders as they thoughtfully step up their investment in the education and career success of California's future workforce.
- **MWDOC Water Awareness Poster Contest** is an annual activity developed to encourage Orange County's K-12 students to investigate and explore their relationship to water, connect the importance of good water stewardship to their daily lives, and express their conclusions creatively through art. Each year, MWDOC receives hundreds of entries, and 40 winners from across Orange County are invited to attend a special awards ceremony with their parents and teachers, and Ricky the Rambunctious Raindrop.
- **Boy Scouts Soil and Water Conservation Merit Badge and Girl Scouts Water Resources and Conservation Patch Programs** guide Orange County Scouts on a learning adventure of where their water comes from, the importance of Orange County water resources, and how to be water efficient. These STEAM-based clinics are hosted by MWDOC and include interactive learning stations, hands-on activities, and a guided tour of an Orange County water source, water treatment facility, or ecological reserve
- **Partnerships** are an integral part of achieving water-related goals that impact all Orange County water users. MWDOC's partner list is extensive, and acts as a collective catalyst for all those involved to grow and prosper. Some of the MWDOC's most recognized partners include local, regional, state, and federal legislators, educators, water and energy industry leaders, environmental groups, media, and business associations all focused on the common goals of water education, water use efficiency, and advocacy on behalf of the region.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

The District recognizes that water auditing is the basis for effective water loss control. Senate Bill 1420 signed into law in September 2014 requires urban water suppliers that submit UWMPs to calculate annual system water losses using the water audit methodology developed by the AWWA. SB 1420 requires the water loss audit be submitted to DWR every five years as part of the urban water supplier's UWMP; however, a Water Loss Audit is completed for the District annually. Expressing water loss audit results in terms of Real Losses per Service Connection per Day allows for standardized comparison across MWDOC retailer agencies and is a metric consistent with the Water Board's forthcoming economic model. The Real Losses per Service Connection per Day for calendar year 2019 was 2.16 gal/connection/day.

In 2019 the District conducted a leak detection test on the distribution system. The test identified 17 leaks, 16 of which were located on services. The District Operations working with MWDOC to repair identified leaks and is expected to be completed by 2021.

9.1.6 Water Conservation Program Coordination and Staffing Support

The District's Administration Department includes one full-time equivalent fulfilling the District's Water Conservation Coordinator function, which includes responsibility for a variety of tasks related to water use efficiency and community information. The District's Water Conservation Coordinator role works closely with other District departments, such as Customer Service, Water and Wastewater Operations, as well as MWDOC's Water Use Efficiency staff in order to effectively develop and implement District and regional programs. Sources of funding for the District's water conservation program are included in the rate structure.

9.1.7 Other Demand Management Measures

9.1.7.1 Residential Program

MWDOC assists the District with the implementation of residential DMMs by making available the following programs aimed at increasing landscape and indoor water use efficiency for residential customers.

High Efficiency Clothes Washer Rebate Program

The High Efficiency Clothes Washer (HECW) Rebate Program provides residential customers with rebates for purchasing and installing HECWs that. Approximately 15% of home water use goes towards laundry, and HECWs use 35-50% less water than standard washer models, with savings of approximately 10,500 gallons per year, per device. Devices must meet or exceed the Consortium for Energy Efficiency (CEE) Tier 1 Standard, and a listing of qualified products can be found at ocwatersmart.com. There is a maximum of one rebate per home.

Premium High Efficiency Toilet Rebate Program

The largest amount of water used inside a home, 30%, goes toward flushing the toilet. The Premium High Efficiency Toilet (HET) Rebate Program offers incentives to residential customers for replacing their toilets using 1.6 gallons per flush or more. Premium HETs use just 1.1 gallons of water or less per flush, which is 20% less water than WaterSense standard toilets. In addition, Premium HETS save an average of 9 gallons of water per day while maintaining high performance standards.

9.1.7.2 CII Programs

MWDOC provides a variety of financial incentives to help District businesses, restaurants, institutions, hotels, hospitals, industrial facilities, and public sector sites achieve their efficiency goals. Water users in these sectors have options to choose from a standardized list of water efficient equipment/devices or may complete customized projects through a pay-for-performance where the incentive is proportional to the amount of water saved. Such projects include high efficiency commercial equipment installation and manufacturing process improvements.

Water Savings Incentive Program

The Water Savings Incentive Program (WSIP) is designed for non-residential customers to improve their water efficiency through upgraded equipment or services that do not qualify for standard rebates. WSIP is

unique because it provides an incentive based on the amount of water customers actually save. This “pay-for-performance” design lets customers implement custom projects for their sites.

Projects must save at least 10 million gallons of water to qualify for the Program and are offered from $195 to $390 per acre foot of water saved. Examples of successfully projects include but are not limited to changing industrial process system water, capturing condensation and using it to supplement cooling tower supply, and replacing water-using equipment with more efficient products.

On-site Retrofit Program

The On-site Retrofit Program provides another pay-for-performance financial incentive to commercial, industrial and institutional property owners, including Homeowner Associations, who convert potable water irrigation or industrial water systems to recycled water use.

Projects commonly include the conversion of mixed or dedicated irrigation meters using potable water to irrigate with reclaimed water, or convert industrial processes use to recycled water, such as a cooling towers. Financial incentives of up to $1,300 per AF of potable water saved are available for customer-side on the meter retrofits. Funding is provided by MET, USBR, and DWR.

Multi-Family Premium High Efficiency Toilet Incentive Program

MWDOC makes an effort to reach all water-users in Orange County. For the Multi-Family Premium HET Rebate Program, MWDOC targets multi-family buildings in both disadvantaged communities (DAC) and non-DAC communities, in addition to targeting all commercial buildings, and single-family residential homes through Premium HET device rebates.

MWDOC offers the DAC Multi-Family HET Program, a special version of the HET Program, to ensure regardless of economic status all water-users in Orange County can benefit from the rebate. This Program targets 3.5 gallon per flush (gpf) or greater toilets to replace them with WaterSense Labeled 1.1 gpf or less. For this purpose, DAC are referenced as communities facing economic hardship. This is defined using criteria established by DWR and the County of Orange, which includes communities where the MHI is less than 85% of the Orange County MHI.

The DAC Multi-Family Program is contractor-driven, where a contractor works with building owners to replace all of the toilets in the building(s). To avoid any cost to tenants, the rebate is $200 per toilet paid to the contractor, essentially covering the contractor’s cost; therefore, there is little to no charge to the building owners that may be passed through to tenants. This process was formed after consulting contractors and multi-family building owners in Orange County. To serve those in multi-family buildings outside of designated DAC locations, MWDOC offers $75 per toilet through the same contractor-driven format. An additional option is available through SoCalWater$mart, which offers up to $250 per toilet to multi-family buildings that were built before 1994, therefore targeting buildings built before legislation required low-flow plumbing fixtures in new construction.

Device Retrofits

MWDOC offers additional financial incentives under the Socal Water$mart Rebate Program which offers rebates for various water efficient devices to CII customers. Core funding is provided by MET and supplemental funding is sourced from MWDOC via grant funds and/or retail water agencies.

9.1.7.3 Landscape Programs

One of the most active and exciting water use efficiency sectors MWDOC provides services for are those programs that target the reduction of outdoor water use. With close to 60% of water consumed outdoors, this sector has been and will continue to be a focus for MWDOC and the District.

Turf Removal Program

The Orange County Turf Removal Program offers incentives to remove turf grass from residential, commercial, and public properties throughout the County. This program is a partnership between MWDOC, MET, and local retail water agencies. The goals of this program are to increase water use efficiency through sustainable landscaping practices that result in multi-benefit projects across Orange County. Participants replace their turf grass with drought-tolerant, CA Friendly, or CA Native landscaping, and retrofit their irrigation systems to high efficiency equipment, such as drip, or remove it entirely, and are encouraged to utilize smart irrigation timers. Furthermore, projects are required to include a stormwater capture feature, such as a rain garden or dry stream bed, and have a minimum of three plants per 100 square feet to increase plant density and promote healthy soils. These projects save water and also reduce dry and wet weather runoff, increase urban biomass, and sequester more carbon than turf landscapes.

Landscape Design and Maintenance Plan Assistance Programs

To maximize the water efficiency and quality of Orange County's Turf Removal Program Projects, MWDOC offers free landscape designs and free landscape maintenance plans to participating residential customers. The Landscape Design Assistance Program is offered at the beginning stages of their turf removal project so that customers may receive a customized, professionally designed landscape to replace their turf. Landscape designs include plant selection, layout, irrigation plans, and a stormwater capture feature. These designs help ensure climate appropriate plants are chosen and planted by hydrozone, that appropriate high efficiency irrigation is properly utilized, that water savings are maximized as a result of the transformation. Landscape maintenance plans are offered after a project is complete to ensure that the new landscape is cared for properly and water savings are maximized.

Smart Timer Rebate Program

Smart Timers are irrigation clocks that are either weather-based irrigation controllers (WBICs) or soil moisture sensor systems. WBICs adjust automatically to reflect changes in local weather and site-specific landscape needs, such as soil type, slopes, and plant material. When WBICs are programmed properly, turf and plants receive the proper amount of water throughout the year. During the fall months, when property owners and landscape professionals often overwater, Smart Timers can save significant amounts of water.

Rotating Nozzles Rebate Program

The Rotating Nozzle Rebate Program provides incentives to residential and commercial properties for the replacement of high-precipitation rate spray nozzles with low-precipitation rate multi-stream, multi-trajectory rotating nozzles. The rebate offered through this Program aims to offset the cost of the device and installation.

Spray-to-Drip Rebate Program

The Spray to Drip Rebate Program offers residential, commercial, and public agency customers rebates for converting areas irrigated by traditional high-precipitation rate spray heads to low-precipitation rate drip irrigation. Drip irrigation systems are extremely water-efficient. Rather than spraying wide areas subject to wind drift, overspray and runoff, drip systems use point emitters to deliver water to specific locations at or near plant root zones. Water drips slowly from the emitters either onto the soil surface or below ground. As a result, less water is lost to wind, evaporation, and overspray, saving water and reducing irrigation runoff and non-point source pollution.

Socal Water$mart Rebate Program for Landscape

The District through MWDOC also offers financial incentives under the SoCal Water$mart Rebate Program for a variety of water efficient landscape devices, such as Central Computer Irrigation Controllers, large rotary nozzles, and in-stem flow regulators.

Landscape Training Classes

The California Friendly and Native Landscape Training and the Turf Removal and Garden Transformation Workshops provide education to residential homeowners, property managers, and professional landscape contractors on a variety of landscape water efficiency practices that they can employ and use to help design a beautiful garden using California Friendly and native plant landscaping principles. The California Friendly and Native Landscape Class demonstrates how to: implement storm water capture features in the landscape; create a living soil sponge that holds water; treat rainwater by a resource; select and arrange plants to maximize biodiversity and minimize water use; and control irrigation to minimize water waste, runoff and non-point source pollution.

The Turf Removal and Garden Transformation Workshop teaches participants how to transform thirsty turfgrass into a beautiful, climate-appropriate water efficient garden. This class teaches how to: evaluate the landscape's potential; plan for garden transformation; identify the type of turfgrass in the yard; remove grass without chemicals; build healthy, living soils; select climate-appropriate plants that minimize water use and maximize beauty and biodiversity; and implement a maintenance schedule to maintain the garden.

Qualified Water Efficient Landscape Certification (Commercial)

Since 2018, MWDOC along with the District, has offered free Qualified Water Efficient Landscaper (QWEL) certification classes designed for landscape professionals. Classes are open to any city staff, professional landscaper, water district employee, or maintenance personnel that would like to become a Qualified Water Efficient Landscaper. The QWEL certification program provides 20 hours of instruction on water efficient areas of expertise such as local water supply, sustainable landscaping, soil types, irrigation systems and maintenance, as well as irrigation controller scheduling and programing. QWEL has received recognition from EPA WaterSense for continued promotion of water use efficiency. To earn the QWEL certification, class participants must demonstrate their ability to perform an irrigation audit as well as pass the QWEL exam. Successful graduates will be listed as a Certified Professional on the WaterSense website as well as on MWDOC's landscape resources page, to encourage Turf Removal participants or those making any landscape improvements to hire a QWEL certified professional.

Started in December 2020, a hybrid version of QWEL is available in conjunction with the California Landscape Contractors Association's Water Management Certification Program. This joint effort allows landscape industry an opportunity to obtain two nationally recognized EPA WaterSense Professional Certifications with one course and one written test. This option is offered through MET.

Orange County Water Smart Gardens Resource Page

MWDOC's Orange County Water Smart Gardens webpage provides a surplus of helpful guides and fact sheets, as well as an interactive photo gallery of water-saving landscape ideas. The purpose of this resource is to help Orange County residents find a broad variety of solutions for their water efficient landscaping needs. This includes a detailed plant database with advanced to search features; photo and/or video-based garden tours; garden gallery with images organized into helpful landscape categories such as back yards, hillsides, full sun, and/or shade with detailed plant information; and the ability to select and store plants in a list that the user can print for use when shopping.

Additional technical resources are available such as a watering calculator calibrated for local evapotranspiration rates, and a garden resources section with fact sheets on sustainable landscape fundamentals, water and soil management, composting, solving run-off, and other appropriate topics. Web page is accessible through mwdoc.com and directly at www.ocwatersmartgardens.com.

9.2 Implementation over the Past Five Years

During the past five years, FY 2015-16 to 2020-21, the District, with the assistance of MWDOC, has continued water use efficiency programs for its residential, CII, and landscape customers as described below. Implementation data is provided in Appendix I. The District will continue to implement all applicable programs in the next five years.

Table 9-2: Trabuco Canyon Water District Water Conservation Efficiency Program Participation

Measure	Unit	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
Central Computer Irrigation Controllers	computer controllers	-	-	-	-	-
Flow Restrictor	restrictors	-	-	-	-	-
HECWs	washers	37	29	21	14	12
HETs	toilets	168	-	-	2	7
Rain Barrels	barrels	50	2	1	-	-
Cisterns	cisterns	-	-	-	-	-
Premium HETs	toilets	3	4	3	-	-
Rotating Nozzles	nozzles	177	4,339	30	-	-

Measure	Unit	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
CII WBICs	clocks	50	3	-	-	-
Residential WBICs	clocks	21	14	23	38	34
Zero Water Urinals	urinals	-	-	-	-	-
Plumbing Flow Control	valves	-	-	-	-	-
Soil Moisture Sensor	controllers	-	-	-	-	-
Ice-Making Machine	machines	-	-	-	-	-
Turf Removal	sf	5,107	1,465	4,788	3,120	54,285
Spray-to-Drip	sf	-	-	-	-	-
Landscape Design Assistance		-	-	-	-	2
Water Savings Incentive Plan		-	-	-	-	-
On Site Retrofit Program		-	1*	-	-	-
* 3,484,800 sf irrigated area saved 251.5 AFY						

9.3 Water Use Objectives (Future Requirements)

To support Orange County retailers with SB 606 and AB 1668 compliance (Conservation Framework), MWDOC is providing multi-level support to members agencies to ensure they meet the primary goals of the legislation including to Use Water More Wisely and to Eliminate Water Waste. Beginning in 2023, Urban water suppliers are required to calculate and report their annual urban water use objective (WUO), submit validated water audits annually, and to implement and report best management practice (BMP) CII performance measures.

Urban Water Use Objective

An Urban Water Supplier's urban WUO is based on efficient water use of the following:

- Aggregate estimated efficient **indoor residential** water use;
- Aggregate estimated efficient **outdoor residential** water use;
- Aggregate estimated efficient **outdoor** irrigation landscape areas with dedicated irrigation meters or equivalent technology in connection with **CII** water use;

- Aggregate estimated efficient **water losses;**
- Aggregate estimated water use for variances approved the State Water Board;
- Allowable **potable reuse water** bonus incentive adjustments.

MWDOC offers a large suite of programs, described in detail throughout Section 9 that will assist Orange County retailers in meeting and calculating their WUO.

Table 9-3 describes MWDOC's programs that will assist agencies in meeting their WUO through both direct measures: programs/activities that result in directly quantifiable water savings; and indirectly: programs that provide resources promoting water efficiencies to the public that are impactful but not directly measurable.

Table 9-3: MWDOC Programs to Assist in Meeting WUO

WUO Component	Calculation	Program	Impact
Indoor Residential	Population and GPCD standard	**Direct Impact** • HECW • HET • Multi-Family HET (DAC/ non-DAC)	**Direct Impact:** Increase of indoor residential efficiencies and reductions of GPCD use
Outdoor Residential	Irrigated/irrigable area measurement and a percent factor of local ETo	**Direct Impact** • Turf Removal • Spray-to-Dip • Smart Timer • High Efficiency Nozzles (HENs) • Rain Barrels/Cisterns **Indirect Impact** • Landscape Design and Maintenance Assistance • Orange County Friendly Gardens Webpage • CA Friendly/Turf Removal Classes	**Direct Impact** Increase outdoor residential efficiencies and reductions of gallons per ft^2 of irrigated/ irrigable area used **Indirect Impact** Provide information, resources, and education to promote efficiencies in the landscape

WUO Component	Calculation	Program	Impact
		• QWEL	
Outdoor Dedicated Irrigation Meters	Irrigated/irrigable area measurement and a percent factor of local ETo	**Direct Impact** • Turf Removal • Spray-to-Dip • Smart Timer • HEN • Central Computer Irrigation Controllers • Large Rotary Nozzles • In-Stem Flow Regulators **Indirect Impact** • Orange County Friendly Gardens Webpage • CA Friendly/Turf Removal Classes • QWEL	**Direct Impact** Increase outdoor residential efficiencies and reductions of gallons per ft^2 of irrigated/ irrigable area used **Indirect Impact** Provide information, resources, and education to promote efficiencies in the landscape
Water Loss	Following the AWWA M36 Water Audits and Water Loss Control Program, Fourth Edition and AWWA Water Audit Software V5	**Direct Impact** • Water Balance Validation • Customer Meter Accuracy Testing • Distribution System Pressure Surveys • Distribution System Leak Detection • No-Discharge Distribution System Flushing • Water Audit Compilation • Component Analysis	**Direct Impact** Identify areas of the distribution system that need repair, replacement or other action
Bonus Incentives	One of the following:	**Direct Impact** • GWRS	**Direct Impact** The GWRS (run by

WUO Component	Calculation	Program	Impact
	• Volume of potable reuse water from existing facilities, not to exceed 15% of WUO • Volume of potable reuse water from new facilities, not to exceed 10% of WUO		OCWD) significantly increases the availability of potable reuse water

In addition, MWDOC is providing support to agencies to assist with the calculation of WUOs. DWR will provide residential outdoor landscape measurements; however, Urban Water Suppliers are responsible for measuring landscape that is irrigated/irrigable by dedicated irrigation meters. MWDOC is contracting for consultant services to assist agencies in obtaining these measurements. Services may include but are not limited to:

- Accounting/database clean up (e.g., data mining billing software to determine dedicated irrigation customers);
- Geolocation of dedicated irrigation meters;
- In-field measurements;
- GIS/Aerial imagery measurements;
- Transformation of static/paper maps to digital/GIS maps.

These services will help agencies organize and/or update their databases to determine which accounts are dedicated irrigation meters and provide landscape area measurements for those accounts. These data points are integral when calculating the WUO. MWDOC is also exploring funding options to help reduce retail agencies' costs of obtaining landscape area measurements for dedicated irrigation meters.

CII Performance Measures

Urban water supplies are expected to report BMPs and more for CII customers. MWDOC offers a broad variety of programs and incentives to help CII customers implement BMPs and increase their water efficiencies.

Table 9-4: CII BMP Implementation Programs Offered

Component	Program Offered	Impact
CII Performance Measures	• Water Savings Incentive Program (WSIP) • On-Site Retrofit Program (ORP) • HE Toilets • HE Urinals • Plumbing Flow Control Valves • Connectionless Food Steamers • Air-cooled Ice Machines • Cooling Tower Conductivity controllers • Cooling Tower pH Controllers • Dry Vacuum Pumps • Laminar Flow Restrictors	WSIP incentivizes customized CII water efficiency projects that utilize BMPS. ORP incentivizes the conversion of potable to recycled water and is applicable to CII dedicated irrigation meters or CII mixed-use meters that may be split to utilize recycled water for irrigation. Additional CII rebates based on BMPS increase the economic feasibility of increasing water efficiencies.

These efforts to assist Orange County retail agencies are only just beginning. Our plan is to ensure that all agencies are fully ready to begin complying with the new water use efficiency standards framework called for in SB 606 and SB 1668 by the start date of 2023.

10 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The Water Code requires the UWMP to be adopted by the Supplier's governing body. Before the adoption of the UWMP, the Supplier has to notify the public and the cities and counties within its service area per the Water Code and hold a public hearing to receive input from the public on the UWMP. Post adoption, the Supplier submits the UWMP to DWR and the other key agencies and makes it available for public review.

This section provides a record of the process the District followed to adopt and implement its UWMP.

10.1 Overview

Recognizing that close coordination among other relevant public agencies is key to the success of its UWMP, the District worked closely with many other entities, including representation from diverse social, cultural, and economic elements of the population within the District's service area, to develop and update this planning document. The District also encouraged public involvement through its public hearing process, which provided residents with an opportunity to learn and ask questions about their water supply management and reliability. Through the public hearing, the public has an opportunity to comment and put forward any suggestions for revisions of the Plan.

Table 10-1 summarizes external coordination and outreach activities carried out by the District and their corresponding dates. The UWMP checklist to confirm compliance with the Water Code is provided in Appendix A.

Table 10-1: External Coordination and Outreach

External Coordination and Outreach	Date	Reference
Notified the cities and counties within the Supplier's service area that Supplier is preparing an updated UWMP (at least 60 days prior to public hearing)	3/19/2021	Appendix K
Public Hearing Notice	6/1/2021 & 6/8/2021	Appendix K
Held Public Hearing	6/16/2021	Appendix K
Adopted UWMP	6/16/2021	Appendix L
Submitted UWMP to DWR (no later than 30 days after adoption)	7/1/2021	-
Submitted UWMP to the California State Library (no later than 30 days after adoption)	7/1/2021	-

External Coordination and Outreach	Date	Reference
Submitted UWMP to the cities and counties within the Supplier's service area (no later than 30 days after adoption)	7/1/2021	-
Made UWMP available for public review (no later than 30 days after filing with DWR)	7/31/2021	-

This UWMP was adopted by the Board of Directors on June 16, 2021. A copy of the adopted resolution is provided in Appendix L.

10.2 Agency Coordination

The Water Code requires the Suppliers preparing UWMPs to notify any city or county within their service area at least 60 days prior to the public hearing. As shown in Table 10-2, the District sent a Letter of Notification to the County of Orange and the cities within its service area on March 19, 2021 to state that it was in the process of preparing an updated UWMP (Appendix K).

Table 10-2: Retail: Notification to Cities and Counties

DWR Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Lake Forest	☑	☑
Mission Viejo	☑	☑
Rancho Santa Margarita	☑	☑
County Name	60 Day Notice	Notice of Public Hearing
Orange County	☑	☑

The District's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. The District is dependent on imported water from MET through MWDOC, its regional wholesaler, groundwater from SJBA, the agency that manages the San Juan Groundwater Basin, surface water from Irvine Lake and recycled wastewater from the District's RRWWTP and CWWRP, managed by SMWD. As such, the District involved the relevant agencies in this 2020 UWMP at various levels of contribution as described below.

MWDOC provided assistance to the District's 2020 UWMP development by providing much of the data and analysis such as population projections from the California State University at Fullerton CDR and the information quantifying water availability to meet the District's projected demands for the next 25 years, in five-year increments. Additionally, MWDOC led the effort to develop a Model Water Shortage Ordinance that its retail suppliers can adopt as is or customize and adopt as part of developing their WSCPs. This 2020 UWMP was developed in collaboration with MWDOC's 2020 UWMP to ensure consistency between the two documents.

As a groundwater producer who relies on supplies from the SJBA-managed San Juan Groundwater Basin, the District coordinated the preparation of this 2020 UWMP with SJBA and used the San Juan Groundwater Basin Management Plan to retrieve the required relevant information.

The District also worked in close coordination with SMWD which provides a portion of the District's recycled wastewater supply from CWWRP.

The various planning documents of the key agencies that were used to develop this UWMP are listed in Section 2.2.1.

10.3 Public Participation

The District encouraged community and public interest involvement in the plan update through a public hearing and inspection of the draft document on June 16, 2021. As part of the public hearing, the District discussed adoption of the UWMP, SBx7-7 baseline values, compliance with the water use targets (Section 5), implementation, and economic impacts of the water use targets (Section 9).

Copies of the draft plan were made available for public inspection at the District's main office.

Public hearing notifications were distributed through the District's On-Tap Newsletter included with the monthly utility bills and published in the local newspaper. A copy of the published Notice of Public Hearing is included in Appendix K.

The hearing was conducted during a regularly scheduled meeting of the Board of Directors.

10.4 UWMP Submittal

The Board of Directors reviewed and approved the 2020 UWMP at its June 16, 2021meeting after the public hearing. See Appendix L for the resolution approving the Plan.

By July 1, 2021, the District's adopted 2020 UWMP was filed with DWR, California State Library, the County of Orange and the cities within its service area. The submission to DWR was done electronically through the online submittal tool – WUE Data Portal. The District will make the Plan available for public review on its website no later than 30 days after filing with DWR.

10.5 Amending the Adopted UWMP or WSCP

Based on DWR's review of the UWMP, the District will make any amendments in its adopted UWMP, as required and directed by DWR and will follow each of the steps for notification, public hearing, adoption, and submittal for the amending the adopted UWMP.

If the District revises its WSCP after UWMP is approved by DWR, then an electronic copy of the revised WSCP will be submitted to DWR within 30 days of its adoption.

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APPENDICES

Appendix A.	UWMP Water Code Checklist
Appendix B.	DWR Standardized Tables
Appendix C.	Reduced Delta Reliance
Appendix D.	SBx7-7 Verification and Compliance Forms
Appendix E.	2021 OC Water Demand Forecast for MWDOC and OCWD Technical Memorandum
Appendix F.	AWWA Water Loss Audits
Appendix G.	G1 – San Juan Basin Groundwater and Facilities Management Plan G2 – 2020 Adaptive Pumping Management Plan Technical Memorandum
Appendix H.	Water Shortage Contingency Plan
Appendix I.	Water Use Efficiency Implementation Report
Appendix J.	Demand Management Measures
Appendix K.	Notice of Public Hearing
Appendix L.	Adopted UWMP Resolution

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