MEETING OF THE BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
April 5, 2021, 8:30 a.m.

Due to the spread of COVID-19 and as authorized by the Governor's Executive Order, MWDOC will be holding all upcoming Board and Committee meetings by Zoom Webinar and will be available by either computer or telephone audio as follows:

Computer Audio: You can join the Zoom meeting by clicking on the following link:
https://zoom.us/j/8828665300

Telephone Audio:	**(669) 900 9128 fees may apply**
	(877) 853 5247 Toll-free
Webinar ID:	**882 866 5300#**

P&O Committee:
Director Yoo Schneider, Chair
Director Nederhood
Director Seckel

Staff: R. Hunter, J. Berg, V. Osborn, H. De La Torre, T. Dubuque, D. Micalizzi, H. Baez, T. Baca

Ex Officio Member: Director Tamaribuchi

MWDOC Committee meetings are noticed and held as joint meetings of the Committee and the entire Board of Directors and all members of the Board of Directors may attend and participate in the discussion. Each Committee has designated Committee members, and other members of the Board are designated alternate committee members. If less than a quorum of the full Board is in attendance, the Board meeting will be adjourned for lack of a quorum and the meeting will proceed as a meeting of the Committee with those Committee members and alternate members in attendance acting as the Committee.

PUBLIC COMMENTS - Public comments on agenda items and items under the jurisdiction of the Committee should be made at this time.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED - Determine there is a need to take immediate action on item(s) and that the need for action came to the attention of the District subsequent to the posting of the Agenda. (Requires a unanimous vote of the Committee)

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING -- Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection in the lobby of the District's business office located at 18700 Ward Street, Fountain Valley, California 92708, during regular business hours. When practical, these public records will also be made available on the District's Internet Web site, accessible at http://www.mwdoc.com.

ACTION ITEM

1. CONSULTANT SERVICES FOR ORANGE COUNTY DEDICATED IRRIGATION METER LANDSCAPE AREA MEASUREMENTS

2. MWDOC ADMINSTRATION BUILDING SEISMIC RETROFIT AND REMODEL PROJECT – ABS OWNER'S REPRESENTATIVE PROFESSIONAL SERVICES

CONTRACT – CHANGE ORDER

3. SOUTH EMERGENCY OPERATIONS CENTER CAPITAL PROJECT DECISION

DISCUSSION ITEMS

4. UPDATE ON COVID-19 (ORAL REPORT)

5. REVIEW OC DEMAND FORECASTING/CDM SMITH STUDY

6. REVIEW OF MWDOC'S DRAFT 2020 URBAN WATER MANAGEMENT PLAN

INFORMATION ITEMS (The following items are for informational purposes only – background information is included in the packet. Discussion is not necessary unless a Director requests.)

7. LOCAL LEGISLATIVE ACTIVITIES
   a. County Legislative Report (Lewis)
   b. Legal and Regulatory Report (Ackerman)

8. PUBLIC HEARING DATE SCHEDULED FOR MAY 19, 2021 RE MWDOC'S 2020 URBAN WATER MANAGEMENT PLAN

9. MWDOC CHOICE SCHOOL PROGRAMS UPDATE

10. 2021 OC WATER SUMMIT UPDATE

11. STATUS REPORTS

    a. Ongoing MWDOC Reliability and Engineering/Planning Projects
    b. WEROC
    c. Water Use Efficiency Projects
    d. Public and Government Affairs

12. REVIEW OF ISSUES RELATED TO PLANNING OR ENGINEERING PROJECTS, WEROC, WATER USE EFFICIENCY, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, PUBLIC AFFAIRS PROGRAMS AND EVENTS, PUBLIC INFORMATION PROJECTS, PUBLIC INFORMATION CONSULTANTS, DISTRICT FACILITIES, and MEMBER-AGENCY RELATIONS

ADJOURNMENT

NOTE: At the discretion of the Committee, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated, and may be subject to action by the Committee. On those items designated for Board action, the Committee reviews the items and makes a recommendation for final action to the full Board of Directors; final action will be taken by the Board of Directors. Agendas for Committee and Board meetings may be obtained from the District Secretary. Members of the public are advised that the Board consideration process includes consideration of each agenda item by one or more Committees indicated on the Board Action Sheet. Attendance at Committee meetings and the Board meeting considering an item consequently is advised.

Accommodations for the Disabled. Any person may make a request for a disability-related modification or accommodation needed for that person to be able to participate in the public meeting by telephoning Maribeth Goldsby, District Secretary, at (714) 963-3058, or writing to Municipal Water District of Orange County at P.O. Box 20895, Fountain Valley, CA 92728. Requests must specify the nature of the disability and the type of accommodation requested. A telephone number or other contact information should be included so that District staff may discuss appropriate arrangements. Persons requesting a disability-related accommodation should make the request with adequate time before the meeting for the District to provide the requested accommodation.

Item No. 1

ACTION ITEM
April 21,2021

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

Robert Hunter, General Manager

Staff Contact: Joe Berg, Rachel Waite

SUBJECT: **Consultant Services for Orange County Dedicated Irrigation Meter Landscape Area Measurements**

STAFF RECOMMENDATION

Staff recommends the Board of Directors authorize the General Manager to:

1. Enter into a Professional Services agreement with Quantum Spatial, for an amount not to exceed $1,400,000, to provide participating retail water agencies with area measurements of landscapes with dedicated irrigation meters, as required by SB 606 and AB 1668, and
2. Enter into agreements with participating agencies for area measurement services from Quantum Spatial.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

The proposed consultant-provided services will be used to assist MWDOC member agencies in complying with SB 606 and AB 1668 (Conservation Framework) by identifying and measuring landscaped areas associated with dedicated irrigation meters. Urban Water Suppliers are responsible for measuring landscapes that are irrigated or irrigable by dedicated irrigation meters to calculate their Urban Water Use Objective. A MWDOC-led,

Budgeted (Y/N): N	Budgeted amount: N/A	Core __	Choice X
Action item amount: $1.4m	Line item:		
Fiscal Impact (explain if unbudgeted): This dedicated irrigation meter area measurements effort will be funded through Choice contributions from participating retail agencies. MWDOC staff time will be used for Project administration.			

regional approach increases cost effectiveness for Orange County retailers through economies of scale and minimizes administrative burdens.

Detailed Report

Project Background

In 2018, the California State Legislature enacted two policy bills, Senate Bill (SB) 606 and Assembly Bill (AB) 1668, to establish a new foundation for long-term improvements in water conservation and drought planning through a water-budget based approach. These bills are commonly referred to as the Conservation Framework.

The Conservation Framework requires each Urban Water Supplier to calculate and report their Urban Water Use Objective by January 1, 2024 (extended from October 1, 2023 by AB 1414), and to stay within their calculated Water Use Objective each year.

The Urban Water Use Objective is an aggregate of efficient water use based on:

- Indoor Residential Use (population x gallons per capita per day standard);
- Outdoor Residential Use (based on measurements of irrigated/irrigable area and local weather data);
- Outdoor Use with Dedicated Irrigation Meters (based on measurements of irrigated/irrigable area and local weather data);
- Distribution System Water Losses;
- Approved Variances; and
- Potable Reuse Bonus.

The California Department of Water Resources (DWR) will provide *residential* outdoor landscape measurements; however, Urban Water Suppliers are responsible for measuring landscapes that are irrigated/irrigable by *dedicated irrigation meters* in order to calculate their Water Use Objective.

Assistance to Orange County Retailers

Dedicated Irrigation Meter Area Measurements have been identified as the component of the Conservation Framework that retail agencies may need the most assistance with. Seventy-eight percent of Orange County's retail water agencies that qualify as an Urban Water Supplier and have dedicated irrigation meter accounts have expressed interest in accessing a contractor through MWDOC, at the retail agency's cost, to assist with measuring these landscapes.

Request for Proposals

MWDOC staff, in conjuncture with Santa Ana Watershed Project Authority (SAWPA) staff, released a Request for Proposals (RFP) to firms capable of providing the required area measurement associated with dedicated irrigation meters. MWDOC and SAWPA coordinated on this effort after identifying that both agencies were planning similar projects. This prevented duplication of efforts, saving staff time and allowing both agencies to benefit from increased economies of scale.

The RFP was released on November 10, 2020 and proposals were received from three firms: Quantum Spatial, Waterfluence, and Geovironment. Interviews with all three firms were conducted on December 17, 2020. A review panel consisting of six staff members representing MWDOC, SAWPA, Inland Empire Utilities Agency, and Laguna Beach County Water District evaluated respondents based on each firm's proposal and interview. Firms were evaluated on a scale from 0-11 in the following categories: Experience and Qualifications, Project Approach and Understanding of Needs, and Anticipated Value and Quality of Services Received.

Of the three firms, Quantum Spatial received the highest score from the panel, see all scores in Table 1 below. The maximum potential score is 198.

Table 1. Review Panel Scores

Firm Name	Score	Rank
Quantum Spatial	152	1
Waterfluence	117	2
Geovironment	105	D/Q

Quantum Spatial's qualifications, experience, and ability to execute the project resulted in a unanimous selection from the interview panel. Geovironment was disqualified due to displaying little experience with water suppliers, water meters, and landscape area measurements. The panel determined that lack of experience and familiarity with the Conservation Framework for this project could be detrimental to a retailer's ability to comply with the Conservation Framework.

Pricing was considered as a component of the evaluation category *Project Approach and Understanding of Needs*. Costs are assigned on a per customer basis and are contingent on whether the measurement can be obtained remotely (via aerial imagery, existing maps, etc.) or if fieldwork is required. It is anticipated that most agencies will have both remote and fieldwork customers. Quantum Spatial and Waterfluence proposed competitive pricing. Quantum Spatial's remote cost is $112 dollars more than Waterfluence; however, Quantum Spatial's field cost is $104.75 less than Waterfluence, see Table 2 below.

Table 2. Cost Comparison

	Quantum Spatial	Waterfluence	Difference
Remote Cost	$262.98	$150.00	+$112.00
Field Cost	$495.25	$600.00	-$104.75

While Waterfluence displayed competitive pricing and relevant experience and qualifications, the panel was concerned with staffing availability, and it was not apparent that the firm had the bandwidth to cover a large, regional project in the necessary timeframe set by the legislature. Quantum Spatial was determined to have competitive pricing and the staffing capacity for the project in addition to the most substantial, relevant experience. This experience includes being part of the team DWR is utilizing to provide residential landscape area measurements to Urban Water Suppliers across the state and therefore having a clear understanding to DWRs landscape classification system to define irrigated and irrigable landscaped area.

Project Cost

Total project cost is dependent on two key variables: 1) the number of customers serviced and 2) if those customers are measured remotely or via field work.

Variable 1, the total number of customers, is estimated to be around 4,703.
Table 3 reflects agencies who have expressed interest in the project and an estimated number of customers that may need consultant services. This list is preliminary and subject to change as agencies refine their needs. Agencies not currently included on this list are still welcome participate.

Table 3. Estimated dedicated irrigation customers needing services

Agency	**Estimated Number of DIM Customers**
City of Anaheim	528
City of Brea	156
City of Buena Park	177
El Toro Water District	176
City of Fountain Valley	90
City of Fullerton	259
City of Garden Grove	326
Golden State Water Company	225
City of La Habra	91
Laguna Beach County Water District	43
Mesa Water District	616
Moulton Niguel Water District	200
City of Newport Beach	704
City of Orange	73
City of San Clemente	247
City of Seal Beach	47
South Coast Water District	209
Trabuco Canyon Water District	28
City of Westminster	276
Yorba Linda Water District	232
Estimated Total:	**4,703**

Variable 2, cost per customer per method, is represented in Table 4 below. Measurement methodology categories are mutually exclusive; each customer will fall only in one category. The consultant will first attempt to utilize a remote methodology and initiate field work only if necessary. In many cases, customer contact will be essential to delineate and measure landscapes. In an instance where customer contact is imperative but customers are unresponsive, a statistical methodology will be utilized at a discounted price. As shown in Table 4, remote and field work are shown as a range. Quantum Spatial has offered price breaks based on guaranteed activity levels. MWDOC staff have narrowed potential activity down to the two price options; once staff best understands all Orange County retailer needs, one price will be selected based on anticipated activity level.

Additionally, Quantum offers an <u>optional</u> data viewing portal that an agency may purchase for an additional cost. The portal will allow an agency to store and view their customers and associated measurements in a map-style view. This option may be of most interest to retailers who do not have geographic information systems (GIS) software and/or staff, but wish to view their data in a GIS-style format. The cost of this portal is a flat $10,560 fee per agency plus $33 per customer.

Table 4. Proposed Unit Costs

Measurement Method	Cost Per Customer	
	Low Range	**High Range**
Remote Work	$258.33	$262.98
Field Work	$465.52	$495.25
Statistical	$131.49	
Optional Viewing Tool	$10,560/Agency + $33/customer	

Of the estimated 4,703 Orange County dedicated irrigation customers that may be assigned area measurements through Quantum Spatial, it is estimated that 15% (705 customers) may be unresponsive and fall in the statistical methodology category. Of the remaining 3,998 customers, it is anticipated that 85% (3,398 customers) will be completed remotely and 15% (600 customers) will be measured utilizing field work. The total costs associated with these assumptions are shown below in Table 5, and conservatively assume the upper range of remote and field work pricing. Additionally, it is estimated that six agencies totaling 900 customers may select to purchase the optional Data Viewer Tool, for an estimated total project cost of just below $1.4 million.

Table 5. Estimated Total Price

Method Category	**# of Customers**	**Unit Cost**	**Total Cost**
Remote	3,398	$262.98	$893,606.04
Field	600	$495.25	$297,150.00
Statistical	705	$131.49	$92,700.45
			Subtotal: $1,283,456.49
Data Viewer	6 Agencies	$10,560	$63,360.00
	900 Customers	$33	$29,700.00
			Subtotal: $93,060.00
Total			**$1,376,516.49**

Because the key components that determine the total estimated cost—number of customers and measurement methodology—are variable, the total cost estimate is variable. As Orange County agencies and MWDOC continue to improve their understanding and needs of both variables, the total project cost will continue to be refined.

Additionally, MWDOC staff is exploring options to help offset agency costs with funding from Metropolitan and SAWPA (note: SAWPA funding is only available to agencies within the

Santa Ana Watershed). This funding will directly lower agency costs on a per customer basis.

BOARD OPTIONS

Option #1: Staff recommends the Board of Directors authorize the General Manager to enter into a Professional Services agreement with Quantum Spatial, for an amount not to exceed $1,400,000, to provide participating retail water agencies with area measurements of landscapes with dedicated irrigation meters, as required by SB 606 and AB 1668.

Fiscal Impact: Consultant services will be funded by the participating retail water agencies; MWDOC will provide staff time to oversee the contract.

Business Analysis: Through a regional, MWDOC-led approach, administrative burdens of Orange County water retailers will be minimized, and lower unit cost pricing is accessible.

Option #2: Take no action

Fiscal Impact: Increased administrative and unit costs will be placed on Orange County water retailers.

Business Analysis: Orange County water retailers will duplicate efforts to obtain consultant-services and miss out on reduced pricing achieved through a regional approach.

Item No. 2

ACTION ITEM
April 21, 2021

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

Robert Hunter, General Manager Staff Contact: Charles Busslinger

SUBJECT: **MWDOC Administration Building Seismic Retrofit and Remodel Project – ABS Owner's Representative Professional Services Contract - Change Order**

STAFF RECOMMENDATION

Staff recommends the Board of Directors approve a change order to the ABS Consulting Professional Services contract to extend the contract through to completion of the Administration Building Seismic Retrofit and Remodel Project. The change order includes the necessary additional professional services hours for the duration of the project in the amount of $90,425.00 for a revised not to exceed total of $385,031.00.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

Staff is seeking Board authorization to proceed with extending the term of the ABS Consulting Professional Services agreement to provide additional owner's representative services for an additional five months through to project completion.

Budgeted (Y/N): N	Budgeted amount:	Core X	Choice __
Action item amount:	Line item: 19-8811		
Fiscal Impact (explain if unbudgeted): The additional $90,425 will be taken from reserves			

DETAILED REPORT

On February 19, 2020, the Board approved entering into an agreement with ABS Consulting to provide Owner's Representative services for the MWDOC Administration Building Seismic Retrofit and Remodel project in the amount of $245,434.00 plus 5% contingency for a total not to exceed amount of $257,706.

ABC Consulting worked with IDS (the Architect of Record) to prepare the bid document package, advertised the project, helped IDS respond to Requests for Information, and reviewed bids. During the pre-bid phase it was determined that further assistance would be needed in the area of move management planning, scheduling, and coordination for the multiple move-outs/move-backs to allow for continued operations within the building during construction. ABS Consulting stepped forward to provide those services on short notice which allowed the project to continue on schedule. The Board subsequently awarded the construction contract to Optima, RPM on October 21, 2020 along with a $36,900 increase to ABS Consulting's contract scope of work to include move management services through all phases of construction.

The original ABS Consulting contract included part-time Owner's Representative/ Construction Management services including pre-bid and bidding support services, as well as construction management services for an estimated seven-month construction schedule. During the bidding phase of the project, multiple potential bidders indicated that the construction schedule for the project would be closer to 12 months. Staff has held off on coming back to the Board for any additional increases to ABS' contract until sufficient information became available.

ABS Consulting services has exceeded expectations. ABS' construction and structural expertise has saved the District time and provided valuable assistance in managing Change Orders. ABS has repeatedly stepped in to provide guidance to IDS with design change alternatives which reduced change order costs; all while keeping the project largely on track.

During the course of the project, the following changes to ABS Consulting's scope of work and associated Change Orders (C.O.) were approved:

Approved Change Orders:

C.O.	Description	Cost
1	Additional scope of work added for move management planning and scheduling services. There was no change to the contract total as this amount was taken from the 5% contingency portion of the original contract. The deliverables for this work were the move schedule and move plan.	$9,623.00
2	Increased ABS' scope of work to include move management support services for the entire project through sub consultant – Blackman & Forsyth for all phases of construction. This work includes coordination with MWDOC staff, movers, the construction contractor, and various MWDOC sub-contractors.	$36,900.00
	Total	**$46,523.00**

Staff is recommending the Board approve the Change Order as summarized below.

Additional Requested Change Order:

C.O.	Description	Cost
3	Provide Owner's Representative/Construction Management services for an additional five months to cover the duration of the construction schedule.	$90,425.00
	Total	**$90,425.00**

BOARD OPTIONS

Option #1

- Approve the Change Order for ABS Consulting services

Fiscal Impact: $90,425.00
Business Analysis: Construction is currently underway and ABS Consulting's Owner's Representative and Construction Management services have been vital to the project's completion.

Option #2

- Do not approve the Change Order.

Fiscal Impact: No increase to construction management services costs
Business Analysis: If not approved, engineering staff will need to discontinue working on other tasks to provide the necessary additional construction management support. This option risks potential delay claims by the contractor as staff expertise in building renovation is limited.

STAFF RECOMMENDATION

Option #1

ABS Consulting

March 9, 2021

Mr. Charles Busslinger
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
18700 Ward Street
Fountain Valley, CA 92728

Ph: (714) 292-2405
Email: cbusslinger@mwdoc.com

Subject: ***Proposal to Provide Additional Part-Time Owner's Representative Services for Twelve-Month Construction Schedule at Municipal Water District of Orange County Administration Building***
(ABSG Consulting Inc. Proposal No. 4385398-003)

Dear Mr. Busslinger:

ABSG Consulting Inc. (ABS Consulting) is pleased to present this proposal to provide the subject owner's representative services. The purpose of these services is to continue to provide part-time owner's representative services for Municipal Water District of Orange County (MWDOC) seismic and tenant improvement project for the total duration of the construction work, up to twelve months.

The original ABS Consulting proposal included providing part-time owner's representative services for a seven-month construction schedule. The seven-month construction schedule was established in the MWDOC RFP for the project. Subsequently, during the bidding and construction phases of the project, it became evident that the construction schedule for the project would be twelve months, or effectively five additional months beyond the original MWDOC RFP construction schedule. ABS Consulting is providing this change order request, for MWDOC's review and consideration, to continue providing part-time owner's representative services up to twelve months of construction. A complete breakdown of additional hours are included in Table 1.

SCOPE OF WORK

The scope of work consists of the following task:

Task 3 Provide Additional Part-Time Owner's Representative Services up to Twelve-Months of Construction

ABS Consulting will continue to provide owner's representative services identified in the original ABS Consulting proposal on a part-time basis. Services would include the following:

1. Manage weekly construction meetings and prepare meeting minutes for distribution to the Team.

2. Coordinate construction progress and issues with MWDOC, Designer, and Contractor on daily basis.

3. Conduct site visits (one to two times per week) and monitor construction progress.

4. Review Contractor RFIs, Submittals, Change Order Requests, Payment Applications, and correspondence and coordinate with MWDOC and Designer for responses.

5. Assist MWDOC and Designer in issuance of Architectural Supplemental Instructions (ASI).

6. All other services requested and agreed upon by MWDOC and ABS Consulting during duration of construction.

EXCLUSIONS

- Permit and Plan Check Fees
- Full-Time Owner's Representative Services
- Part-Time Owner's Representative Services beyond Twelve-Month Construction Schedule and beyond estimated weekly hours noted in Table 1

COST & SCHEDULE

The following section presents ABS Consulting's proposed fee breakdown for performing the project as described in our proposed scope of work. The proposed **Time and Materials Fees** includes all labor costs, travel costs and expenses to perform the proposed scope of work. **<u>The additional fee for Task 3 is $90,425</u>** (difference between original Task 3 fee of $117,940 (Table 0) and the revised Task 3 fee of $208,365 (Table 1)).

Table 0 reflects an augmented original weekly hour breakdown and fee for seven months of construction per the original ABS Consulting proposal for Task 3 (Owner's Representative Services during Construction Phase) while Table 1 indicates a revised weekly hour breakdown and fee for up to twelve months of construction. Table 2 reflects the total ABS Consulting Revised Project Fee.

Table 0 – Original Task 3 Fee for 7-Months (1)

Task 003 (7-Month Schedule)	PM (hrs/wk) ($250/hr)	CM (hrs/wk) ($115/hr)	No. Weeks	Reimbursables ($)	Total ($)	Comments
Hourly Budget/Week	5.5	20.5	30.31	$4,280	**$117,940**	7-Months

(1): Hours per Week are approximate and rounded

Table 1 – Revised Task 3 Fee for 12-Months (1)

Task 003 (12-Month Schedule)	PM (hrs/wk) ($250/hr)	CM (hrs/wk) ($115/hr)	No. Weeks	Reimbursables ($)	Total ($)	Comments
Initial 4 Months	6.1	25.4	17.32	$436	$77,441	4-Months
3-Months (Phase 1)	6.0	26.0	13.00	$352	$58,722	3-Months
5-Months (Phases 2-3)	4.0	20.0	21.68	$658	$72,202	5-Months
Total	---	---	52.00	$1,446	**$208,365**	12-Months

(1): Hours per Week are approximate and rounded

Table 2 – ABS Consulting Revised Total Project Fee

Task Name	Revised Fee ($)
Task 001 - Preconstruction	$54,860
Task 002- Plan Check and Bidding	$54,424
Task 003 - Construction Phase (12-Months)	$208,365
Task 004 - Closeout	$18,210
Task 005 - Relocation Phase 1	$9,623
Task 006 - Relocation Phases 2-4	$36,900
Task 007 - Contingency	$2,649
Total	**$385,031**

This fee is valid for a period of 60 days from the date of this proposal, after which ABS Consulting reserves the right to retain or modify this cost to reflect changing economic conditions. Work performed by ABS Consulting will be billed monthly based on the actual expenses incurred.

REQUIRED INFORMATION

Prior to commencement of work, we will need the following documents sent to our office:

- An executed change order.

Please execute and return to us a copy of this letter contract to acknowledge your understanding of our proposal and to formally authorize us to proceed.

We look forward to continue working with MWDOC on this important project. If you have any questions regarding this proposal, please do not hesitate to call.

Sincerely,
ABSG Consulting Inc.

Daniel J. Dopudja, S.E.
Group Manager

APPROVED FOR MWDOC

Task 3: ______________________________

By: ______________________________

Title: ______________________________

Date: ______________________________

Item No. 3

ACTION ITEM
(April 21, 2021)

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

Robert Hunter, General Manager Staff Contact: Vicki Osborn

SUBJECT: **South Emergency Operations Center Capital Project Decision**

STAFF RECOMMENDATION

Staff recommends the Board of Directors authorize the General Manager to execute Option #1 and proceed with the project as outlined.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

The WEROC South Emergency Operations Center (South EOC) is located on El Toro Water District (ETWD) property in Mission Viejo, CA. ETWD is beginning a redevelopment project of the site and needs a decision and commitment as to whether WEROC/MWDOC will participate in the redevelopment of the South EOC. While this redevelopment project will occur over a three-year period, a Go/NoGo decision by MWDOC is required now. Project options and estimated costs are presented.

DETAILED REPORT

Budgeted (Y/N): N	Budgeted amount:	Core __	Choice __
Action item amount: See Option 1	Line item:		
Fiscal Impact (explain if unbudgeted): See Option 1			

As a provider of critical water resources, the Municipal Water District of Orange County (MWDOC) plays a vital role in supporting the on-going needs of the community. Being well prepared to quickly and effectively respond to natural or man-made hazard events is an inherent component of community resilience and a sound business practice. Maintaining a dedicated (primary) and properly-equipped Emergency Operations Center (EOC) that can be staffed and operational on a 24X7 basis along with an identified alternate (backup) EOC is considered an industry "best practice" for critical infrastructure providers.

In 2016, a WEROC Emergency Operations Center Site Facility Assessment was conducted by Claris Strategy consulting firm on the three WEROC EOC Sites consisting of the South EOC, North EOC and MWDOC Administration Building. Thirteen distinct evaluation criteria elements were identified, prioritized, ranked and scored for each of the sites. Within that document, the recommendation of the independent consulting team was for MWDOC to consider designating the WEROC South EOC in Mission Viejo, CA as the **primary** EOC with the MWDOC Administration Offices in Fountain Valley, CA as the **alternate** (or backup) EOC. The South EOC is the optimal location for countywide communications from border to border based on its line of site for both low band and the primary 800Mhz radio system repeaters. In addition, the fire risk is much lower than the North EOC location and the undersoil is not subject to liquefaction. It was also recommended that MWDOC retain access to the North EOC facility to be utilized for furniture storage and as potential space that can be used in the event of a catastrophic loss of both the South EOC and MWDOC Administration Office facilities.

The South EOC is a permanent, ready to use facility that supports a multitude of critical infrastructure for communications including radios that communicate directly with member agencies, a radio direct connection to MET, and with the County and State. Additional redundant, interoperable permanent communication systems are installed at the South EOC within the EOC layout for direct access. The South EOC facility was constructed in 1982 and has undergone minor renovations in the intervening years. The 2,400 square foot metal building is comprised of steel columns and beams with metal panels on a concrete slab foundation.

Part of the facility assessment study highlighted the need to address the following operational capabilities of the South (Primary) EOC. Potential improvements included:

- Structural enhancements
- Life safety modifications
- Building infrastructure improvements
- Furniture and equipment upgrades
- Workspace improvements

In 2019, ETWD began working on the Prothero Filter Plant and Clearwell Project. ETWD offered WEROC/MWDOC to be part of the redevelopment project relative to the South EOC.

Initial preliminary project cost estimates were developed for the overall site redevelopment components:

- Demolition cost was estimated at $1.7 million (100% ETWD)
- New ETWD m warehouse building estimates at $1.15 million (100% ETWD).
- New 3,265 S.F. WEROC Building (only the building) built to Essential Facility Standards estimated at $750,000 (100% WEROC)

The initial building-only cost estimate has been further developed and analyzed for the total wrap around costs of the EOC.; to include the total estimated cost for WEROC to build a new structure and include the electrical, plumbing/water, back-up power, fire suppression, design and engineering soft costs, AV and communications and, fixtures, furniture and equipment costs. The total estimated costs for this project is approximately $1.7 million over three fiscal years.

WEROC Overall EOC Development Costs

FY 2021-22: Soft Costs & Site Grading	$404,219
FY 2022-23: Construction Costs	$670,391
FY 2023-24: Construction Costs & FF&E	$670,391
Total Costs	$1,745,000

During previous board discussions, MWDOC Staff was requested to look at funding alternatives including grants and funding partners. The other WEROC funding agencies are either unable to commit funding to this project above the WEROC Operating Budget contributions or have not yet made a decision on participation. While the search for grant funding continues, there are currently no grants available.

During the committee meeting discussions on the South EOC redevelopment, other site locations have been recommended and have been researched including the potential use of the Baker Treatment Plant. In speaking with the General Manager of IRWD, this site is not viable based on size, location and logistics. IRWD had a consultant perform an EOC study for their own agency, and this site was disqualified for a variety of reasons.

The P&O Committee discussions (March 1, 2021) of rehabilitating the existing South EOC building so that it meets current seismic standards and addresses the electrical, roof and generator issues concluded that the estimated investment of over $1.1 million is not fiscally responsible given that the building is 40-years old.

ETWD is ready to proceed with their project redevelopment and requires a decision by MWDOC regarding participation in order that they can proceed with their budget, funding, and schedule.

Financing Options

MWDOC Staff evaluated eligibility and availability of the United States Environmental Protection Agency's Water Infrastructure Finance and Innovation Act (WIFIA), CA State Water Resources Control Board's State Revolving Fund (SRF), California Infrastructure Economic Development Bank (IBank) and US Bank loan options. The District/Project does not qualify for WIFIA and while it would technically qualify for SRF funding it will not succeed in the scoring analysis and will not receive funding. Information has not yet been received from IBank relative to qualification. US Bank would have loan options of various terms and offered the example of a 5-year loan with a fixed rate of 1.55% with no option for early payoff or a fixed rate of 1.65% with options to pay off early. Both rates are subject to change depending on market conditions until locked in. A Net Revenue Pledge would be required as security for the loan. The District will need to create a Debt Policy with assistance from legal counsel and provide a Resolution before loan funding. Reserve funds are also available for partial or complete project funding. While available grants have not been currently identified, research will continue. The infrastructure funding situation in Washington, DC is very fluid at the moment and opportunities could develop.

BOARD OPTIONS

Option #1: The Board approves proceeding with the new South EOC construction project and authorizes the General Manager to do the following:

- Enter into an agreement with El Toro Water District
- Use cash reserves to cover the first year costs for FY 2021-22 (estimated $404,219)
- MWDOC to continue seeking grant funding
- Utilize FY 2021-22, to finalize and implement funding options for full project budget with additional Board approval through either:
    - A combination of debt and grant financing to mitigate rate impacts with potential options of the Infrastructure State Revolving Fund (ISRF) Program thru IBank, or a Bank loan with a Bank.
    - Full project funding with MWDOC reserves with a proscribed period of reserve repayment to mitigate rate impacts.

Fiscal Impact: FY 2021-22 cash reserves are available and can move this project forward. Remaining funding could be through debt financing or use of reserves. Debt payment or reserve repayment would likely extend over a period of 5-15 years to mitigate rate impacts. Funding the project on a PayGo basis would roughly equate to increases in the retail meter rate for the three fiscal years of $0.65, $1.05, and $1.05 per meter. The equivalent increases in the Groundwater Customer Charge would be approximately $15,500, $25,800, and $25,800. These charges would expire at the end of the three-year period.

Business Analysis:
Option #1 (new construction) provides the highest quality product (EOC) and increases Orange County's resilience and response capability to emergencies. The past analyses have indicated that the South EOC is the best alternative for the primary EOC location. As a provider of critical water resources, the Municipal Water District of Orange County (MWDOC) plays a vital role in supporting the on-going needs of the community. Maintaining a dedicated (primary) and properly-equipped emergency operations center (EOC) that can be staffed and operational on a 24X7 basis along with an identified alternate (backup) EOC is considered an industry "best practice" for critical infrastructure providers. Being well prepared to quickly and effectively respond to natural or man-made hazard events is an inherent component of community resilience and a sound business practice.

Option #2: The Board approves rehabilitating the existing South EOC and authorizes the General Manager to do the following:

- Enter into an agreement with El Toro Water District
- Financial options similar to Option #1

Fiscal Impact: Similar to Option #1 but at 65% of costs and estimated rate impacts.

Business Analysis:
Option #2 (rehabilitation) has been previously discussed and rejected at the P&O Committee meeting. The substantial amount of work (seismic, electrical, roof and generator) and the significant cost of over $1.1 million was deemed inappropriate, as the resulting facility is still a 40-years old metal building.

Option #3: Board opts not to invest in the South Emergency Operations Center.

- MWDOC/WEROC advises El Toro Water District that we will not move forward on the Joint Project.
- WEROC will not continue to use the current South Emergency Operations Center, and will terminate the South Emergency Operations Center Lease Agreement with ETWD.
- The MWDOC Administration Building will become the primary EOC and the North EOC will be the alternate.

Fiscal Impact: None.

Business Analysis: Based on the 2016 facility assessment, loss of the South Emergency Operations Center will decrease the capability of WEROC to support all 37 water and wastewater agencies in Orange County. A primary issue is that both WEROC EOCs will be in north Orange County in hazard-prone risk areas. MWDOC's Administration Building is in a high liquefaction zone and based on studies/assessments will have significant impact following an earthquake on the Newport Inglewood, San Andres, and Northridge Earthquake faults. The MWDOC facility is currently being seismically retrofitted, but the impacts to the building and surrounding areas following a significant event are unknown. The North EOC is small and has its own hazard zone issues including earthquake liquefaction and location in a High Fire risk area. The area has required fire protection two times in the last few years. Each location has communication challenges based on location and topography, which would have to be addressed.

South Emergency Operations Center

Tour By Pictures
4.5.2021

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MWDOC

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MWDOC

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MWDOC

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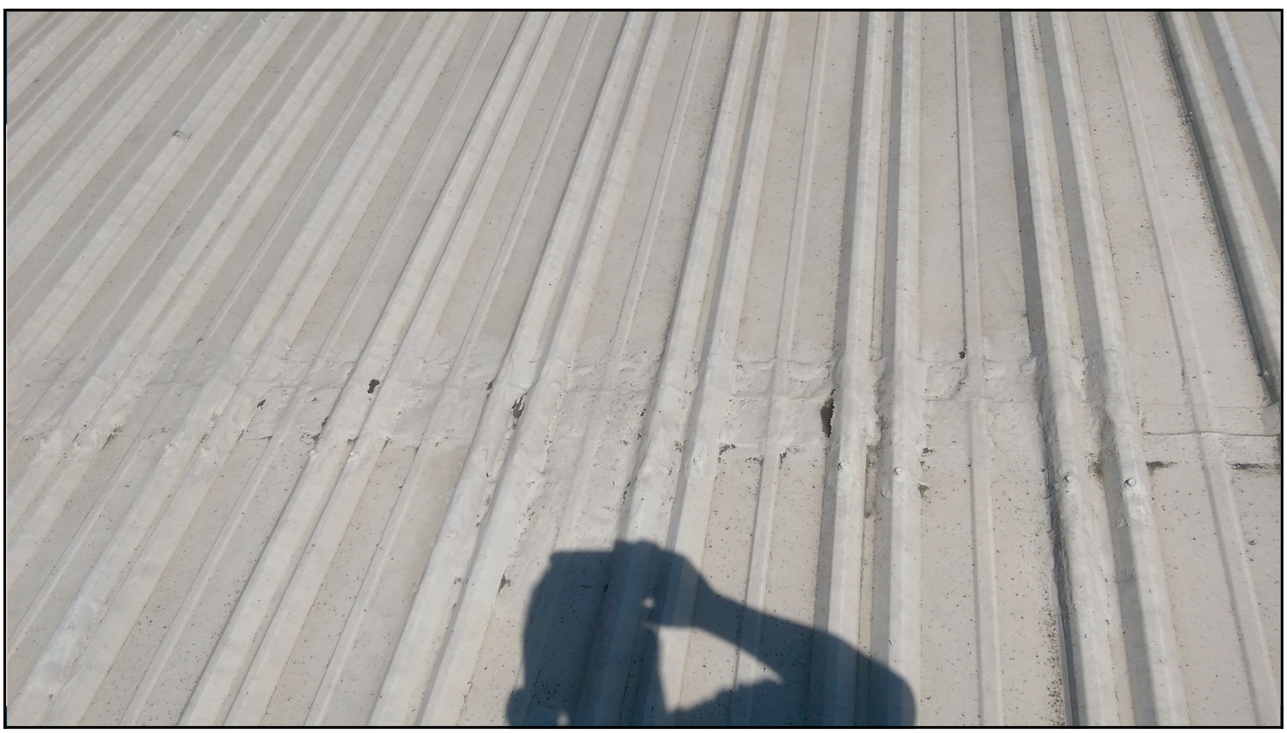

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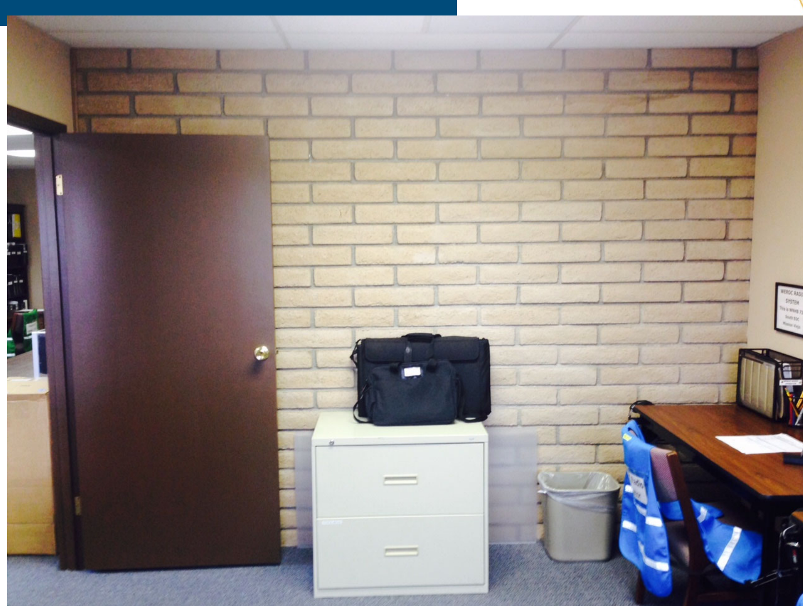

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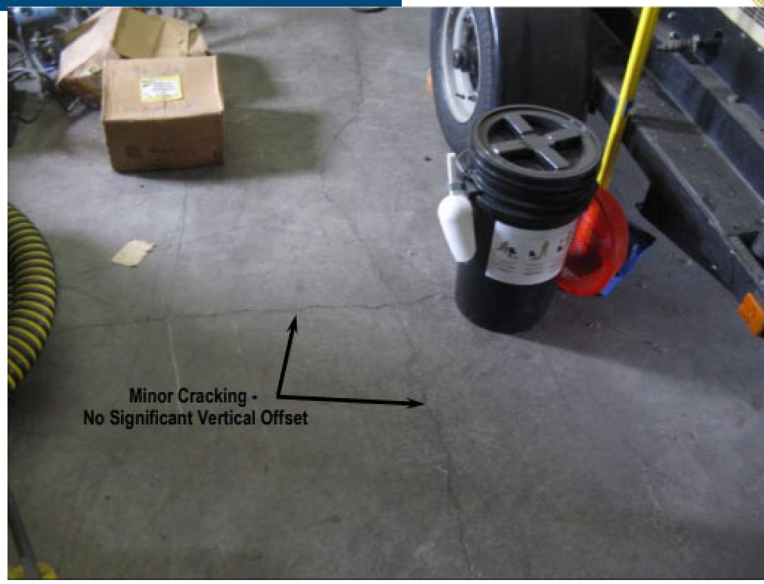
Minor Cracking -
No Significant Vertical Offset

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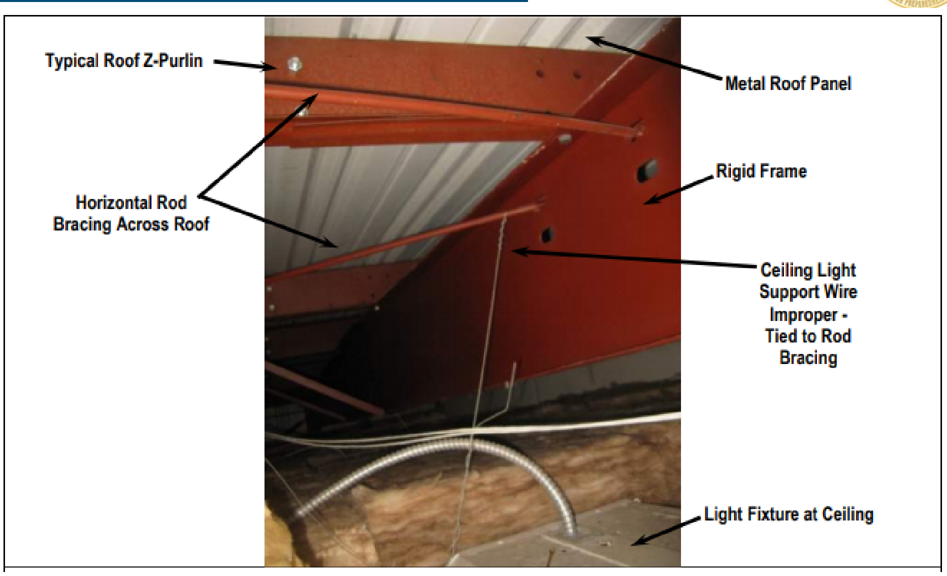

Typical Roof Z-Purlin
Metal Roof Panel
Horizontal Rod
Bracing Across Roof
Rigid Frame
Ceiling Light
Support Wire
Improper -
Tied to Rod
Bracing
Light Fixture at Ceiling

18

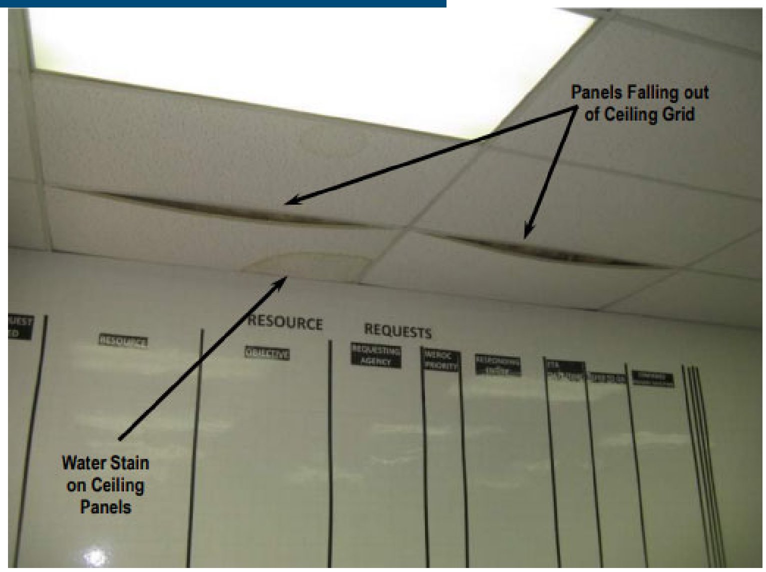
No Compression Posts Present

Ceiling Mounted Projector – No Direct Support to Structure

19

Electrical Wire Used to Brace Ceiling in Several Locations

20


Panels Falling out of Ceiling Grid
Water Stain on Ceiling Panels
RESOURCE
REQUESTS
RESOURCE
OBJECTIVE
REQUESTING AGENCY
WEROC PRIORITY

21

Item No. 5

COMMITTEE DISCUSSION ITEM
April 5, 2021

TO: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

FROM: **Robert Hunter, General Manager**

Staff Contact: Harvey De La Torre

SUBJECT: REVIEW OF OC DEMAND FORECASTING/CDM SMITH STUDY

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee to receive and file this report

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

Since the drought of 2014-2015 demands have been more difficult to forecast, with an uncertain potential water use rebound, more water use efficiency regulations, and unknown impacts from COVID-19. In an effort to better align Orange County's demands to current conditions for various planning efforts within the Region, such as MET's Integrated Resource Plan (IRP), MWDOC & Retail Agencies' 2020 Urban Water Management Plans, and OCWD's Groundwater Reliability Plan, MWDOC and OCWD partnered in hiring CDM Smith to update each of our service area's (as well as all of Orange County) demand forecasts from 2020 to 2050.

Attached is the Technical Memorandum that CDM Smith completed on OC Demand Forecasting Study for MWDOC and OCWD. Below is a brief description of CDM Smith's approach, methodology, and demand forecasting results for MWDOC's service area.

Study's Approach

CDM Smith prepared the water demand forecast with a "bottoms-up" approach using a consistent forecast methodology. Meaning the demand forecast was first developed for

Budgeted (Y/N): Y	Budgeted amount: $38,000	Core X	
Action item amount: n/a	Line item: 21-7010		
Fiscal Impact (explain if unbudgeted):			

every retail water agency in Orange County, using a uniformed calculation per sector, then consolidated to determine MWDOC's, OCWD's, and the entire County's forecasted demands. However, it should be noted that based on the interest of several retail agencies, individual meetings were held to refine assumptions specific to their agency. Based on these meetings, six retail agencies decided to use their own water demand projections and respectfully asked that MWDOC and OCWD incorporated their projections in all official documents i.e. MWDOC's 2020 Urban Water Management Plan and OCWD's Groundwater Reliability Plan.

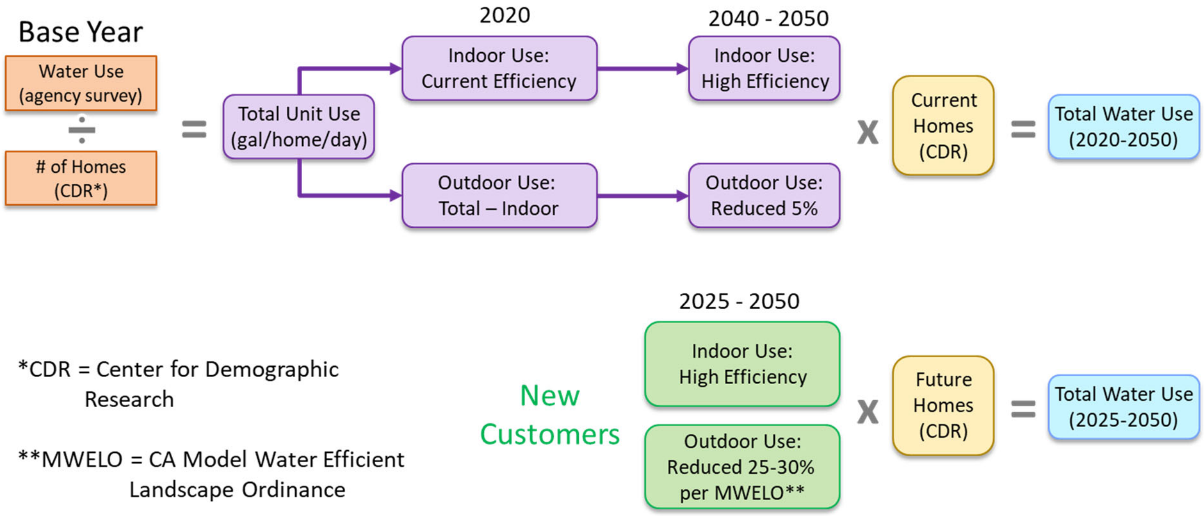
Demand Forecast Methodology

The forecast methodology began with a retail water agency survey that asked for FY 2018, 2019 and 2020 water use by major sector, including number of accounts. The years were chosen because FY 2018 was a slightly above-normal demand year (warmer/drier than average) and FY 2019 was a slightly below-normal demand year (cooler/wetter than average). FY 2020 was analyzed to see the potential impact of COVID-19 on water use. By averaging the dry year of 2018 and the wet year of 2019, a based water demand year was created.

Given the significant changes in plumbing codes, landscape ordinances, and public participation in water use efficiency programs in the last five years, the focus of the demand forecast methodology was on single-family and multi-family residential sections. CDM Smith further split the household water use into indoor and outdoor uses. To reflect the different water use of older and newer housing, the study created three different profiles of indoor single-family and multi-family residential end uses in Orange County:

- **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.

Below is a flow chart of how residential water demand was calculated:



For recycled water, large landscape (potable use) areas, and non-revenue, CDM Smith relied on the each agency's historical data as well as their projections in these sectors.

However, for CII water use, CDM Smith assumed that this sector's demand in FY 2020 would remain the same from 2020-2025 to represent COVID-19 impacts. Between 2025 to 2050, average CII unit use from FY 2018 and 2019 were 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.

CDM Smith's Demand Forecast Results

The results of the water demand forecast for MWDOC's service area are presented below by major category of demand and for average weather under Mid Scenario for CII:

MWDOC Service Area Water Demand
Under Average Weather and Mid Scenario Growth
(in Acre-Feet per year)

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	171,622	170,108	168,573	167,335	164,546	163,979	163,411
Multifamily Residential	60,013	61,411	60,994	60,916	60,364	61,123	61,882
CII	65,252	66,868	76,557	78,450	80,391	80,391	80,391
Large Landscape Potable	36,819	35,439	35,169	35,119	35,094	35,094	35,094
Non-Potable Recycled Water	50,174	52,645	54,094	56,774	56,829	56,829	56,829
Non-Revenue	27,102	27,267	28,198	28,384	28,470	28,507	28,544
Grand Total	**410,982**	**413,738**	**423,584**	**426,978**	**425,694**	**425,923**	**426,151**

MWDOC's average year water demands under Mid Scenario CII growth are expected to increase from 410,982 AFY in 2020 to 426,978 AFY in 2035, and then level off through 2050. This is the result of the following:

- **Single-Family Residential** - CDR is projecting only a slight growth in single-family residential. However, with the impacts of highly efficient plumbing codes and MWELO on new development and retrofits, it is forecasted that single-family water use will steadily decrease from the current usage of 171,622 AFY in 2020 to 163,411 AFY in 2050
- **Multifamily Residential** - Although CDR is projecting significantly more multifamily units, demands remain steady because of the impact of highly efficient plumbing codes and MWELO
- **CII** - Using a mid-scenario annual growth of 0.5% in CII accounts, results in an increase of 65,252 AFY in 2020 to 80,391 AFY in 2040 and then hold relatively constant
- **Large landscape** - Demands served by potable water are expected to decrease somewhat due to increases in non-potable recycled water (although not on a one to one basis)
- **Non-Potable Recycled Water** – These demands are projected to increase according to the member agencies expansion of additional recycled water projects

Comparison with Retail Agency Specified Demand Forecasts

As shown above, the estimated water demand forecast used CDM Smith's methodology across all of MWDOC's service area. However, as mentioned earlier there were six retail agencies that requested MWDOC to incorporate their projections in all official documents (i.e. MWDOC's 2020 UWMP).

Below is a comparison table on CDM Smith's methodology (uniformly applied across all retail agencies) and a combination methodology (using the six agencies projections and CDM Smith's projections with the remaining agencies):

Comparison of Water Demand Forecasts
Under Average Weather without Climate Change
(in Acre-Feet per year)

Year	CDM Smith Method Uniformly Applied	CDM Smith Method + Agency Generated Forecast	Difference
Actual 2020	409,025	409,025	NA
2025	413,738	431,130	(17,392)
2030	423,584	440,341	(16,757)
2035	426,978	446,398	(19,420)
2040	425,694	445,870	(20,176)
2045	425,923	445,778	(19,855)
2050	426,151	445,416	(19,265)

The difference is between 4.3 and 4.5 percent by 2050, which CDM Smith finds is within a reasonable margin of error.

Attachment – CDM Smith Technical Memorandum *"Orange County Water Demand Forecast for MWDOC and OCWD"* March 30, 2021

Memorandum

To: *Rob Hunter, General Manager, MWDOC*
John Kennedy, Assistant General Manager, OCWD

From: *Dan Rodrigo, CDM Smith*

Date: *March 30, 2021*

Subject: *Orange County Water Demand Forecast for MWDOC and OCWD*

Purpose and Background

For the purposes of water supply reliability planning and to support the preparation of 2020 UWMPs, CDM Smith prepared water demand forecasts for the MWDOC and OCWD service areas using a consistent forecast methodology. While the methodology was a bottoms-up approach—meaning water demand forecasts were developed for every retail water agency in Orange County—the results presented in this technical memorandum are for the total service areas for MWDOC and OCWD, as well as a total for Orange County. All retail water agencies were given an opportunity to review both the forecast methodology and forecast results to determine if they wanted to utilize the information for their own 2020 UWMPs and local planning.

CDM Smith developed and presented a draft forecast methodology to a meeting of both MWDOC and OCWD member agencies for input. CDM Smith then developed draft retail agency forecasts for agency review. Based on interest, several retail water agencies met with CDM Smith individually to refine assumptions specific to their agency. We believe these meetings with the retail agencies improved both the methodology and demand forecast results. In the end, six retail water agencies decided to utilize their own water demand forecast.

Demand Forecast Methodology

Given the significant changes in residential water use in the past 5 years due to California plumbing codes and landscape ordinances, as well as substantial customer participation in agency rebates for water use efficiency programs, the focus of the forecast methodology was on single-family and multifamily residential sectors. This decision to focus more on residential sectors was also supported by the relatively constant commercial/institutional/industrial (CII) water demands on a per account basis for the last five years.

The forecast methodology for residential sectors also provided the ability to separate indoor vs outdoor water use to support agency reporting for California's indoor residential target of 55 gallons per capita per day (gpcd) by 2025 and approximately 50 gpcd by 2030.

The forecast methodology began with a retail water agency survey that asked for FY2018, 2019 and 2020 water use by major sector, including number of accounts (see Figure 1 for example survey for FY2018). If an agency provided recycled water to customers that information was also requested. All retail agencies had provided the requested information to MWDOC and OCWD by December of 2020.

Figure 1. Member Agency Water Use Survey

Please fill out **all** three worksheets for **FY Ending 2017-18, 2018-19, and 2019-20**.

Input billed water demand data by sector, use **either:** AFY, CCF, or GPD columns.

If non-residential sectors are combined for commercial, institutional, industrial, enter values under commercial sector and provide comments to indicate what is included.

Non-revenue water, the difference between total water production from all sources of water supply minus total billed water, includes system losses, fire protection, system flushing and meter error.

FY Ending 2017-18					
Water Demand by Billing Sector	Water Demand (AFY)	Water Demand (CCF)	Water Demand (GPD)	Number of Accounts	Comments
Residential, Single-Family					
Residential, Multifamily					
Government/Institutional					
Commercial					
Industrial					
Large Landscape (Irrigation)					
Recycled Water					
Other					
Total Consumptive Demand					
Non-Revenue Water					
Total Water Production					

Given that FY 2018 was a slightly above-normal demand year (warmer/drier than average) and FY 2019 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. FY 2020 was examined to determine potential impacts of the COVID-19 pandemic on water use.

Residential Forecast Methodology

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 professional judgement. 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.

Table 1. Shows the three indoor single-family residential end uses of water for the three efficiency levels assumed for the Orange County water demand forecast.

Table 1. Single-Family Residential Indoor End Uses of Water Used for OC Water Demand Forecast

Indoor Single-Family End Use of Water	Unit	Per Person Use Rate	Pre-2010 Efficiency Level: Flow Rate per Day	Pre-2010 Efficiency Level: Per Capita Use (gal/day)	High Efficiency Level: Flow Rate per Day	High Efficiency Level: Per Capita Use (gal/day)	Current Avg. Efficiency Level: Flow Rate per Day	Current Avg. Efficiency Level: Per Capita Use (gal/day)
Toilet (gal/flush)	gal/flush	5	1.4	7.0	1.28	6.40	1.36	6.80
Shower (gmp)	gal/min	5.1	2.1	10.7	1.8	9.18	2.00	10.19
Bathroom Faucet (gpm)	gal/min	4.2	1.8	7.6	1.2	5.04	1.60	6.71
Kitchen Faucet (gpm)	gal/min	6.2	2.1	13.0	1.8	11.16	2.00	12.39
Dishwashing	gal/load	0.1	12	1.2	9	0.90	10.98	1.10
Clotheswashing	gal/load	0.3	30	9.0	28	8.40	29.32	8.80
All Others	gal/day	1	3.5	3.5	3	3.00	3.33	3.33
Leaks	gal/day	1	6.8	6.8	6.5	6.50	6.70	6.70
Total				**58.79**		**50.58**		**56.01**

The multifamily residential uses were similar in magnitude as shown in Table 1, although slightly lower for certain end uses.

For outdoor residential water use, the indoor per capita total was multiplied by each retail 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 illustrative purposes, the average single-family household water use for Orange County was derived showing indoor and outdoor water uses for both single-family and multifamily homes (see Figures 2 and 3).

Figure 2. Single-Family Indoor and Outdoor Water Use per Household

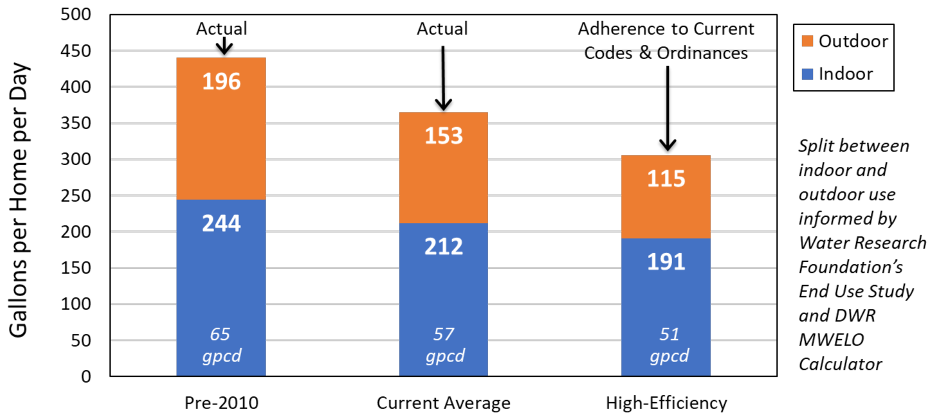
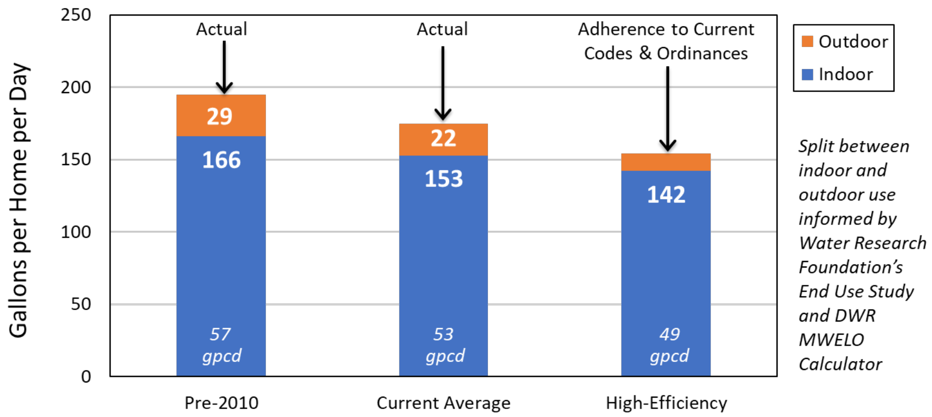


Figure 3. Multifamily Indoor and Outdoor Water Use per Household

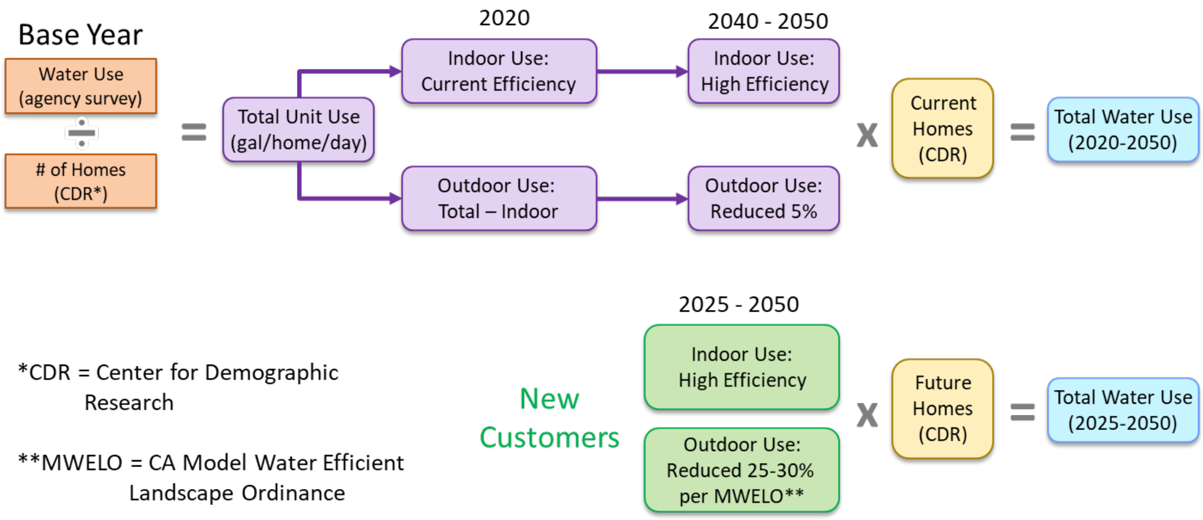


For existing residential homes, the current average indoor and outdoor water use (as illustrated in Figures 2 and 3) for each agency were used for the year 2020. It was assumed that indoor water uses would reach the high efficiency level by 2040. Based on current age of homes, replacement/remodeling 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.

The residential water demand methodology is depicted in Figure 4.

Figure 4. Residential Water Demand Methodology for Orange County



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

CII Forecast Methodology

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 FY2020 would remain the same from 2020-2025 to represent COVID-19 impacts. Reviewing agency water use data from FY2018 through FY2020 revealed that residential water use increased slightly in FY2020 while CII demands decreased slightly as a result of COVID-19. From 2030 to 2050, the average CII unit use from FY2018 and 2019 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.

Other Demand Categories Forecast Methodology

For those agencies that supply recycled water for non-potable demands, we 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, we 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, we reduced the large landscape demands served by potable water accordingly.

For non-revenue water, which represents the difference in total water production less all water billed to customers, we held this percentage constant through 2050.

Demand Forecast Results

The results of the water demand forecast for MWDOC's service area are presented in Table 2 by major category of demand and for average weather under Mid Scenario for CII. MWDOC's service area includes all retail water agencies in Orange County except Anaheim, Fullerton and Santa Ana.

Table 2. MWDOC Service Area Water Demand Under Average Weather and Mid Scenario Growth

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	171,622	170,108	168,573	167,335	164,546	163,979	163,411
Multifamily Residential	60,013	61,411	60,994	60,916	60,364	61,123	61,882
CII	65,252	66,868	76,557	78,450	80,391	80,391	80,391
Large Landscape Potable	36,819	35,439	35,169	35,119	35,094	35,094	35,094
Non-Potable Recycled Water	50,174	52,645	54,094	56,774	56,829	56,829	56,829
Non-Revenue	27,102	27,267	28,198	28,384	28,470	28,507	28,544
Grand Total	**410,982**	**413,738**	**423,584**	**426,978**	**425,694**	**425,923**	**426,151**

As CDR is projecting only slight single-family housing growth for MWDOC's area, plus the impacts of highly efficient plumbing codes and MWELO on new development and retrofits, it is forecasted that single-family water use will steadily decrease from current 171,622 acre-feet (AFY) in 2020 to 163,411 AFY in 2050. While plumbing codes and MWELO will impact multifamily water demand in similar ways as single-family, CDR is projecting significantly more multifamily units—thus, these two factors are countering each other somewhat and results in a relatively constant multifamily water demand. CII water demands, based on 0.5% annual growth in CII accounts, are forecasted to increase from 65,252 AFY in 2020 to 80,391 AFY in 2040 and then hold relatively constant. Large landscape demands served by potable water are expected to decrease somewhat due to increases in non-potable recycled water (although not on a one to one basis). Finally, there will be a slight increase in non-revenue water in the planning horizon. In total, MWDOC's average year water demands under Mid Scenario CII growth are expected to increase from 410,982 AFY in 2020 to 426,978 AFY in 2035, and then level off through 2050.

The results of the water demand forecast for OCWD's service area are presented in Table 3 by major category of demand and for average weather under Mid Scenario for CII. OCWD's service area includes all retail water agencies in Orange County that produce groundwater from the Orange County Basin, including Anaheim, Fullerton and Santa Ana. It also includes a portion of IWRD's service area that overlays the groundwater basin.

Table 3. OCWD Service Area Water Demand Under Average Weather and Mid Scenario Growth

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	157,755	155,725	153,616	151,319	148,737	148,311	147,885
Multifamily Residential	69,188	72,351	72,778	73,137	73,132	74,534	75,937
CII	86,886	89,043	100,752	103,251	105,812	105,812	105,812
Large Landscape Potable	22,988	22,988	22,988	22,988	22,988	22,988	22,988
Non-Potable Recycled Water	24,899	24,899	24,899	24,899	24,899	24,899	24,899
Non-Revenue	22,406	22,719	23,671	23,881	24,044	24,111	24,178
Grand Total	**384,123**	**387,726**	**398,705**	**399,475**	**399,613**	**400,656**	**401,699**

OCWD's service area demands for single-family are decreasing until 2040, but then stabilize due to the older housing stock which uses more water per home than new development in Anaheim, Fullerton and Santa Ana. Multifamily water demands for OCWD's area are expected to increase from 2020 to 2050 due to significantly greater projected multifamily housing in Anaheim, Fullerton, and Santa Ana. CII water demands, based on 0.5% annual growth in CII accounts, are forecasted to increase from 86,886 AFY in 2020 to 105,812 AFY in 2040 and then hold relatively constant. Large landscape served by potable water and non-potable recycled water demands served by potable water are forecasted to remain fairly constant. Finally, there will be a slight increase in non-revenue water in the planning horizon. In total, OCWD's average year water demands under Mid Scenario CII growth are expected to increase from 384,123 AFY in 2020 to 401,699 AFY in 2050.

The results of the water demand forecast for the total Orange County are presented in Table 4 by major category of demand and for average weather under Mid Scenario for CII. The total Orange County area includes all retail water agencies in Orange County.

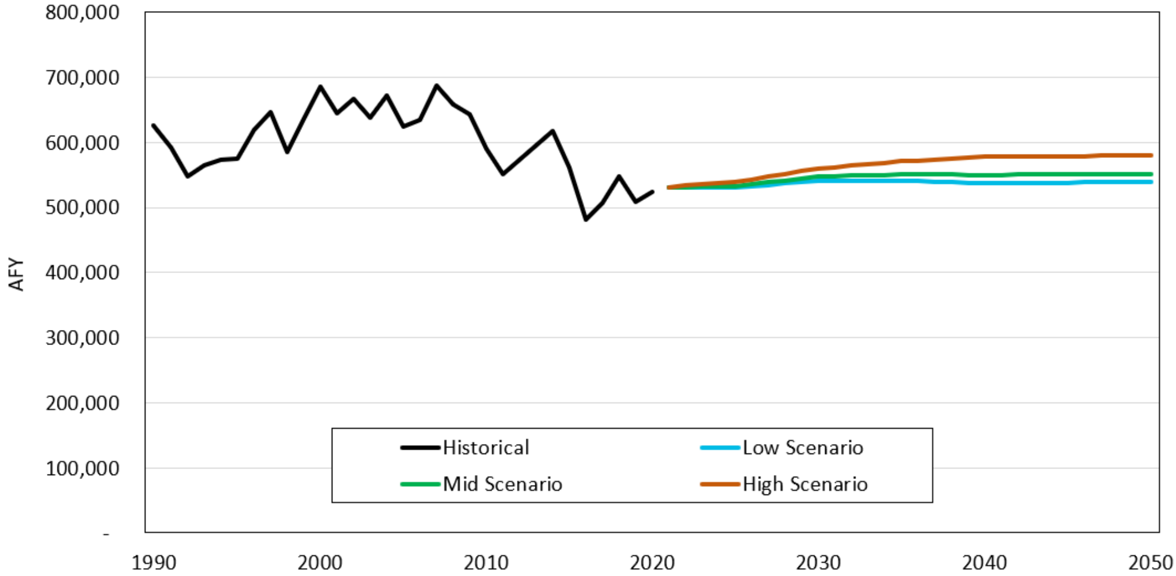
Table 4. Total Orange County Water Demand Under Average Weather and Mid Scenario Growth

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	215,900	213,658	211,302	209,257	205,649	204,951	204,253
Multifamily Residential	86,584	89,866	90,222	90,473	90,262	91,853	93,443
CII	101,418	103,939	118,298	121,235	124,246	124,246	124,246
Large Landscape Potable	39,545	38,165	37,895	37,845	37,820	37,820	37,820
Non-Potable Recycled Water	50,518	52,989	54,438	57,118	57,173	57,173	57,173
Non-Revenue	31,739	32,012	33,181	33,432	33,587	33,656	33,725
Grand Total	**525,704**	**530,628**	**545,335**	**549,360**	**548,737**	**549,698**	**550,659**

The total water demand for all of Orange County is forecasted to increase from 525,704 AFY in 2020 to 550,659 AFY in 2050.

Figure 5 presents the historical and forecasted water demand over time for the total Orange County area under average weather and for all three scenarios of CII growth.

Figure 5. Total Orange County Water Demand Forecast Under Average Weather



For comparison, the previous water demand used for the 2014 Orange County Water Reliability Study was approximately 580,000 AFY in 2050. Which compares closely with the demands under the High Scenario of CII growth for this forecast of 579,500 AFY. However, the Mid Scenario demand forecast is about 30,000 AFY lower than the 2014 forecast in 2050.

Weather Variability and Long-Term Climate Change Impacts

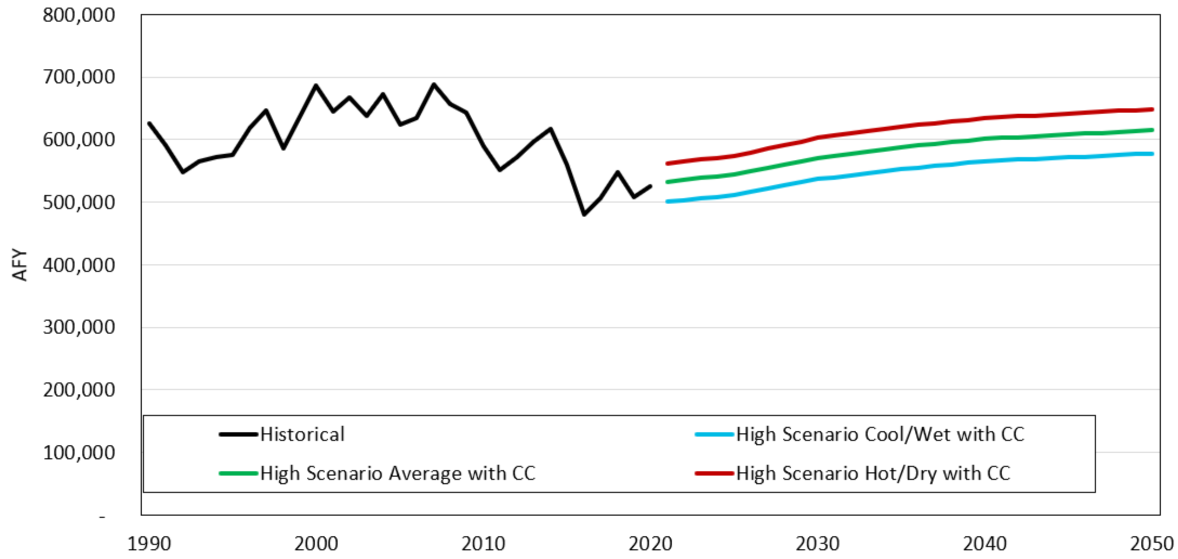
In any given year water demands can vary substantially due to weather. In addition, long-term climate change can have an impact on water demands into the future. For the 2014 OC Water Reliability Study, CDM Smith developed a robust statistical model of total water monthly production from 1990 to 2014 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

Figure 6 presents the water demand forecast for the total Orange County area under the High Scenario showing climate change impacts and year-to-year weather variability. This forecast represents the likely higher-end range of future water demands.

Figure 6. Total Orange County Water Demand Forecast Under High Scenario with Climate Change



Comparison with Retail Agency Specified Demand Forecasts

At the start of this effort, MWDOC and OCWD committed to use retail water agency generated water demand forecasts for official reporting purposes (i.e., MWDOC's 2020 UWMP) if agencies decided not to use CDM Smith's methodology. As stated earlier, six retail water agencies either provided their own water demand forecast or made significant modifications to CDM Smith's methodology such that it was no longer considered uniform.

Table 5 compares the water demand forecast generated using CDM Smith's methodology applied uniformly across all retail agencies with a forecast that represents a combination of agency-generated forecasts (for the six retail agencies that supplied them) along with CDM Smith's methodology applied to the rest of the retail agencies for MWDOC and OCWD service areas.

Table 5. Comparison of Water Demand Forecasts Under Average Weather without Climate Change

	MWDOC Service Area			OCWD Service Area		
Year	CDM Smith Method Uniformly Applied	CDM Smith + Agency Provided Method	Difference	CDM Smith Method Uniformly Applied	CDM Smith + Agency Provided Method	Difference
Act. 2020	409,025	409,025	NA	387,317	387,317	NA
2025	413,738	431,130	(17,392)	387,726	400,460	(12,734)
2030	423,584	440,341	(16,757)	398,705	412,568	(13,863)
2035	426,978	446,398	(19,420)	399,475	415,973	(16,498)
2040	425,694	445,870	(20,176)	399,613	417,371	(17,758)
2045	425,923	445,778	(19,855)	400,656	418,308	(17,652)
2050	426,151	445,416	(19,265)	401,699	418,973	(17,274)

The difference between the CDM Smith method applied uniformly to all agencies vs the CDM Smith method plus agency provided forecast is between 4.3 and 4.5 percent by 2050, certainly within the reasonable range of error.

Orange County Water Demand Forecast

April 5, 2021

Methodology and Results

MWDOC Planning & Operation Committee

Water Demand Forecast Goals

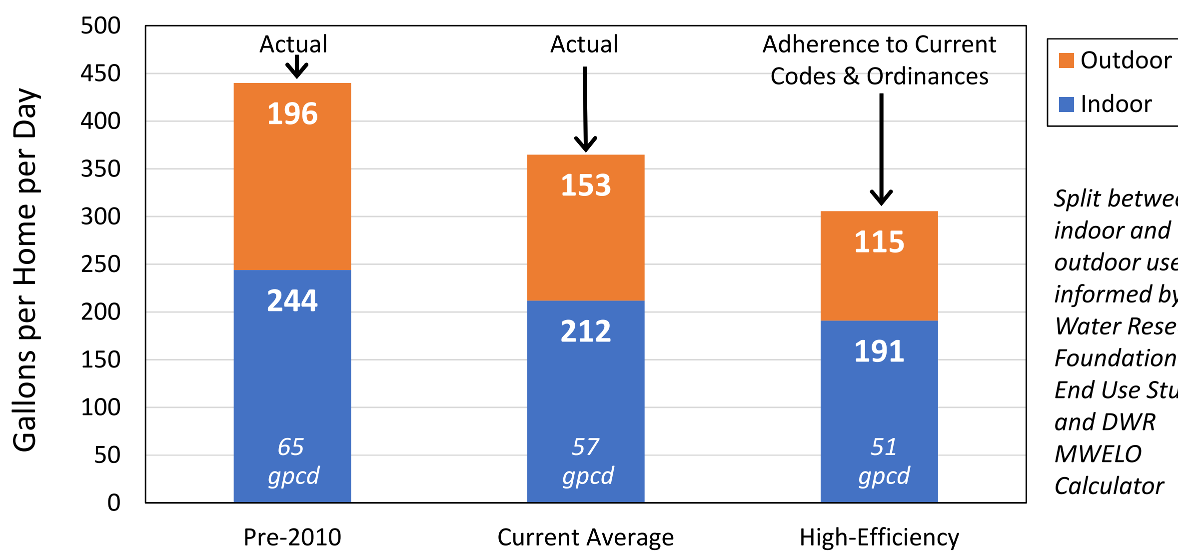
- Used by MWDOC and OCWD for their reliability planning and MWDOC's 2020 UWMP
- Methodology presented to retail water agencies for comments/improvements
- Results provided to each retail water agency for optional use for their own 2020 UWMP (six agencies chose to use their own demand forecasts)

Water Demand Forecast Overview

- Water use and account data for FY2018, 2019, and 2020 obtained from retail water agency survey, completed in December 2020
- Base-year is average of FY2018 and FY2019 water use (pre Covid-19 influence)
- Forecast period is 2020-2050
- Demographic data (population, housing, family size) from Center for Demographic Research (CDR) for each retail agency service area
- MWDOC and OCWD service area demand forecast build up from individual retail agency forecasts

3

Average OC Single-Family Household Water Use



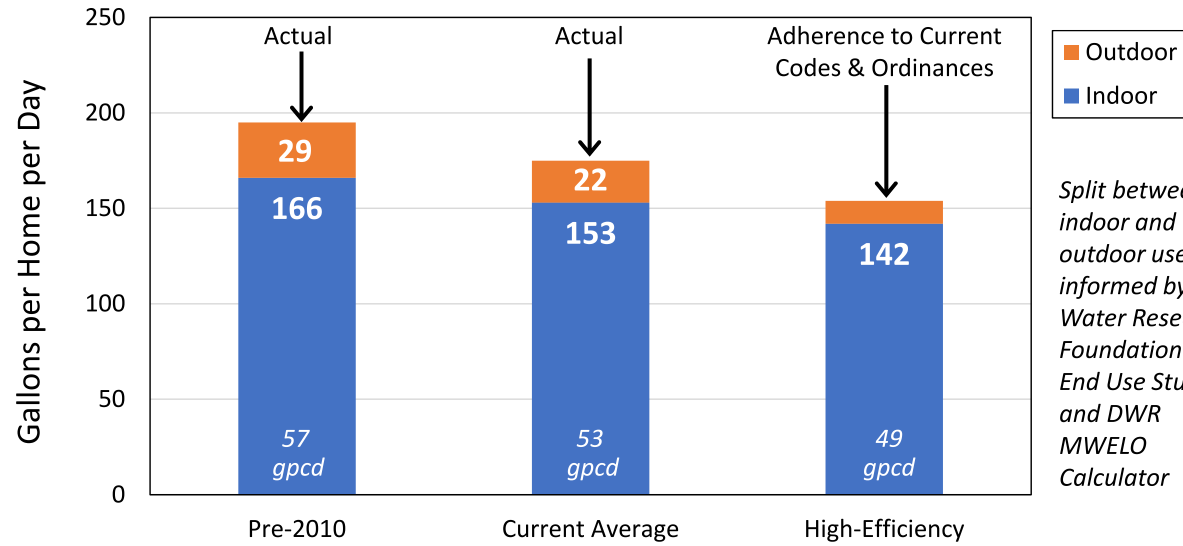
Split between indoor and outdoor use informed by Water Research Foundation's End Use Study and DWR MWELO Calculator

PPH = 3.7

4

CDM Smith

Average OC Multifamily Household Water Use

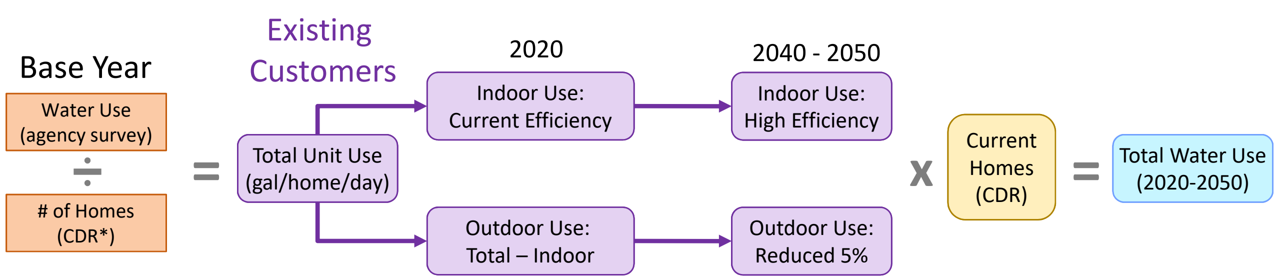


Split between indoor and outdoor use informed by Water Research Foundation's End Use Study and DWR MWELO Calculator

PPH = 2.9

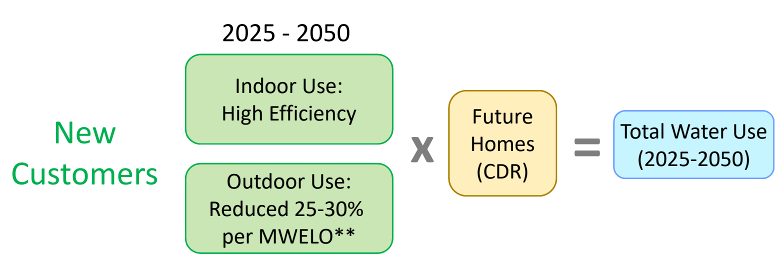
5

Forecast Methodology for Residential (SF and MF)



*CDR = Center for Demographic Research

**MWELO = CA Model Water Efficient Landscape Ordinance



6

Forecast Methodology for Commercial, Institutional, Industrial (CII)

- CII unit use (gal/account/day) for FY 2020 (with COVID impacts) used for years 2020 and 2025
- CII unit use average for FY 2018 and 2019 used for 2030-2050 (rebound)
- Growth in CII accounts:
  - Low Scenario – no growth
  - Mid Scenario – 0.5% annual growth
  - High Scenario – 1.5% annual growth

Forecast Methodology for Other Demands

- Recycled Water (if present) is based on Agency projections
- Large Landscape (potable use) is based on historical Agency data, held constant into future (except when recycled water is projected to increase, then it decreases)
- Non-Revenue Water (difference between total water production and billed water) is based on historical Agency data

MWDOC Service Area Demand Forecast

Mid-Scenario Under Average Weather Demands (No Climate Change)

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	171,622	170,108	168,573	167,335	164,546	163,979	163,411
Multifamily Residential	60,013	61,411	60,994	60,916	60,364	61,123	61,882
CII	65,252	66,868	76,557	78,450	80,391	80,391	80,391
Large Landscape Potable	36,819	35,439	35,169	35,119	35,094	35,094	35,094
Non-Potable Recycled Water	50,174	52,645	54,094	56,774	56,829	56,829	56,829
Non-Revenue	27,102	27,267	28,198	28,384	28,470	28,507	28,544
Grand Total	**410,982**	**413,738**	**423,584**	**426,978**	**425,694**	**425,923**	**426,151**

MWDOC's service areas does not include cities of Anaheim, Fullerton and Santa Ana.

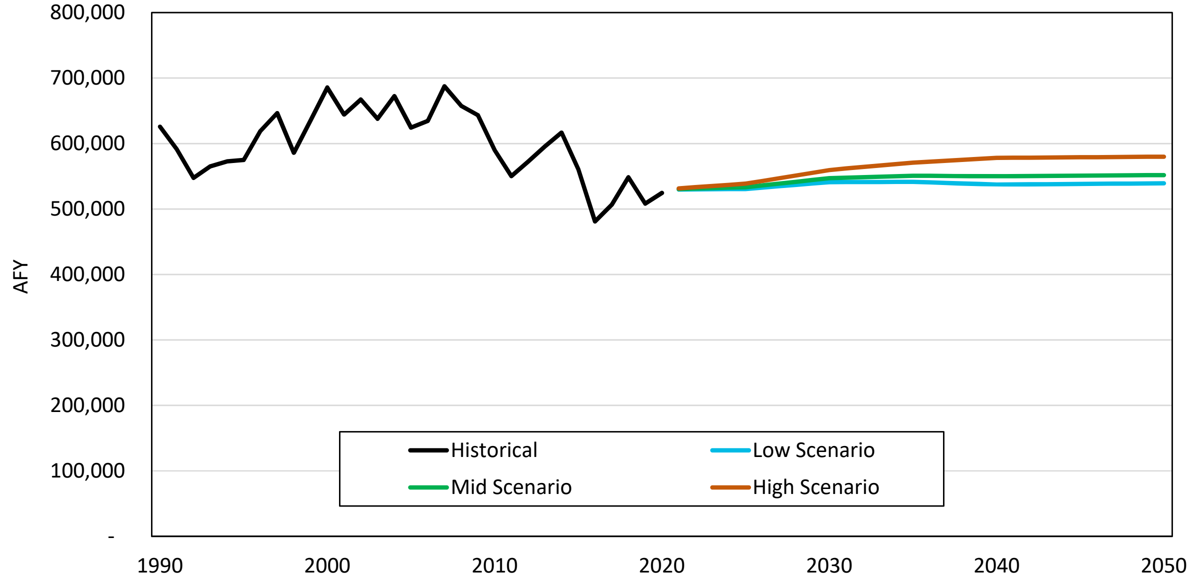
Total Orange County Demand Forecast

Mid-Scenario Under Average Weather Demands (No Climate Change)

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	215,900	213,658	211,302	209,257	205,649	204,951	204,253
Multifamily Residential	86,584	89,866	90,222	90,473	90,262	91,853	93,443
CII	101,418	103,939	118,298	121,235	124,246	124,246	124,246
Large Landscape Potable	39,545	38,165	37,895	37,845	37,820	37,820	37,820
Non-Potable Recycled Water	50,518	52,989	54,438	57,118	57,173	57,173	57,173
Non-Revenue	31,739	32,012	33,181	33,432	33,587	33,656	33,725
Grand Total	**525,704**	**530,628**	**545,335**	**549,360**	**548,737**	**549,698**	**550,659**

Total Orange County area includes ALL retail water agencies.

Total OC Demand Forecast (Average Weather)



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Weather and Climate Adjustments

- Based on statistical analysis of total water production from 2000 to 2015 from OC Water Reliability Study
- Historical weather variability:
  - Wet years reduce average water demands by 6%
  - Dry years increase average water demands by 5.5%
- Long-term climate change will increase average water demands by 6% by 2050, with wet and dry year variability on top of this (e.g., dry year in 2050 will be 12% greater than average water demands in 2020)

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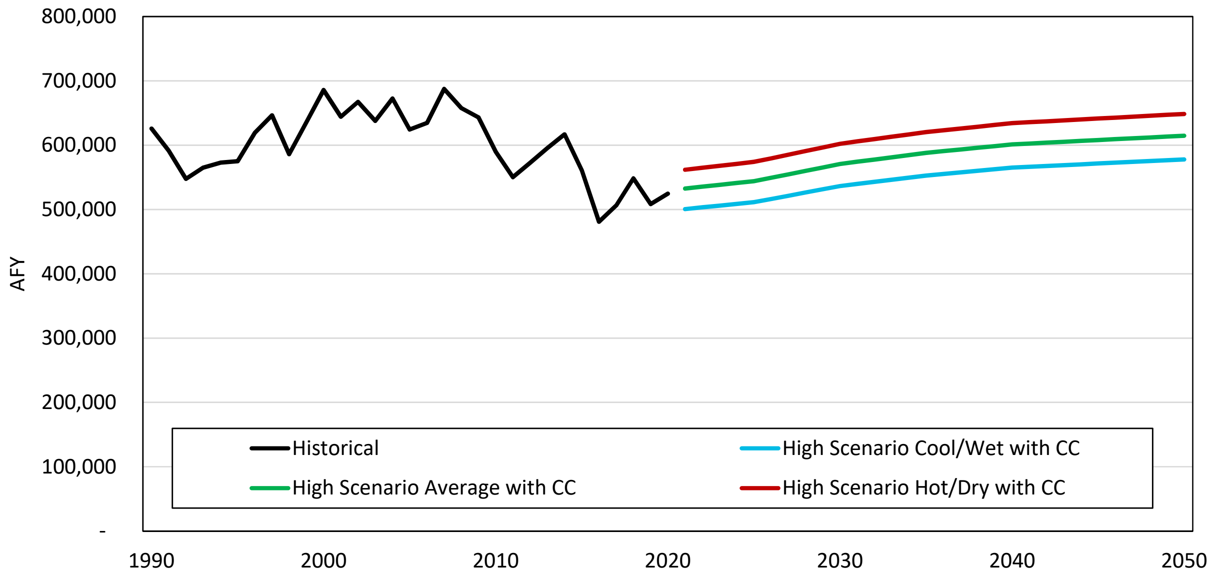
CDM Smith

Total OC Demand Forecast (with Climate Change)



Comparison of Water Demand Forecasts

- Since MWDOC committed to use retail water agency generated water demand forecasts for official reporting (i.e., MWDOC's 2020 UWMP), a comparison of the forecasts is shown in table below for MWDOC's service area.

Year	CDM Smith Method Uniformly Applied	CDM Smith Method + Agency Generated Forecast	Difference
Actual 2020	409,025	409,025	NA
2025	413,738	431,130	(17,392)
2030	423,584	440,341	(16,757)
2035	426,978	446,398	(19,420)
2040	425,694	445,870	(20,176)
2045	425,923	445,778	(19,855)
2050	426,151	445,416	(19,265)

- CDM Smith estimates a slower growth rate in demands from actual 2020 through 2035 than the six agencies that provided their own forecast. By 2050, the difference in the forecast is 4.5%.

BACKUP SLIDES

15

OCWD Service Area Demand Forecast

Mid-Scenario Under Average Weather Demands (No Climate Change)

Sector Demand (AFY)	2020	2025	2030	2035	2040	2045	2050
Single-Family Residential	157,755	155,725	153,616	151,319	148,737	148,311	147,885
Multifamily Residential	69,188	72,351	72,778	73,137	73,132	74,534	75,937
CII	86,886	89,043	100,752	103,251	105,812	105,812	105,812
Large Landscape Potable	22,988	22,988	22,988	22,988	22,988	22,988	22,988
Non-Potable Recycled Water	24,899	24,899	24,899	24,899	24,899	24,899	24,899
Non-Revenue	22,406	22,719	23,671	23,881	24,044	24,111	24,178
Grand Total	**384,123**	**387,726**	**398,705**	**399,475**	**399,613**	**400,656**	**401,699**

OCWD's service area includes cities of Anaheim, Fullerton and Santa Ana; but does not include Brea, La Habra, and retail water agencies in South Orange County (except for a large portion of IRWD).

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Item No. 6

INFORMATION ITEM
April 5, 2021

TO: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

FROM: **Robert Hunter, General Manager**

Staff Contact: Harvey De La Torre
Alex Heide

SUBJECT: **REVIEW OF MWDOC'S DRAFT 2020 URBAN WATER MANAGEMENT PLAN**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receive and file this report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

The State of California requires all water suppliers (including wholesalers), either publicly or privately owned, that provide water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually to submit an updated Urban Water Management Plan (UWMP) with the Department of Water Resources (DWR) at least once every five years; in years ending in six or one. To meet the requirements of the Urban Water Management Planning Act, MWDOC must adopt and submit its 2020 UWMP to the California Department of Water Resources by July 1, 2021.

The purpose of this report is to provide the Board, MWDOC member agencies, and the public an opportunity to review MWDOC's Draft 2020 UWMP, 2020 Water Shortage Contingency Plan (WSCP), and 2015 UWMP Addendum, in order to receive feedback and comments on the plan prior to the official public hearing. This report will describe the plan's overall approach, key areas of importance, linkage to Metropolitan's 2020 UWMP, and next steps.

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core _X_	Choice __
Action item amount: none	Line item:		
Fiscal Impact (explain if unbudgeted):			

DETAILED REPORT

During both of the preceding UWMP cycles, MWDOC has been the project manager and coordinator for the UWMP efforts for MWDOC's and Orange County participating retail agencies' UWMPs. This had provided an economies of scale cost-savings to the retail agencies, and helped to coordinate consistency between the Metropolitan, MWDOC, and local UWMPs. For the 2020 UWMP cycle, 21 retail agencies have joined this cost-sharing agreement with MWDOC, whereby Arcadis Inc., prepares the UWMPs for submittal by July 1, 2021.

Since the fall of 2020, MWDOC staff have been working with Arcadis in updating MWDOC's 2020 UWMP by providing key data, direction, and coordination between MWDOC, the Member Agencies and Metropolitan. Additionally, MWDOC staff has been leading a parallel effort with CDM Smith to update the demand projections from the O.C. Reliability study that form the basis for the information contained in this year's UWMP. MWDOC's Draft UWMP is a culmination of these efforts along with input, feedback, and information from MWDOC's Member Agencies and Metropolitan.

MWDOC staff circulated an Internal Draft of the UWMP to the Member Agencies on March 12 for their initial comments, feedback, and edits for incorporation prior to the release of the Public Review Draft. Staff has received several comments from Member Agencies on the Internal Draft, including a letter from OCWD (Attachment A), and has modified the Public Review Draft to reflect those changes, where appropriate.

MWDOC's Regional Approach

Similar to MWDOC's previous UWMPs, the focus of the analysis and information is at the regional level for MWDOC's service area. Specific information and data on individual member agencies will not be covered in detail in the MWDOC UMWP. Although information such as demographics, demand and supply projections, and new proposed projects have been collected from the member agencies to determine the overall total for MWDOC's service area, the member agency individual information will be contained in their own UWMPs.

This Regional Approach ensures coordination with the member agencies and helps to prevent conflicting information between MWDOC's plan and the member agencies' plans. More importantly, it distinguishes the role of MWDOC as the regional entity and the role of the member agency as the retail entity.

Major New Elements of the UWMP

As a result of the 2014-2015 statewide drought, several new requirements were added to the UWMPs by the California Legislature through the passage of SB 606 and AB 1668 in 2018. Major new elements, or substantially changed elements of the UWMP are:

1. Water Shortage Contingency Plan (WSCP) – Must consider shortages of greater than 50%, crosswalk to the State's six standard shortage levels, contain procedures for the Annual Water Supply and Demand Assessment, and outline & quantify demand reduction actions.
2. WSCP – Must be a stand-alone document, updateable outside of the UWMP planning process.

3. Water Service Reliability Assessment – Must consider five consecutive dry years for the reliability assessment and Drought Risk Assessment (previously three dry years).

Additionally, agencies participating in a covered action in the Delta must comply with the Delta Stewardship Council (DSC) Policies. Metropolitan and other State Water Contractor's anticipated participation in a Delta Conveyance Project has triggered Delta Stewardship Council Policy WR-P1, which is *Reduced Reliance on the Delta through Improved Regional Self-Reliance*. Compliance with this policy requires inclusion of detailed reporting on Regional Self Reliance in the 2020 UWMP (Appendix C). Appendix C is also required to be included in the 2015 UWMP per the DSC policy and will be added to MWDOC's 2015 plan through an addendum, which staff will present to the MWDOC Board of Directors at the Public Hearing and adoption in May.

Areas of Importance

In updating the MWDOC's 2020 UWMP, staff found the following as key areas of importance in demonstrating MWDOC's water supply reliability over the next 25 years:

Linkage to Metropolitan's 2020 UWMP

As the provider of imported water via Metropolitan, MWDOC's UWMP is closely linked to the water supply and demand projections of Metropolitan. Therefore, included in MWDOC's 2020 UWMP are sections describing the conditions, associated challenges, program developments and expected supply availability for each of Metropolitan's core water supplies – Colorado River and State Water Project (SWP). Along with a description of Metropolitan storage and transfer programs' capacity and terms.

In Metropolitan's 2020 UWMP, Metropolitan evaluated supply reliability by projecting supply and demand conditions for the single- and five-year drought cases based on conditions affecting the SWP and the Colorado River supplies. It concluded that the MET region can provide reliable water supplies not only under normal conditions but also under both the single driest year and the five dry year hydrologies. Below are tables illustrating how they plan to meet a single dry year and five-dry year conditions:

Table 2-1
Metropolitan Regional Water Demands
Single Dry-Year
(Acre-Feet)

		2025	2030	2035	2040	2045
A.	**Total Demands**[1]	**4,942,000**	**5,023,000**	**5,147,000**	**5,252,000**	**5,365,000**
	Retail Municipal and Industrial	4,397,000	4,507,000	4,626,000	4,737,000	4,848,000
	Retail Agricultural	144,000	134,000	130,000	122,000	123,000
	Seawater Barrier	57,000	57,000	57,000	57,000	57,000
	Storage Replenishment	345,000	325,000	334,000	336,000	337,000
B.	**Total Conservation**	**1,162,000**	**1,211,000**	**1,263,000**	**1,325,000**	**1,389,000**
	Existing Active (through 2020)[2]	93,000	55,000	35,000	25,000	17,000
	Code-based	560,000	623,000	665,000	701,000	731,000
	Price-Effect[3]	259,000	283,000	313,000	349,000	391,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**Total Local and Other Imported Supplies**	**2,461,000**	**2,543,000**	**2,657,000**	**2,681,000**	**2,703,000**
	Groundwater	1,248,000	1,263,000	1,304,000	1,314,000	1,327,000
	Surface Water	83,000	86,000	86,000	86,000	86,000
	Los Angeles Aqueduct	119,000	119,000	119,000	119,000	119,000
	Seawater Desalination	56,000	56,000	56,000	56,000	56,000
	Groundwater Recovery	144,000	158,000	158,000	158,000	160,000
	Recycling[4]	533,000	584,000	656,000	669,000	678,000
	Other Imported Supplies[5]	278,000	278,000	278,000	278,000	278,000
D.	**Total Metropolitan Demands**	**1,319,000**	**1,270,000**	**1,227,000**	**1,246,000**	**1,273,000**
	Consumptive Use	1,157,000	1,133,000	1,092,000	1,111,000	1,138,000
	Seawater Barrier	6,000	5,000	4,000	4,000	4,000
	Replenishment	156,000	131,000	131,000	131,000	131,000

Table 2-2
Metropolitan Regional Water Demands
Drought Lasting Five Consecutive Water Years
(Acre-Feet)

		2025	2030	2035	2040	2045
A.	**Total Demands**[1]	**4,877,000**	**5,051,000**	**5,168,000**	**5,285,000**	**5,397,000**
	Retail Municipal and Industrial	4,417,000	4,540,000	4,658,000	4,777,000	4,889,000
	Retail Agricultural	147,000	143,000	135,000	129,000	126,000
	Seawater Barrier	57,000	57,000	57,000	57,000	57,000
	Storage Replenishment	257,000	311,000	318,000	323,000	325,000
B.	**Total Conservation**	**1,162,000**	**1,211,000**	**1,263,000**	**1,325,000**	**1,389,000**
	Existing Active (through 2020)[2]	93,000	55,000	35,000	25,000	17,000
	Code-based	560,000	623,000	665,000	701,000	731,000
	Price-Effect[3]	259,000	283,000	313,000	349,000	391,000
	Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
C.	**Total Local and Other Imported Supplies**	**2,364,000**	**2,508,000**	**2,608,000**	**2,670,000**	**2,695,000**
	Groundwater	1,205,000	1,258,000	1,288,000	1,313,000	1,327,000
	Surface Water	81,000	81,000	82,000	82,000	82,000
	Los Angeles Aqueduct	118,000	118,000	118,000	118,000	118,000
	Seawater Desalination	56,000	56,000	56,000	56,000	56,000
	Groundwater Recovery	140,000	152,000	158,000	158,000	159,000
	Recycling[4]	487,000	564,000	627,000	664,000	675,000
	Other Imported Supplies[5]	278,000	278,000	278,000	278,000	278,000
D.	**Total Metropolitan Demands**	**1,351,000**	**1,332,000**	**1,297,000**	**1,290,000**	**1,313,000**
	Consumptive Use	1,254,000	1,208,000	1,173,000	1,167,000	1,190,000
	Seawater Barrier	8,000	5,000	5,000	4,000	4,000
	Replenishment	89,000	119,000	119,000	119,000	119,000

Projected Demands

In 2020, MWDOC and OCWD hired CDM Smith to update the 2016 OC Reliability demand projections. Both agencies worked with the Orange County retail agencies, including the three MET cities, to do a comprehensive update to the demand projection methodology. Retail agencies were asked to provide feedback, input, and revisions to the methodology and projections before they were finalized. Additionally, for agencies that provided their own projections or substantially altered the CDM Smith methodology, those projections were incorporated into the MWDOC Draft 2020 UMWP.

Moving forward, under normal conditions, total water demands are projected to increase to 494,795 AF by the year 2045. This demand projection considered such factors as current and future demographics for the MWDOC service area, future active and passive conservation measures, and ground & surface water needs, as well as future local projects. For reference, MWDOC's service area demands for fiscal year 2019-20 totaled 427,701 AF. These demands include retail municipal & Industrial, groundwater replenishment, and surface water purchases.

As shown in the 2020 Draft UWMP, the table below illustrates MWDOC's total water demands over the next 25 years:

MWDOC Service Area Water Supply Projections (AF)						
Water Source	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
OCWD Basin GW	192,652	231,936	236,430	236,506	236,280	236,274
Non-OCWD GW	21,267	22,734	24,747	24,763	24,740	24,890
Recycled Water	42,330	52,017	53,891	56,926	57,043	57,094
Surface Water	9,897	4,700	4,700	4,700	4,700	4,700
MET (Retail M&I)	142,879	119,743	120,573	123,502	123,107	122,819
Total M&I Demand	**409,025**	**431,130**	**440,341**	**446,398**	**445,870**	**445,778**
MET Irvine Lake Fill (Non-M&I)	649	4,017	4,017	4,017	4,017	4,017
MET GW Replenishment (Non-M&I)	18,027	45,000	45,000	45,000	45,000	45,000
Total non- M&I Demand	**18,676**	**49,017**	**49,017**	**49,017**	**49,017**	**49,017**
Total Water Demand	**427,701**	**480,147**	**489,358**	**495,415**	**494,887**	**494,795**

Source: MWDOC Draft 2020 UWMP, Table 4-1

MWDOC Reliability

Based on Metropolitan's supply capabilities and demand projections, MWDOC will be able to meet its service area demands under average year, single dry year, and five dry year scenarios. These projections represent the amount of supplies projected to meet MWDOC demands, as MWDOC will only purchase the amount of water needed to meet its service area demands via Metropolitan. Note that the supply and demand comparison provided below is specific to anticipated demands for imported water on MWDOC.

MWDOC Five Dry Years Supply and Demand Comparison (in Acre-Feet)						
		2025	2030	2035	2040	2045
First year	Supply totals	171,291	176,121	177,446	179,846	179,449
	Demand totals	171,291	176,121	177,446	179,846	179,449
	Difference	**0**	**0**	**0**	**0**	**0**
Second year	Supply totals	172,454	176,297	178,067	179,762	179,389
	Demand totals	172,454	176,297	178,067	179,762	179,389
	Difference	**0**	**0**	**0**	**0**	**0**
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	Demand totals	173,618	176,473	178,688	179,678	179,328
	Difference	**0**	**0**	**0**	**0**	**0**
Fourth year	Supply totals	174,781	176,649	179,309	179,594	179,267
	Demand totals	174,781	176,649	179,309	179,594	179,267
	Difference	**0**	**0**	**0**	**0**	**0**
Fifth year	Supply totals	175,945	176,825	179,930	179,510	179,206
	Demand totals	175,945	176,825	179,930	179,510	179,206
	Difference	**0**	**0**	**0**	**0**	**0**

Source: MWDOC Draft 2020 UWMP, Table 7-4

MWDOC's Water Shortage Contingency Plan

Water Shortage Contingency Plan (WSCP) requirements were substantially modified as a result of SB 606 in 2018. MWDOC's WSCP will serve as the document for guiding MWDOC's shortage actions and levels, and can help support member agency's WSCPs. Additions to MWDOC's WSCP are:

- **Annual Water Supply and Demand Assessment Procedures** - The Annual Assessment is a determination of the near-term outlook for supplies and demands and how a perceived shortage may relate to WSCP shortage stage response actions in the current calendar year. Starting in 2022, the Annual Assessment will be due to DWR by July 1 of every year.
- **Six Standard Shortage Levels** - Per Water Code Section 10632 (a)(3)(A), MWDOC must include the six standard water shortage levels that represent shortages from the normal reliability as determined in the Annual Assessment. The six standard

water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10%, 20%, 30%, 40%, 50%, and greater than 50% shortage).

- **Shortage Response Action**s – The WSCP contains specific shortage response actions that align with the defined shortage levels to help reduce the anticipated gap that may result from shortage conditions. Shortage response actions may be demand management measures or supply augmentation measures.
- **Seismic Risk Assessment and Mitigation Plan**- Per the Water Code Section 10632.5, Suppliers are required to assess seismic risk to water supplies as part of their WSCP. MWDOC relies upon information contained in the Hazard Mitigation Plan, which evaluates hazards applicable to all jurisdictions in its entire planning area, prioritized based on probability, location, maximum probable extent, and secondary impacts.
- **Communication Protocols** - This section includes specific communications protocols MWDOC would trigger to address each shortage level and response actions implemented. This element is focused on communicating the water shortage contingency planning actions that would be derived from the results of the Annual Water Supply and Demand Assessment.
- **Legal Authorities** – Per Water Code Section 10632 (a)(7)(A), MWDOC must specify that it has the ability to implement and enforce its shortage response actions outlined in its WSCP and coordinate with Cities and Counties in its Service Area.

Water Shortage Contingency Plan Levels (Simplified)		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions**
0	0% (Normal)	A Level 0 Water Supply Shortage –Condition exists when MWDOC notifies its water users that no supply reductions are anticipated in this year.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when no supply reductions are anticipated, a consumer imported demand reduction of up to 10% is recommended to make more efficient use of water and respond to existing water conditions.
2	11% to 20%	A Level 2 Water Supply Shortage – Condition exists when MWDOC notifies its member agencies that due to drought or other supply reductions, a consumer imported demand reduction of up to 20% is necessary to make more efficient use of water and respond to existing water conditions.
3	21% to 30%	A Level 3 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 30% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection.
4	31% to 40%	A Level 4 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 40% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection.

5	41% to 50%	A Level 5 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection.
6	>50%	A Level 6 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that greater than 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection.

Appendix C – Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance

Under the Sacramento-San Joaquin Delta Reform Act of 2009, state and local public agencies proposing a covered action in the Delta must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the Delta Stewardship Council (DSC). DSC Policy WR P1 (Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance) states that an urban water supplier that anticipates participating in or receiving water from a proposed covered action such as a conveyance facility that involves transferring water through, exporting water from, or using water in the Delta should provide information in their 2015 and 2020 UWMPs.

With Metropolitan's anticipated participation in a covered action, as outlined in DSC Policy WR P1, Metropolitan and its Member Agencies and sub-agencies must provide the applicable information in both their 2015 and 2020 UWMPs. MWDOC has been closely coordinating with Metropolitan and MWDOC's member agencies to ensure that the intent of WR P1 is implemented in the UWMPs to the closest extent possible. MWDOC's information relevant to WR P1 is included in its Appendix C of its 2020 UWMP.

MWDOC and its member agencies have significantly reduced their reliance on the Delta as highlighted in the tables included in MWDOC's Appendix C:

- Near-term (2025) – Normal water year regional self-reliance is expected to increase by 243 TAF from the 2010 baseline; this represents an increase of about 30 percent of 2025 normal water year retail demands (Table C-2).
- Long-term (2040) – Normal water year regional self-reliance is expected to increase by nearly 265 TAF from the 2010 baseline, this represents an increase of about 38 percent of 2040 normal water year retail demands (Table C-2).

Of note, Appendix C was not included in DWR guidance for the 2015 UWMPs and was therefore not included in Metropolitan's, MWDOC's, or its Member Agencies' UWMPs. As part of the 2020 UWMP Public Hearing and Adoption action in May, MWDOC will consider appending MWDOC's 2020 Appendix C to its 2015 UWMP to ensure compliance with WR P1.

Timeline for the 2020 UWMP Completion

Date	Action
March 12	Release of Internal Draft of the MWDOC 2020 UWMP
March 18	Presentation of Draft UWMP at Member Agency Manager Meeting
March 29	Deadline for Member Agency comments to be considered for the Public Review Draft
April 5	Public Review Draft presented at the MWDOC Planning and Operations Committee
April 23	Deadline for Comments on the Public Draft of the UWMP
May 3	Final UWMP presentation at MWDOC Planning and Operations Committee
May 19	Final UWMP Public Hearing and Adoption
July 1	Deadline to submit 2020 UWMP, WSCP, and 2015 Addendum to DWR

Attachment A – OCWD's March 26, 2021 Letter re: MWDOC 2020 Urban Water Management Plan Draft Comments

Attachment B – Draft 2020 UWMP Planning and Operations Presentation

Attachment C – MWDOC DRAFT 2020 Urban Water Management Plan, April 2020

SINCE 1933

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

March 26, 2021

Mr. Robert J. Hunter
General Manager
Municipal Water District of Orange County
18700 Ward Street
Fountain Valley CA 92708

SUBJECT: MWDOC 2020 Urban Water Management Plan Draft Comments

Dear Mr. Hunter:

The Orange County Water District (OCWD) would like to provide comments on the Municipal Water District of Orange County (MWDOC) 2020 Urban Water Management Plan Draft and asks that these comments be included in the release of the draft document for public comment. Our comments are as follows:

1. Page 1-1 - Change the second sentence in the second paragraph to read "…MWDOC has been assisting its member agencies to manage both their water supplies and demands."
2. Page 2-3 – Change the first sentence in the fourth bullet to read "…the primary source of groundwater for 19 retail water suppliers in OC."
3. Page 2-4 – Change the first sentence in the second paragraph to read "As the local wholesale supplier of imported water, MWDOC represents the interests of all but three OC retail water suppliers at MET…"
4. Page 3-5 – In the second paragraph you state that over 45 years your programs have reached nearly 3,000,000 students. Could you clarify how you arrived at that number?
5. Page 4-1 – Change the first sentence in the first paragraph to read "…insight into MWDOC's member agencies future water demands…"
6. Page 4-2 – Change the first sentence in the third paragraph to read "…33.4% of MWDOC's member agencies total water use."
7. Page 4-2 - Change the first sentence in the fourth paragraph to read "…methodology, MWDOC's member agencies total water demands (by source) for the next 25 years are also shown in table 4-1. By 2045, total water demands are projected…"
8. Page 4-3 – Are the values in the first row of Table 4-1 based on the latest estimate from OCWD?
9. Page 4-4 – Change the second sentence in the first paragraph of Section 4.2.1 to read "…percent of MWDOC's member agencies total demands."

10. Page 4-6 – Change the first sentence in the first paragraph of Section 4.3.1 to read “In 2021, MWDOC & OCWD, in collaboration with their member agencies, led the effort…”
11. Page 6-1 – Change the first sentence in the first paragraph to read “…MWDOC’s water supply along with a description of the groundwater, wastewater and recycled water provided by other agencies.”
12. Page 6-2 – Change the title of Figure 6-1 to “2019-2020 WATER SUPPLY SOURCES”
13. Page 6-3 – Change the second sentence in the second paragraph to read “…discussion of the water supply sources in MWDOC’s service area, as well as evaluate…”
14. Page 6-27 – Change the number in the first sentence of the first paragraph from 285,000 to 286,550
15. Page 6-27 – Delete the first sentence of the third paragraph. The OC Basin was not required to submit a GSP
16. Page 6-27 – Change the number in the last sentence of the last paragraph from 82% to 77%
17. Page 6-29 – Change the second sentence in the first paragraph to read “…OCWD exempts a portion of the BEA for their…”
18. Page 6-29 – Change the last sentence in the first paragraph to read “…without having to pay the full BEA for the amount…”
19. Page 6-29 – Add the following sentence to the end of the first paragraph “Coastal pumpers receive BEA revenue from OCWD to assist in offsetting their additional water supply cost from taking less groundwater.”
20. Page 6-29 – Change the number in the third sentence of the fourth paragraph from 82% to 77%
21. Page 6-29 – Change the second sentence in the last paragraph to read “recharged in the Kraemer, Miller, Miraloma and La Palma Basins.”
22. Page 6-40 – In Section 6.3.2.5 you did not include the IRWD Wells 21 & 22 Project
23. Page 6-42 – Change the first sentence in the fifth paragraph to read “In FY 2019-20, two percent of the water supply in MWDOC’s service area was attributed to…”
24. Page 6-43 – Change the last sentence in the third paragraph to read “…published in 2021 and OCWD anticipates that the Prado Dam Water Control Manual will be updated by the US Army Corps of Engineers in 2021 to include stormwater capture to elevation 505 feet year round.”
25. Page 6-43 – Change the last sentence in the last paragraph to read “…as well as MWDOC’s member agencies projected recycled…”
26. Page 6-45 – Change the last sentence in the fourth paragraph to read “The treatment process is described on OCWD’s website.”
27. Page 6-45 – Change the number in the third sentence of the fifth paragraph from 72% to 77%.

28. Page 6-51 – Delete the first paragraph on the OCWD Groundwater Replenishment System Expansion. OCWD is in the process of constructing its final expansion and in doing so will be at its ultimate capacity and recycling 100% of OC San's recyclable wastewater.
29. Page 6-54 – Change the first sentence in the third paragraph of Section 6.8.1.2 to read "…success in accessing water in the OC Basin…"
30. Page 6-55 – In Section 6.8.2 the MWRF Expansion project really doesn't fit the classification of a desalter and you have omitted the IRWD Wells 21 & 22 Project
31. Page 7-6 – Change the number in the first sentence of the fourth paragraph from 285,000 to 286,550

Thank you for consideration of these comments.

Sincerely,

Michael R. Markus, P.E., D.WRE, BCEE, F.ASCE
General Manager

Cc: Harvey De La Torre, MWDOC
John Kennedy, OCWD
Greg Woodside, OCWD

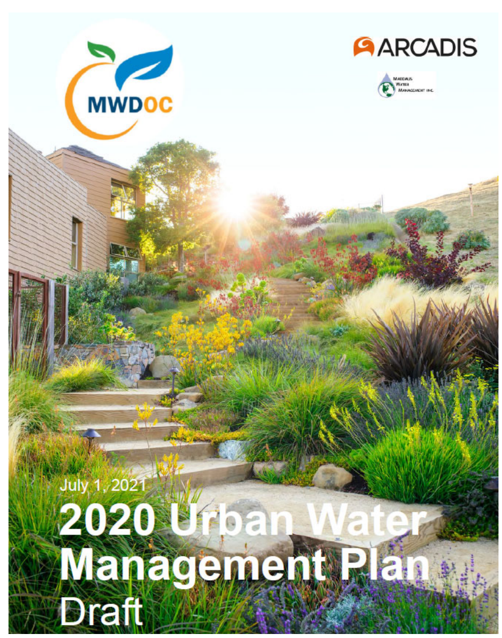
MWDOC's 2020 Draft Urban Water Management Plan

Municipal Water District of Orange County

Planning and Operations: April 5, 2021

Urban Water Management Plans

- Required pursuant to 1983 Urban Water Management Planning Act
  - Water Code § 10610 – 10656
- Threshold – Every Urban Water Supplier that provides water to 3,000 or more customers or provides over 3,000 acre-feet of water annually
- Updates are due every five years
- Plans must be submitted to DWR by July 1, 2021



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UWMP Overview

MWDOC

3

MAKING WATER CONSERVATION A CALIFORNIA WAY OF LIFE

Primer of 2018 Legislation on Water Conservation and Drought Planning
Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)

PREPARED BY

California Department of Water Resources

AND

Water Boards

State Water Resources Control Board

NOVEMBER 2018

Major New Elements of the 2020 UWMP

- Major Changes due to SB 606 & AB 1668
  - Addition of a five dry-year analysis on the reliability assessment
  - Drought Risk Assessment for certification of water supplies for the upcoming year.
  - Inclusion of Water Loss Reporting
  - Major Changes to Water Shortage Contingency Plans
- Delta Stewardship Council Policies
  - Appendix C – Reduced Reliance on the Delta

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MWDOC's Regional Approach

- MWDOC's UWMP is a regionally focused plan
- Provides analysis and information at the regional level
  - Water Demand Projections and supply analysis
  - SBx7-7 by 2020 – O.C. Regional Alliance
  - Water Use Efficiency activities and efforts
- Coordination of Water Shortage Contingency Plans & Model Drought Ordinance

MWDOC

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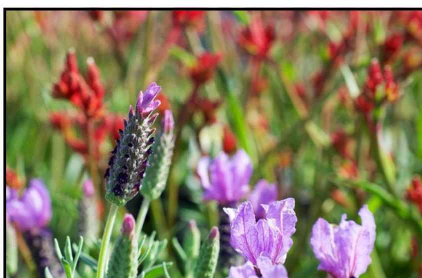

MWDOC 2020 UWMP

- MWDOC's UWMP demonstrates the supply capabilities to meet expected demands from 2025 to 2045 under average, single-dry year, and five dry-year conditions
- Includes MET's 2020 UWMP supply conditions assumptions which ensures reliability
- Includes OCWD's and other groundwater basin management estimates
- Includes key assumptions in Orange County Reliability Study
- Includes local demand and supply information from the Member Agencies
- Water Shortage Contingency Plan will now be "stand alone"

MWDOC

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Imported Supplies - Metropolitan

- MWDOC's Supply and Demand analysis is specific to imported water
- MET's 2020 UWMP analysis shows sufficient supplies to meet all anticipated demands in all water year conditions
- Includes the most recent information from DWR and MET on export deliveries from the SWP
- Does not include supplies from the Delta Conveyance Project
- Integrates MET's water shortage contingency plan including their water supply allocation plan and six standard shortage levels

MWDOC

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Future Local Projects

- Orange County Water District
  - UWMP assumes a Basin Pumping Percentage (BPP) of 85% starting in 2025 and covering the 25 year planning horizon per OCWD
  - Inclusion of OCWD/OCSD Groundwater Replenishment System (GWRS) final expansion
- Recycled Water & Groundwater Recovery Projects
  - Coordination with member agencies and wastewater districts
- Ocean Desalination
  - Description of the efforts in Doheny and Huntington Beach

MWDOC

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MWDOC Service Area Demands

- 2020 MWDOC UWMP Demands are based on a collaboration between CDM Smith Member Agency Demands and the Member Agencies
  - For agencies that submitted their own projections for demands, those were used in-lieu of CDM Smith's.
- Dry Year Analysis
  - Based on the 2016 OC Reliability Study
  - Single Dry Year = FY 2013-14
  - Five Dry Years = FY 2011/12-FY 2015-16
  - Conservative Scenario of a 6% increase in demands during dry years

MWDOC's Demands

MWDOC Service Area Water Supply Projections (AF)

Water Source	2020	2025	2030	2035	2040	2045
OCWD Basin GW	192,652	231,936	236,430	236,506	236,280	236,274
Non-OCWD GW	21,267	22,734	24,747	24,763	24,740	24,890
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MWDOC's Supply and Demand Assessment

Five Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045
First year	Supply totals	171,291	176,121	177,446	179,846	179,449
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	Demand totals	175,945	176,825	179,930	179,510	179,206
	Difference	0	0	0	0	0

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MWDOC Water Shortage Contingency Plan

- Stand Alone Document that can be update outside of the 2020 UWMP
  - Standardized for the six standard levels 10%, 20%, 30%, 40%, 50%, and greater than 50%
  - Inclusion of a 0% shortage level that contains permeant water use efficiency measures
  - Inclusion of procedures and process for an annual water supply and demand assessment
  - Includes shortage response actions and estimates of potential to close the supply gap for several major actions
- MWDOC's WSCP will help to "fold into" the Member Agency Plan's

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Appendix C – Reduced Reliance on the Delta (New)

- Agencies participating in a covered action in the Delta must comply with Delta Stewardship Council (DSC) Policies
- DSC Policy WR-P1 - *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance*
- Metropolitan, MWDOC, and the retail agencies are all required to complete Appendix C
- MWDOC has been closely coordinating with Metropolitan
  - Appendix C in MWDOC's 2020 UWMP reflects MWDOC investments in conservation and member agency projects that have reduced reliance on the Delta
- MWDOC's 2020 Appendix C will be appended to the 2015 UWMP to ensure compliance with WR P1

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Reduce Reliance on the Delta

- Near-term (2025) –regional self-reliance is expected to increase by 243 TAF from the 2010 baseline
  - Represents about 30 percent of 2025 normal water year retail demands compared to the baseline
- Long-term (2040) –Regional self-reliance is expected to increase by nearly 265 TAF from the 2010 baseline
  - Represent about 38 percent of 2040 normal water year retail demands compared to the baseline
- MWDOC and its Member Agencies have made significant efforts in Conservation and local projects to increase Regional self-reliance

MWDOC

Next Steps

March 12	Release of Internal Draft of the MWDOC 2020 UWMP
March 18	Presentation of Draft UWMP at Member Agency Manager Meeting
March 29	Deadline for Member Agency comments to be considered for the Public Review Draft
April 5	Public Review Draft presented at the MWDOC Planning and Operations Committee
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May 19	Final UWMP Public Hearing and Adoption
July 1	Deadline to submit UWMP, WSCP, and Addendum to DWR

Questions?

- Staff is available for any questions

April 1, 2021

2020 Urban Water Management Plan

Draft

2020 URBAN WATER MANAGEMENT PLAN

Sarina Sriboonlue, PE
Project Manager

Prepared for:

Municipal Water District of Orange County

18700 Ward Street

Fountain Valley, California 92708

Prepared by:

Arcadis U.S., Inc.

320 Commerce

Suite 200

Irvine

California 92602

Tel 714 730 9052

Fax 714 730 9345

Our Ref:

30055240

Date:

April 1, 2021

MESSAGE FROM THE BOARD OF DIRECTORS

Since the Municipal Water District of Orange County's (MWDOC) formation in 1951, MWDOC has remained steadfast in its commitment to provide a reliable supply of high-quality water for Orange County at a reasonable rate.

Through leadership, representation at the Metropolitan Water District of Southern California (MET), and collaboration with our retail agencies, MWDOC seeks opportunities to improve Orange County's water resources and reliability. By integrating local planning challenges and regional stakeholder partnerships, MWDOC maximizes water system reliability and overall system efficiencies. MWDOC works to expand Orange County's water supply portfolio by providing planning and local resource development in the areas of recycled water, groundwater, ocean water desalination, and water-use efficiency.

DIRECTORS

Division 1 Al Nederhood

Brea, Buena Park, portions of Golden State Water Company, La Habra, La Palma, Yorba Linda Water District.

Division 2 Larry D. Dick

Garden Grove, Orange, Tustin and Villa Park, and unincorporated North Tustin.

Division 3 Robert R. McVicker

Cypress, Fountain Valley, Los Alamitos, Stanton, Westminster, the western portion of Garden Grove, and nearby portions of unincorporated Orange County

Division 4 Karl Seckel

Huntington Beach, Seal Beach, and portions of Costa Mesa, Irvine and Newport Beach.

Division 5 Sat Tamaribuchi

Newport Beach, Laguna Woods, portions of Irvine, Lake Forest, Laguna Hills, Aliso Viejo, and parts of Mission Viejo.

Division 6 Jeffery M. Thomas

Tustin and Rancho Santa Margarita, portions of Irvine, Lake Forest, Mission Viejo, San Juan Capistrano, and San Clemente.

Division 7 Megan Yoo Schneider

Aliso Viejo, Dana Point, Laguna Beach, Laguna Hills, Laguna Niguel, Mission Viejo, San Clemente, and San Juan Capistrano.

MISSION STATEMENT

"To provide reliable, high-quality supplies from Metropolitan Water District of Southern California and other sources to meet present and future needs, at an equitable and economical cost, and to promote water use efficiency for all of Orange County."

CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

%	Percent
20x2020	20% water use reduction in GPCD by year 2020
ACWRF	Aliso Creek Water Reclamation Facility
ADU	Accessory Dwelling Unit
AF	Acre-Feet
AFY	Acre-Feet per Year
AVEK	Antelope Valley-East Kern
AWTP	Advanced Water Treatment Plant
AWWA	American Water Works Association
Base	Marine Corps Base, Camp Pendleton
Basin 8-1	Orange County Grounwater Basin
BEA	Basin Equity Assessment
Biops	Biological Opinions
BMP	Best Management Practice
BPP	Basin Production Percentage
BPOU	Baldwin Park Operable Unit
CDR	Center for Demographic Research
CDWC	California Domestic Water Company
CLWUE	Comprehensive Landscape Water Use Efficiency
CII	Commercial/Industrial/Institutional
COA	Coordinated Operation Agreement
CRA	Colorado River Aqueduct
CTP	Coastal Treatment Plant
CUP	Conjunctive Use Program
CVP	Central Valley Project
CWRP	Chiquita Water Reclamation Plant
DATS	Deep Aquifer Treatment System
DDW	Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DLR	Detection Limit for Purposes of Reporting
DMM	Demand Management Measure
DOF	Department of Finance
DRA	Drought Risk Assessment
DPR	Direct Potable Reuse
DVL	Diamond Valley Lake
DWR	California Department of Water Resources
EBSD	Emerald Bay Services District
EIR	Environmental Impact Report

EOCWD	East Orange County Water District
ESA	Endangered Species Act
ET	Evapotranspiration
ETWD	El Toro Water District
FIRO	Forecast Informed Reservoir Operations
FY	Fiscal Year
GAC	Granular Activated Carbon
GAP	Green Acres Project
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GRF	Groundwater Recovery Facility
GRP	Groundwater Reliability Plan
GSA	Groundwater Sustainabiltiy Agency
GSP	Groundwater Sustainability Plan
GSWC	Golden State Water Company
GWRP	Groundwater Recovery Plant
GWRS	Groundwater Replenishment System
GWRSFE	Groundwater Replenishment System Final Expansion
HEN	High Efficiency Sprinkler Nozzle
HET	High Efficiency Toilet
ICS	Intentionally Created Surplus
IPR	Indirect Potable Reuse
IRP	Integrated Water Resources Plan
IRWD	Irvine Ranch Water District
ITP	Incidental Take Permit
JADU	Junior Accessory Dwelling Unit
LAWRP	Los Alisos Water Recycling Plant
LBCWD	Laguna Beach County Water District
LRP	Local Resources Program
M&I	Municipal and industrial
MAF	Million Acre-Feet
MAF	Million Acre-Feet per Year
MCL	Maximum Contaminant Level
Mesa Water	Mesa Water District
MET	Metropolitan Water District of Southern California
MF	Microfiltration
MGD	Million Gallons per Day
MNWD	Moulton Niguel Water District
MTBE	Methyl Tert-Butyl Ether

MWDOC	Municipal Water District of Orange County
MWRF	Mesa Water Reliability Facility
MWRP	Michelson Water Recycling Plant
NDMA	N-nitrosodimethylamine
OC Basin	Orange County Groundwater Basin
OC San	Orange County Sanitation District
OCWD	Orange County Water District
OCWRP	Oso Creek Water Reclamation Plant
OSY	Operating Safe Yield
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
Plan	Urban Water Management Plan
Poseidon	Poseidon Resources LLC
PPCP	Pharmaceuticals and Personal Care Product
PPB	Parts per Billion
PPT	Parts Per Trillion
RA	Replenishment Assessment
RDA	Resource Development Assessment
RHNA	Regional Housing Needs Assessment
RO	Reverse Osmosis
RoC on LTO	Reinitiation of Consultation for Long-Term Operations
RRWTP	Robinson Ranch Wastewater Treatment Plant
RTP	Regional Treatment Plant
RWQCB	Regional Water Quality Control Board
SARCCUP	Santa Ana River Conservation and Conjunctive Use Program
SBx7-7	Senate Bill 7 as part of the Seventh Extraordinary Session, Water Conservation Act of 2009
SCAB	South Coast Air Basin
SCAG	Southern California Associations of Governments
SCWD	South Coast Water District
SDCWA	San Diego County Water Authority
SDP	Seawater Desalination Program
Serrano	Serrano Water District
SJBA	San Juan Basin Authority
SMWD	Santa Margarita Water District
SNWA	Southern Nevada Water Authority
SOCWA	South Orange County Wastewater Authority
SWP	State Water Project
SWRCB	California State Water Resources Control Board

TAZ	Traffic Analysis Zone
TCWD	Trabuco Canyon Water District
TDS	Total Dissolved Solids
TVMWD	Three Valleys Municipal Water District
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USGVMWD	Upper San Gabriel Valley Municipal Water District
UV	Ultraviolet
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act of 1983
VOC	Volatile Organic Compounds
WRD	Water Replenishment District of Southern California
WRF	Water Research Foundation
WRP	Water Recycling Plant
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
YLWD	Yorba Linda Water District

EXECUTIVE SUMMARY

INTRODUCTION AND UWMP OVERVIEW

The Municipal Water District of Orange County (MWDOC) prepared this 2020 Urban Water Management Plan (UWMP) to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (UWMP Act or Act) and subsequent California Water Code (Water Code) requirements. MWDOC is a wholesale water supplier that provides water to 28 retail water suppliers in Orange County using imported water supplies obtained from its regional wholesaler, Metropolitan Water District of Southern California (MET).

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 MWDOC's service area. It presents an update to the 2015 UWMP on the MWDOC'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

MWDOC coordinated the preparation of this 2020 UWMP with other key entities, including MET (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), Orange County Water District (OCWD) (Orange County Groundwater Basin [OC Basin] manager and provider of recycled water in north Orange County), and retail water suppliers in Orange County which include MWDOC's 28 member agencies and the three cities which are direct members of MET – Anaheim, Fullerton, and Santa Ana. MWDOC 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.

SYSTEM DESCRIPTION

MWDOC was formed by Orange County voters in 1951 under the Municipal Water District Act of 1911 to provide imported water to inland areas of Orange County. Governed by an elected seven-member Board of Directors, MWDOC is MET's third largest member agency based on assessed valuation. Today, MWDOC manages all of Orange County's imported water supply except for water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC is committed to ensuring water reliability for more than 2.34 million residents in its 600-square-mile service area. Although MWDOC does not own water facilities and does not have jurisdiction over local supplies, it works to ensure the delivery of reliable water supplies to the region. MWDOC focuses on sound planning and appropriate investments in water supply, water use efficiency, regional delivery infrastructure, and emergency preparedness.

WATER USE CHARACTERIZATION

MWDOC is the wholesale provider of treated and untreated imported water from MET for municipal and industrial (M&I) uses (i.e. direct uses) and non-M&I (indirect uses e.g. groundwater recharge) within its service area.

MWDOC's service area M&I water use has consistently exceeded 400,000 acre-feet per year (AFY) until recently. Since fiscal year (FY) 2013-14, as a result of drought, retail water usage (including recycled water) began to trend downward. FY 2015-16 was the first year that water use in the MWDOC's service area dropped below 400,000 AF due to large-scale water efficiency efforts undertaken by MWDOC and member agencies.

25-year Water Use Projection

Over the next five years, MWDOC's total service area water demands are expected to gradually increase between now and 2023 due to projected growth in M&I demands. However, the bulk of the increase in demands are projected in 2024 and 2025 due to indirect imported demands for groundwater replenishment returning in those years 2024 and 2025. The current regulatory impacts of PFAS in the OC Basin has reduced the need for purchasing any imported groundwater replenishment water, due to reductions in groundwater pumping expected to last until 2023. Over the next 25 years, total water demands within the MWDOC service area are projected to increase by about 15% from approximately 428,000 acre-feet (AF) in 2020 to approximately 495,000 AF by 2045. This demand projection considers such factors as current and future demographics, future conservation measures, and ground and surface water needs.

CONSERVATION TARGET COMPLIANCE

MWDOC in collaboration with all its retail member agencies as well as the Cities of Anaheim, Fullerton, and Santa Ana, created the Orange County 20x2020 Regional Alliance to assist retail agencies in complying with the requirements of 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, it requires the State of California to reduce urban water use by 20% by 2020.

Retail water suppliers are required to comply with SBx7-7 individually or as a region in collaboration with other retail water suppliers, in order to be eligible for water related state grants and loans. As a wholesale water supplier, MWDOC is not required to establish a baseline or set targets for daily per capita water use itself. Orange County, as a region, had a 2020 target water use of 159 gallons per capita per day (GPCD). The actual water use in 2020 was 109 GPCD which is well below its target. This is indicative of the collective efforts of MWDOC and retail agencies in reducing water use in the region.

WATER SUPPLY CHARACTERIZATION

Imported water from MET accounts for about 33% of MWDOC's service area water use. The other 67% is from various other sources, including groundwater from the OC Basin, groundwater from other smaller groundwater basins such as the Main San Gabriel Basin, and recycled water. The Orange County Sanitation District (OC San) and South Orange County Wastewater Authority (SOCWA) are the wastewater providers of North county and South county agencies, respectively. A few MWDOC member agencies produce their own recycled water.

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 multiple dry water years. The water service reliability assessment compares projected supply to projected demand for three long-term hydrological conditions: a normal year, a single dry year, and a drought period lasting five consecutive years. MWDOC as an imported water provider relies on its wholesaler's water reliability assessments which concluded that it will be able to meet MWDOC's service area demands for imported water under normal, single-dry, and five-year consecutive dry conditions over the next 25 years (2020 – 2045).

Overall, MWDOC's service area depends on a combination of imported and local supplies to meet its service area water demands. MWDOC has taken numerous steps to ensure its member agencies have adequate supplies. Development of numerous local sources augment the reliability of the imported water system. The water supplies available to the MWDOC service area are projected to meet full-service demands based on the findings by MET in its 2020 UWMP starting 2021 through 2045 during normal years, single dry year, and five consecutively dry years.

WATER SHORTAGE CONTINGENCY PLANNING

Water shortage contingency planning is a strategic planning process that MWDOC 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 MWDOC WSCP provides a 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 MWDOC 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 MWDOC 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

MWDOC has demonstrated its commitment to water use efficiency through multi-faceted and holistic water use efficiency programs. As a wholesaler, MWDOC facilitates implementation of DMM throughout Orange County. MWDOC's efforts focus on the following three areas: Regional Program Implementation, Local Program Assistance, and Research and Evaluation. MWDOC develops, obtains funding for, and implements regional water savings programs on behalf of all retail water agencies in Orange County. This approach minimizes confusion to consumers by providing the same programs with the same participation guidelines, maintains a consistent message to the public to use water efficiently, and provides support to retail water agencies by acting as program administrators for the region. MWDOC provides assistance to a variety of local programs including, but not limited to Water Loss Control and Management Program, and Public Outreach and School Education Program.

1 INTRODUCTION AND UWMP OVERVIEW

MWDOC prepared this 2020 UWMP to submit to the California Department of Water Resources (DWR) to satisfy the UWMP Act of 1983 (UWMP Act or Act) and subsequent California Water Code (Water Code) requirements. MWDOC is a wholesale water supplier that provides water to 28 retail water suppliers in Orange County using imported water supplies obtained from its regional wholesaler, Metropolitan Water District of Southern California (MET). MWDOC, as one of MET's 26 member agencies, has prepared this 2020 UWMP in collaboration with MET and its own member 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, MWDOC has been assisting its member agencies to manage both their water supplies and demands. 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 actions that MWDOC has taken 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 MWDOC's service area. It presents an update to the 2015 UWMP on the MWDOC'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.

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 six and one.

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 Standards - SB 555. New UWMP requirements in 2020 are a direct result of these new water regulations. Two complimentary 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 10 percent to greater than 50 percent; 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; and reevaluation and improvement procedures for evaluating the WSCP.
- **Drought Risk Assessment –**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 (GSPs), 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 MWDOC’s story of water supply reliability and plans 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 MWDOC, lists the type of year and units of measure used and introduces the coordination and outreach activities conducted by MWDOC to develop this UWMP.

Section 3 System Description gives a background on MWDOC and its climate characteristics, population projections, 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 for MWDOC and the projection methodology used by MWDOC to develop the 25-year projections**.**

Section 5 Conservation Target Compliance reports data of the Orange County Regional Alliance, which is administered by MWDOC to track the SB X7-7 water use conservation target compliance of all the retail agencies in Orange County, i.e., the member agencies of MWDOC and the cities of Anaheim, Fullerton, and Santa Ana.

Section 6 Water Supply Characterization describes the current water supply portfolio of MWDOC 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 MWDOC'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 which provides a structured guide for MWDOC 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 description of the MWDOC's current and planned measures and programs to help the retail customers in its service area comply with their SB X7-7 water use conservation targets.

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

2 UWMP PREPARATION

MWDOC's 2020 UWMP is an individual UWMP for MWDOC to meet the California Water Code (Water Code) compliance as a wholesale water supplier. While MWDOC opted to prepare its own UWMP and meet Water Code compliance individually, the development of this UWMP involved close coordination with its member agencies, its wholesale supplier MET, along with other key entities within the region.

2.1 Individual Planning and Compliance

MWDOC opted to prepare its own UWMP (Table 2-1) and comply with the Water Code individually, while closely coordinating with MET 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). All of DWR Submittal Tables are provided in Appendix B.

Generally, MWDOC and the majority of its retail member agencies selected to report demands and supplies using fiscal year as the 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**
☑	**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 *	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
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

MWDOC, as the wholesale water supplier, coordinated this UWMP preparation with other key entities, including MET (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), Orange County Water District (OCWD) (OC Groundwater Basin [OC Basin or “Basin 8-1”] manager and provider of recycled water in north OC), and retail water suppliers in OC which include MWDOC’s 28 member agencies and the three cities which are direct members of MET – Anaheim, Fullerton, and Santa Ana. MWDOC 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.

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

- **MET's 2020 Integrated Water Resources Plan (IRP)** (In progress) 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 availability assessment and guide for MET's intended actions during water shortage conditions, which determine MWDOC's shortage conditions.
- **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 the MWDOC's service area.
- **OCWD's Groundwater Reliability Plan (GRP)** (to be finalized after July 2021) provides the latest information on groundwater management and supply projection for the OC Basin, the primary source of groundwater for 19 retail water suppliers in OC.
- **OCWD's 2019-20 Engineer's Report** provides information on the groundwater conditions and basin utilization of the OC Basin.
- **2017 Basin 8-1 Alternative** is an alternative to the GSP for the OC Basin and provides significant information related to sustainable management of the basin in the past and hydrogeology of the basin, including groundwater quality and basin characteristics.
- **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 Plans and Sewer Master Plans** of the cities and counties serving within the MWDOC's service area provide information on water infrastructure planning projects and plans to address any required water system improvements.
- **Groundwater Management Plans** provide the groundwater sustainability goals for the basins in the MWDOC's service area and the programs, actions, and strategies activities that support those goals.

Statewide Water Planning

In addition to regional coordination with various agencies described above, MWDOC as a MET 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, MWDOC has demonstrated a reduction in Delta reliance and a subsequent improvement in regional self-reliance. For a detailed description and documentation of MWDOC's consistency with Delta Plan Policy WR P1 see Section 7.4 and Appendix C.

2.2.2 Wholesale and Retail Coordination

All MWDOC retail member agencies developed their UWMPs in conjunction with MWDOC's UWMP. Per the Water Code requirements to help its retail customers develop their own UWMPs, MWDOC facilitated the projections of the water demand by retail agency and supply that will be available from MWDOC over the next 25 years. Table 2-3 lists these retail water suppliers.

As the local wholesale supplier of imported water, MWDOC represents the interests of all but three OC retail water suppliers at MET and administers various regional programs and measures to help its retail customers meet various State requirement compliance, such as the OC Regional Alliance for SB x7-7 compliance, regional water loss program for SB 555 compliance, and regional water use efficiency programs. Sections 5 and 9 provide detailed information on these programs.

Table 2-3: Wholesale: Water Supplier Information Exchange

DWR Submittal Table 2-4 Wholesale: Water Supplier Information Exchange	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.
Section 3-2 (Page 3-5)	**Provide page number for location of the list.**
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631. **Complete the table below.**
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, MWDOC 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. In addition, due to the diverse population that MWDOC serves, there was a Spanish translator available at the public hearing to assist any members of the public wishing to participate in the public hearing process that may need that service.

3 SYSTEM DESCRIPTION

MWDOC was formed by Orange County voters in 1951 under the Municipal Water District Act of 1911 to provide imported water to inland areas of Orange County. Governed by an elected seven-member Board of Directors, MWDOC is MET's third largest member agency based on assessed valuation.

MWDOC is a regional water wholesaler and resource planning agency, managing all of OC's imported water supply except for water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC is committed to ensuring water reliability for more than 2.34 million residents in its 600-square-mile service area. To that end, MWDOC focuses on sound planning and appropriate investments in water supply, water use efficiency, regional delivery infrastructure, and emergency preparedness.

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, MWDOC's service area in the North OC is almost built out with predominantly residential units with pockets dedicated to commercial, institutional, governmental uses and open space and parks and the existing vacant lots in South OC are gradually transitioning to residential and commercial mixed-use areas. The current population of 2,342,740 is projected to increase by 8% over the next 25 years.

3.1 Agency Overview

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

3.1.1 Formation and Purpose

Orange County was settled around areas of surface water. San Juan Creek supplied the mission at San Juan Capistrano. The Santa Ana River supplied the early Cities of Anaheim and Santa Ana. The Santa Ana River also provided water to a large aquifer underlying the northern half of the county, enabling settlers to move away from the river's edge and still obtain water by drilling wells.

By the early 1900s, Orange County residents understood that their water supply was limited, the rivers and creeks did not flow all year long, and the aquifer would eventually be degraded or even dry up if the water was not replenished on a regular basis.

In 1928, the Cities of Anaheim, Santa Ana, and Fullerton joined with 10 other southern California cities to form MET. Their objective was to build an aqueduct from the Colorado River to provide the additional water necessary to sustain the growing southern California economy and its enviable lifestyle.

OCWD was formed in 1933 to protect the County's water rights on the Santa Ana River. Later that mission was expanded to manage the underground aquifer, optimizing use of local supplies and augmenting those with imported supplies provided through the MET's member agencies in Orange County.

It was not long before other parts of Orange County also saw the need for supplemental supplies. A severe drought in the late 1940s further emphasized this need for coastal communities from Newport Beach to San Clemente. In 1948, coastal communities from Newport Beach south to the San Diego county line formed the Coastal Municipal Water District as a way to join in the benefits provided by MET. Three years later, MWDOC was formed by Orange County voters in 1951 under the Municipal Water District Act of 1911 to provide imported water to inland areas of Orange County. To improve services and reduce cost, the Coastal Municipal Water District became a part of MWDOC in January 2001.

Today, MWDOC is MET's third largest member agency, providing and managing the imported water supplies used within its service area.

3.1.2 MWDOC Board of Directors

MWDOC is governed by an elected seven-member Board of Directors, with each board member representing a specific area of the County and elected to a four-year term by voters who reside within that part of the MWDOC service area. The Board of Directors map is shown on Figure 3-1.

Each director is a member of at least one of the following standing committees: Planning and Operations; Administration and Finance; and Executive. Each committee meets monthly. The full Board convenes for its regular monthly meeting on the third Wednesday of the month and holds a Board workshop on MET issues the first Wednesday of the month.

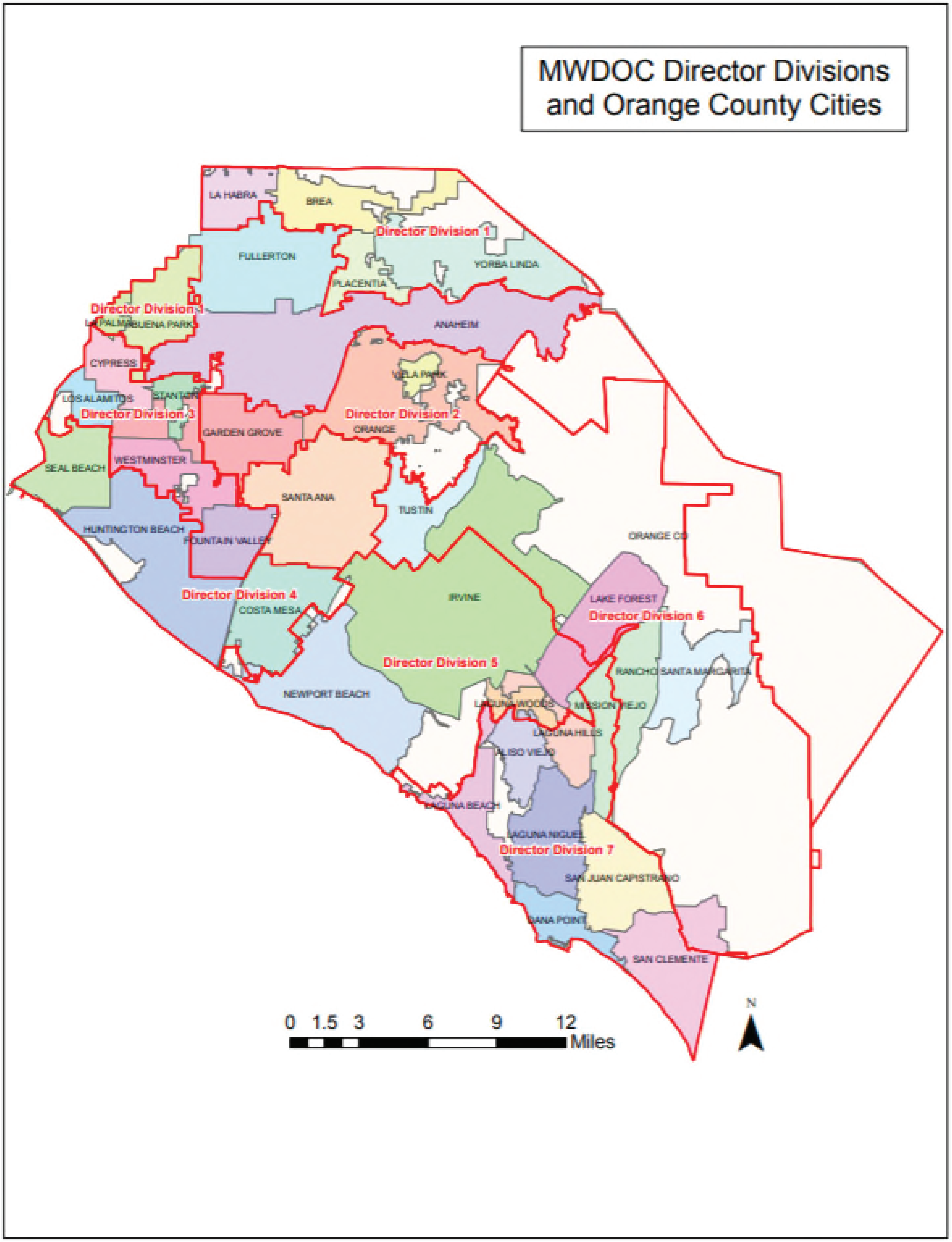


Figure 3-1: MWDOC Board of Directors Map, by Director Division

3.1.3 Relationship to MET

MWDOC became a member agency of MET in 1951 to bring supplemental imported water supplies to parts of Orange County. MET is a consortium of 26 cities and water agencies that provides supplemental water supplies to parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura Counties. MET's two main sources of supply are the Colorado River and the Delta. Supplies from these sources are delivered to southern California via the Colorado River Aqueduct (CRA) and the State Water Project (SWP). MWDOC purchases imported water from these sources from MET and sells the water to its 28 member agencies, which provide retail water services to the public.

3.1.4 Goals and Objectives

MWDOC's Mission Statement is "*To provide reliable, high-quality supplies from Metropolitan Water District of Southern California and other sources to meet present and future needs, at an equitable and economical cost, and to promote water use efficiency for all of Orange County."*

MWDOC's related water management goals and objectives are to:

- Represent the interests of the public within its jurisdiction;
- Appoint its representative directors to the Board of MET;
- Inform its directors and its retail agencies about MET issues;
- Guide MET in its planning efforts and act as a resource of information and advocate for our retail agencies;
- Purchase water from MET and represent the interest of our service area at MET;
- Work together with Orange County water agencies and others to focus on solutions and priorities for improving Orange County's future water supply reliability;
- Cooperate with and assist OCWD and other agencies in coordinating the balanced use of the area's imported and native surface and groundwater;
- Plan and manage the allocation of imported water to its retail agencies during periods of shortage;
- Coordinate and facilitate the resolution of water issues and development of joint water projects among its retail agencies;
- Represent the public and assist its retail agencies in dealing with other governmental entities at the local, regional, state, and federal levels on water-related issues; and
- Inform its retail agencies and inform and educate the general public on matters affecting present and future water use and supply.

As a regional wholesaler, MWDOC has roles that are broadly applicable to all of its retail agencies. A key goal of MWDOC is to provide broad reaching services and programs at an economy-of-scale that the retail agencies cannot reasonably provide as single entities.

Since 1991, MWDOC has offered educational classes, water use surveys, and a variety of consumer incentives for indoor and outdoor water-efficient devices for all residents and businesses throughout Orange County. Through the program, MWDOC provides a wide variety of water saving rebates and programs to residential, commercial, industrial, and institutional customers. MWDOC's programs have resulted in the conservation of more than 17.1 billion gallons of water each year.

For more than 45 years, MWDOC's Public Information and Water Education programs have reached thousands of consumers and nearly 3,000,000 Orange County students. The programs are performed on behalf of, and in coordination with, MWDOC's retail agencies and are designed to facilitate a student's understanding of current water issues as well as the challenges, opportunities, and costs involved in securing a reliable supply of high-quality water.

Additionally, as part of its multi-faceted public education effort, MWDOC sponsors the Orange County Boy Scout Council's Soil & Water Conservation Merit Badge and offers the Water Resources and Conservation Patch produced jointly with Girl Scouts.

3.2 Water Service Area

MWDOC serves more than 2.34 million residents in a 600-square-mile service area (Figure 3-2). Although MWDOC does not have its own water facilities and does not have jurisdiction over local supplies, it works to ensure the delivery of reliable water supplies to the region.

MWDOC serves imported water in Orange County to 28 water agencies. These entities, comprised of cities and water districts, are referred to as MWDOC member agencies and provide water to approximately 2.34 million customers. MWDOC retail agencies include:

- City of Brea
- City of Buena Park
- City of Fountain Valley
- City of Garden Grove
- City of Huntington Beach
- City of La Habra
- City of La Palma
- City of Newport Beach
- City of Orange
- City of San Clemente
- City of San Juan Capistrano
- City of Seal Beach
- City of Tustin
- City of Westminster
- East Orange County Water District (EOCWD)
- El Toro Water District (ETWD)
- Emerald Bay Services District (EBSD)
- Irvine Ranch Water District (IRWD)
- Golden State Water Company (GSWC)
- Laguna Beach County Water District (LBCWD)
- Mesa Water District (Mesa Water)
- Moulton Niguel Water District (MNWD)
- Orange County Water District (OCWD)
- Santa Margarita Water District (SMWD)
- Serrano Water District (Serrano)
- South Coast Water District (SCWD)
- Trabuco Canyon Water District (TCWD)
- Yorba Linda Water District (YLWD)

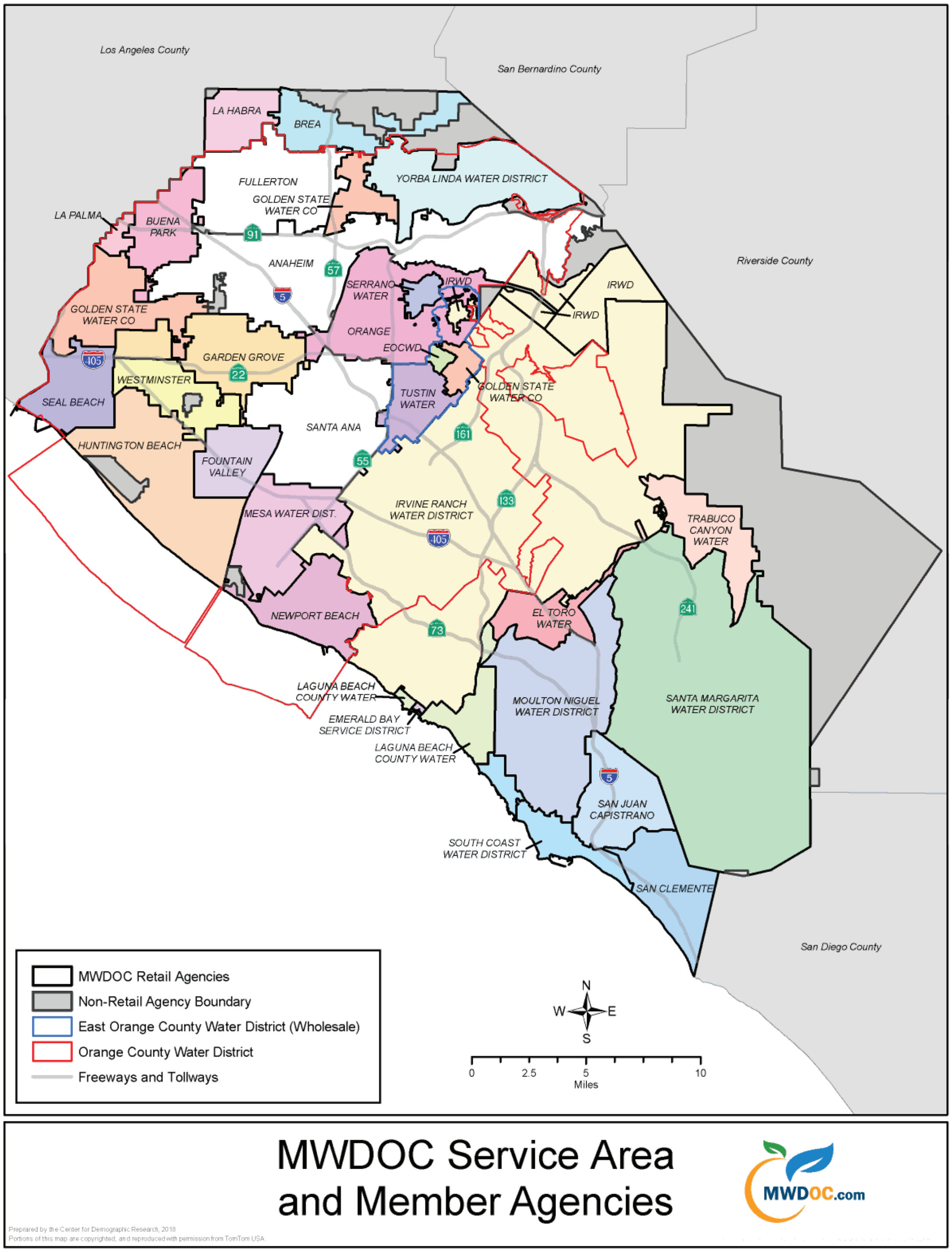


Figure 3-2: MWDOC's Water Service Area by Retail Agency

3.3 Climate

MWDOC's service area 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 and temperature greatly influence water usage in the service area. The biggest variation in annual water demand is due to changes in rainfall and temperature. In Orange County, the average daily temperatures range from 58.2 ˚F in December and January to 75.2 ˚F in August (Table 3-1). The average annual precipitation is 13.1 inches, although the region is subject to significant variations in annual precipitation (Table 3-2). The average evapotranspiration (ET_0) is above 40 inches per year (Table 3-3) which is greater than three times the annual average rainfall.

Table 3-1: OC 30-Year Average Temperature

Orange County 30-Year Average (1991-2020) Temperature													
Orange County Temperature (°F)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Average Daily High Temperature	70.3	70.3	72.2	74.2	75.7	78.6	83.6	85.5	84.7	80.4	75.1	69.2	76.6
Average Daily Temperature	59.2	59.5	61.7	63.9	66.6	69.7	73.9	75.2	74.1	69.7	63.7	58.2	66.3
Average Daily Low Temperature	48.2	48.9	51.3	53.6	57.6	60.8	64.2	64.8	63.5	58.9	52.2	47.3	55.9
Source: NOAA Weather Station (Santa Ana Fire Station #135)													

Table 3-2: OC 30-Year Average Precipitation Orange County 30-Year Average Precipitation

Orange County 30-Year Average (1991-2020) Precipitation													
Orange County Average Precipitation (Inches)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Central Orange County	3.1	3.2	1.8	0.7	0.3	0.1	0.0	0.0	0.1	0.6	0.8	2.3	13.1
Source: County of Orange Santa Ana Rainfall Station #121 (Santa Ana Crime Lab)													

Table 3-3: OC Evapotranspiration

Orange County Evapotranspiration													
Orange County ET_o	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.3
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.9
NOTE: ET_o values are from Model Water Efficient Landscape Ordinance, September 10, 2009, Appendix A: Reference ET_o Table													

Although service area demands are influenced by local rainfall and temperature, the imported water supply that MWDOC provides to its member agencies is not. It should also be noted that MET's core water supplies from the SWP and the CRA are largely influenced by climate conditions in northern California and the Colorado River Basin, respectively. Both regions have variable hydrologic conditions that can significantly impact MET's water supplies. This past decade we have seen dramatic swings in annual precipitation and temperatures on the SWP. In 2014, California saw the lowest ever "Table A" State Project Water Allocation of contract supplies and two years later in 2017, experienced the highest SWP allocation since 2006. In a similar way the Colorado River Basin also experienced annual swings in hydrology; however, the multi-year drought conditions due to record low precipitation has largely been mitigated through the large volume of water Basin States have been storing in Lake Mead to maintain the system.

3.4 Population, Demographics, and Socioeconomics

3.4.1 Service Area Population

MWDOC serves a 2020 population of 2,342,740 according to CDR. MWDOC's population is composed of the sum of its 28 member agencies populations. Overall, the population is projected to increase 8 percent by 2045, representing an average growth rate of 0.32 percent per year. Table 3-4 shows the population projections in five-year increments out to the year 2045 within MWDOC's service area.

Table 3-4: Wholesale: Population - Current and Projected

DWR Submittal Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045
	2,342,740	2,411,727	2,473,392	2,518,117	2,532,393	2,530,621
NOTES: Source - Center for Demographic Research at California State University, Fullerton, 2020						

3.4.2 Demographics and Socioeconomics

Generally, housing within MWDOC's service area is becoming denser with addition of new residential units. This is apparent in many of the cities located in the northern and central areas of MWDOC's service area. Whereas in South Orange County, the southern portion of MWDOC's service area, there still remains open land suitable for further development and growth. As shown below in Table 3-5, the total number of dwelling units in the MWDOC service area is expected to increase by 7.4 percent in the next 25 years from 870,800 in 2020 to 934,984 in 2045.

Table 3-5: MWDOC Service Area Dwelling Units by Type

MWDOC Service Area Dwelling Units by Type						
Dwelling Units	2020	2025	2030	2035	2040	2045
Total	**870,800**	**894,953**	**906,206**	**921,751**	**927,884**	**934,984**
Single Family	435,011	438,288	440,878	444,562	445,293	445,872
All Other*	435,789	456,665	465,328	477,189	482,591	489,112

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 MWDOC's water management and planning. Based on the U.S. Census Bureau's QuickFacts, OC has about 15.3 percent of population of 65 years and over, 21.7 percent under the age of 18 years and 5.8 percent under the age of 5 years. 85.5 percent of the OC's population with an age of more than 25 years has a minimum of high school graduate and 40.6 percent of this age group has at least a bachelor's degree. For the fraction of population with an age of less than 65 years, 5 percent has a disability and 8.1 percent does not own any health insurance. Based on the OC's median household income of $90,234 for 2015-2019, 9.5 percent of the population is living in poverty.

3.4.3 CDR Projection Methodology

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 geographic information system (GIS) mapping 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

Land use within the service area of MWDOC is primarily residential. Based on the zoning designation collected and aggregated by Southern California Association of Governments (SCAG) in 2018 the current land use within the MWDOC's service area can be categorized as follows:

- Single family residential – 23.6%
- Multi-family residential – 7.3%
- Agriculture – 1.6%
- Commercial – 5.6%
- Industrial – 4.1%
- Institutional/Governmental – 7.1%
- Open space and parks – 32.6%
- Other – 17.2% (e.g., Undevelopable or Protected Land, Water, and Vacant)
- No land use designations – 0.9%

3.5.2 Projected Land Uses

Land uses in North OC and South OC are both predominantly residential. North OC is substantially built out, with a majority residential land uses with some mixed-use areas dedicated to commercial, institutional, and governmental uses. Future developments planned in North OC are mainly redevelopment and infill projects. South OC has a greater potential for development, with vacant areas gradually transitioning to residential and commercial mixed-use areas.

Moving forward, the following requirements and changes in laws will impact the future land use in OC:

- **Regional Housing Needs Assessment (RHNA)** - State law requires jurisdictions to provide their share of the RHNA allocation. SCAG determines the housing growth needs by income for local jurisdictions through RHNA. The cities will continue planning to meet their RHNA allocation requirements.
- **Accessory Dwelling Units (ADUs)** – ADUs 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 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 translates to higher water demand.

4 WATER USE CHARACTERIZATION

4.1 Water Use Overview

One of the main objectives of this UWMP is to provide an insight into MWDOC's service area's future water demands. This section describes MWDOC's service area's current and future water demands (direct and indirect), factors that influence demands, and the methodology used to forecast of future water demands over the next 25 years.

As shown in Figure 4-1 and Table 4-1, MWDOC's service area's total water use was 427,701AF in Fiscal Year (FY) 2019-20. MWDOC is the wholesale provider of imported water that provides treated and untreated water from MET for municipal and industrial (M&I) (direct uses) and non-M&I (indirect uses) within its service area. MWDOC member agencies also use water from various other sources, including the OC Basin (managed by OCWD) and other smaller groundwater basins such as the Main San Gabriel Basin. OC San and South Orange County Wastewater Authority (SOCWA) are the wastewater providers of North county and South county agencies, respectively. A few MWDOC member agencies produce their own recycled water.

4.2 Past and Current Water Use

As shown below, MWDOC's service area's retail M&I total water usage has consistently exceeded 400,000 AFY until recently (Figure 4-1). Since FY 2013-14, retail water usage (including recycled water) has begun to trend downward, and FY 2015-16 was the first year that water use dropped below 400,000 AF. Nevertheless, MWDOC's service area population has continued to grow over the past 30 years (Figure 4-1). This trend is likely due to large-scale water efficiency efforts undertaken by MWDOC and its member agencies.

Note that FYs 2011-12 to 2015-16 represent the driest five-consecutive year historic sequence for MWDOC's service area water supply. This period included the driest four-year statewide precipitation on record (2012-15) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent 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 a result, State mandated conservation goals were issued to retail water agencies throughout the state with the aim of reducing statewide water use by 25% as compared to the FY 2013-14 baseline.

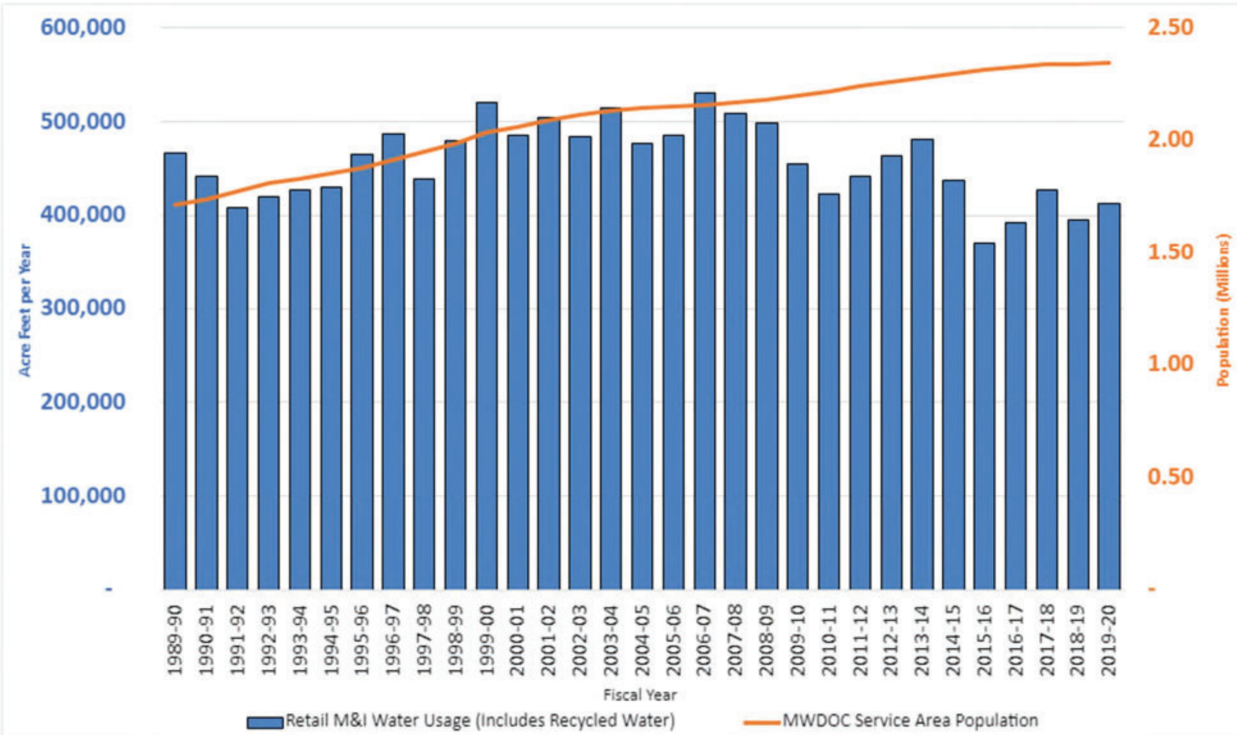


Figure 4-1: MWDOC's Service Area Historical Water Use and Population

Integrating M&I (direct) and non-M&I (indirect) usages of water in the planning process can be confusing and misleading and does not necessarily reflect the actual level of consumptive water demand in the region. In practice, the two types of water usage are often shown separately. Table 4-1 presents MWDOC's service area existing and future water use by source for these two types of uses separately. MWDOC's service area total water usage in FY 2019-20 was 427,701 AF; direct (M&I) usage accounted for 409,025 AF of that total (95.6%), while indirect (non M&I) uses accounted for the remainder (Table 4-1). The total usage was met through a combination of groundwater, imported water, surface water, and recycled water (Table 4-1**).** In FY 2019-20, about 45% of the total demand was met through OC Basin ground water.

Of note, while total water usage of all water sources is important to understand, MWDOC is the wholesale provider of only imported (untreated & treated) water from MET. In FY 2019-20, 161,555 AF of the total water demand was water from MET used for either direct or indirect uses.

M&I treated and untreated imported water accounts for 33.4% of MWDOC's service area's total water use. 9.9% of total water use is recycled (non-potable) water that retail agencies use directly for M&I uses. Non M&I applications of MET water include groundwater replenishment (18,027 AF in FY 2019-20) and Irvine Lake fill (649 AF in FY 2019-20). Remaining contributions are detailed in Table 4-1.

Based on the Demand Forecast TM (Appendix H) methodology, MWDOC's service area's total water demands (by source) for the next 25 years are also shown in Table 4-1. By 2045, total water demand is projected to be 494,795 AF, a 15.7% increase (as compared to 2020 actuals). OC Basin groundwater is expected to continue providing a notable percentage of total water demand between 2020 and 2045 (roughly 47.8% in 2045).

Table 4-1: MWDOC's Service Area Existing and Future Water Use by Source

MWDOC Service Area Water Supply Projections (AF)						
Water Source	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
OCWD Basin GW[1]	192,652	231,936	236,430	236,506	236,280	236,274
Non-OCWD GW[1]	21,267	22,734	24,747	24,763	24,740	24,890
Recycled Water[1]	42,330	52,017	53,891	56,926	57,043	57,094
Surface Water[1]	9,897	4,700	4,700	4,700	4,700	4,700
MET (Retail M&I)[2]	142,879	119,743	120,573	123,502	123,107	122,819
Total M&I Demand	**409,025**	**431,130**	**440,341**	**446,398**	**445,870**	**445,778**
MET Irvine Lake Fill (Non-M&I)[2]	649	4,017	4,017	4,017	4,017	4,017
MET GW Replenishment (Non-M&I)[2,3]	18,027	45,000	45,000	45,000	45,000	45,000
Total non- M&I Demand	**18,676**	**49,017**	**49,017**	**49,017**	**49,017**	**49,017**
Total Water Demand	**427,701**	**480,147**	**489,358**	**495,415**	**494,887**	**494,795**

NOTES:

[1] Agency usage from various sources including OC Basin (managed by OCWD) and other smaller groundwater basins. OCWD and South Orange County Wastewater Authority (SOCWA) are the wastewater providers of North county and South county agencies, respectively. A few MWDOC member agencies produce their own recycled water.

[2] MWDOC is the wholesale provider of imported water that provides treated and untreated water from MET for M&I (direct) and non-M&I (indirect) uses within its service area.

[3] Includes indirect use which are Cyclic Program, Groundwater replenishment, and seawater barrier water.

MWDOC's wholesale demands for potable and non-potable water in 2020 totaled 161,555 AF (Table 4-2). Sales to agencies (treated and untreated imported water) comprised 88.4% of the total volume. Untreated imported water for groundwater recharge comprised 11.2%, and untreated import water for surface storage comprised 0.4% (Table 4-2). This table only includes water (potable and non-potable) that is purchased from MET and sold by MWDOC to their retail agencies and OCWD.

Table 4-2 Wholesale: Demands for Potable and Non-Potable Water – Actual

DWR Submittal Table 4-1 Wholesale: Demands for Potable and Non-Potable Water - Actual			
Use Type	2020 Actual		
	Additional Description	Level of Treatment When Delivered	Volume (AF)*
Sales to other agencies	MWD Treated and Untreated Imported Water	Drinking Water	142,879
Groundwater recharge	Untreated Import Water for Groundwater Recharge + Sea Water Barrier	Raw Water	18,027
Other Potable	Untreated Import Water for Surface Storage	Raw Water	649
		TOTAL:	161,555
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES:			

4.2.1 Direct (M&I) Use – Municipal/Industrial and Agricultural Demands

Direct water use in Orange County includes municipal, industrial, and agricultural use. It represents, based on a 10-year average, approximately 81 percent of MWDOC's service area total demands. Demands for direct use are met through imported water (treated and untreated), groundwater, local surface water, and recycled water. M&I demands represent the full spectrum of water use within a region, including residential and commercial, industrial, institutional (CII), as well as un-metered uses (e.g., hydrant flushing, fire-fighting). Agricultural demands represent less than 1 percent of the total direct use. It has significantly decreased over the years due to development and urban growth within the service area.

4.2.2 Indirect (non-M&I) Use – Replenishment/Barrier and Surface Water Demands

Indirect water use in Orange County includes water to replenish groundwater basins and to serve as a barrier against seawater intrusion. It represents, based on a 10-year average, 19 percent of MWDOC's total demands. Most, if not all of the indirect water use delivered is for managing and replenishing the OC Basin. This water is purchased by OCWD, a special district created by the state and governed by a ten-member Board of Directors to protect, manage, and replenish the OC Basin with purchased imported water, storm water, and recycled water. OCWD further protects the groundwater basin from seawater intrusion through the injection of imported and recycled water along the coast, known as the Talbert Injection Barrier.

Since demands for replenishment of the groundwater basin storage and seawater barriers are driven by the availability of local supplies to OCWD, the demand forecast for this type of use is based on the projection of the following supplies under normal conditions:

- Santa Ana River Flows (Base flows & Storm flows);
- Incidental Recharge;
- Imported supplies from MET; and
- Recycled supplies for replenishment & seawater barrier use.

In addition to Replenishment and Barrier demands, MWDOC also provides imported water to meet the needs of surface water demands, such as those that occurs with respect to Irvine Lake. The water delivered to Irvine Lake is used for both consumptive purposes and water storage. Imported water delivered into Irvine Lake can be held for short or long periods of time to be later delivered for consumptive use. Based on a 10-year average, surface water supplies total 4,000 acre-feet per year (AFY) in Irvine Lake.

Figure 4-2 shows the historical demand of imported water for indirect consumption in MWDOC's service area. Since 2011, groundwater replenishment comprised much of the indirect water demands.
In FY 2019-20, this trend changed due to lower demands for groundwater, and thereby replenishment, primarily due to contamination of the groundwater basin from PFAS. In FY 2017-18, total demand for indirect imported water was higher than average due to an increase in in-lieu water deliveries because of the significant amount of imported water MET received due to the historical amounts of rainfall/snowfall in Northern California.

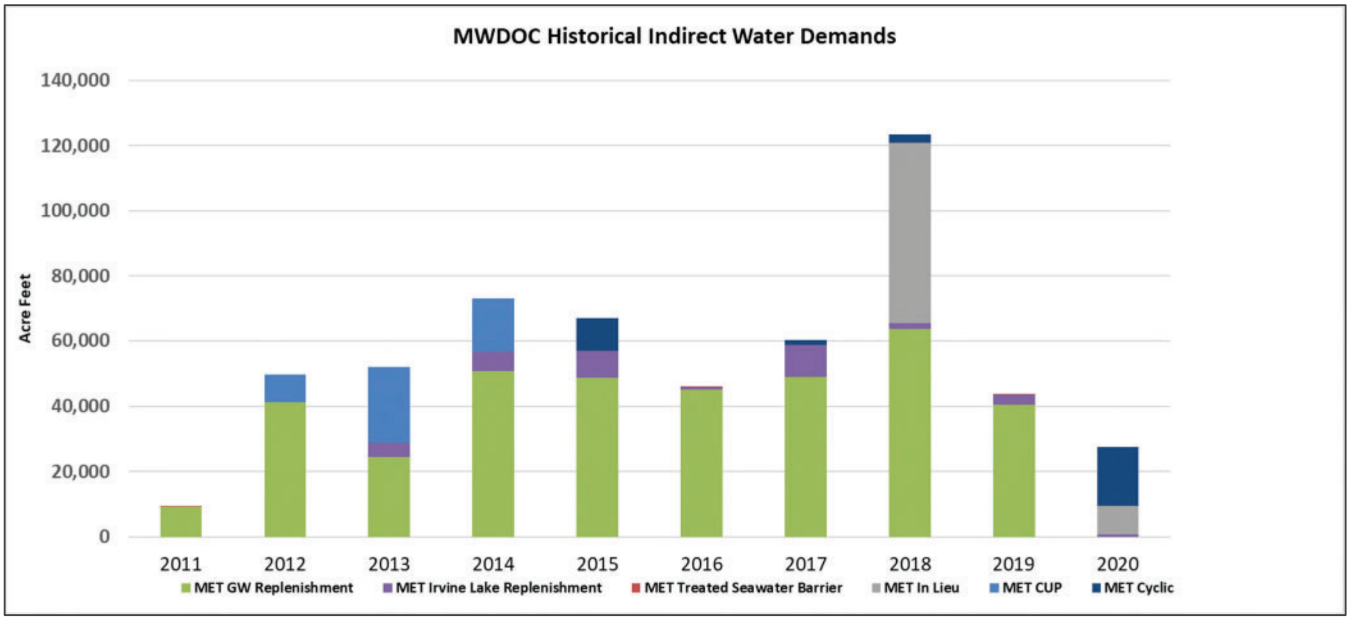


Figure 4-2: MWDOC's Historical Imported Water Use for Indirect Consumption

4.3 Water Use Projections

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 4-3 below.

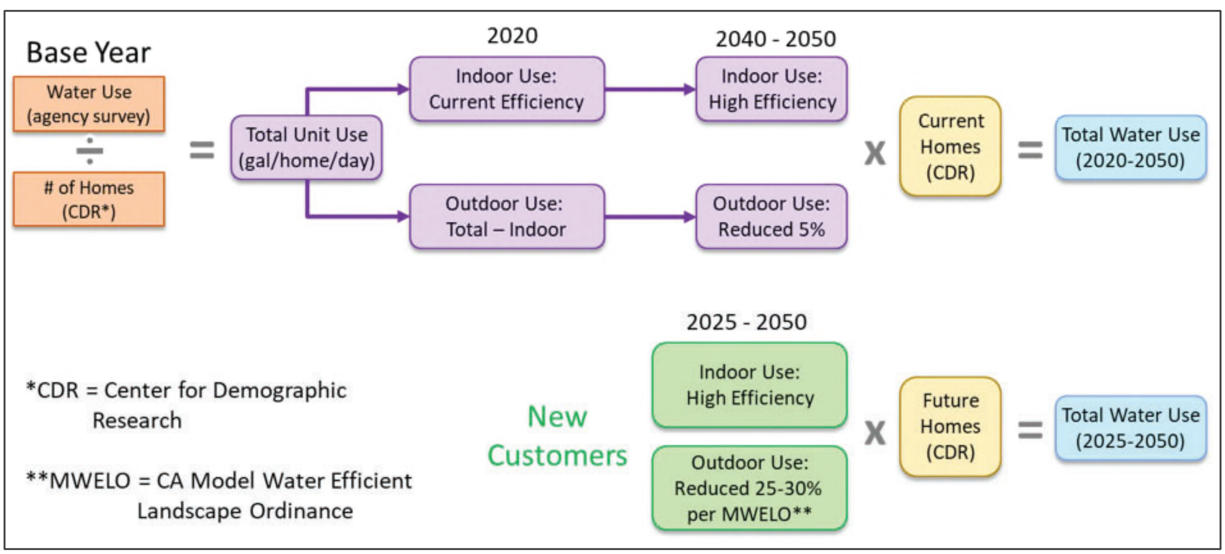


Figure 4-3 Water Use Projection Methodology Diagram

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 those agencies that supply recycled water for non-potable demands, we 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, we 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 constant through 2050.

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.

4.3.2 25-Year Water Use Projection

4.3.2.1 Water Use Projections for 2021-2025

Total demands (direct and indirect) are met through imported water (treated and untreated), groundwater, local surface water, and recycled water. MWDOC utilizes total demands to incorporate the best available planning information when projecting the imported water demands of its service area. As shown in Table 4-3 below, MWDOC's total service area water demands are expected to gradually increase in the first three years (2021 to 2023) due to projected growth in the service area's M&I demands; however, the bulk of the increase in demands are projected in the last two years, as a result of indirect imported demands for groundwater replenishment returning in the years 2024 and 2025.

The current regulatory impacts of PFAS in the OC Basin has reduced the need for purchasing any imported groundwater replenishment water, due to reductions in groundwater pumping. This is expected to last over the next three years (2021 to 2023), under normal hydrological conditions. However, with groundwater treatment anticipated to be online for a number of retail agencies in the years 2023 and 2024, groundwater production is expected to increase. Thus, OCWD estimates a gradual need of imported replenishment water in years 2024 and 2025. With the final expansion of OCWD's Groundwater Replenishment System (GWRS) online in 2023, the future need of imported replenishment water is expected to average 45,000 AF per year.

Table 4-3: MWDOC's Service Area Total Potable and Non-Potable Demand Projections for 2021-2025

Total Water Demand					
Fiscal Year Ending	2021	2022	2023	2024	2025
Total Water Demand (AF)	413,042	417,463	421,884	450,726	480,147
NOTES: This assumes no replenishment water in 2021,2022, and 2023 due impacts from PFAS.					

4.3.2.2 Water Use Projections for 2025-2045

Under normal conditions, total direct and indirect water demands are projected to increase to 494,795 AF by the year 2045 or about 3% between 2025 and 2045. This demand projection comes from MWDOC's Demand Forecast TM update done in 2021, that considered such factors as current and future demographics, future conservation measures, and ground & surface water needs. Section 4.3.1 offers a description of the methodology used to calculated MWDOC's demand projections.

Table 4-4: MWDOC's Service Area Total Potable and Non-Potable Demand Projections for 2025-2045

Total Water Demand					
Fiscal Year Ending	2025	2030	2035	2040	2045
Total Water Demand (AF)	480,147	489,358	495,415	494,887	494,795
NOTES:					

Table 4-5 presents 2025-2045 demand projections for water (potable and non-potable) that is purchased from MET and sold by MWDOC to their retail agencies and OCWD. Projections for groundwater recharge and other potable uses (ie. Irvine Lake fill) are expected to remain constant between 2025 and 2045. Sales to other agencies is expected to rise by about 2.5% (comparing 2025 values to 2045 values).

Table 4-5: Wholesale: Use for Potable and Raw Water – Projected

DWR Submittal Table 4-2 Wholesale: Use for Potable and Raw Water - Projected						
Use Type	Additional Description	Projected Water Use (AF) *				
		2025	2030	2035	2040	2045 (opt)
Sales to other agencies	MWD (Retail M&I)	119,743	120,573	123,502	123,107	122,819
Groundwater recharge	MWD GW Replenishment (Non-M&I)	45,000	45,000	45,000	45,000	45,000
Other Potable	MWD Irvine Lake Fill (Non-M&I)	4,017	4,017	4,017	4,017	4,017
	TOTAL:	168,760	169,591	172,520	172,124	171,837
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

A comparison of actual (2020) and projected (2025-2045) wholesale total water use is presented in Table 4-6 below.

Table 4-6: Wholesale: Total Water Use (Potable and Non-Potable)

DWR Submittal Table 4-3 Wholesale: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	161,555	168,760	169,591	172,520	172,124	171,837
Recycled Water Demand* From Table 6-4W	0	0	0	0	0	0
TOTAL WATER DEMAND:	161,555	168,760	169,591	172,520	172,124	171,837
NOTES: Volumes in AF.						

4.4 Water Loss

MWDOC is a recognized industry leader in Water Loss programs and activities. MWDOC helps member agencies evaluate and reduce their distribution systems' real and apparent losses through comprehensive Water Loss Control Programs. In 2015, the MWDOC Board of Directors authorized staff to begin implementing a Water Loss Control Technical Assistance Program (TAP) to support member agency compliance with Senate Bills 1420 and 555, both of which address distribution system Water

Loss. The TAP program established a menu of technical assistance that water retailers can elect to participate in. These programs connect water retailers with industry experts who provide one on one technical assistance through data analysis, agency specific advising, and assessment. The TAP services offered by MWDOC include Water Balance Compilation, Component Analysis of Real and Apparent Losses, Source/Production Meter Accuracy Testing, Billing Data Chain Assessment, and Internal Water Loss Committee Planning. MWDOC's Water Loss Control TAP has a very positive impact on building knowledge of water loss recovery strategies by all retail water agencies in the County and implementation of those strategies. To date MWDOC has hosted 30 Water Loss Work Group Meetings with approximately 35 agency representatives' attending each meeting. A total of 137 Annual Water Balances have been compiled and validated over the last five years, vastly improving water agency understanding of volumes of real and apparent losses, strategies to recovery losses and value of losses.

Due to the success of the TAP program, MWDOC began to consider other services that would assist in controlling water loss. In 2019, the MWDOC Board authorized the implementation of a Water Loss Control Shared Services Business Plan (Business Plan) based on the needs outlined in the survey and the direction of the Water Loss Control Performance Standards currently in development. Services provided under the program available to MWDOC member agencies include Water Balance Validation, Customer Meter Accuracy Testing, Distribution System Pressure Surveys, Distribution System Leak Detection, Suspected Leak Investigations, and No Discharge Distribution System Flushing (No-DES). Since the start of the shared services program in August 2019, more than 780 miles of distribution system leak detection has been completed, which resulted in discovery of 373 hidden leaks that have been repaired or are in the process of being repaired. These leak repairs result in recovering more than 84.5 million gallons of water valued at more than $300,000 per year. A total of 1,439 water meter accuracy tests have been completed by 6 agencies improving agency knowledge of meter performance and accuracy of water balance results. A total of thirty-two sites have been monitored during pressure surveys for three agencies that were used to calculate average system pressure, calibrate hydraulic models and investigate pressure anomalies. And lastly, 12 miles of distribution system mains have been flushed resulting in improved water quality for consumers and recovery of 176,200 gallons of water that was filtered and returned to the distribution system for beneficial use.

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 percent 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.

As a wholesale water supplier, MWDOC is not required to establish a baseline or set targets for daily per capita water use. However, it is required to provide an assessment of its present and proposed future measures, programs and policies that will help its retail water suppliers achieve their SBx7-7 water use reduction targets. One of the ways MWDOC is assisting its retail agencies is by leading the coordination of Orange County Regional Alliance for all of the retail agencies in Orange County. MWDOC's role is to assist each retail water supplier in Orange County in analyzing the requirements and establishing their baseline and target water use, as guided by DWR.

The following sections describe the efforts by MWDOC to assist retail agencies in complying with the requirements of SBx7-7, including the formation of a Regional Alliance to provide additional flexibility to all water suppliers in Orange County. This section also includes the documentation of calculations that allow retail water suppliers to use recycled water for groundwater recharge (indirect reuse) to offset a portion of their potable demand when meeting the regional as well as individual water use targets for compliance purposes. 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.

5.1 Orange County 20x2020 Regional Alliance

MWDOC in collaboration with all of its retail agencies as well as the Cities of Anaheim, Fullerton, and Santa Ana, has created the Orange County 20x2020 Regional Alliance in an effort to create flexibility in meeting the daily per capita water use targets. This Regional Alliance allows all of Orange County to benefit from regional investments, such as the GWRS, recycled water, and water conservation programs. The members of the Orange County 20x2020 Regional Alliance are shown in Table 5-1.

Table 5-1: Members of Orange County 20x2020 Regional Alliance

Orange County 20x2020 Regional Alliance	
Anaheim	MNWD
Brea	Newport Beach
Buena Park	Orange
EOCWD	San Clemente
ETWD	San Juan Capistrano
Fountain Valley	Santa Ana
Fullerton	Santa Margarita Water District
Garden Grove	Seal Beach
GSWC	Serrano
Huntington Beach	SCWD
IRWD	TCWD
La Habra	Tustin
La Palma	Westminster
LBCWD	YLWD
Mesa Water	

Within a Regional Alliance, each retail water supplier will have an additional opportunity to achieve compliance under either an individual target or a regional water use 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.

Individual water suppliers in the Orange County 20x2020 Regional Alliance will state their participation in the alliance and include the regional 2015 and 2020 water use targets in their individual UWMPs.

As the reporting agency for the Orange County 20x2020 Regional Alliance, MWDOC has documented the calculations for the regional urban water use reduction targets. MWDOC will also provide annual monitoring and reporting for the region on progress toward the regional per capita water use reduction targets.

5.2 Water Use Target Calculations

To preserve maximum flexibility in the Orange County 20x2020 Regional Alliance, each water supplier in the Regional Alliance first calculates its individual target in its retail UWMP as if it were complying individually. Then, the individual targets are weighted by each supplier's population and averaged over all members in the alliance to determine the regional water use target.

5.2.1 Retail Agency Compliance Targets

As described above, the first step in calculating a regional water use target is to determine each water supplier's individual target. DWR has established four target options for urban retail water suppliers to choose from in calculating their water use reduction targets under SBx7-7. The four options are as follows:

- *Option 1* requires a simple 20 percent reduction from the baseline by 2020 and 10 percent 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 gallons per capita per day (GPCD)
    - Landscape water use commensurate with the Model Landscape Ordinance
    - 10 percent reduction in baseline CII water use
- *Option 3* is to achieve 95 percent of the applicable state hydrologic region target as set forth in the State's 20x2020 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.

MWDOC has analyzed each of these options and has worked with all retail agencies in Orange County to assist them in selecting the most suitable option in 2010 and 2015. In 2015, retail water agencies may update their 2020 water use target using a different target method than was used in 2010. However, the target method is not permitted to change after the 2015 UWMP is submitted with the exception of having changes to the distribution service area.

5.2.2 Regional Targets Calculation and 2020 Compliance

The regional water use targets for the Orange County 20x2020 Regional Alliance are calculated by weighting the individual retail agency water use targets by population and averaging them over all members of the alliance. The calculation of the baseline water use and water use targets in the 2010 UWMP was based on the 2000 U.S. Census population numbers obtained from CDR. In 2015, the baseline water use and water use targets for all retail agencies have been revised using population numbers based on the 2010 U.S. Census obtained from CDR in 2012.

The regional alliance target calculation is provided below in Table 5-2. Column (1) and (2) show the 2015 and 2020 population for each individual supplier. The individual targets, including appropriate deductions for recycled water, for each supplier is provided in column (3) for the 2015 interim targets, and column (4) for the 2020 final targets.

To calculate the weighted averages for each retail water supplier, the population is multiplied by the individual targets to get a weighted total for each individual supplier. This is found in column (3) for the 2015 interim targets and in column (5) for the 2020 final targets. The regional targets for the Orange County 20x2020 Regional Alliance are then derived as the sum of the individual weighted averages divided by the total population for a regional alliance.

For example, the 2020 water use target for the City of Brea is 221 GPCD, and the 2020 population is 45,317. By multiplying this 2020 target by the population, the result is a weighted average of 10,003978. The sum of the weighted averages for all members of the Orange County 20x2020 Regional Alliance is 505,077,088. By dividing this weighted total by the regional population of 3,185,461, the resulting regional 2020 water use target is 159 GPCD.

The source of the information in Table 5-2, including the population figures, is from within the individual 2020 UWMPs for each water supplier in the Orange County 20x2020 Regional Alliance.

Table 5-2: Calculation of Regional Urban Water Use Targets for Orange County 20x2020 Regional Alliance

Calculation of Regional Compliance Daily Per Capita Water Use						
Orange County 20x2020 Regional Alliance	(1) 2015 Population	(2) 2020 Population	(3) Individual Targets 2015	(4) Weighted Total 2015	(5) Individual Targets 2020	(6) Weighted Total 2020
Brea	42,943	45,317	248	10,664,892	221	10,003,978
Buena Park	82,495	82,023	178	14,687,524	158	12,980,878
EOCWD RZ	3,252	3,210	261	850,233	232	746,002
ETWD	48,579	47,911	183	8,905,378	163	7,807,042
Fountain Valley	57,768	56,747	157	9,049,547	142	8,032,538
Garden Grove	176,666	176,635	152	26,922,535	142	25,002,684
GSWC	169,213	168,108	157	26,567,284	142	23,795,687
Huntington Beach	197,787	201,327	151	29,937,195	142	28,497,837
IRWD	381,788	421,627	192	73,182,789	170	71,839,380
La Habra	61,913	61,923	151	9,353,551	150	9,304,086

Calculation of Regional Compliance Daily Per Capita Water Use						
Orange County 20x2020 Regional Alliance	(1) 2015 Population	(2) 2020 Population	(3) Individual Targets 2015	(4) Weighted Total 2015	(5) Individual Targets 2020	(6) Weighted Total 2020
La Palma	15,921	15,567	149	2,371,281	140	2,179,079
LBCWD	20,103	19,468	183	3,684,178	163	3,171,382
Mesa Water	109,542	111,051	163	17,814,705	145	16,053,433
MNWD	168,999	170,236	194	32,829,113	173	29,395,029
Newport Beach	63,229	61,916	228	14,407,217	203	12,540,480
Orange	138,647	138,995	203	28,156,956	181	25,091,226
San Clemente	51,280	51,065	172	8,817,256	153	7,804,701
San Juan Capistrano	37,987	38,301	206	7,832,864	183	7,020,098
Santa Margarita WD	156,469	161,264	190	29,688,827	169	27,198,793
Seal Beach	24,001	24,000	149	3,570,691	142	3,397,200
Serrano WD	6,421	6,263	434	2,785,481	386	2,415,057
South Coast WD	34,993	34,232	169	5,916,823	150	5,145,021
Trabuco Canyon WD	12,747	12,921	233	2,973,383	200	2,581,514
Tustin	64,068	62,957	170	10,897,894	151	9,519,034
Westminster	94,394	94,068	137	12,900,652	130	12,232,790
Yorba Linda WD	74,741	75,608	266	19,899,036	237	17,893,214
Anaheim	361,290	365,987	183	65,977,152	162	59,408,797
Fullerton	140,672	141,648	201	28,253,525	179	25,288,490
Santa Ana	338,336	335,086	123	41,538,549	116	38,731,637
Regional Alliance Total:	3,136,244	3,185,461	**173**	550,436,512	**159**	505,077,088

Table 5-3 provides the regional urban water use targets for the Orange County 20x2020 Regional Alliance – the 2015 target is 173 GPCD and the 2020 target is 159 GPCD. The actual 2015 GPCD achieved by the regional alliance is 125 GPCD indicating that not only has the region met its 2015 target but it has already well below its 2020 water use target. This is indicative of the collective efforts of

MWDOC and retail agencies in reducing water use in the region. Note, the target and actual GPCD values listed include appropriate deductions for recycled water used for indirect potable reuse (IPR) as detailed below.

Table 5-3: Urban Water Use Target and Actual GPCD for Orange County 20x2020 Regional Alliance

	2020 Target GPCD	2020 Actual GPCD
Orange County 20X2020 Regional Alliance	159	109

5.2.3 Deducting Recycled Water Used for IPR

SBx7-7 allows urban retail water suppliers to calculate a deduction for recycled water entering their distribution system indirectly through a groundwater source. Individual water suppliers within the OC Basin have the option of choosing this deduction to account for the recharge of recycled water into the OC Basin by OCWD, historically through Water Factory 21, and more recently by GWRS. These deductions also benefit all members of the Orange County 20x2020 Regional Alliance.

MWDOC has provided the documentation for the calculations of this deduction to assist retail water suppliers if they choose to include recycled water for IPR in their individual targets. This calculation is applied as a deduction from the water supplier's calculation of Gross Water Use. Table 5-4 provides the calculation to deduct recycled water for IPR for OC Basin Agencies. Because year-to-year variations can occur in the amount of recycled water applied in a groundwater recharge operation, a previous five-year average of recharge is used, as found in column (1). To account for losses during recharge and recovery, a factor of 96.5 percent is applied in column (2). After accounting for these losses, the estimated volume of recycled water entering the distribution system is calculated in column (3).

In column (4), the annual deduction for recycled water for IPR is expressed as a percentage of the total volume of water extracted from the OC Basin in that year. This is the annual percentage of total OCWD basin production that is eligible for a deduction. For individual water suppliers in the OC Basin, the annual deduction is calculated as their basin pumping in a given year multiplied by the value in column (4).

For example, if Agency A pumped 10,000 AF of water from the OC Basin in FY 2004-05, then 1.47 percent of that total production would be deducted from the agency's calculation of Gross Water Use for that year as found in column (4). This equates to a deduction of 147 AF.

The deductible amount of indirect recycled water increased from 66,152 AF in 2015 to approximately 94,235 AF in 2020 as a result of the full production from GWRS. OCWD has additional expansion plans for GWRS, which are expected to further increase the deductible amount of indirect recycled water up to approximately 145,600 AF, or 130 million gallons per day (MGD).

Table 5-4: Calculation of Annual Deductible Volume of Indirect Recycled Water Entering Distribution System

Deduct Recycled Water Used for IPR [1]						
Fiscal Year Ending	Total Groundwater Recharge	(1) 5-Year Average Recharge (AF)	(2) Loss Factor for Recharge & Recovery	(1) x (2) = (3) Volume Entering Distribution System (AF)	Total Basin Production (AF)	(4) Percent of Total Basin Production
1990	6,498	6,498	96.5%	6,271	229,878	2.73%
1991	6,634	6,498	96.5%	6,271	235,532	2.66%
1992	6,843	6,566	96.5%	6,336	244,333	2.59%
1993	8,161	6,658	96.5%	6,425	243,629	2.64%
1994	5,042	7,034	96.5%	6,788	237,837	2.85%
1995	2,738	6,636	96.5%	6,403	276,096	2.32%
1996	4,282	5,884	96.5%	5,678	302,273	1.88%
1997	4,389	5,413	96.5%	5,224	310,217	1.68%
1998	2,496	4,922	96.5%	4,750	297,726	1.60%
1999	3,489	3,789	96.5%	3,657	322,476	1.13%
2000	5,774	3,479	96.5%	3,357	320,250	1.05%
2001	2,067	4,086	96.5%	3,943	323,129	1.22%
2002	4,143	3,643	96.5%	3,515	322,590	1.09%
2003	3,867	3,594	96.5%	3,468	274,927	1.26%
2004	1,784	3,868	96.5%	3,733	272,954	1.37%
2005	4,156	3,527	96.5%	3,404	232,199	1.47%
2006	4,086	3,203	96.5%	3,091	215,172	1.44%
2007	218	3,607	96.5%	3,481	284,706	1.22%
2008	17,792	2,822	96.5%	2,723	351,622	0.77%
2009	54,261	5,607	96.5%	5,411	310,586	1.74%
2010	65,950	16,103	96.5%	15,539	273,889	5.67%

Deduct Recycled Water Used for IPR [1]						
Fiscal Year Ending	Total Groundwater Recharge	(1) 5-Year Average Recharge (AF)	(2) Loss Factor for Recharge & Recovery	(1) x (2) = (3) Volume Entering Distribution System (AF)	Total Basin Production (AF)	(4) Percent of Total Basin Production
2011	66,083	28,461	96.5%	27,465	251,622	10.92%
2012	71,678	40,861	96.5%	39,431	235,222	16.76%
2013	72,877	55,153	96.5%	53,223	298,175	17.85%
2014	66,167	66,170	96.5%	63,854	318,967	20.02%
2015	76,546	68,551	96.5%	66,152	293,903	22.51%
2016	100,347	70,670	96.5%	68,197	262,795	25.95%
2017	94,081	77,523	96.5%	74,810	282,257	26.50%
2018	103,990	82,004	96.5%	79,134	228,146	34.69%
2019	93,399	88,226	96.5%	85,138	290,749	29.28%
2020	94,235	93,673	96.5%	90,394	271,263	33.32%

NOTES:

[1] Indirect is recycled water for groundwater recharge through spreading and injection of GWRS and Water Factory 21. The yearly totals are apportioned among the OCWD Basin agencies on the basis of groundwater production over a five year rolling average.

[2] Loss factor provided by OCWD, includes loss over county lines to LA Basin.

6 WATER SUPPLY CHARACTERIZATION

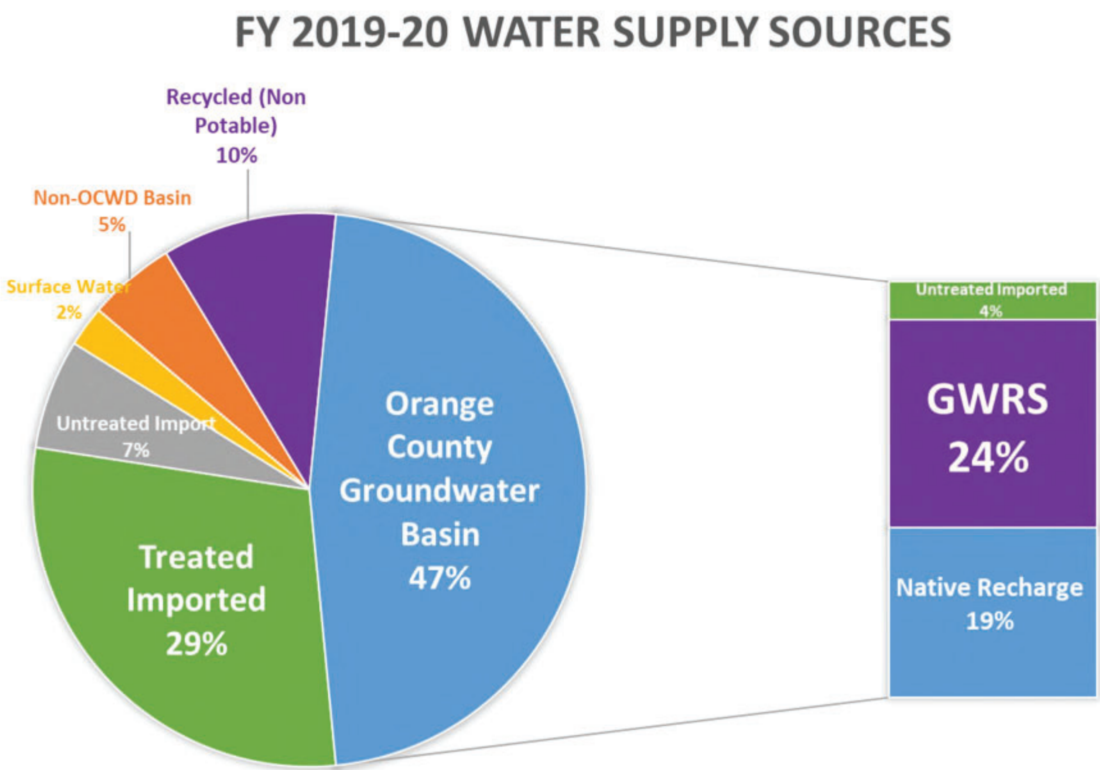
As a counterpart to Section 4's Water Use Characterization, this section characterizes MWDOC's water supply along with a description of the groundwater, wastewater and recycled water provided by other agencies. This section includes identification and quantification of water supply sources through 2045, 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

Water supplies within MWDOC's service area are from local and imported sources. MWDOC is the regional wholesaler of imported water purchased from MET, which is sourced from the CRA and SWP. Local retail agencies and one local wholesale agency purchase imported water through MWDOC to supplement their local supplies. In FY 2019-20, MWDOC supplied approximately 142,879 AFY of treated and untreated imported water to its retail agencies for M&I purposes and 18,675 AFY for groundwater replenishment (Cyclic Storage) and surface water purposes. Imported water represents 36 percent of total water supply in the MWDOC service area. However, imported water volume varies vary year to year; over the last 10 years, imported water has represented 39 percent of total M&I water supply.

Local supplies developed by other entities and retail agencies include groundwater, recycled water, and surface water. Local sources presently account for 65 percent of the service area's water supplies, whereby groundwater is the major source of local supply. The primary groundwater basin, OC Basin, is located in the northern portion of MWDOC's service area and is managed by OCWD. OCWD also provides advanced treatment to secondary treated wastewater from Orange County Sanitation District (OC San) to produce recycled water for various water agencies in north Orange County. In south Orange County, there are a number of water agencies that provide their own wastewater treatment, to produce recycled water. A relatively minimal amount of MWDOC's water supply portfolio – approximately two percent in FY 2019-20 – is attributed to surface water.

Figure 6-1 shows a breakdown of all sources within MWDOC's service area. Although MWDOC only delivers imported water to its retail agencies, other sources of water are obtained locally and are specific to each retail agency. Note that GWRS supplies are included as part of groundwater pumping numbers.



Note: Supplies are specific to the MWDOC Service Area. The Orange County Water Basin water supply can further be broken down by the sources of supply on the right and are intented to add up to the total 47% of water supplies that the Orange County Groundwater Basin represents.

Figure 6-1: Water Supply Sources within MWDOC's Service Area

MWDOC and its retail agencies collectively work together to improve the water reliability within the service area by developing additional local supplies, implementing water use efficiency efforts, and expanding local projects. MWDOC also works in collaboration with two primary agencies – MET and OCWD – to ensure a safe and high-quality water supply to Orange County.

Figure 6-2 illustrates the different water sources in MWDOC's service area and for all of Orange County.

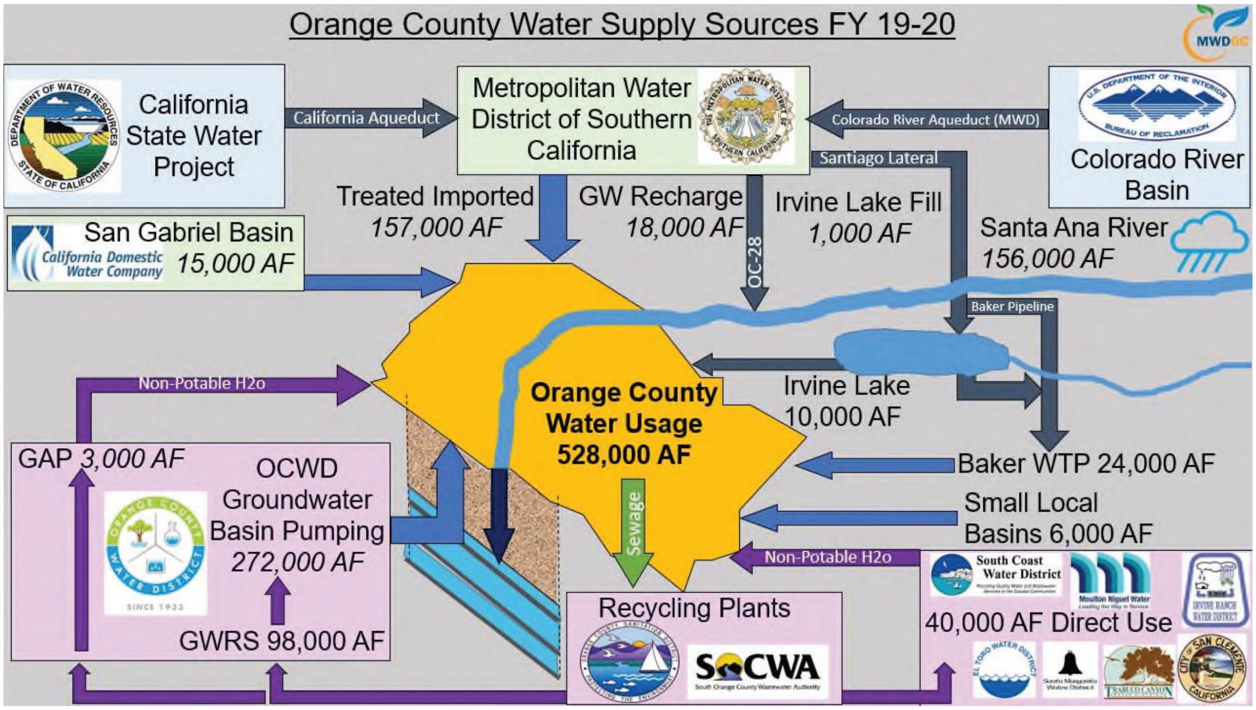


Figure 6-2: Orange County Water Supply Sources

Although MWDOC supports the various water supply sources for agencies within MWDOC's service area, MWDOC supplies only imported water. In FY 2019-20, MWDOC used its imported water supplies for M&I uses, groundwater recharge, and surface storage (Table 6-1).

MWDOC's projected water supply sources from MET for M&I are expected to increase through 2045, with the imported water for groundwater recharge and surface storage projected to remain the same (Table 6-2). The following subsections will provide a detailed discussion of the water supply sources in MWDOC's service area, as well as evaluate MWDOC's projected supply for the next 25 years.

Table 6-1: Wholesale: Water Supplies – Actual

DWR Submittal Table 6-8 Wholesale: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	2020	
		Actual Volume (AF)	Water Quality
Purchased or Imported Water	From MET for Municipal & Industrial	142,879	Drinking Water
Purchased or Imported Water	From MET for Groundwater Recharge	18,027	Other Non-Potable Water
Purchased or Imported Water	From MET for Surface Storage	649	Other Non-Potable Water
	Total:	161,555	
NOTES:			

Table 6-2: Wholesale: Water Supplies – Projected

DWR Submittal Table 6-9 Wholesale: 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	From MET for Municipal & Industrial	119,743	120,573	123,502	123,107	122,819
Purchased or Imported Water	From MET for Groundwater Recharge	45,000	45,000	45,000	45,000	45,000
Purchased or Imported Water	From MET for Surface Storage	4,017	4,017	4,017	4,017	4,017
	Total:	168,760	169,591	172,520	172,124	171,837
NOTES: Total volumes are +/- 1 AF due to rounding						

6.2 Imported Water

In FY 2019-20, 36 percent of MWDOC's water supply portfolio was attributed to treated and untreated imported water. MWDOC purchases water from MET and distributes this water to its 28 member agencies to supplement local supplies. MET's two principal sources of water are the Colorado River and the SWP. MET receives water from the Colorado River through the CRA and from the SWP through the California Aqueduct. For Orange County, the water obtained from these sources 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.

6.2.1 Metropolitan Water District of Southern California

MET is the largest water wholesaler for domestic and municipal uses in California, serving approximately 19 million customers. MET wholesales imported water supplies to 26 member cities and water districts in six southern California counties. Its service area covers the southern California coastal plain, extending approximately 200 miles along the Pacific Ocean from the City of Oxnard in the north to the international boundary with Mexico in the south. This encompasses 5,200 square miles and includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Approximately 85 percent of the population from these counties reside within MET's boundaries.

MET is governed by a Board of Directors comprised of 38 appointed individuals with a minimum of one representative from each of MET's 26 member agencies. The allocation of directors and voting rights are determined by each agency's assessed valuation. Each member of the Board is entitled to cast one vote for each ten million dollars ($10,000,000) of assessed valuation of property taxable for district purposes, in accordance with Section 55 of the Metropolitan Water District Act. Directors can be appointed through the chief executive officer of the member agency or by a majority vote of the governing board of the agency. Directors are not compensated by MET for their service (The Metropolitan Water District Act, 1969).

MET is responsible for importing water into the region through its operation of the CRA and its contract with the State of California for SWP supplies. Major imported water aqueducts bringing water to southern California are shown in Figure 6-3. Member agencies receive water from MET through various delivery points and pay for service through a rate structure made up of volumetric rates, capacity charges and readiness to serve charges. Member agencies provide estimates of imported water demand to MET annually in April regarding the amount of water they anticipate they will need to meet their demands for the next five years.

In Orange County, MWDOC and the cities of Anaheim, Fullerton, and Santa Ana are MET member agencies that purchase imported water directly from MET. Furthermore, MWDOC purchases both treated potable and untreated water from MET to supplement its retail agencies' local supplies. Figure 6-4 illustrates the MET feeders and major transmission pipelines that deliver water within Orange County.

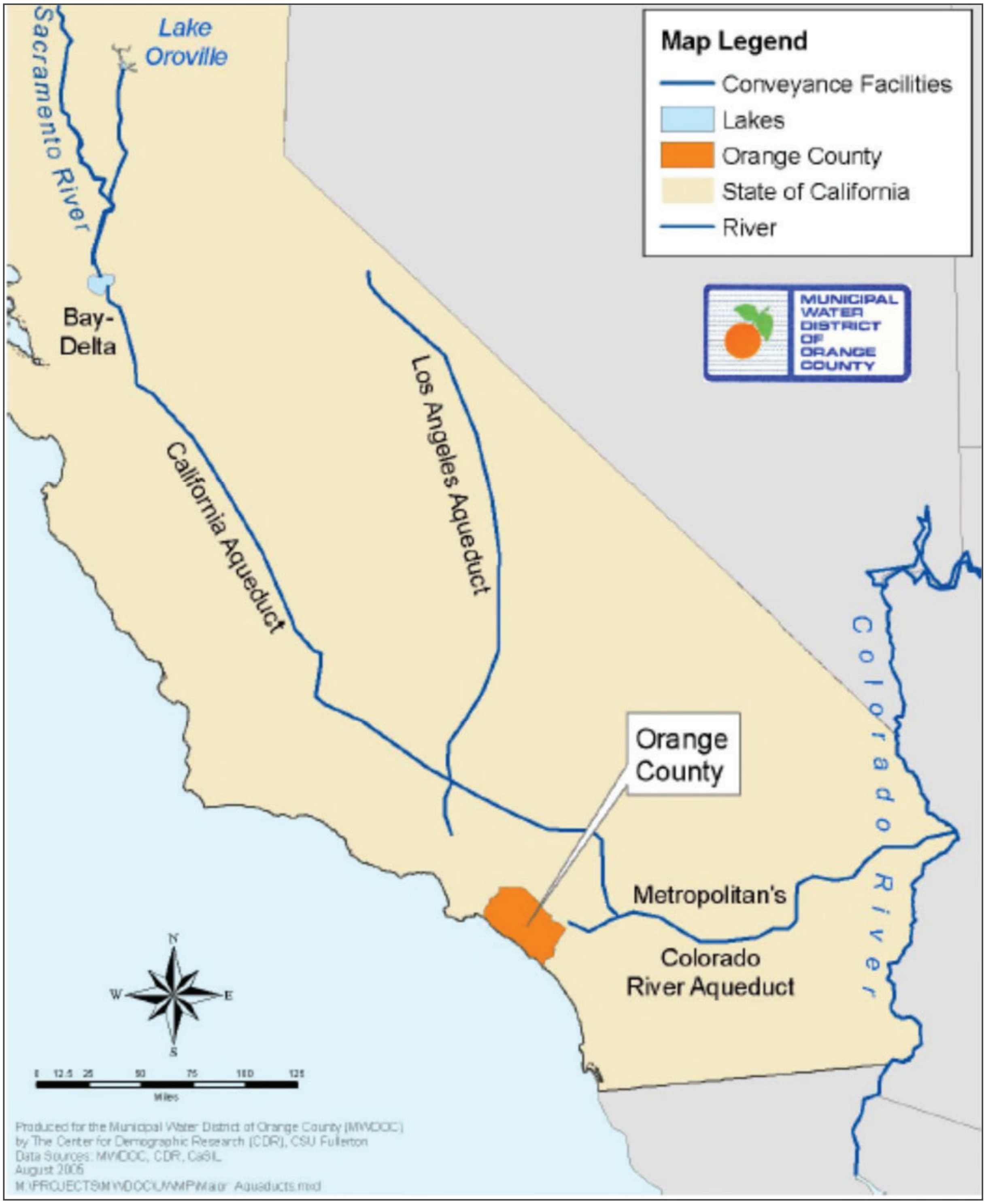


Figure 6-3: Major Aqueducts Bringing Water to Southern California

Figure 6-4: MET Feeders and Transmission Mains Serving Orange County

6.2.1.1 MET's 2020 Urban Water Management Plan

MET's 2020 UWMP reports on its water reliability and identifies projected supplies to meet the long-term demand within its service area. The MET 2020 UWMP discusses the current water supply conditions and long-term plans for supply implementation and continued development of a diversified resource mix. It describes the programs being implemented such as the CRA, SWP, Central Valley storage/transfer programs, water use efficiency programs, local resource projects, and in-region storage that will enable the region to meet its water supply needs. MET's 2020 UWMP also presents MET's supply capacities from 2025 through 2045 for average year, single dry-year, five consecutive dry-year, and more frequent and severe droughts, as specified in the UWMP Act.

Information concerning MET's UWMP, including the background, associated challenges, and long-term development of programs for each of MET's supply sources and capacities have been summarized and included in the following subsections. Additional information on MET can be found directly in MET's 2020 UWMP.

6.2.1.2 Colorado River Aqueduct

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 million acre-feet (MAF) entitlement. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 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).

In light of declining reservoir levels, the Lower Basin Drought Contingency Plan (DCP) was signed in 2019. This agreement incentivizes storage in Lake Mead and requires certain volumes of water be stored in Lake Mead under certain Lake Mead elevation levels through 2026. MET is to store certain volumes of water in Lake Mead as DCP ICS once Lake Mead is below elevation 1,045 feet. This agreement also increases MET's flexibility to take delivery of water stored as ICS at Lake Mead elevations below 1,075 feet. The goal of this agreement is to keep Lake Mead above critical elevations, and overall it increases MET's flexibility to store water in Lake Mead in greater volumes and to take delivery of stored water to fill the CRA as needed.

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).

6.2.1.3 State Water Project

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 percent of SWP's contracted water supply going to urban users and 30 percent 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 who have 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 acre-feet 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).

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 are to access additional supplies to maximize deliveries 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 percent.

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 will likely continue until a long-term solution to the problems in the 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 three elements: Delta ecosystem restoration, water supply conveyance, and 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.

6.2.1.4 Central Valley / State Water Project Storage and Transfer Programs

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 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.

6.2.1.5 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 plant was a joint regional project by five South Orange County water districts: ETWD, IRWD, MNWD, SMWD, and TCWD, which have capacity rights of 3.2 MGD, 6.8 MGD, 8.4 MGD, 8.4 MGD, and 1.3 MGD, respectively. The project went online in early 2017 and is managed and run by IRWD.

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.

6.2.2 Supply Reliability Within MET

6.2.2.1 MET's Water Service Reliability Assessment Results

In MET's 2020 UWMP, MET evaluated supply reliability by projecting supply and demand under a normal year, single-dry year, and five-year consecutive dry years, based on conditions affecting the SWP (MET's largest and most variable supply). For this supply source, the average of historic years 1922-2017 most closely represents water supply conditions in a normal water year, the single driest year was 1977 and the five-year dry period was 1988-1992. The analyses also include Colorado River supplies under the same hydrological variations.

MET also incorporated the SWP and Colorado River's reliability factors, such as water quality objectives set by the SWRCB, Biops, and amendments to the COA for the SWP and Quantification Settlement Agreements for the Colorado River into their assessment.

MET has concluded that the region can provide reliable water supplies under normal, single-dry, and five-year consecutive dry conditions (Table 6-4, Table 6-5, Table 6-6). MWDOC is a MET member agency, and MET's projections take into account the imported demands from Orange County. As so, MET's water reliability assessments are used to determine that demands within MWDOC can be met for all three hydrological conditions.

Table 6-4: MET's Projected Supply Capability and Demands through 2045 for a Normal Year

Normal Water Year
Supply Capability[1] and Projected Demands
Average of 1922-2017 Hydrologies
(Acre-feet per year)

Forecast Year	2025	2030	2035	2040	2045
Current Programs					
In-Region Supplies and Programs	878,000	880,000	878,000	876,000	875,000
California Aqueduct[2]	1,838,000	1,832,000	1,832,000	1,831,000	1,831,000
Colorado River Aqueduct					
Total Supply Available[3]	1,216,000	1,342,000	1,342,000	891,000	916,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,216,000	1,250,000	1,250,000	891,000	916,000
Capability of Current Programs	**3,932,000**	**3,962,000**	**3,960,000**	**3,598,000**	**3,622,000**
Demands					
Total Demands on Metropolitan	996,000	978,000	995,000	1,016,000	1,041,000
Exchange with SDCWA	278,000	278,000	278,000	278,000	278,000
Total Metropolitan Deliveries[5]	**1,274,000**	**1,256,000**	**1,273,000**	**1,294,000**	**1,319,000**
Surplus	**2,658,000**	**2,706,000**	**2,687,000**	**2,304,000**	**2,303,000**
Programs Under Development					
In-Region Supplies and Programs	0	0	0	0	0
California Aqueduct	13,000	13,000	13,000	13,000	13,000
Colorado River Aqueduct					
Total Supply Available[3]	0	0	0	0	0
Aqueduct Capacity Limit[4]	*34,000*	*0*	*0*	*359,000*	334,000
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**47,000**	**13,000**	**13,000**	**372,000**	**347,000**
Potential Surplus	**2,705,000**	**2,719,000**	**2,700,000**	**2,676,000**	**2,650,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange, and canal lining water conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfer and exchange and canal lining water.

[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal lining water. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 6-5: MET's Projected Supply Capability and Demands through 2045 for a Single Dry Year

Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(Acre-feet per year)

Forecast Year	2025	2030	2035	2040	2045
Current Programs					
In-Region Supplies and Programs	878,000	880,000	878,000	876,000	875,000
California Aqueduct[2]	675,000	661,000	661,000	660,000	660,000
Colorado River Aqueduct					
Total Supply Available[3]	1,174,000	1,466,000	1,466,000	1,015,000	1,037,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,174,000	1,250,000	1,250,000	1,015,000	1,037,000
Capability of Current Programs	**2,727,000**	**2,791,000**	**2,789,000**	**2,551,000**	**2,572,000**
Demands					
Total Demands on Metropolitan	1,124,000	1,109,000	1,130,000	1,153,000	1,179,000
Exchange with SDCWA	278,000	278,000	278,000	278,000	278,000
Total Metropolitan Deliveries[5]	**1,402,000**	**1,387,000**	**1,408,000**	**1,431,000**	**1,457,000**
Surplus	**1,325,000**	**1,404,000**	**1,381,000**	**1,120,000**	**1,115,000**
Programs Under Development					
In-Region Supplies and Programs	0	0	0	0	0
California Aqueduct	0	0	0	0	0
Colorado River Aqueduct					
Total Supply Available[3]	0	0	0	0	0
Aqueduct Capacity Limit[4]	*76,000*	*0*	*0*	*235,000*	*213,000*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**0**	**0**	**0**	**0**	**0**
Potential Surplus	**1,325,000**	**1,404,000**	**1,381,000**	**1,120,000**	**1,115,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange, and canal lining water conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfer and exchange and canal lining.
[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal lining. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 6-6: MET's Projected Supply Capability and Demands through 2045 for a Normal Water Year

Drought Lasting Five Consecutive Water Years
Supply Capability[1] and Projected Demands
Repeat of 1988-1992 Hydrology
(Acre-feet per year)

Forecast Year	2025	2030	2035	2040	2045
Current Programs					
In-Region Supplies and Programs	192,000	199,000	198,000	197,000	197,000
California Aqueduct[2]	766,000	761,000	761,000	761,000	761,000
Colorado River Aqueduct					
Total Supply Available[3]	1,240,000	1,466,000	1,466,000	1,015,000	1,037,000
Aqueduct Capacity Limit[4]	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*	*1,250,000*
Colorado River Aqueduct Capability	1,240,000	1,250,000	1,250,000	1,015,000	1,037,000
Capability of Current Programs	**2,198,000**	**2,210,000**	**2,209,000**	**1,973,000**	**1,995,000**
Demands					
Total Demands on Metropolitan	1,134,000	1,136,000	1,157,000	1,179,000	1,206,000
Exchange with SDCWA	278,000	278,000	278,000	278,000	278,000
Total Metropolitan Deliveries[5]	**1,412,000**	**1,414,000**	**1,435,000**	**1,457,000**	**1,484,000**
Surplus	**786,000**	**796,000**	**774,000**	**516,000**	**511,000**
Programs Under Development					
In-Region Supplies and Programs	0	0	0	0	0
California Aqueduct	0	0	0	0	0
Colorado River Aqueduct					
Total Supply Available[3]	0	0	0	0	0
Aqueduct Capacity Limit[4]	*10,000*	*0*	*0*	*235,000*	213,000
Colorado River Aqueduct Capability	*0*	*0*	*0*	*0*	*0*
Capability of Proposed Programs	**10,000**	**0**	**0**	**235,000**	**213,000**
Potential Surplus	**796,000**	**796,000**	**774,000**	**751,000**	**724,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal lining water conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfer and exchange and canal lining.

[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal lining water. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

6.2.2.2 MET's Drought Risk Assessment Results

For its DRA, MET assessed the reliability of each individual water supply source over the five consecutive year drought through a modeling method using the same historical hydrologic conditions as the water service reliability assessment: 1922 to 2017. MET used the five-consecutive years of 1988 to 1992 to complete its DRA, because this represents the driest five-consecutive year historic sequence for MET's supply. Even without activating WSCP actions, according to MET's UWMP Table 2-7, MET's water supply from the SWP and CRA can reliably meet the demands of a five-year drought from FY 2020-21 through FY 2024-25 (Table 6-7).

Table 6-7: MET's Projected Supply Capability and Demands during a Five-Year Drought

Table 2-7
Metropolitan's Drought Risk Assessment
Water Use, Supply, and Risk Assessment for 2021 – 2025
(also included as Appendix 12 DWR Submittal Table 7-5)

Based on DWR DRA Optional Planning Tool (Annual totals in AF)	
Water Use Worksheet	
Historicf and Actual	
2016	1,663,599
2017	1,449,015
2018	1,560,487
2019	1,327,928
Customer Water Use Subtotal	1,393,149
Losses[1]	48,520
2020 Total Gross Water Use	**1,441,669**
Five Consecutive Water Years	
Change from 2020	-43,669
2021 Gross Water Use	**1,398,000**
Change from 2021	74,000
2022 Gross Water Use	**1,472,000**
Change from 2022	33,000
2023 Gross Water Use	**1,505,000**
Change from 2023	-160,000
2024 Gross Water Use	**1,345,000**
Change from 2024	67,000
2025 Gross Water Use	**1,412,000**

[1] Losses include treated system losses and surface reservoir evaporation.

Supply Worksheet [1]	
2021 (1st year)	**1,517,000**
2022 (2nd year)	**2,374,000**
2023 (3rd year)	**1,557,000**
2024 (4th year)	**1,816,000**
2025 (5th year)	**1,644,000**
Supply 1 - Colorado River Aqueduct supplies [2]	
2021 (1st year)	1,250,000
2022 (2nd year)	1,250,000
2023 (3rd year)	1,250,000
2024 (4th year)	1,250,000
2025 (5th year)	1,250,000
Supply 2 - State Water Project supplies	
2021 (1st year)	267,000
2022 (2nd year)	1,124,000
2023 (3rd year)	307,000
2024 (4th year)	566,000
2025 (5th year)	394,000
Supply 3 - In-Region supplies	
2021 (1st year)	0
2022 (2nd year)	0
2023 (3rd year)	0
2024 (4th year)	0
2025 (5th year)	0

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

2021	Total
Gross Water Use	**1,398,000**
Total Supplies	**1,517,000**
Surplus/Shortfall w/o WSCP Action	**119,000**
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
Gross Water Use [Use Worksheet]	**1,472,000**
Total Supplies [Supply Worksheet]	**2,374,000**
Surplus/Shortfall w/o WSCP Action	**902,000**
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%**

2023	Total
Gross Water Use [Use Worksheet]	**1,505,000**
Total Supplies [Supply Worksheet]	**1,557,000**
Surplus/Shortfall w/o WSCP Action	**52,000**
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
Gross Water Use [Use Worksheet]	**1,345,000**
Total Supplies [Supply Worksheet]	**1,816,000**
Surplus/Shortfall w/o WSCP Action	**471,000**
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
Gross Water Use [Use Worksheet]	**1,412,000**
Total Supplies [Supply Worksheet]	**1,644,000**
Surplus/Shortfall w/o WSCP Action	**232,000**
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%**

1. Includes Metropolitan's core supplies as defined in WSCP in Appendix 4. Detailed Supply Worksheets are included in Appendix 3 Table A.3-8.
2. Maximum CRA deliveries limited to 1.25 MAF including IID-SDCWA transfer and exchange and canal linings.

6.2.3 Planned Future Sources

Beyond the programs highlighted in Sections 6.2.1, 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

Among all local supplies available to MWDOC's service area, groundwater supplies make up the majority. The water supply resources within MWDOC's service area are enhanced by the existence of groundwater basins, which provide a reliable local source and, additionally, are used as reservoirs to store water during wet years and draw from storage during dry years.

MWDOC does not provide nor sell any groundwater to its retail agencies. However, its retail agencies do extract groundwater locally to diversify their portfolio. Table 6-8 shows a breakdown of historical groundwater production by the retail agencies from all groundwater basins within MWDOC's service area.

This section describes the five groundwater basins used by MWDOC's retail agencies and provides a 25-year projection of the service area's groundwater supply.

Table 6-8: Groundwater pumped in the Past 5 Years within MWDOC's Service Area (AF)

Groundwater Basin	Fiscal Year Ending				
	2016	2017	2018	2019	2020
OC Basin[1]	195,319	205,262	155,658	204,989	192,652
San Juan Basin	1,640	1,661	2,817	2,395	3,010
La Habra Basin	3,540	3,296	2,921	2,183	2,751
Main San Gabriel Basin	11,753	12,434	14,059	14,790	14,870
San Mateo Basin	433	462	620	411	390
Total Groundwater[2]:	**212,595**	**223,116**	**176,076**	**224,769**	**213,674**

NOTES:
[1] Includes only the MWDOC member agencies' groundwater production. Does not include the groundwater production of Anaheim, Fullerton, and Santa Ana.
[2] Total volumes are +/- 1 AF due to rounding

6.3.1 Orange County Groundwater Basin

This section describes the medium-priority OC Basin and the management measures taken by OCWD, the basin manager to optimize local supply and minimize overdraft.

The OCWD was formed in 1933 by a special legislative act of the California State Legislature to protect and manage the County's vast, natural, groundwater supply using the best available technology and defend its water rights to the OC Basin. This legislation is found in the State of California Statutes, Water – Uncodified Acts, Act 5683, as amended. The OC Basin is managed by OCWD under the Act, which functions as a statutorily-imposed physical solution. The OCWD Management Area includes approximately 89 percent of the land area of the OC Basin, and 98 percent of all groundwater production occurs within the area. Approximately 2.5 million residents live within OCWD's boundaries and rely upon the basin for their primary water supply. OCWD manages water resource monitoring programs, land use elements related to basin management, groundwater elevation, groundwater quality, and coastal area monitoring through a number of monitoring programs. OCWD monitors the basin by collecting groundwater elevation and quality data from approximately 400 District-owned wells and manages an electronic database that stores water elevation, water quality, production, recharge and other data on over 2,000 wells and facilities within and outside OCWD boundaries (City of La Habra et al., 2017). For detailed monitoring programs and management information, refer to the 2017 Basin 8-1 Alternative (Appendix D).

Groundwater levels are managed within a safe basin operating range to protect the long-term sustainability of the OC Basin and to protect against land subsidence. OCWD regulates groundwater levels in the OC Basin by regulating the annual amount of pumping and setting the Basin Production Percentage (BPP) for the water year. As defined in the District Act, the BPP is the ratio of water produced from groundwater supplies within the OCWD service area to all water produced within the area from both supplemental sources and groundwater within the OCWD (OCWD, 2020a).

6.3.1.1 Basin Characteristics

The OC Basin underlies the northern half of Orange County beneath broad lowlands. The OC Basin, managed by OCWD, covers an area of approximately 350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, and the Pacific Ocean to the southwest. The OC Basin boundary extends to the Orange County-Los Angeles Line to the northwest, where groundwater flows across the county line into the Central Groundwater Basin of Los Angeles County. A map of the OC Basin is shown on Figure 6-5. The total thickness of sedimentary rocks in the OC Basin is over 20,000 feet, with only the upper 2,000 to 4,000 feet containing fresh water. The OC Basin’s full volume is approximately 66 MAF.

There are three major aquifer systems that have been subdivided by OCWD, the Shallow Aquifer System, the Principal Aquifer System, and the Deep Aquifer System. These three aquifer systems are hydraulically connected as groundwater is able to flow between each other through intervening aquitards or discontinuities in the aquitards. The Shallow Aquifer system occurs from the surface to approximately 250 feet below ground surface. Most of the groundwater from this aquifer system is pumped by small water systems for industrial and agricultural use. The Principal Aquifer system occurs at depths between 200 and 1,300 feet below ground surface. Over 90 percent of groundwater production is from wells that are screened within the Principal Aquifer system. Only a minor amount of groundwater is pumped from the Deep Aquifer system, which underlies the Principal Aquifer system and is up to 2,000 feet deep in the center of the OC Basin.

Per- and polyfluoroalkyl substances (PFAS) are a group of thousands of manmade chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). PFAS compounds were once commonly used in many products including, among many others, stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, and fire-fighting foams. Beginning in the summer of 2019, the California State Division of Drinking Water (DDW) began requiring testing for PFAS compounds in some groundwater production wells in the OCWD area.

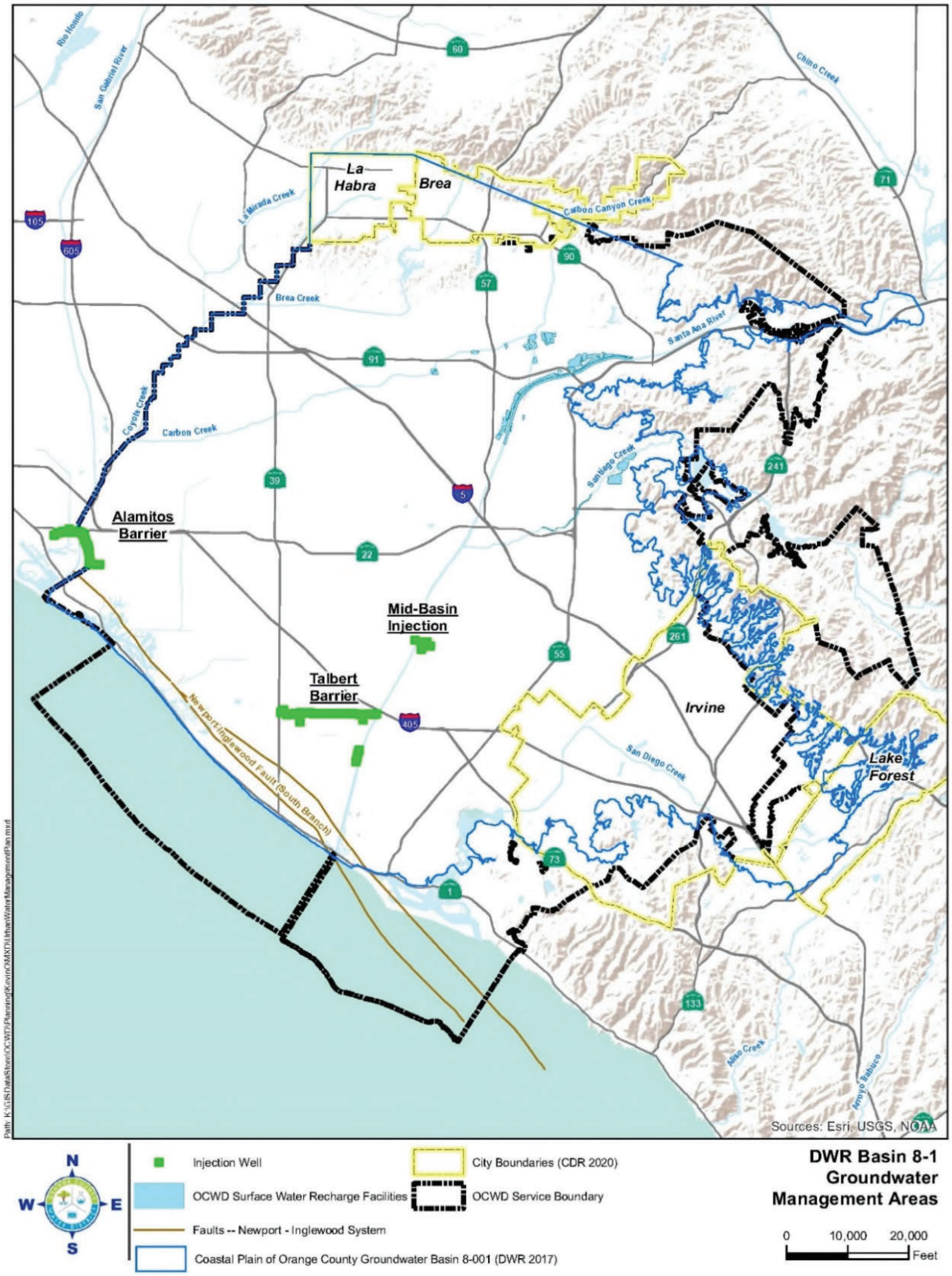


Figure 6-5: Map of the OC Basin

Groundwater production in FY 2019-20 was expected to be approximately 325,000 acre-feet but declined to 286,550 acre-feet primarily due to PFAS impacted wells being turned off around February 2020. OCWD expects groundwater production to be in the area of 245,000 acre-feet in FY 2020-21 due to the currently idled wells and additional wells being impacted by PFAS and turned off. As PFAS treatment systems are constructed, OCWD expects total annual groundwater production to slowly increase back to normal levels (310,000 to 330,000 acre-feet) (OCWD, 2020a).

6.3.1.2 Sustainable Groundwater Management Act

In 2014, the State of California adopted the Sustainable Groundwater Management Act (SGMA) to help manage its groundwater sustainably, and limit adverse effects such as significant groundwater-level declines, land subsidence, and water quality degradation. SGMA requires all high- and medium-priority basins, as designated by DWR, be sustainably managed. DWR designated the Coastal Plain of OC Basin as a medium-priority basin, primarily due to heavy reliance on the OC Basin's groundwater as a source of water supply. Compliance with SGMA can be achieved in one of two ways (City of La Brea et al., 2017):

1. A Groundwater Sustainability Agency (GSA) is formed and a GSP is adopted, or
2. Special Act Districts created by statute, such as OCWD, and other agencies may prepare and submit an Alternative to a GSP

Led by OCWD, the agencies within Basin 8-1, including La Habra, collaborated to submit an Alternative to a GSP in 2017, titled the "Basin 8-1 Alternative" to meet SGMA compliance. This document will be updated every five years. The current (2017) version is included in Appendix D.

6.3.1.3 Basin Production Percentage

Background

The OC Basin is not adjudicated and as such, pumping from the OC Basin is managed through a process that uses financial incentives to encourage groundwater producers to pump a sustainable amount of water. The framework for the financial incentives is based on establishing the BPP, the percentage of each Producer's total water supply that comes from groundwater pumped from the OC Basin. Groundwater production at or below the BPP is assessed the Replenishment Assessment (RA). While there is no legal limit as to how much an agency pumps from the OC Basin, there is a financial disincentive to pump above the BPP. The BPP is set uniformly for all Producers by OCWD on an annual basis. Agencies that pump above the BPP are charged the RA plus the Basin Equity Assessment (BEA). The BEA is presently calculated so that the cost of groundwater production is equivalent to the cost of importing potable water supplies. This approach serves to discourage, but not eliminate, production above the BPP, and the BEA can be increased to discourage production above the BPP if necessary.

The BPP is set based on groundwater conditions, availability of imported water supplies, and Basin management objectives. The supplies available for recharge must be estimated for a given year. The supplies of recharge water that are estimated are: 1) Santa Ana River stormflow, 2) Natural incidental recharge, 3) Santa Ana River baseflow, 4) GWRS supplies, and 5) other supplies such as imported water and recycled water purchased for the Alamitos Barrier. The BPP is a major factor in determining the cost of groundwater production from the OC Basin for that year. The BPP set for Water Year 2021-22 is 77%.

BPP Adjustments for Basin Management

OCWD has established management guidelines that are used to establish future BPPs, as seen in Table 6-9. Raising or lowering the BPP allows OCWD to manage the amount of pumping from the basin. OCWD has a policy to manage the groundwater basin within a sustainable range to avoid adverse impacts to the basin. OCWD seeks to maintain some available storage space in the basin to maximize surface water recharge when such supplies are available, especially in relatively wet years. By keeping the basin relatively full during wet years, and for as long as possible in years with near-normal recharge, the maximum amount of groundwater could be maintained in storage to support pumping in future drought conditions. During dry hydrologic years when less water would be available for recharge, the BPP could be lowered to maintain groundwater storage levels. A component of OCWD's BPP policy is to manage the groundwater basin so that the BPP will not fluctuate more that 5 percent from year to year.

Based on most recent modeling of water supplies available for groundwater recharge and water demand forecasts, OCWD anticipates being able to sustain the BPP at 85% starting in 2025. The primary reasons for the higher BPP are the expected completion of the GWRS Final Expansion (GWRSFE) in 2023 and the relatively low water demands of approximately 400,000 afy.

Modeling and forecasts generate estimates based on historical averages. Consequently, forecasts use average hydrologic conditions which smooth the dynamic and unpredictable local hydrology. Variations in local hydrology are the most significant impact to supplies of water available to recharge the groundwater basin. The BPP projection of 85% is provided based upon average annual rainfall weather patterns. If OCWD were to experience a relatively dry period, the BPP could be reduced to maintain water storage levels, by as much as five percent.

Table 6-9: Management Actions Based on Changes in Groundwater Storage

Available Storage Space (amount below full basin condition, AF)	Basin Management Action to Consider
Less than 100,000	Raise BPP
100,000 to 300,000	Maintain and / or raise BPP towards 75% goal
300,000 to 350,000	Seek additional supplies to refill basin and / or lower the BPP
Greater than 350,000	Seek additional supplies to refill basin and lower the BPP

BPP Exemptions

In some cases, OCWD encourages treating and pumping groundwater that does not meet drinking water standards in order to protect water quality. This is achieved by using a financial incentive called the BEA Exemption. A BEA Exemption is used to promote beneficial uses of poor-quality groundwater and reduce or prevent the spread of poor-quality groundwater into non-degraded aquifer zones. OCWD uses a partial or total exemption of the BEA to compensate a qualified participating agency or Producer for the costs of treating poor quality groundwater, which typically include capital, interest and operations and maintenance costs for treatment facilities. (City of La Habra et al., 2017). Similarly, for proactive water quality management, OCWD exempts a portion of the BEA for their Coastal Pumping Transfer Program

(CPTP). The CPTP encourages inland groundwater producers to increase pumping and coastal producers to decrease pumping in order to reduce the groundwater basin drawdown at the coast and protect against seawater intrusion. Inland pumpers can pump above the BPP without having to pay the full BEA for the amount pumped above the BPP (OCWD, 2015). Coastal pumpers receive BEA revenue from OCWD to assist in offsetting their additional water supply cost from taking less groundwater.

6.3.1.3.1 OCWD Groundwaterl Reliability Plan

In order to adapt to the substantial growth in water demands in OCWD's management area, it is paramount to anticipate and understand future water demands and develop projects to increase future water supplies proactively to match demands. The GRP is a continuation of these planning efforts that estimates the OC Basin's sustainable average annual production and extrapolates water needs of the OC Basin by combining recently completed water demand projections and modeling of Santa Ana River flows available for recharge. These data will be used to evaluate future water supply projects and guide management of the OC Basin. OCWD is currently developing the GRP, and the first public draft is expected to be available May 2021.

Current water demand projections show a relatively slow increase over the 25-year planning horizon, which is generally of similar magnitude as the additional production from the GWRSFE in early 2023. Once complete, the GWRSFE will increase capacity from 100,000 to 134,000 AFY of high-quality recycled water. This locally controlled, drought proof supply of water reduces the region's dependance on imported water.

Historically, the Santa Ana River has served as the primary source of water to recharge the OC Basin. To determine the availability of future Santa Ana River flows, OCWD utilized surface water flow modeling of the upper watershed. Modeling was developed to predict the impacts future stormwater capture and wastewater recycling projects in the upper watershed would have on future Santa Ana River flow rates at Prado Dam. Santa Ana River base flows are expected to decrease as more water recycling projects are built in the upper watershed. OCWD continues to work closely with the US Army Corps of Engineers to temporarily impound and slowly release up to approximately 20,000 AF of stormwater in the Prado Dam Conservation Pool. To some extent, the losses in baseflow are partially offset through the capture of additional stormwater held in the Prado Dam Conservation Pool. When available, OCWD will continue to augment groundwater recharge through the purchase of imported water through MET. OCWD will diligently monitor and evaluate future water supply projects to sustainably manage and protect the OC Basin for future generations.

6.3.1.3.2 OCWD Engineer's Report

The OCWD Engineer's Report reports on the groundwater conditions and investigates information related to water supply and groundwater basin usage within OCWD's service area.

The overall BPP achieved in the 2019 to 2020 water year within OCWD for non-irrigation use was 75.9 percent. The achieved pumping was less than the BPP established for the 2019 to 2020 water year primarily due to the water quality impacts of PFAS. A BPP of 77 percent will be used for water year 2021-22. Analysis of the OC Basin's projected accumulated overdraft, the available supplies to the OC Basin (assuming average hydrology) and the projected pumping demands indicate that this level of pumping can be sustained for 2021-22 without detriment to the OC Basin (OCWD, 2021).

In FY 2021-22 additional production of approximately 22,000 AF above the BPP will be undertaken by the City of Tustin, City of Garden Grove, City of Huntington Beach, Mesa Water, and IRWD. These agencies use the additional pumping allowance in order to accommodate groundwater quality improvement projects. As in prior years, production above the BPP from these projects would be partially or fully exempt from the BEA as a result of the benefit provided to the OC Basin by removing poor-quality groundwater and treating it for beneficial use (OCWD, 2021).

6.3.1.4 Recharge Management

Recharging water into the OC Basin through natural and artificial means is essential to support pumping from the OC Basin. Active recharge of groundwater began in 1949, in response to increasing drawdown of the OC Basin and, consequently, the threat of seawater intrusion. The OC Basin's primary source of recharge is flow from the Santa Ana River, which is diverted into recharge basins and its main Orange County tributary, Santiago Creek. Other sources of recharge water include natural infiltration, recycled water, and imported water. Natural recharge consists of subsurface inflow from local hills and mountains, infiltration of precipitation and irrigation water, recharge in small flood control channels, and groundwater underflow to and from Los Angeles County and the ocean.

Recycled water for the OC Basin recharge is from two sources. The main source of recycled water is from the GWRS, which is injected into the Talbert Seawater Barrier and recharged in the Kraemer, Miller, Miraloma and La Palma Basins (City of La Habra et al., 2017). The second source of recycled water is water purified at the Water Replenishment District's Leo J. Vander Lans Treatment Facility, which supplies water to the Alamitos Seawater Barrier (owned and operated by the Los Angeles County Department of Public Works). OCWD's share of the Alamitos Barrier injection total for water year 2018-19 was less than half of the total injection, based on barrier wells located within Orange County. The Water Replenishment District of Southern California (WRD) also works closely with OCWD to ensure that the water demands at the Alamitos Barrier are fulfilled through the use of recycled water as opposed to imported water, however the recycled portion was less than 33 percent for the last six years due to operational issues and wastewater supply interruptions (OCWD, 2020a). Injection of recycled water into these barriers is an effort by OCWD to control seawater intrusion into the OC Basin. Operation of the injection wells forms a hydraulic barrier to seawater intrusion.

OCWD purchases imported water for recharge from MWDOC. Untreated imported water can be used to recharge the OC Basin through the surface water recharge system in multiple locations, such as Anaheim Lake, Santa Ana River, Irvine Lake, and San Antonio Creek. Treated imported water can be used for in-lieu recharge, as was performed extensively from 1977 to 2007 (City of La Habra et al., 2017). For detailed recharge management efforts from OCWD, refer to OCWD's 2017 Basin 8-1 Alternative (Appendix D).

6.3.1.5 MET Imported Water for Groundwater Replenishment

In the past OCWD, MWDOC, and MET have coordinated water management to increase storage in the OC Basin when imported supplies are available for this purpose. MET's groundwater replenishment program was discontinued on January 1, 2013, and currently MET via MWDOC sells replenishment water to OCWD at the full service untreated MET rate. Figure 6-6 shows MWDOC's imported water sales to OCWD since FY 1990-91, which averages approximately 31,200 AF per year. Recently, due to low Santa

Ana River flows as a result of low precipitation and increased use along the river, OCWD has needed to purchase more imported replenishment water per year, in the range of 60,000 to 65,000 AF per year (This does not include water amounts from MET's Conjunctive Use Program (CUP) or its Cyclic Storage Account). However, with the emergence of PFAS affecting groundwater production, the need of purchasing imported water has been temporary suspended. Until PFAS treatment is in place for most groundwater producers, imported replenishment water will be significantly reduced.

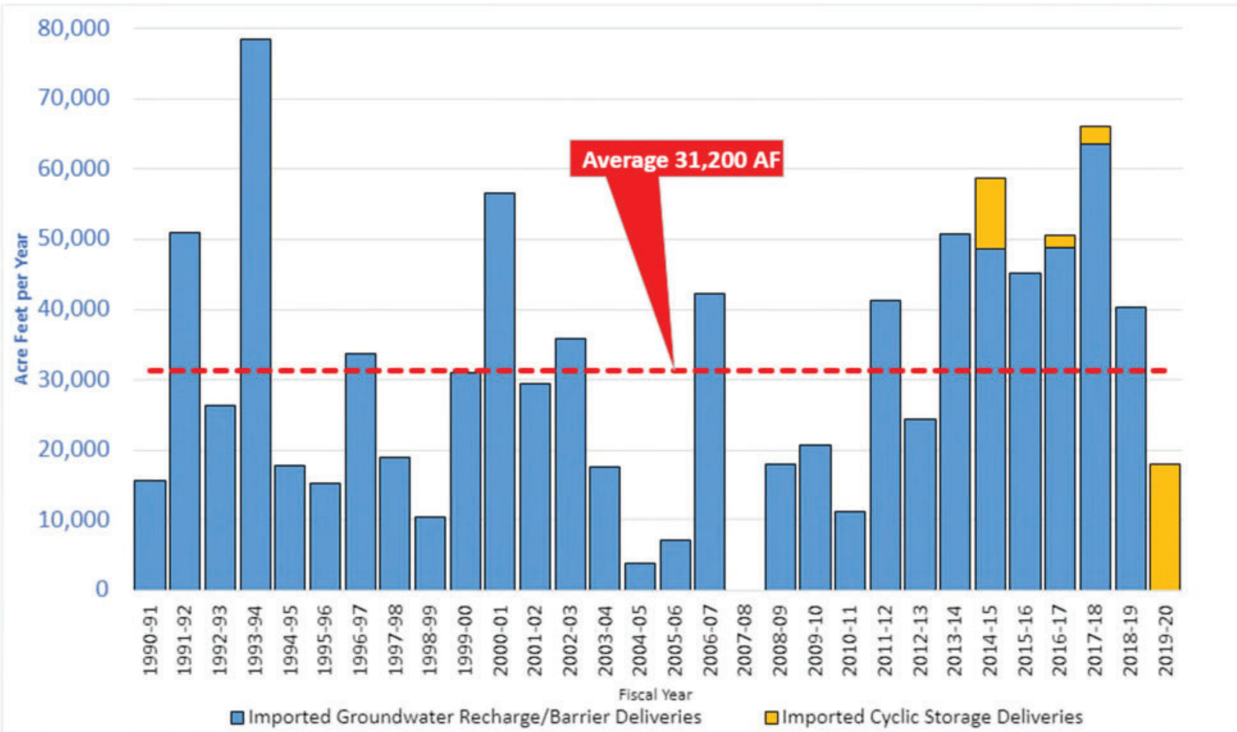


Figure 6-6: MWDOC Imported Water Sales for Groundwater Replenishment

6.3.1.6 MET Conjunctive Use/Cyclic Storage Program with OCWD

Since 2004, OCWD, MWDOC, and certain groundwater producers have participated in MET's CUP. This program allows for the storage of MET water in the OC Basin. The existing MET program provides storage of up to 66,000 AF of water in the OC Basin to be pumped by participating producers in place of receiving imported supplies during dry years or water shortage events. In exchange, MET contributed to improvements in basin management facilities and to an annual administrative fee. These improvements included eight new groundwater production wells, improvements to the seawater intrusion barrier, and construction of the Diemer Bypass Pipeline. The water is accounted for via the CUP program administered by the wholesale agencies and is controlled by MET such that it can be withdrawn over a three-year time period (OCWD, 2020a).

The CUP account was filled in the wet years of 2007 & 2013 and withdrawn to near-zero during the dry-years of 2010 & 2016. MET has not stored water in the CUP account since 2014, and the CUP account has been withdrawn to zero and is projected to remain at 0 AF by the end of 2021. The CUP contract with MET ends in 2028.

As so, the values in Figure 6-7 from 2015 onwards, represent only volumes from the MET Cyclic Storage Agreement. The Cyclic Storage account is an alternative storage account with MET. However, unlike the CUP program, OCWD controls when the water is used. The Cyclic Water Storage Program allows MET to store water in a local groundwater basin during surplus conditions, where MET has limited space in its regional storage locations. Once the water is stored via direct delivery or In-lieu the groundwater agency has the ability to purchase this water at a future date or over a 5-year period.

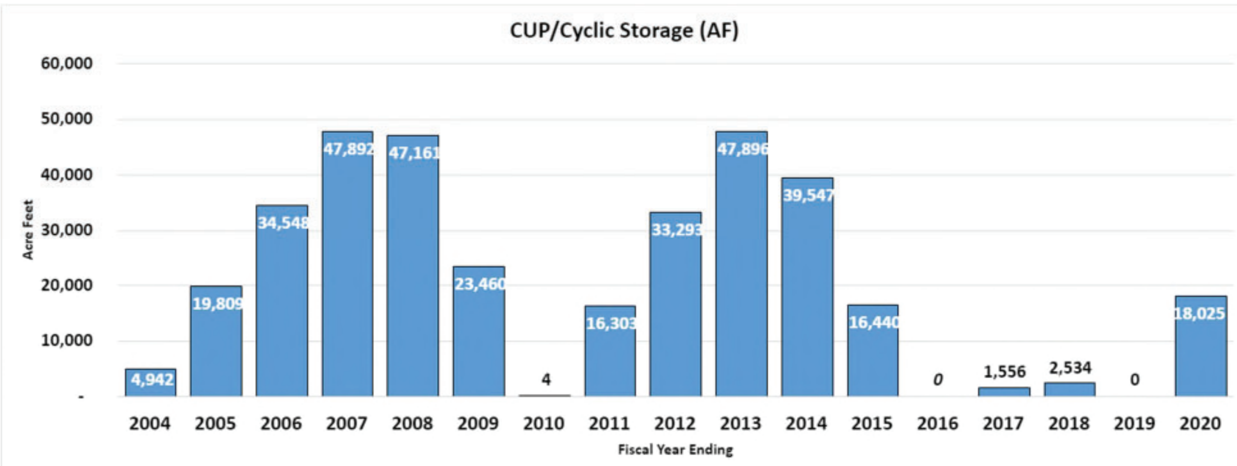


Figure 6-7: MWDOC Conjunctive Use Program Historical Storage Balance

6.3.2 Other Groundwater Basins

6.3.2.1 San Juan Groundwater Basin

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 6-8. 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.

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 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.

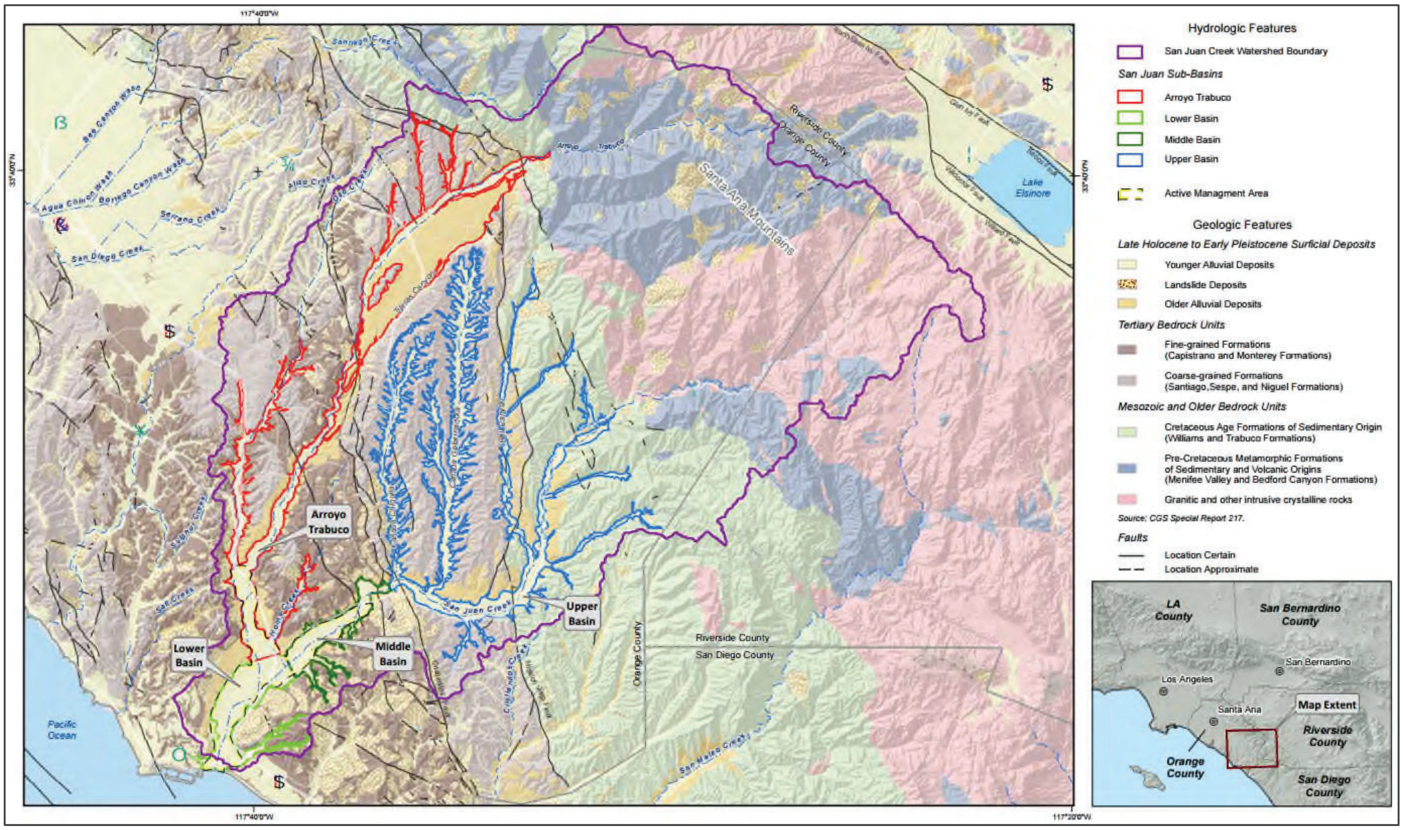


Figure 6-8: Principal Groundwater Basins for the San Juan Groundwater Basin

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

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 differs from many adjudicated groundwater basins as it 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 E), 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 and 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 F.

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).

6.3.2.2 La Habra Groundwater Basin

Basin Characteristics

The unadjudicated La Habra Groundwater Basin covers parts of Los Angeles County and Orange County and is part of both the Central Basin, and the OC Basin, which are both medium-priority basins. The Basin lies entirely within the Coyote Creek Watershed and the La Habra Basin area is shown on Figure 6-9. A portion of the La Habra Basin is located within Central Basin as well as the northern tip of the OC Basin.

The City of La Habra has been deemed the exclusive GSA under SGMA for the La Habra-Brea Management Area. This management area is part of Basin 8-1 but is hydrogeologically distinct from the OCWD Management Area and is not under the jurisdiction of OCWD. La Habra adopted a resolution to establish the La Habra Basin as a separate basin from Basin 8-1. OCWD adopted a resolution to support the City's request to DWR for an internal jurisdictional boundary modification in the OC Basin that follows the city limits of La Habra and Brea as it is outside of the OCWD's jurisdictional boundary.

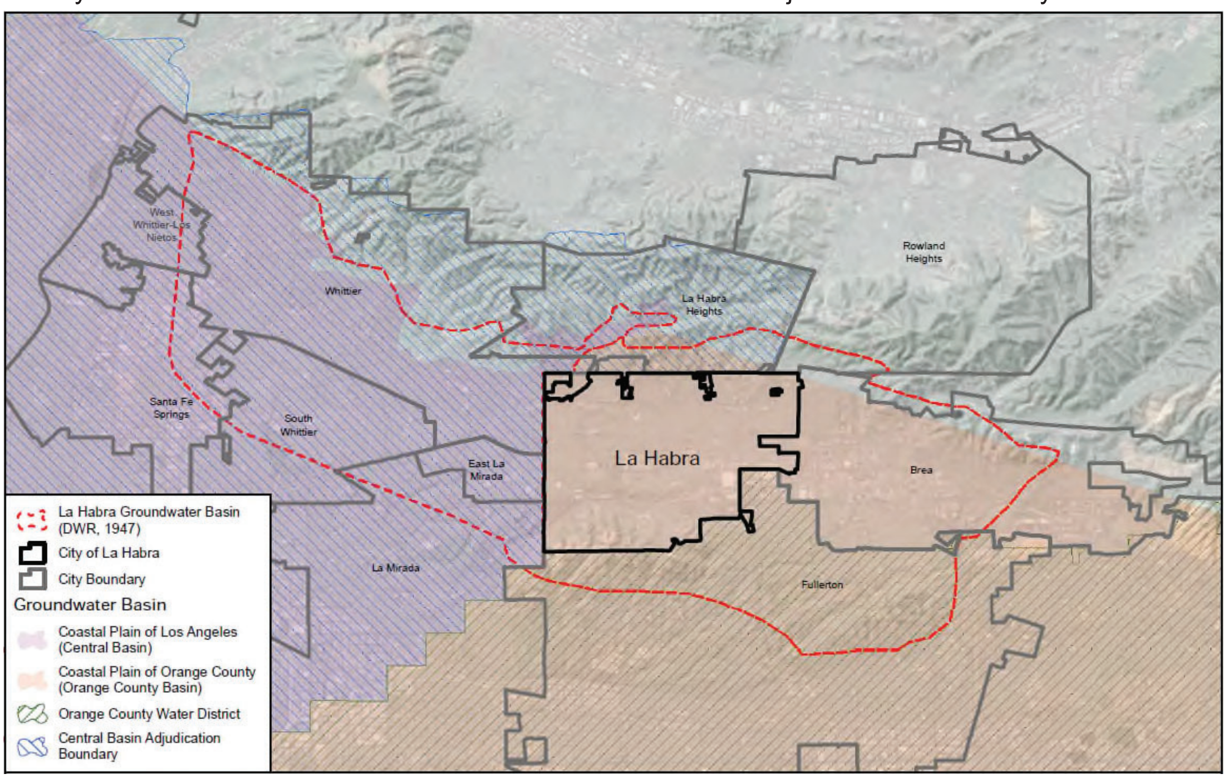


Figure 6-9: La Habra Groundwater Basin

From a structural geological standpoint, the La Habra Basin area is dominated by the northwest trending La Habra Syncline (a U–shaped down–fold) which is bounded on the north by the Puente Hills and on the south by the Coyote Hills. The fold is a naturally occurring trough, or valley, where significant quantities of groundwater have accumulated over the past 150,000 years. The La Habra Basin consists of three water-bearing zones: 1) the Alluvium, 2) the La Habra Formation (including the Coyote Hills Formation), and 3) the San Pedro Formation.

The Alluvium is comprised of young and old alluvium. The deposits are found along the surface stream courses and is composed of unconsolidated silt, clay, sand, and gravel. Alluvium thickness ranges from a few feet to over 100 feet. Generally, the La Habra Formation lies below the Alluvium, consisting of the La Habra and Coyote Hills Formations. However, in the Coyote Hill and Puente Hills, the Alluvium is uplifted and exposed. The La Habra Formation consists of non-marine mudstone, siltstone, sandstone, and conglomerate. It ranges in thickness from 300 to nearly 1,200 feet. Water levels of wells in the La Habra Formation have been measured between 100 and 200 feet below ground surface across the Basin.

Underneath the La Habra Formation lies the San Pedro Formation. As the deepest water bearing unit, the San Pedro Formation is comprised of sand, gravel, sandstone, conglomerate, and shale. The San Pedro Formation ranges between 200 and 400 feet in thickness and produces the best quality groundwater of all the water bearing zones. Pressure levels of confined groundwater in wells of the San Pedro aquifer zone range from about 100 to 200 feet below ground surface (La Habra, Groundwater Study, August 2014).

Basin Management and Safe Yield

As stated in Section 6.3.1.1, the agencies within Basin 8-1, such as the City of La Habra, collaborated to submit an Alternative to a GSP in 2017, titled the “Basin 8-1 Alternative” to meet SGMA compliance. This document supersedes the Groundwater Management Plan from 2014 and will be updated every five years. The current (2017) version of the SGMA-compliant document is included in Appendix D.

The La Habra Basin is not adjudicated. Instead, the City of La Habra follows a “safe yield” which is used for the management and future planning of the La Habra Basin for sustained beneficial use. The safe yield is the volume of groundwater that can be pumped without depleting the aquifer to a point where it cannot recover through natural recharge over a reasonable period of time.

The safe yield for the La Habra Basin was estimated to be approximately 4,500 AFY. This safe yield was determined through an average from two separate studies that took into account natural groundwater recharge and natural groundwater discharge. The La Habra Basin continues to be managed sustainably by maintaining and coordinating groundwater production within the estimated safe yield. The City of La Habra is also evaluating its existing monitoring program with the intent to develop a more robust groundwater elevation and water quality monitoring program (La Habra, 2020).

Historical and Current Groundwater Extraction

From 1922 to the early 1940’s water levels in the La Habra Basin declined markedly because of increased water extraction and deficient rainfall. Water levels rose in the mid 1940’s and then declined again in the late 1940’s reaching the lowest recorded levels in the middle to late 1950’s. From 1960 to 1977, water levels increased in elevation because of a significant decrease in water extraction. Based upon recorded stream runoff yields, it is estimated that approximately 2,100 AF of water would percolate during the average year. For direct percolation of rainfall and resulting runoff within the valley itself, it is estimated that an average of 1,600 AFY would percolate. Thus, the groundwater recharge is estimated at approximately 3,700 AFY. Subsurface flow estimates are about 5,500 AFY. Therefore, it is estimated that the average long–term supply that can be extracted without severe or sustained changes in the amount of groundwater in storage, is approximately 4,500 AFY (an average of the two values).

The City of La Habra pumps local groundwater from the La Habra Basin from three production wells for drinking water purposes and one non-potable groundwater well used for irrigation. Groundwater production in the La Habra Basin has ranged from 3,295 AF in FY 2016-17 to 2,245 AF in FY 2018-19 (La Habra, 2020).

6.3.2.3 Main San Gabriel Groundwater Basin

California Domestic Water Company (CDWC) has water rights, production, treatment and conveyance facilities in the adjudicated Main San Gabriel Groundwater Basin that serve customers overlying the basin within Suburban Water Systems as well as serving the cities of Brea and La Habra in Orange County. Based on the ten-year average from FY 2010-11 through 2019-20, Brea and La Habra purchase approximately 13,261 AFY of Main San Gabriel Groundwater Basin groundwater from CDWC, but this volume varies from year to year.

There is not a limit or cap on the amount of water CDWC can produce from the basin. CDWC owns approximately 12,363 AF of prescriptive pumping rights in the Main San Gabriel Basin. Prescriptive pumping rights are adjusted based on the determination of the Operating Safe Yield (OSY) annually. Based on the FY 2020-21 OSY set at 150,000 AF, CDWC’s prescriptive pumping rights total 9,383.24 AF. Currently, this is the amount of groundwater CDWC can produce from the basin before incurring replacement water assessments, further described in Section 6.3.2.3.1.

The Main San Gabriel Basin and its operations are described below.

Basin Characteristics

The Main San Gabriel Basin lies in eastern Los Angeles County and occupies most of San Gabriel Valley. The hydrologic basin or watershed coincides with a portion of the upper San Gabriel River watershed, and the aquifer or groundwater basin underlies most of the San Gabriel Valley. It is bounded on the north by the San Gabriel Mountains, on the northwest by Raymond Basin, on the southeast by Puente Basin, and on the south by Central Basin. The Main San Gabriel Basin encompasses approximately 107,000 acres and has a storage of 8.9 MAF when the groundwater elevation at the Baldwin Park Key Well is 316 feet. Generally speaking, one foot of groundwater elevation is equivalent to approximately 8,000 AF of storage.

The hydrogeological San Gabriel Basin is divided between three sub-basins, Main Basin, Puente Basin, and portions of Six Basins area. A portion of Six Basins area is tributary to the Main Basin. Each of the sub-basins are adjudicated and managed separately.

Major sources of recharge to the Main San Gabriel Basin are infiltration of rainfall on the valley floor and runoff from the nearby mountains. The Main San Gabriel Basin is the first of a series of basins to receive the water from mountain runoff. The Main San Gabriel Basin interacts hydrogeologically and institutionally with adjoining basins, including Puente Basin, Central Basin, and West Coast Basin (Main San Gabriel Basin Watermaster, 2020a).

Figure 6-10 depicts the boundaries of the Main San Gabriel Basin.

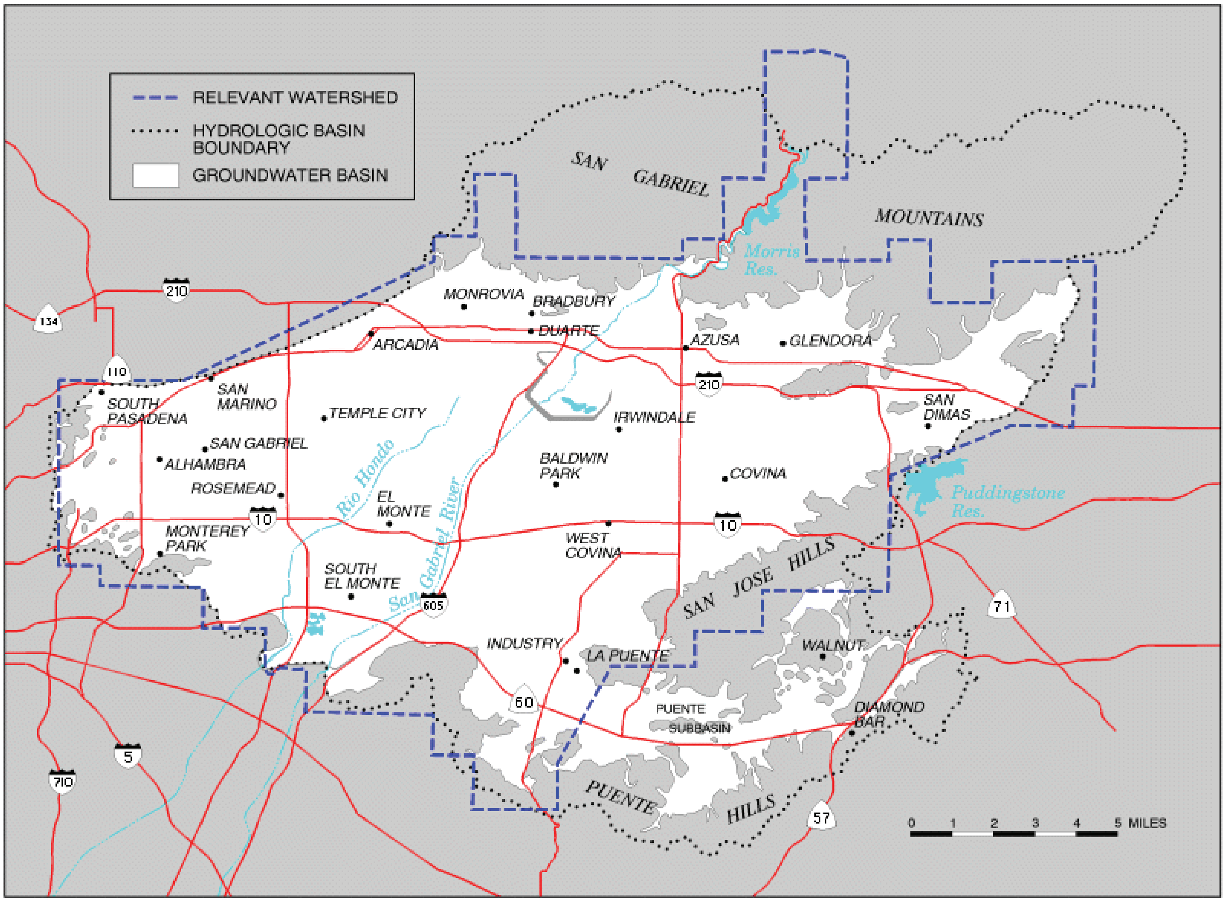


Figure 6-10: Main San Gabriel Groundwater Basin

6.3.2.3.1 Basin Judgment

Rapid urbanization in the San Gabriel Valley in the 1940s resulted in an increased demand for groundwater drawn from the Upper Area users in Main San Gabriel Basin. Consequently, the Main San Gabriel Basin was in a state of overdraft and the available water supply for the Lower Area and downstream users decreased. In 1968, at the request of producers, the Upper San Gabriel Municipal Water District filed a complaint that would adjudicate water rights in the Basin and would bring all Basin producers under control of one governing body. The final result was the entry of the Main San Gabriel Basin Judgment in 1973.

The Judgment defined the water rights of 190 original parties to the legal action. It created a new governing body, the Main San Gabriel Basin Watermaster, and described a program for management of water in the Basin. Under the terms of the Main San Gabriel Basin Judgment all rights to the diversion of surface water and production of groundwater within the Main Basin and its relevant watershed were adjudicated. The Main Basin Judgment does not restrict the quantity of water agencies may extract from the Main Basin. Rather, it provides a means for replacing with Supplemental Water all annual extractions in excess of an agency's annual right to extract water. The Main Basin Watermaster annually establishes an OSY for the Main Basin that is then used to allocate to each agency its portion of the OSY that can be produced free of a Replacement Water Assessment. If a producer extracts water in excess of his right under the annual OSY, it must pay an assessment for Replacement Water that is sufficient to purchase one AF of Supplemental Water to be spread in the basin for each AF of excess production. All water production is metered and is reported quarterly to the Main Basin Watermaster. The OSY is set at 150,000 AF for FY 2020-21.

In addition to Replacement Water Assessments, the Main Basin Watermaster levies an Administration Assessment to fund the administration of the Main Basin management program under the Main Basin Judgment and a Make-up Obligation Assessment in order to fulfill the requirements for any Make-Up Obligation under the Long Beach Judgment and to supply fifty percent of the administration costs of the River Watermaster service. The Main Basin Watermaster levies an In-lieu Assessment and may levy special Administration Assessments.

Water rights under the Main Basin Judgment are transferable by lease or purchase so long as such transfers meet the requirements of the Main Basin Judgment. There is also provision for Cyclic Storage Agreements that allow parties and non-parties to store imported supplemental water in the Main San Gabriel Basin under such agreements with the Main Basin Watermaster pursuant to uniform rules and conditions and Court approval (Main San Gabriel Basin Watermaster, 2020a).

The Main Basin Watermaster has entered into a Cyclic Storage Agreement with three municipal water districts, MET, Three Valleys Municipal Water District (TVMWD), and Upper San Gabriel Valley Municipal Water District (USGVMWD). The first agreement with MET and USGVMWD permits MET to deliver and store imported water in the Main Basin in an amount not to exceed 100,000 AF for future Replacement Water use. The second Cyclic Storage Agreement is with TVMWD and permits MET to deliver and store 40,000 AF for future Replacement Water use. The third is with San Gabriel Valley Municipal Water District. The Amended Main San Gabriel Basin Judgment contains more detailed information on the agreements and management of water rights to the basin (Appendix G).

The Main San Gabriel Basin is currently in an extended period of drought-like conditions, with 18 out of the most recent 25 years having below-average rainfall, as well as minimal runoff and limited recharge. As a result, Basin recovery is dependent on the Main Basin Watermaster's management actions. Long-term water demand has fallen steadily over the last decade, and in FY 2019-20, the demand was approximately 30% below the peak in 2006. The Key Well also rose 6.3 feet in FY 2019-20 due to increases in Cyclic Storage and local and Resource Development Assessment (RDA) water.

6.3.2.4 San Mateo Valley Groundwater Basin

Basin Characteristics

Per DWR's designation, the San Mateo Valley Basin is a non-adjudicated, very low-priority basin located to the south of the Orange County boundary, within the boundary of the Marine Corps Base (Base), Camp Pendleton, in San Diego County. The basin covers an area of 4.7 square miles (DWR, 2019a). Historically, the Base utilized groundwater from the basin for Base use and for irrigation of agricultural lease lands on Base property. Recent data have not been obtained on use of water from the basin by the Base.

Marine terrace deposits characterized as predominantly fine to coarse sand and gravel in the southern part of San Clemente are underlain by the San Mateo and Capistrano Formations. These deposits are in direct hydraulic contact with the ocean and are subject to seawater intrusion. The San Mateo Formation consists of marine sands and conglomerates, while the Capistrano Formation that underlies it consists of interbedded sandstone and shale zones, with nested turbidite-filled channels that are conducive to groundwater production (Dudek, 2015).

Confined groundwater in the San Mateo Valley Basin is produced from a deep-lying series of semi-consolidated sandstone beds with numerous coarse gravel lenses. The majority of the soils have slow or very slow infiltration rates. The usable surface area of the Basin was identified to be 107 acres with a hypothetical usable depth ranging from 10 to 110 feet (Boyle Engineering Corporation, 1987).

San Clemente operates two water supply wells, Well 6 and Well 8, to augment it's water supply.

Basin Management

Due to the unadjudicated, very low-priority designation of the San Mateo Valley Basin, a formal management plan does not exist.

The Basin has recharge areas along San Mateo Creek, downgradient from drinking water supply wells (DWR, 2019b).

6.3.2.5 Impaired Groundwater

The combined yield from the seven projects described below, was 25,443 AF in FY 2019-20. This supply is expected to increase substantially to over 30,000 AF at ultimate development of these projects. Since these projects use groundwater, a similar amount must either be replenished on an average annual basis to maintain water balance or be salvaged from water that otherwise would flow into the ocean as subsurface outflow. The benefit of these projects is to provide a firm base supply, restore use of groundwater storage impaired by natural causes and/or agricultural drainage, improve conjunctive use storage operations, and provide a drought supply by the additional capacity to tap groundwater in storage.

Huntington Beach Well 9: This project would restore the 3,000 gpm well capacity by removing nuisance odor from dissolved Hydrogen Sulfide. The City is pursuing assistance from OCWD to help fund both capital and operational costs for this project. Upon completion of the treatment system, Well 9 will be able to produce high quality water at full design capacity (Psomas, 2016).

Tustin Main Street Desalter - The City of Tustin currently operates two desalter plants. The Main Street Treatment plant began operating in 1989 with a capacity of 2 MGD. The Main Street Desalter reduces nitrate levels from the groundwater produced by Tustin's Main Street wells. The untreated groundwater undergoes either Reverse Osmosis (RO) or Ion Exchange treatment.

Tustin 17th Street Desalter - The Tustin 17th Street Desalter began operating in 1996 with a capacity of 3 MGD. The Tustin 17th Street Desalter reduces high nitrate and TDS concentrations from the groundwater pumped by Tustin's 17th Street wells. The 17th Street Desalter plant uses two RO membrane trains to treat the groundwater.

Mesa Water Reliability Facility (MWRF) – Mesa currently owns and operates MWRF with a capacity of 5.8 MGD that removes color from the water using microfiltration (MF).

IRWD Deep Aquifer Treatment System – IRWD's Deep Aquifer Treatment System (DATS) purifies drinking water from the lower aquifer of the OC Basin. The water in this aquifer is very high quality, but has a brownish tint imparted from the remains of ancient vegetation. The DATS facility went on-line in 2002 and can treat up to 7.4 MGD from two wells that pump water from 2000 feet below ground level.

IRWD Wells 21 & 22 Desalter Treatment plant - The Wells 21 and 22 Rehabilitation, Pipelines and Water Treatment Plant project recovers and treats local groundwater to remove nitrates using reverse osmosis. The treated water is used in the potable water system. Adding this new source of drinking water helps to satisfy increasing demand for water and provides a sustainable infrastructure with long-term benefits. The Wells 21 and 22 project will produce approximately 6,300 acre-feet per year of drinking water for the IRWD service area.

IRWD Irvine Desalter Project - The Irvine Desalter Project was completed in 2006 and purifies water found in the Irvine sub-basin of the larger OC Basin. It is a two-part endeavor, with recycled water and drinking water components. The Irvine Desalter Potable Treatment Facility uses two reverse osmosis trains to produce 2.7 MGD by removing salts that are caused by natural geology and past agricultural use.

San Juan Basin Desalter - The GWRP came on-line in 2004, also known as the San Juan Basin Desalter, is a 5 MGD plant that is owned and operated by the City of San Juan Capistrano. The GWRP takes groundwater high in iron, manganese, and TDS using RO and makes it suitable for potable water uses. The plant has never operated continuously at the 5 MGD rate, but prior to the drought restrictions in the basin, had been producing water at the rate of about 3 MGD.

SCWD Groundwater Desalter - SCWD currently owns and operates a 1 MGD GRF that came on-line in 2007, also known as the Capistrano Beach Desalter. The plant extracts brackish groundwater from an aquifer in the San Juan Basin and goes through iron and manganese removal due to high mineral content.

6.3.3 Planned Future Sources

The agencies that manage the OC, Main San Gabriel, La Habra, and San Juan basins regularly evaluate potential projects and conduct studies to review the feasibility of new projects or sources. A few groundwater basin-related projects that are planned or in progress are described below.

OC Basin

GWRSFE **–** The final expansion of the GWRS is currently underway and is the third and final phase of the project. When the Final Expansion is completed in early 2023, the plant's treatment capacity will increase from 100 to 130 MGD. To produce 130 MGD, additional treated wastewater from OC San's Treatment Plant 2 is required. This recycled water represents a high quality, drought-proof source of water to protect and enhance the OC Basin. The Final Expansion project will include expanding the existing GWRS treatment facilities, constructing new conveyance facilities at OC San Plant 2, and rehabilitating an existing pipeline between OC San Plant 2 and the GWRS. Once completed, the GWRS plant will recycle 100% of OC San's reclaimable sources and produce enough water to meet the needs of over one million people.

Forecast Informed Reservoir Operations (FIRO) at Prado Dam – Stormwater represents a significant source of water used by OCWD to recharge the OC Basin. Much of this recharge is made possible by the capture of Santa Ana River stormflows behind Prado Dam in the Conservation Pool. FIRO represents the next generation of operating water reservoirs using the best available technology. Advances in weather and stormwater runoff forecasting hold promise to allow USACE to safety impound more stormwater while maintaining equivalent flood risk management capability behind Prado Dam. Preliminary modeling show that by expanding the Conservation Pool from elevation 505 to 512 ft msl, annual recharge to the groundwater basin could increase by as much as 4,500 to 7,000 AFY.

Main San Gabriel Groundwater Basin

Involvement in MET's Regional Recycled Water Project **–** The Main San Gabriel Basin is listed in Phase I of this project, which is expected to deliver approximately 40,000 AF of recharge water to the basin for spreading and groundwater replenishment. The Main San Gabriel Basin Watermaster Board of Directors authorized a letter of intent that was provided to MET expressing the basin's intent to continue cooperating and working with MET on the project.

San Juan Basin

San Juan Watershed Project – The San Juan Watershed Project is a multi-phase project proposed by SMWD and project partners. If implemented, this project would enhance water reliability by capturing local stormwater runoff as well as directing recycled water into temporary storage and using it to recharge the San Juan Creek Watershed. A final Environmental Impact Report (EIR) was submitted by SMWD in 2019 (SMWD, 2021)

6.4 Surface Water

In FY 2019-20, two percent of MWDOC's service area water supply was attributed to surface water captured in local reservoirs. The largest surface water reservoir in Orange County is Santiago Reservoir (Irvine Lake), which is further discussed in Section 6.4.1. In other areas, surface water runoff percolates into alluvial materials or groundwater basins. IRWD, SMWD, and SCWD capture and manage surface water supplies at certain locations. Surface water is managed by MWDOC's member agencies (Orange County Local Agency Formation Commission, 2020).

6.4.1 Irvine Lake

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 (Section 6.2.1.5). Serrano Water District (Serrano) 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 also add imported water from MET to the lake (IRWD, 2021a).

6.5 Stormwater

MWDOC does not own or operate stormwater facilities. This section describes existing and planned stormwater sources in the region that benefit Orange County.

6.5.1 Existing Sources

Costly and limited imported water availability from the CRA and SWP has heightened the need to enhance water supply by increasing local stormwater capture. The Prado Dam in Riverside, California captures approximately 52 TAF of stormwater annually, on average, for recharge in Orange County. During times of minimal flood threat, the dam can be regulated to control runoff in order to supply water to OCWD. The current agreement between the US Army Corps of Engineers and OCWD allows for the capture of stormwater up to an elevation of 498 feet above sea level during flood season and up to 505 feet above sea level during non-flood season behind Prado Dam (OCWD, 2016).

6.5.2 Planned Future Sources

The Prado Basin Feasibility Study evaluates the alternatives to restore environmental resources within the Prado Basin and Santa Ana River and increase the existing volume of water conservation potential. Increasing stormwater capture by an additional 7 feet during the flood season, to 505 ft above sea level, can provide up to an additional 30 TAFY of water (OCWD, 2016). The proposed Water Conservation Plan includes re-operation of the Prado Dam for controlled release of water for reduced discharge rates from the Prado Dam and reducing sediment deposition in the Basin to increase the effective yield of water from the Santa Ana River for diversion and infiltration at OCWD's facilities downstream of the dam. The final EIR was published in 2021 and OCWD anticipates that the Prado Dam Water Control Manual will be updated by the US Army Corps of Engineers in 2021 to include stormwater capture to elevation 505 feet year-round (OCWD, 2021).

6.6 Wastewater and Recycled Water

MWDOC is not directly involved in wastewater services and does not own or operate the wastewater collection system in its service area. Additionally, MWDOC does not own or operate wastewater treatment facilities. Some local agencies provide wastewater collection and treatment as well as potable water services, while other agencies send their wastewater to large regional facilities. Wastewater is not collected by MWDOC and MWDOC does not treat or discharge wastewater.

MWDOC is indirectly involved in recycled water production, through its supply to systems whose wastewater is sent for IPR. MWDOC does not produce or manage recycled water, but supports, encourages, and partners in recycled water efforts within its service area. Recycled water planning within MWDOC's service area requires close coordination with multiple agencies that often have overlapping jurisdictional boundaries. As imported water supplies have become increasingly challenged, the local agencies, including OCWD have continued working to identify opportunities for the use of recycled water for irrigation purposes, groundwater recharge and some non-irrigation applications. The following sections expand on the existing agency collaboration involved in these efforts as well as MWDOC's member agencies projected recycled water use over the next 25 years.

6.6.1 Agency Coordination

MWDOC does not own or operate wastewater treatment facilities and the individual agencies that MWDOC supplies often send collected wastewater to either OC San in North County or SOCWA in South County for treatment and disposal. OCWD is the manager of the OC Basin and strives to maintain and increase the reliability of the OC Basin through replenishment with imported water, stormwater, and advanced treated wastewater.

6.6.1.1 Orange County Sanitation District

OC San collects wastewater from residential, commercial, and industrial customers in 21 cities, three special districts, and portions of unincorporated Orange County, totaling 479 square miles that serves more than 2.5 million residents. These flows include dry weather urban runoff collected from 15 diversion points and discharged into the sewer system for treatment and Santa Ana River Interceptor flows from the upper Santa Ana watershed.

OC San operates and maintains two treatment plants: Reclamation Plant No. 1, located in Fountain Valley with a capacity of 320 MGD, and Treatment Plant No. 2 located in Huntington Beach with a capacity of 312 MGD. OC San also operates 572 miles of collection system pipelines along with 15 offsite pump stations. Treated wastewater is discharged to the Pacific Ocean via an ocean outfall in compliance with state and federal requirements as set forth in OC San's National Pollutant Discharge Elimination System (NPDES) permit. Approximately 100 MGD of secondary effluent undergoes advanced treatment at the GWRS facility operated by the OCWD and 7 MGD undergoes tertiary treatment at OCWD's Green Acres Project (GAP) facility. OC San's ocean outfall is 120-inch diameter and extends four miles off the coast of Huntington Beach. A 78-inch diameter emergency outfall also exists that extends 1.3 miles off the coast.

OC San Reclamation Plant No. 1 - Reclamation Plant No. 1 treats raw wastewater and has a maximum treatment capacity of 320 MGD. The plant provides primary and secondary treatment and supplies secondary effluent to OCWD for further tertiary treatment at their GAP facility and advanced treatment at their GWRS. Reclamation Plant No. 1 is the only plant that provides water to OCWD for additional treatment and recycling. An interplant pipeline allows flows to be conveyed to Treatment Plant No. 2.

OC San Treatment Plant No. 2 - Treatment Plant No. 2 provides primary and secondary treatment to raw wastewater and has a maximum treatment capacity of 312 MGD. All secondary effluent from their plant is discharged to the ocean through the ocean outfall.

6.6.1.2 Orange County Water District

OCWD is the manager of the OC Basin and provides water to 19 municipal water agencies and special districts. A full description of the OC Basin is available in Section 6.3.1. OCWD and OC San have jointly constructed and expanded two water recycling projects that include: 1) OCWD GAP and 2) OCWD GWRS.

OCWD GAP

OCWD owns and operates the GAP, a water recycling system that provides up to 8,400 AFY of recycled water for irrigation and industrial uses. GAP provides an alternate source of water that is mainly delivered to parks, golf courses, greenbelts, cemeteries, and nurseries in the cities of Costa Mesa, Fountain Valley, Newport Beach, and Santa Ana. Approximately 100 sites use GAP water, current recycled water users include Mile Square Park and Golf Courses in Fountain Valley, Costa Mesa Country Club, Chroma Systems carpet dyeing, Kaiser Permanente, and Caltrans.

OCWD GWRS

OCWD's GWRS allows southern California to decrease its dependency on imported water and creates a local and reliable source of water. OCWD's GWRS purifies secondary treated wastewater from OC San to levels that meet and exceed all state and federal drinking water standards. The GWRS Phase 1 plant has been operational since January 2008 and uses a three-step advanced treatment process consisting of MF, RO (RO), and ultraviolet (UV) light with hydrogen peroxide. A portion of the treated water is injected into the seawater barrier to prevent seawater intrusion into the groundwater basin. The other portion of the water is pumped to ponds where the water percolates into deep aquifers and becomes part of Orange County's water supply. The treatment process is described on OCWD's website. (OCWD, GWRS, 2020).

The GWRS first began operating in 2008 producing 70 million gallons of water per day (MGD) and in 2015, it underwent a 30 MGD expansion. Approximately 39,200 AFY of the highly purified water is pumped into the injection wells and 72,900 AFY is pumped to the percolation ponds in the City of Anaheim where the water is naturally filtered through sand and gravel to deep aquifers of the groundwater basin. The OC Basin provides approximately 77 percent of the potable water supply for north and central Orange County. The design and construction of the first phase (78,500 AFY) of the GWRS project was jointly funded by OCWD and OC San; Phase 2 expansion (33,600 AFY) was funded solely by OCWD.

The Final Expansion of the GWRS is currently underway and is the third and final phase of the project. When the Final Expansion is completed in 2023, the plant will produce 130 MGD. To produce 130 MGD, additional treated wastewater from OC San is required. This additional water will come from OC San's Treatment Plant 2, which is in the City of Huntington Beach approximately 3.5 miles south of the GWRS. The Final Expansion project will include expanding the existing GWRS treatment facilities, constructing new conveyance facilities at OC San Plant 2 and rehabilitating an existing pipeline between OC San Plant 2 and the GWRS. Once completed, the GWRS plant will recycle 100 percent of OC San's reclaimable sources and produce enough water to meet the needs of over one million people.

6.6.1.3 South Orange County Wastewater Authority

SOCWA is a Joint Powers Authority created on July 1, 2001 to facilitate and manage the collection, transmission, treatment, and discharge of wastewater for more than 500,000 homes and businesses across South Orange County. It was formed as the legal successor to the Aliso Water Management Agency, South East Regional Reclamation Authority, and South Orange County Reclamation Authority. SOCWA has ten member agencies that include: City of Laguna Beach, City of San Clemente, City of San Juan Capistrano, ETWD, EBSD, IRWD, MNWD, SMWD, SCWD, and TCWD. All these service areas receive wholesale water through MWDOC. The service area encompasses approximately 220 square miles including the Aliso Creek, Salt Creek, Laguna Canyon Creek, and San Juan Creek Watersheds.

Within its service area, SOCWA operates four wastewater treatment plants, with an additional eight wastewater treatment plants operated by SOCWA member agencies. Wastewater in the service area is collected at the local and regional level through a series of interceptors that convey influent to the wastewater treatment plants. Treated effluent throughout the service area is conveyed to two gravity flow ocean outfalls operated by SOCWA the Aliso Creek Outfall and the San Juan Creek Outfall. The Aliso Creek outfall has a capacity of 33.2 MGD and extends 1.5 miles offshore near Aliso Beach in the City of Laguna Beach. The San Juan Creek outfall has a nominal capacity of 36.8 MGD which can be increased by pumping and extends 2.2 miles offshore near Doheny Beach in the City of Dana Point. Full secondary treatment is provided at SOCWA wastewater treatment plants, with most plants exceeding this level of treatment when the water is beneficially reused.

SOCWA Coastal Treatment Plant - SOCWA’s Coastal Treatment Plant (CTP) in Aliso Canyon, Laguna Niguel has a 6.7 MGD capacity and treats wastewater received from the City of Laguna Beach, EBSD, MNWD, and SCWD to secondary effluent standards. Effluent from the CTP is treated to secondary or tertiary levels depending on the discharge method, ocean outfall or beneficial reuse. Recycled water is treated to Title 22 standards at the Advanced Water Treatment Plant (AWTP) owned by SCWD, but operated by SOCWA, located adjacent to the CTP. During the summer months, over 2 MGD of recycled water can be produced by the AWTP. Treated effluent that is not recycled is discharged through the Aliso Creek Ocean Outfall. Waste sludge is sent to the Regional Treatment Plant (RTP) in Laguna Niguel.

SOCWA Regional Treatment Plant – SOCWA's RTP in Laguna Niguel has a 12 MGD liquid capacity and 24.6 MGD solids handling capacity. The RTP treats wastewater from MNWD's service area to secondary or tertiary levels depending on discharge method, ocean outfall or reuse such as landscape irrigation. Recycled water is treated to applicable Title 22 standards. Secondary effluent is conveyed to the Aliso Creek Ocean Outfall via the SOCWA Effluent Transmission Main.

SOCWA Plant 3A – SOCWA's Plant 3A located in the City of Mission Viejo has a maximum capacity of 6 MGD and treats wastewater received from MNWD and SMWD. Effluent is treated to secondary or tertiary levels depending on the discharge method, ocean outfall or beneficial reuse. Recycled water is treated to applicable Title 22 standards and used to irrigate parks and greenbelts. Secondary effluent is conveyed to the San Juan Creek Outfall via the 3A Effluent Transmission Main.

SOCWA J. B. Latham Treatment Plant - SOCWA’s J. B. Latham Treatment Plant located in the City of Dana Point has a 13 MGD capacity and treats wastewater from MNWD, City of San Juan Capistrano, SMWD, and SCWD to secondary effluent standards. The secondary effluent is conveyed directly to the San Juan Creek Outfall as the plant does not have tertiary treatment.

6.6.2 Current Recycled Water Uses

MWDOC does not produce or manage recycled water, but supports, encourages, and partners in recycled water efforts within its service area. Recycled water planning within MWDOC’s service area requires close coordination with multiple agencies that many times have overlapping jurisdictional boundaries. As imported water supplies have become more challenged, the local agencies, including OCWD have continued working to identify opportunities for the use of recycled water for irrigation purposes, groundwater recharge and some non-irrigation applications. A list of agencies that provide wholesale or retail recycled water within MWDOC’s service area are below.

Recycled water is widely accepted as a water supply source throughout MWDOC's service area. In the past, recycled water was mainly used for landscape irrigation, but large recycled water projects including OCWD's GAP and GWRS, and IRWD's recycled water projects have significantly expanded and increased uses. GWRS uses include injection for sea water barriers and percolation for groundwater recharge. IRWD is at the forefront of using recycled water not only for irrigation, but for other uses such as toilet flushing and commercial applications. Other agencies in south Orange County, such as MNWD and SMWD use a significant amount of recycled water. Recycled water in Orange County is treated to various levels depending on the end use and in accordance with Title 22 regulations as described below. For information on OCWD's GAP and GWRS, refer to Section 6.6.1.2.

ETWD Water Recycling Plant – ETWD's Water Recycling Plant (WRP) located in the City of Lake Forest has a maximum influent capacity of 6 MGD. Wastewater is treated to secondary or tertiary levels depending on the discharge method, ocean outfall or beneficial reuse. Recycled water is treated to Title 22 standards with the expansion completed in 2014. Treated effluent that is not recycled is discharged of through the Aliso Creek Ocean Outfall.

SMWD Chiquita Water Reclamation Plant – SMWD's Chiquita Water Reclamation Plant (CWRP) located in Chiquita Canyon treats wastewater to a tertiary level for recycled water use meeting Title 22 standards. CWRP has a maximum design capacity of 8 MGD with plans to increase its size to 10 MGD by 2025. Effluent that is not beneficially reused is discharged via the Chiquita Land Outfall that connects to the San Juan Creek Ocean Outfall.

SMWD Oso Creek Water Reclamation Plant – SMWD's Oso Creek Water Reclamation Plant (OCWRP) located along Oso Creek. Wastewater is treated to a secondary or tertiary depending on the method of discharge, ocean outfall or beneficial reuse. Recycled water is treated to Title 22 standards. A bypass facility allows excess wastewater to be sent to SOCWA's J.B. Latham Treatment Plant as OCWRP does not have an outfall. Without the ability to discharge treated effluent, excess flows beyond recycled water demands are sent to J.B. Latham Treatment Plant. OCWRP has a maximum design capacity of 3 MGD and is considered a scalping plant as it intercepts flows from a large trunkline.

SMWD Nichols Institute Water Reclamation Plant – the Nichols Institute Water Reclamation Plant is operated by SMWD, but owned by a private company that owns property within SMWD's service area. This small facility treats approximately 34 AFY and does not have an outfall. All wastewater is treated to Title 22 standards for recycling purposes. Since this facility is remote from existing water and wastewater facilities, SMWD is not obligated to provide an alternate source of water in the event the facility becomes inoperable.

San Clemente Water Reclamation Plant - The City of San Clemente owns and operates the San Clemente Water Reclamation Plant located within San Clemente. The plant has a design capacity of 7 MGD and treats wastewater to secondary or tertiary levels depending on the discharge method, ocean outfall or beneficial reuse. Any secondary effluent in excess of the plant's recycling limit is conveyed to the San Juan Creek Ocean Outfall via the San Clemente Land Outfall. Recycling capacity is currently 4.4 MGD after the expansion was completed in 2014 and included 9 miles of pipelines, conversion of a domestic water reservoir to recycled water storage, and a pressure reducing station as well as an interconnection with SMWD.

IRWD Los Alisos Water Recycling Plant – Los Alisos Water Recycling Plant (LAWRP) is operated by IRWD and is located in the City of Lake Forest. LAWRP has a capacity of 7.5 MGD and wastewater is treated to a secondary or tertiary level depending on the use, ocean outfall or beneficial reuse such as landscape irrigation and other non-potable uses. When excess secondary effluent beyond the plant's tertiary treatment capacity is received, it is conveyed to the SOCWA Effluent Transmission Main for discharge via the Aliso Creek Ocean Outfall.

IRWD Michelson Water Recycling Plant – Michelson Water Recycling Plant is located in the City of Irvine and is operated by IRWD. MWRP has a maximum influent capacity of 28 MGD. Wastewater is treated to a tertiary level with advanced treatment in the form of UV disinfection meeting Title 22 standards. All effluent is conveyed to the recycled water distribution system for landscape irrigation, toilet flushing, and industrial uses.

IRWD UCI's Cooling Towers - IRWD partnered with the University of California, Irvine (UCI) by constructing approximately 3,000 feet of pipeline to bring recycled water to the campus's central plant where recycled water is used as make-up water in the cooling towers. This project conserves more than 250 acre-feet of potable water each year and helps UCI achieve its sustainability goals.

IRWD Great Park Ice and Five Point Arena - In 2017, the Irvine Ice Foundation constructed the Great Park Ice and Five Point Arena. This 280,000 square foot facility located at the Great Park in Irvine is considered the largest ice facility in California and one of the largest in the United States. This facility also serves as the official practice facility of the National Hockey League's Anaheim Ducks. IRWD provides the facility's recycled water which is used to make and maintain the ice at the four indoor ice rinks.

IRWD Dual Plumbed Buildings Initiative - IRWD was the first agency to work with a customer to construct a dual plumbed commercial building to use recycled water for flushing toilets and urinals in 1991. Today IRWD serves 127 dual plumbed commercial buildings ranging from a restroom at a park to 20-story high-rise office buildings. From 2015 to 2020, IRWD added 65 commercial buildings to its customer roles and more are on the way.

IRWD Dual Plumbed Hyatt House - This seven-story hotel is fully dual plumbed, using recycled water in all the restrooms including the 149 guest rooms. It is the first fully dual plumbed hotel in the United States.

IRWD Irvine Lake Pipeline (ILP) Conversion Project - The Irvine Lake Pipeline (ILP) Conversion Project was designed to convert the northern section of the ILP from an untreated water system to a recycled water system. This conversion was designed to provide recycled water to approximately 80 landscape and agricultural irrigation customers, offsetting imported water demands and reducing evaporation losses at Irvine Lake. Prior to the recycled water conversion, the ILP delivered imported untreated water that IRWD purchased from MET and stored in Irvine Lake, with subsequent conveyance to irrigation sites. By constructing the ILP Conversion Project, existing irrigation demands that once relied on imported water were converted to recycled water, reducing imported water needs, eliminating evaporation losses, and enhancing water supply reliability. The ILP North Conversion Project includes capacity for both existing and future planned recycled water demands.

TCWD Robinson Ranch Water Reclamation Plant - TCWD owns and operates the Robinson Ranch Wastewater Treatment Plant (RRWTP) located in the Robinson Ranch development in Trabuco Canyon, an unincorporated area of Orange County. RRWTP has a treatment capacity of 0.85 MGD, and the wastewater is treated to a tertiary level meeting Title 22 standards. All of the wastewater is recycled as the plant is not permitted to have stream discharges, and is infeasible to connect to the existing outfalls in the SOCWA service area.

MNWD RTP Advanced Wastewater Treatment Plant – MNWD's RTP AWTP is operated by SOCWA and is located in the City of Laguna Niguel. The AWTP has a total capacity of 11.4 MGD and the secondary effluent from RTP is treated to a disinfected tertiary level that meets Title 22 requirements for landscape irrigation use.

MNWD Plant 3A Advanced Wastewater Treatment Plant - MNWD's Plant 3A AWTP is operated by SOCWA and is located within the City of Laguna Niguel. The Plant 3A AWTP has a capacity of 2.4 MGD and the secondary effluent from 3A is treated to a disinfected tertiary level that meets Title 22 requirements for landscape irrigation use.

SCWD CTP Advanced Wastewater Treatment Plant - SCWD's CTP AWTP is operated by SOCWA and is located in the City of Laguna Niguel. The CTP AWTP has a capacity of 2.6 MGD and the secondary effluent from CTP is treated to a disinfected tertiary level that meets Title 22 requirements for landscape irrigation use.

SCWD Aliso Creek Water Reclamation Facility - SCWD completed construction on the Aliso Creek Water Reclamation Facility (ACWRF) in 2014 that intercepts and treats a portion of the urban runoff in lower Aliso Creek to supplement the advanced water treatment facility at CTP. The ACWRF has a capacity of 800 gallons per day (GPD) and the creek water is treated using ultrafiltration and RO to improve the quality of the recycled water supply to make it more attractive for irrigation users.
The ACWRF has not been able to be used as the Aliso Creek water level is below what regulation allows. MWDOC does not directly treat or distribute recycled water within their service area.

6.6.3 Projected Recycled Water Uses

As of April 2019, the State of California amended its recycled water policy to expand its numeric goal 2.5 million AFY by 2030 and added annual required reporting requirements for wastewater and recycled water. Specific to the MWDOC's service area, most agencies within the service area have already maximized their recycled water use. Most are projecting a consistent use through to 2045 and are not expecting for recycled water use to grow. However, a few agencies in South Orange County do expect moderate growth in recycled water production and customers. Collectively, the MWDOC's service area is projected to see an increase in recycled water uses grow from 42,330 AF in 2020 to 57,094 in 2045 (see Section 4).Potential Recycled Water Uses

Potential recycled water use within MWDOC's service area hinges upon many variables including, but not limited to, economics of treatment and distribution system extension (as well as site retrofits and conversions), water quality, public acceptance, infrastructure requirements, and reliability.

Even though demands exist, it is not necessarily economically feasible to provide recycled water to all potential users. Expansion of recycled water systems eventually reach a point where returns diminish and higher investments for expansion are not cost effective. Water recycling projects involve collecting and treating wastewater to applicable standards depending on the end use, providing seasonal storage, pipeline construction, pump station installation, and conversions for existing potable water users or dual plumbing systems for new users. Creative solutions to secure funding, and overcome regulatory requirements, institutional arrangements, and public acceptance are required to offset existing potable demands with potential recycled water demands.

SMWD Chiquita Water Reclamation Plant Expansion - CWRP currently has a capacity of 5 MGD. SMWD plans to expand the plant to 10 MGD by 2015. The expansion will increase total production and reduce dependency on imported water. SMWD is planning to expand the CWRP tertiary capacity from 5 MGD to 10 MGD by 2015, increasing its recycled water supply to 11,200 AFY. The expansion would reduce SMWD's dependency on imported water and provide additional recycled water for irrigation purposes. Because RMV holds riparian water rights for its ranching, agriculture and tenants' uses; RMV and SMWD are looking into an agreement for RMV to potentially provide water in areas of the Ranch Plan to supplement recycled water in the event recycled water is unavailable.

MNWD Plant 3A Expansion - The 3A Treatment Plant Tertiary Expansion Project will provide an additional 3,000 AFY of capacity for recycled water use. The expansion includes the following components: increase the reliability of the aeration system, expand and/or replacing the existing filters with more effective tertiary filters, expand the disinfection system, expand the tertiary effluent pumps, possible upsizing of the discharge pipeline where it connects to SMWD's recycled water distribution system, modification to various in-plant piping and electrical systems, and addition of a standby generator to maintain operation during a power outage. The expansion will increase the local water supply reliability by producing an additional 3,000 AFY of recycled water, reducing dependence on imported water. The expansion will conserve approximately 5,653,000 kWh of energy per year and 3,448,330 pounds of carbon dioxide by producing and distributing recycled water in lieu of imported water. The expansion also benefits MNWD, the project partner.

6.6.4 Optimization Plan

MET and MWDOC support research efforts to encourage development and use of recycled water. These include conducting studies and research to address public concerns, developing new technologies, and assessing health effects. Addressing public concerns is required to gain the support of stakeholders early in the planning process. Education is required to inform the public of the treatment processes. Developing new technologies is a prerequisite to help reduce the cost of producing recycled water. Health effects assessments have a two-fold purpose of alleviating public concerns and ensuring the protection of public health and the environment. Further research supported by MET and others (such as the National Water Research Institute) will have the benefit of reducing risks for MWDOC's member agencies.

To assist in meeting projections, MWDOC plans to take numerous actions to facilitate the use and production of recycled water within its service area. However, MWDOC is a wholesaler and does not impose development requirements or enact ordinances that mandate the use of recycled water. In many cases, additional recycled water production and use is economically infeasible given the current cost of potable water supplies in comparison to recycled water costs. MWDOC has taken the following actions to facilitate further production and use of recycled water:

- Sponsoring and supporting its member agencies in obtaining Local Resources Program (LRP) incentives from MET;
- Assisting and supporting member agencies in applications made for bond funds such as Proposition 84;

- Encouraging MET to participate in studies that will benefit recycled water production in the service area;
- Supporting MET in deriving solutions to regulatory issues;
- Participating in regional plan such as the South Orange County IRWMP;
- Working cooperatively with retail agencies, MET and its member agencies, and other Orange County water and wastewater agencies to encourage recycled water use and develop creative solutions to increase recycled water use;
- Assisting and supporting its member agencies to participate in MET's Future Supply Program, which provides funding for research and studies needed to set the state standards for Direct Potable Reuse (DPR) on American Water Works Association's (AWWA) research Foundation Project.

MWDOC public education and school education programs include extensive sections on water recycling. MWDOC's water use efficiency public information programs are a partnership with agencies throughout the county. Through a variety of public information programs, MWDOC reaches the public with information regarding present and future water supplies, the demands for a suitable quantity and quality of water, including recycled water, and the importance of implementing water efficiency techniques and behaviors. Through MWDOC, water education programs have reached thousands of students with grade-specific programs that include information on recycled water.

Dealing with needed additional funding and other implementation barriers for recycled water at the state and regional level would assist in increasing recycled water production within MWDOC's service area. State funding assistance could reduce the overall cost per AF of recycled water so that it is comparable to the cost of potable water and would allow the development of more expensive recycled water projects in an earlier timeframe. There are numerous barriers to increasing water recycling that could be addressed at the State level. These barriers include establishment of uniform Regional Water Quality Control Board (RWQCB) requirements for recycled water, especially in areas where water and wastewater agency jurisdictions cross RWQCB jurisdictions resulting in varying requirements; partnering in health studies to illustrate the safety of recycled water; increasing public education; and establishing uniform requirements for retrofitting facilities to accept recycled water.

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 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 two incentive formulas under the program:

- Up to $340 per AF for 25 years, depending on the unit cost of seawater produced compared to the cost of MET supplies
- Up to $475 per AF for 15 years, depending on the unit cost of seawater produced compared to the cost of MET supplies

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.

6.7.1 Ocean Water Desalination

6.7.1.1 Huntington Beach Seawater Desalination Plant

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 percent 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. Three general distribution options have been discussed with the 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 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 Term Sheet that provided the overall partner structure in order to advance the project. Based on the initial Term Sheet, 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.

Under guidance provided by DWR, the Huntington Beach Seawater Desalination Plant's projected water supplies are not included in Table 6-2 due to its current status within the criteria established by State guidelines (DWR, 2020c).

6.7.1.2 Doheny Desalination Plant

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 Table 6-9 due to its current status within the criteria established by State guidelines (Urban Water Management Plan Guidebook 2020, 6-36).

6.7.2 Groundwater Desalination

In an effort to improve groundwater production, MET provides financial incentives to local agencies to treat brackish groundwater which has been impaired from either natural causes or from agricultural drainage. Through MET's LRP, the goal is to increase usage of groundwater storage within the region for firm local production, conjunctive use storage, and drought supply. In MWDOC's service area, five groundwater recovery brackish water projects have LRP contracts with MET.

MWRF Expansion - The MWRF, owned and operated by Mesa Water, pumps colored water from a deep colored water aquifer and removes the color MF. Due to increased color and bromide in the source water, Mesa Water upgraded the facility to include Nano filtration membrane treatment. In 2012, the MWRF's capacity was increased from 5.8 MGD to 8.6 MGD.

SCWD Capistrano Beach GRF Expansion - SCWD constructed a 1 MGD GRF that came online in FY 2007-08 in Dana Point. SCWD plans to expand the GRF with the addition of new wells. Treating in excess of 1,300 AFY will require expansion of the GRF and agreement with SJBA or confirmation of water rights from the SWRCB.

Garden Grove Nitrate Blending Project - The Garden Grove Nitrate Blending Project was active during the years of 1990 to 2005. The project is located at the Lampson Reservoir site, where groundwater pumped from two wells is blended in order to meet the maximum contaminant level (MCL) for nitrate. The blending project was shut down in 2005, but the City retrofitted Well 28 with a variable frequency drive and reinstated the blending operation.

San Juan Desalter GWRP Expansion – The City of San Juan Capistrano has operated the GWRP since about 2005. A number of issues have impacted the reliability of production from the facility including iron bacteria in the wells, the discovery of a plume of Methyl Tert-Butyl Ether (MTBE) that required a reduction in production in half to about 2 MGD or less since the spring of 2008 until the responsible party contributed to provide Granular Activated Carbon (GAC) Filter for removal of the MTBE to allow increased production. The drought then struck, reducing the amount of water that could be pumped from the San Juan groundwater basin, requiring a large reduction in production from the groundwater basin in 2014, 2015, and initially in 2016.

Tustin Nitrate Removal Project - The Tustin Nitrate Removal Project consists of two groundwater treatment facilities that are allowed above the BPP and the charges are BEA-exempt. The first facility is the Main Street Treatment Plant, operating since 1989 to reduce nitrate levels from the groundwater produced by Wells No. 3 and 4 by blending untreated groundwater with treatment plant product water which undergoes RO and ion exchange treatment processes. The second facility is the Tustin Seventeenth Street Desalter, operating since 1996 to reduce high nitrate and TDS concentration from groundwater produced by Wells No. 2 and 4 and the Newport well using RO (OCWD, 2015 Groundwater Management Plan, June 2015).

6.8 Water Exchanges and Transfers

6.8.1 Existing Exchanges and Transfers

A few MWDOC member agencies have expressed interests in pursuing exchanges and/or transfers of water from outside of the region. MWDOC will continue to help its member agencies in developing these opportunities to enhance their reliability. In fulfilling this role, MWDOC will help its member agencies navigate the operational and administrative issues of wheeling or exchanging water through the MET water distribution system or by examining other delivery options.

Santa Margarita Water District - SMWD has actively pursued additional water supply reliability through water transfers, and successfully completed water transfers in the late 1990's through the MET system. At present, the future of such transfers as a reliable and cost-effective means of providing the basic supply remain uncertain. However, transfer with specific purposes, such as supplementing dry year supplies can be effective. SMWD continues to explore opportunities for water transfers and exchanges as an alternative water supply, and has worked with MWDOC and other agencies to investigate possible transfers. SMWD has a transfer agreement with Cucamonga Valley Water District of 4,250 AFY, both short term and long term. SMWD also has a short-term transfer agreement with GSWC of 2,000 AFY.

IRWD Strand Ranch Water Banking Program - IRWD implemented their Strand Ranch Water Banking Program and initiated the first delivery of water under the program to their service territory of a 1,000 AF in June 2015 as a demonstration effort. The delivered water was determined by MET to meet the definition of an “extraordinary supply”; meaning that IRWD received full credit for the water and that it counts essentially 1:1 during a drought/water shortage condition under MET’s and MWDOC’s WSAP. The banking program has been implemented via agreements with MET to wheel the water through their system, when requested. IRWD has also entered into a 30-year water banking partnership with the Rosedale-Rio Bravo Water Storage District in Kern County in which IRWD can store up to 50,000 AF in the water bank and recover up to approximately 17,500 AF in any single year. IRWD has purchased high quality groundwater recharge land and constructed 502 acres of groundwater recharge ponds on the property to allow available surface water to percolate into the basin for later use, in which IRWD has priority rights when Rosedale is not recharging Kern River floodwaters (IRWD, 2021b).

6.8.2 Planned and Potential 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. Transfers of water can help with short-term outages, but can also be involved with longer term water exchanges to deal with droughts or long-term emergency situations. MWDOC helps its retail agencies develop both local and regional transfer and exchange opportunities that promote reliability within their systems. Examples of these types of projects that might occur in the future are discussed below.

IRWD Strand Ranch Water Banking Program – As noted in Section 6.8.1, IRWD has begun implementation of the Strand Ranch Banking Program (including adding property to the program such as the groundwater recharge land in Rosedale) and it has about 50,000 AF stored for IRWD's benefit. IRWD and Rosedale were conditionally awarded funds by the CWC to develop a regional water bank to store and capture unallocated Article 21 water from the SWP during periods when surface water is abundant, and they are now completing additional requirements outlined in the program regulations to receive funds. IRWD has obtained Board approval for a coordinated operating and exchange agreement with both MET and MWDOC that will facilitate the recovery and delivery of water from the water bank in Kern County into IRWD's service area in Orange County.

IRWD is also pursuing various additional sources of water supply for the water bank, including pilot agreements with Central Coast Water Authority and Buena Vista Water Storage District that provide water storage and the acquisition of the Jackson Ranch in the Dudley Ridge Water District in Kings County. During wet years, water surplus to the Jackson Ranch farming operations will be banked in the Strand Ranch Project for future use in IRWD (IRWD, 2021b).

In addition, IRWD and MWDOC have entered into discussions to provide a portion of this banked water to other MWDOC member agencies during shortages. A proposed pilot program between IRWD and MWDOC would allow for up to 5,000 AFY of water in Strand Ranch to be delivered to MWDOC as extraordinary supply with varying reservation costs. MWDOC is currently studying the terms and conditions to determine if this pilot program meets the needs of its agencies (CDM Smith, 2019).

Santa Margarita Water District – SMWD has actively pursued additional water supply reliability through water transfers. They are currently involved in the analysis and evaluation of the Cadiz water storage project. The Cadiz Project includes an average yield of 50,000 AF per year for 50 years that could be produced from the Fenner Valley Groundwater Basin. Cadiz is authorized to pump as much as 75,000 AF per year as long as the average yield over 50 years is 50,000 AF and assuming they are meeting all of the monitoring requirements imposed on the project. If not produced, the water would evaporate from the nearby dry lakes and be lost to productive use. The water would require treatment for Chromium VI and would be conveyed via a pump station and pipeline about 40 miles to MET's CRA. SMWD has an option for 5,000 AF per year, expandable to 15,000 AF per year; OCWD is considering the water supply. Work is underway to develop the terms and conditions for conveying the water via the CRA into southern California. The water would have to be wheeled through the MET system.

Santa Ana River Conservation and Conjunctive Use Project (SARCCUP)

The Santa Ana River Conservation and Conjunctive Use Project (SARCCUP) is a joint project established by five regional water agencies within the Santa Ana River Watershed (Eastern Municipal Water District, Inland Empire Utilities Agency, Western Municipal Water District, OCWD, and San Bernardino Valley Municipal Water District.

In 2016, SARCCUP was successful in receiving $55 million in grant funds from Proposition 84 through the California Department of Water Resources (DWR). The overall SARCCUP program awarded by Proposition 84, consists of three main program elements:

- Watershed-Scale Cooperative Water Banking Program
- Water Use Efficiency: Landscape Design and Irrigation Improvements and Water Budget Assistance for Agencies
- Habitat Creation and *Arundo Donax* Removal from the Santa Ana River

The Watershed-Scale Cooperative Water Banking Program is the largest component of SARCCUP and since 2016, Valley, MET, and the four SARCCUP-MWD Member Agencies, with MWDOC representing OCWD, have been discussing terms and conditions for the ability to purchase surplus water from Valley to be stored in the Santa Ana River watershed. With the Valley and MET surplus water purchase agreement due for renewal, it was the desire of Valley to establish a new agreement with MET that allows a portion of its surplus water to be stored within the Santa Ana River watershed.

An agreement between MET and four SARCCUP-MWD Member Agencies was approved earlier this year that gives the SARCCUP agencies the ability to purchase a portion (up to 50%) of the surplus water that San Bernardino Valley Municipal Water District (Valley), a SWP Contractor, sells to MET. Such water will be stored in local groundwater basins throughout the Santa Ana River watershed and extract during dry years to reduce the impacts from multiyear droughts. In Orange County, 36,000 AF can be stored in the OC Basin for use during dry years. More importantly, this stored SARCCUP water can be categorized as “extraordinary supplies”, if used during a MET allocation, and can enhance a participating agencies’ reliability during a drought. Moreover, if excess water is available MWDOC can purchase additional water for its service area.

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.

6.9 Future Water Projects

MWDOC has identified the following future regional projects (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 up to 6,120 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.

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 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 IRWD 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 Water Storage Program – 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.

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

As discussed throughout this report, MWDOC is a wholesale agency that provides imported water to coastal and inland areas of Orange County. MWDOC does not own or operate any water, wastewater, or recycled water facilities. As such, it does not have operational control over the upstream portion of the water system. After water has been delivered to member agencies, these agencies are responsible for final treatment, delivery, and any pumping needed to extract groundwater in their service area.

Although MWDOC does not have operational control over the downstream portions of the water system, the energy efficiency of these systems is important to MWDOC's focus on sound planning and appropriate investments in water supply, water use efficiency, regional delivery infrastructure and emergency preparedness. To this end, awareness of the energy intensity of retail agencies helps with planning for future system needs. By setting a baseline, agencies can better understand and manage their operational expenditures. Several factors will affect the energy intensity of water delivery over time and agencies should be aware of these factors. A decrease in water demand in a service area may create a situation where the energy intensity of each AF delivered actually increases as agencies operate the same pumps and water treatment facilities as before. When tracking energy intensity over time, agencies should keep factors such as these in mind and focus on the efficiency of each facility they operate.

Each agency has a unique geography and customer set that they serve so energy intensities of different agencies can be compared for informational purposes, but operational needs and constraints should be considered. For example, agencies with hills in their service area will inherently have higher pumping energy demands than agencies without hills. Additionally, some agencies have water treatment within their operational control while others deliver already treated water – leading to wide ranges in the energy demand among different agencies. Therefore, each agency should come up with their own energy management plan based on their unique needs and challenges. By tracking energy use as a whole, MWDOC can help member agencies prepare for the future and maintain reliability. Overall, from a subset of 19 MWDOC member agencies together with the cties of Fullerton and Santa Ana, the energy intensity for water operations range between 5.5 and 1681 kilowatt hour per AF (kWH/AF). For North OC agencies within the OC Basin, the energy intensity for water operations range from 5.5 to 1681 kWh/AF. For South OC agencies which rely predominantly on imported water for potable use, the energy intensity for water operations range from 177 to 1336 kWh/AF.

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 MWDOC's water supplies, water uses, and the resulting water supply reliability. Water service reliability reflects MWDOC'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 for three long-term hydrological conditions: a normal year, a single dry year, and a drought period lasting five consecutive years. The DRA, a new UWMP requirement, assesses water supply reliability under a severe drought period lasting for the next five consecutive years, from 2021 to 2025. Factors affecting reliability, such as climate change and regulatory impacts, are considered to prepare more realistic assessments.

7.1 Water Service Reliability Overview

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 multiple dry water years. MWDOC's service area depends on a combination of imported and local supplies to meet its service area water demands and MWDOC has taken numerous steps to ensure its member agencies have adequate supplies. Development of numerous local sources augment the reliability of the imported water system. There are various factors that may impact reliability of supplies such as legal, environmental, water quality and climatic, which are discussed below. The water supplies available to the MWDOC service area are projected to meet full-service demands based on the findings by MET in its 2020 UWMP starting 2025 through 2045 during normal years, single dry year, and five consecutively dry years.

MWDOC is a MET member agency, and MET's projections take into account the imported demands from Orange County. As so, MET's water reliability assessments are used to determine that demands within MWDOC can be met for all three hydrological conditions. As summarized in Section 6.2.2, MET's 2020 UWMP concludes that MET's water supply is able to meet projected demands under normal, single-dry, and five-year consecutive dry conditions.

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: Wholesale: Basis of Water Year Data (Reliability Assessment) shows the basis of water year data used to predict drought supply availability. The average (normal) hydrologic condition for the MWDOC service area 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: Wholesale: Basis of Water Year Data (Reliability Assessment)

DWR Submittal Table 7-1 Wholesale: 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 (AF)	% of Average Supply
Average Year	2018-2019	-	100%
Single-Dry Year	2014	-	106%
Consecutive Dry Years 1st Year	2012	-	106%
Consecutive Dry Years 2nd Year	2013	-	106%
Consecutive Dry Years 3rd Year	2014	-	106%
Consecutive Dry Years 4th Year	2015	-	106%
Consecutive Dry Years 5th Year	2016	-	106%
NOTES: Assumes an increase of six percent above average year demands in dry and multiple dry years based on the Demand Forecast TM (CDM Smith, 2021). 106% represents the percent of average supply needed to meet demands of a single-dry and multiple-dry years. Since all of MWDOC's supply comes from MET, the percent of average supply value reported is equivalent to the percent of average demand under the corresponding hydrologic condition.			

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 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. 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, 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 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, 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

7.2.3.2.1 OCWD

OCWD is responsible for managing the OC Basin. To maintain groundwater quality, OCWD conducts an extensive monitoring program that serves to manage the OC Basin's groundwater production, control groundwater contamination, and comply with all required laws and regulations. A network of nearly 700 wells provides OCWD a source for samples, which are tested for a variety of purposes. OCWD collects samples each month to monitor Basin water quality. The total number of water samples analyzed varies year-to-year due to regulatory requirements, conditions in the basin and applied research and/or special study demands. These samples are collected and tested according to approved federal and state procedures as well as industry-recognized quality assurance and control protocols (City of La Habra et al., 2017).

PFAS are of particular concern for groundwater quality, and since the summer of 2019, DDW requires testing for PFAS compounds in some groundwater production wells in the OCWD area. In February 2020, the DDW lowered its Response Levels (RL) for PFOA and PFOS to 10 and 40 parts per trillion (ppt) respectively. The DDW recommends Producers not serve any water exceeding the RL – effectively making the RL an interim MCL while DDW undertakes administrative action to set a MCL. In response to DDW's issuance of the revised RL, as of December 2020, approximately 45 wells in the OCWD service area have been temporarily turned off until treatment systems can be constructed. As additional wells are tested, OCWD expects this figure may increase to at least 70 to 80 wells. The state has begun the process of establishing MCLs for PFOA and PFOS and anticipates these MCLs to be in effect by the Fall of 2023. OCWD anticipates the MCLs will be set at or below the RLs.

In April 2020, OCWD as the groundwater basin manager, executed an agreement with the impacted Producers to fund and construct the necessary treatment systems for production wells impacted by PFAS compounds. The PFAS treatment projects includes the design, permitting, construction, and operation of PFAS removal systems for impacted Producer production wells. Each well treatment system will be evaluated for use with either GAC or ion exchange (IX) for the removal of PFAS compounds. These treatment systems utilize vessels in a lead-lag configuration to remove PFOA and PFOS to less than 2 ppt (the current non-detect limit). Use of these PFAS treatment systems are designed to ensure the groundwater supplied by Producer wells can be served in compliance with current and future PFAS regulations. With financial assistance from OCWD, the Producers will operate and maintain the new treatment systems once they are constructed.

To minimize expenses and provide maximum protection to the public water supply, OCWD initiated design, permitting, and construction of the PFAS treatment projects on a schedule that allows rapid deployment of treatment systems. Construction contracts were awarded for treatment systems for production wells in the City of Fullerton and Serrano in Year 2020. Additional construction contracts will likely be awarded in the first and second quarters of 2021. OCWD expects the treatment systems to be constructed for most of the initial 45 wells above the RL within the next 2 to 3 years.

As additional data are collected and new wells experience PFAS detections at or near the current RL, and/or above a future MCL, and are turned off, OCWD will continue to partner with the affected Producers and take action to design and construct necessary treatment systems to bring the impacted wells back online as quickly as possible.

Groundwater production in FY 2019-20 was expected to be approximately 325,000 acre-feet but declined to 286,550 acre-feet primarily due to PFAS impacted wells being turned off around February 2020. OCWD expects groundwater production to be in the area of 245,000 acre-feet in FY 2020-21 due to the currently idled wells and additional wells being impacted by PFAS and turned off. As PFAS treatment systems are constructed, OCWD expects total annual groundwater production to slowly increase back to normal levels (310,000 to 330,000 acre-feet) (OCWD, 2020a).

Salinity is a significant water quality problem in many parts of southern California, including Orange County. Salinity is a measure of the dissolved minerals in water including both TDS and nitrates.

OCWD continuously monitors the levels of TDS in wells throughout the OC Basin. TDS currently has a California Secondary MCL of 500 mg/L. The portions of the OC Basin with the highest levels are generally located in the cities of Irvine, Tustin, Yorba Linda, Anaheim, and Fullerton. There is also a broad area in the central portion of the OC Basin where TDS ranges from 500 to 700 mg/L. Sources of TDS include the water supplies used to recharge the OC Basin and from onsite wastewater treatment systems, also known as septic systems. The TDS concentration in the OC Basin is expected to decrease over time as the TDS concentration of GWRS water used to recharge the OC Basin is approximately 50 mg/L (City of La Habra et al., 2017).

Nitrates are one of the most common and widespread contaminants in groundwater supplies, originating from fertilizer use, animal feedlots, wastewater disposal systems, and other sources. The MCL for nitrate in drinking water is set at 10 mg/L. OCWD regularly monitors nitrate levels in groundwater and works with producers to treat wells that have exceeded safe levels of nitrate concentrations. OCWD manages the nitrate concentration of water recharged by its facilities to reduce nitrate concentrations in groundwater. This includes the operation of the Prado Wetlands, which was designed to remove nitrogen and other pollutants from the Santa Ana River before the water is diverted to be percolated into OCWD's surface water recharge system.

Although water from the Deep Aquifer System is of very high quality, it is amber-colored and contains a sulfuric odor due to buried natural organic material. These negative aesthetic qualities require treatment before use as a source of drinking water. The total volume of the amber-colored groundwater is estimated to be approximately 1 MAF.

There are other potential contaminants that are of concern to and are monitored by OCWD. These include:

- **MTBE –** MTBE is an additive to gasoline that increases octane ratings but became a widespread contaminant in groundwater supplies. The greatest source of MTBE contamination comes from underground fuel tank releases. The primary MCL for MTBE in drinking water is 13 μg/L.
- **Volatile Organic Compounds (VOC) –** VOCs come from a variety of sources including industrial degreasers, paint thinners, and dry-cleaning solvents. Locations of VOC contamination within the OC Basin include the former El Toro marine Corps Air Station, the Shallow Aquifer System, and portions of the Principal Aquifer System in the Cities of Fullerton and Anaheim.
- **NDMA –** NDMA is a compound that can occur in wastewater that contains its precursors and is disinfected via chlorination and/or chloramination. It is also found in food products such as cured meat, fish, beer, milk, and tobacco smoke. The California Notification Level for NDMA is 10 ng/L and the Response Level is 300 ng/L. In the past, NDMA has been found in groundwater near the Talbert Barrier, which was traced to industrial wastewater dischargers.
- **1,4-Dioxane –** 1,4-Dioxane is a suspected human carcinogen. It is used as a solvent in various industrial processes such as the manufacture of adhesive products and membranes.
- **Constituents of Emerging Concern (CEC) –** CECs are either synthetic or naturally occurring substances that are not currently regulated in water supplies or wastewater discharged but can be detected using very sensitive analytical techniques. The newest group of CECs include pharmaceuticals, personal care products, and endocrine disruptors. OCWD's laboratory is one of a few in the state of California that continuously develops capabilities to analyze for new compounds (City of La Habra et al., 2017).

7.2.3.2.2 San Juan Groundwater Basin

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 adifferent 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 (Wildermuth Environmental, Inc., 2013).

7.2.3.2.3 La Habra Groundwater Basin

TDS, hydrogen sulfide, iron, and manganese impair La Habra Groundwater's water supply. Investigations of water quality within the La Habra Basin have determined that the quality is extremely variable. Shallow regions within the central portion of the basin and areas recharged by surface water along the basin boundary are of a bicarbonate and chloride character. Historically, TDS concentrations have remained relatively stable, and in 2017, TDS concentration in La Habra wells was approximately 960 mg/L (City of La Habra et al., 2017).

The La Habra Basin has water quality concerns that require treatment or blending with higher quality water to meet the State's health standards. The quality of Idaho Street Well raw water requires treatment before entering the City of La Habra's distribution system. The treatment system includes chlorination, air-stripping to remove hydrogen sulfide and ammonia that may be present, and the addition of sodium hexametaphosphate to sequester iron and manganese. Water from the La Bonita Well and the Portola Well is chlorinated and then blended with CDWC purchased water in a 250,000-gallon forebay to reduce mineral concentration (La Habra, Groundwater Study, 2014).

7.2.3.2.4 Main San Gabriel Groundwater Basin

VOCs and nitrates are the most prevalent contaminants found in the Main San Gabriel Basin. As a result, the location and treatment methods are generally well understood. During FY 2019-20, 30 treatment plants treated approximately 75,000 AF of VOC-contaminated water from the Main San Gabriel Basin. Although VOC contamination is substantial, it is centered in just a few areas, leaving a large portion of the Main San Gabriel Basin unaffected.

The DDW lowered the notification level of perchlorate from 18 to 4 parts per billion (ppb) in January 2002. Subsequently, a total of 22 wells from the Main San Gabriel Basin were removed from service due to unacceptable levels of perchlorate. In October 2007, the DDW established an MCL of 6 ppb. Efforts to treat perchlorate by the Watermaster resulted in ion-exchange technology treatment facilities at five sites in the Baldwin Park Operable Unit (BPOU) and at two facilities in other parts of the Main San Gabriel Basin during FY 2019-20. In April 2020, DDW issued a Notice of Proposed Rulemaking to consider lowering the perchlorate Detection Limit for Purposes of Reporting (DLR) to 2 ppb, and in anticipation of this possible revision, Watermaster coordinated with Producers to conduct “low-level” detection sampling at a level of 0.1 ppb.

During 1998, eight local wells within the Main San Gabriel Basin had levels of NDMA above the notification level of 2 ppt at the time. Five of the wells with measurable levels of NDMA had already been taken out of service for other reasons, and the other three were taken offline as a direct result of NDMA levels above notification level. The Watermaster played a key role in the construction of NDMA treatment facilities within the Main San Gabriel Basin. Five facilities were operational during FY 2019-20.

1,2,3-TCP is a degreasing agent that has been detected in the BPOU during the winter of 2006. Its presence delayed the use of one treatment facility for potable purposes. The DDW determined 1,2,3-TCP is best treated through liquid phase GAC. Facilities to treat 1,2,3-TCP were operational during FY 2019-20.

The DDW required specific water systems to conduct water quality tests for PFAS and PFOS during 2019 and established the notification level at 5.1 ppt and 6.5 ppt for PFOA and PFOS, respectively. Watermaster is conducting PFAS sampling and monitoring as required by the SWRCB and working with the DDW to characterize the extent of PFAS in the Main San Gabriel Basin (Main San Gabriel Basin Watermaster, 2020b).

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 have the ability to meet a majority of their demands through groundwater with very little limitation, except for the OCWD 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 reliability of MWDOC's water service to its customers. This is completed by comparing the projected long-term water demand (Section 4), to the projected water supply sources available to MWDOC (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 4.3.1), 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).

MWDOC is 100 percent reliable for normal year demands from 2025 through 2045. MWDOC receives imported water from MET via connection to MET's regional distribution system. Although pipeline and connection capacity rights do not guarantee the availability of water, they do guarantee the ability to convey water into the local system when it is available to the MET distribution system.

A comparison between the supply and demand for projected years between 2025 and 2045 is shown in Table 7-2. As stated above, the available supply will meet projected demands due to a diversified supply and conservation measures limiting and reducing imported demands in the later years.

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

DWR Submittal Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals	168,760	169,591	172,520	172,124	171,837
Demand totals	168,760	169,591	172,520	172,124	171,837
Difference	0	0	0	0	0
NOTES:Includes treated and untreated water from MET for M&I and non-M&I demands.					

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 4.3.1), 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 six percent increase in demand for the MWDOC's service area (CDM Smith, 2021). Detailed information of the model is included in Appendix H.

MWDOC has documented that it is 100 percent reliable for single dry year demands from 2025 through 2045 with a demand increase of six percent from normal demand with significant reserves held by MET and conservation. A comparison between the supply and the demand in a single dry year is shown in Table 7-3.

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

DWR Submittal Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	175,945	176,825	179,930	179,510	179,206
Demand totals (AF)	175,945	176,825	179,930	179,510	179,206
Difference	0	0	0	0	0
NOTES: The single dry year projections estimate a 6% increase on imported M&I demand. Non-M&I demand (Irvine Lake and groundwater storage and replenishment) remain constant at 49,017 AFY for all years because these demands are not affected by changes in hydrological conditions.					

7.3.3 Multiple Dry Years Reliability

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 4.3.1) 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 FY2017-18 and FY2018-19). For a single dry year condition (FY2013-14), the model projects a six percent increase in demand for the MWDOC's service area (CDM Smith, 2021). It is conservatively assumed that a five-year multi dry year scenario is a repeat of the single dry year over five consecutive years.

Even with a conservative demand increase of six percent each year for five consecutive years, MWDOC is capable of meeting all customers' demands from 2025 through 2045 (Table 7-4), with significant reserves held by MET and conservation.

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

DWR Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2025 (AF)	2030 (AF)	2035 (AF)	2040 (AF)	2045 (AF)
First year	Supply totals	171,291	176,121	177,446	179,846	179,449
	Demand totals	171,291	176,121	177,446	179,846	179,449
	Difference	0	0	0	0	0
Second year	Supply totals	172,454	176,297	178,067	179,762	179,389
	Demand totals	172,454	176,297	178,067	179,762	179,389
	Difference	0	0	0	0	0
Third year	Supply totals	173,618	176,473	178,688	179,678	179,328
	Demand totals	173,618	176,473	178,688	179,678	179,328
	Difference	0	0	0	0	0
Fourth year *(optional)*	Supply totals	174,781	176,649	179,309	179,594	179,267
	Demand totals	174,781	176,649	179,309	179,594	179,267
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals	175,945	176,825	179,930	179,510	179,206
	Demand totals	175,945	176,825	179,930	179,510	179,206
	Difference	0	0	0	0	0

NOTES:
The multiple dry-year projections estimate a six percent increase on imported M&I demand. Non-M&I demand (Irvine Lake and groundwater storage and replenishment) remain constant at 49,017 AFY because these demands are not affected by changes in hydrological conditions. 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.

7.4 Management Tools and Options

Existing and planned water management tools and options that seek to maximize local resources and results in minimizing the need to import water are described below.

- **Reduced Delta Reliance:** Both MWDOC and MET have 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. Similarly, MWDOC and its member agencies have further invested in water use efficiency, local water supply projects, and advanced water technologies to increase regional self-reliance. In 2020, MET had a 602,000 AF change in supplies contributing to regional-self-reliance, corresponding to a 15.3 percent change, and this amount is projected to increase through 2045 (MET, 2021). In 2020, MWDOC had a nearly 200,000 AF change in supplies contributing to regional-self-reliance, which represents a 30% change since the 2010 baseline. 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 service area'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 manage any of the service area's groundwater basins, MWDOC supports and partners in efforts to maintain the health of the local basins through local groundwater recharge efforts such OCWD's GWRS program.

- **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). 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 and MWDOC'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 GWRS and 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 assisted its retail agencies by leading the coordination of the 20% by 2020 Orange County Regional Alliance for all of the retail agencies in Orange County. MWDOC assisted each retail water supplier in Orange County in analyzing the requirements of and establishing their baseline and target water use, as guided by DWR.

7.5 Drought Risk Assessment

CWC 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 demand management measures and water supply projects and programs. The DRA is a specific planning action that assumes MWDOC is experiencing a drought over the next five years and addresses MWDOC's water supply reliability in the context of presumed drought conditions. Together, the water service reliability assessment, DRA, and WSCP allow MWDOC 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.

CWC Section 10612 requires the DRA to be based on the driest five-year historic sequence for MWDOC's water supply. However, CWC 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 methodology and results from MWDOC's DRA.

7.5.1 Methodology

The water demand forecasting model developed for the Demand Forecast TM (described in Section 4.3.1) 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 six percent increase in demand for the MWDOC's service area (CDM Smith, 2021).

For MWDOC, 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 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 five percent 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.

Water Demand Characterization

All of MWDOC's water supplies are purchased from MET, regardless of hydrologic conditions. As described in Section 6.2.1, MET's supplies are from the Colorado River, SWP, and in-region storage. In their 2020 UWMP, both MET's DRA concluded that even without activating WSCP actions, MET can reliably provide water to all of their member agencies, including MWDOC, through 2045, 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 will be met by MET's water supplies.

Based on MWDOC's Demand Forecast TM, in a single dry year, demand is expected to increase by six percent above a normal year. MWDOC's projected normal water use is presented annually for the next five years in Table 7-5. MWDOC'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.

MWDOC developed its demand forecast in a number of steps. First, MWDOC 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. Next, MWDOC estimated the projections of local supplies derived from current and expected local supply programs from MWDOC member agencies. Finally, MWDOC used its demand model to calculate 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. The sum of the 1) M&I demand estimated from the model and the 2) non-M&I water for surface water storage and groundwater replenishment, equate MWDOC's demand, which is supplied by MET.

Table 7-5: MWDOC's Projected Normal M&I and Non-M&I Water Demand

MWDOC's Projected Normal M&I and non-M&I Water Demand					
	2021	2022	2023	2024	2025
Water Use (AF)	162,996	164,437	165,878	167,319	168,760
NOTES: Source – Linearly interpolated from MWDOC Service Area Water Supply Projections					

Water Supply Characterization

MWDOC's assumptions for its supply capabilities are discussed and presented in 5-year increments under its water reliability assessment in Section 7.3**.** 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 CR, 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. For simplicity, the supply capabilities presented in Table 7-6 constitute the total of MWDOC's water supplies made available by MET. 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

MWDOC's anticipated total water use and supply under a five-year drought from FY 2020-21 through FY 2024-25, are compared in Table 7-6. MWDOC's assessment reveals that its supply capabilities are expected to balance with its projected water use for the next five years, from 2021 to 2025, under a repeat of a five consecutive-year drought.

Table 7-6: 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	171,291
Total Supplies	171,291
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	172,454
Total Supplies	172,454
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%
2023	**Total**
Total Water Use	173,618
Total Supplies	173,618
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0

DWR Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	174,781
Total Supplies	174,781
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	175,945
Total Supplies	175,945
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%

7.5.3 Water Source Reliability

As detailed in Section 8, MWDOC has in place a robust WSCP and comprehensive shortage response planning efforts that include demand reduction measures and supply augmentation actions. However, since MWDOC's DRA shows a balance, no water service reliability concern is anticipated, and no shortfall mitigation measures are expected to be exercised over the next five years. Additionally, while a balance of supplies and demands are shown in the previously displayed Table 7-6, it is important to note that MET's DRA shows a surplus of supplies that would be available all of its Member Agencies, including MWDOC, should the need for additional supplies arise. MWDOC will periodically revisit its representation of both individual 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's Description

Water shortage contingency planning is a strategic planning process that MWDOC 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 MWDOC WSCP provides a 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 acre-feet per year or have more than 3,000 connections prepared 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 the California Department of Water Resources by July 1, 2021.

8.2 Overview of the Water Shortage Contingency Plan

The WSCP serves as the operating manual that MWDOC 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 MWDOC 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.

A copy of the MWDOC WSCP is provided in Appendix I and includes the steps to assess if a water shortage is occurring, and what level of demand reduction actions to trigger the most appropriate response to the water shortage conditions. MWDOC, as a wholesaler of MET's treated water supply, has an interdependent relationship with MET documents related to planning for, and responding to, water shortage; therefore, the MWDOC WSCP includes the MET Water Supply Allocation Plan[1] (WSAP). The MET WSAP outlines how MET will determine and implement each of its wholesale and retail agencies' allocation during a time of shortage. MWDOC also has its own version of a WSAP the outlines how MWDOC will determine and implement each of its retail agency's allocation during a time of shortage.

Figure 8-1 illustrates the interdependent relationship between the MET and MWDOC procedural documents related to planning for and responding to water shortages.

[1] MET's Water Shortage Contingency Plan, which includes Water Surplus and Drought Management Plan and WSAP, Appendix 4 of the 2020 UWMP

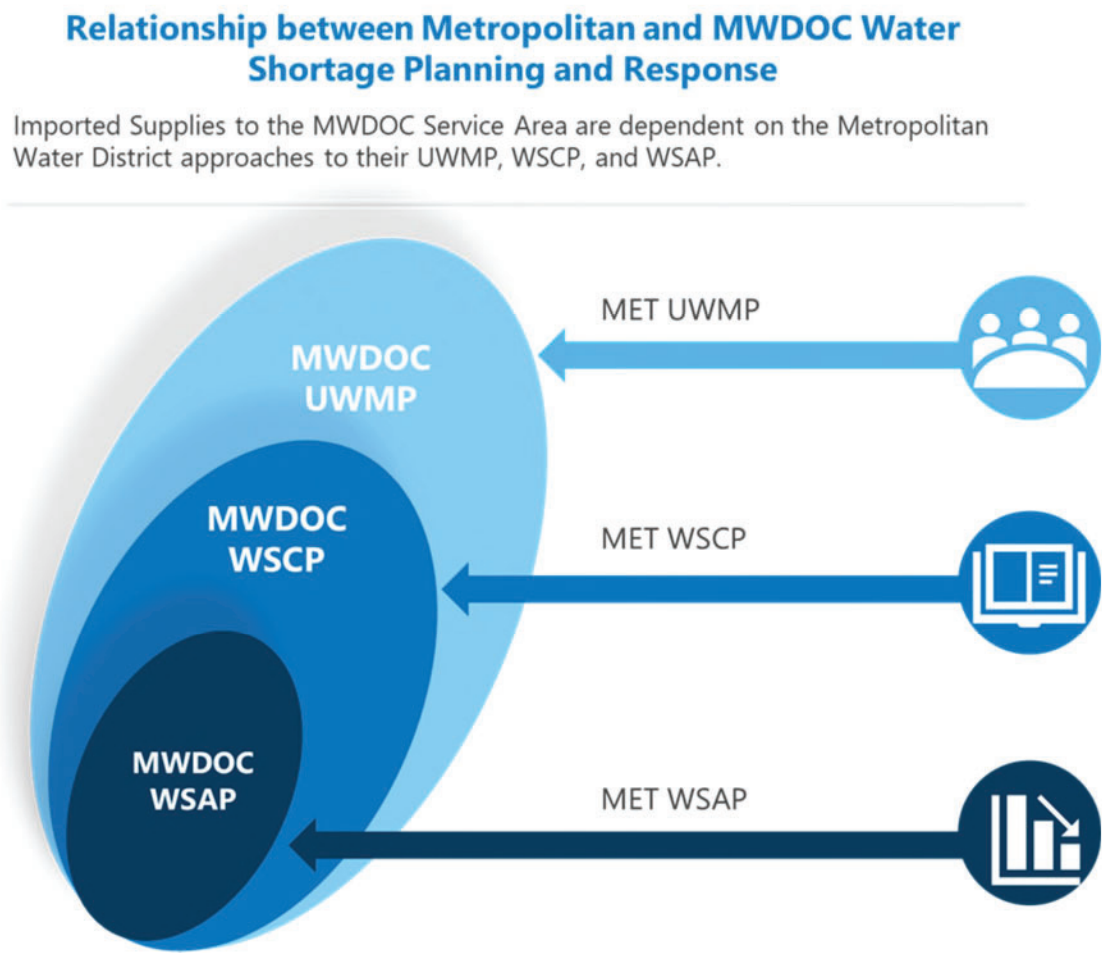


Figure 8-1: Relationship Between MET and MWDOC Water Shortage Planning and Response

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 percent to greater than 50 percent; 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; reevaluation and improvement procedures for evaluating the WSCP.

During past shortages MWDOC has adopted Board Resolutions urging its retail agencies to develop and implement water shortage plans, calling upon each agency to adopt and enforce regulations prohibiting the waste of water, and implementing an allocation plan for available imported water consistent with reductions, incentives, and allocation surcharges imposed on MWDOC by MET. As part of the 2020 UWMP, MWDOC has worked with retail agencies to develop and align individual WSCPs.

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 California 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 MWDOC's water service area.

Section 3 Water Shortage Contingency Plan

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 percent 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 is not required by wholesaler agencies.

Section 3.7 Legal Authorities is a description of the legal authorities that enable MWDOC 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 is not required by wholesaler agencies.

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.

Section 3.12 Plan Adoption, Submittal, and Implementation provides a record of the process MWDOC 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. MWDOC adopted water shortage levels consistent with the requirements identified in Water Code Section 10632 (a)(3)(A) (Table 8-1).

The supply augmentation actions that align with each shortage level are described in DWR Table 8-3. 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. 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

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions**
0	0% (Normal)	A Level 0 Water Supply Shortage –Condition exists when MWDOC notifies its water users that no supply reductions are anticipated in this year. MWDOC proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local MWDOC goals for water supply reliability.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when no supply reductions are anticipated, a consumer imported demand reduction of up to 10% is recommended to make more efficient use of water and respond to existing water conditions. Upon the declaration of a Water Aware condition, MWDOC shall implement the mandatory Level 1 conservation measures identified in this WSCP. The type of event that may prompt MWDOC to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider (MET) calls for extraordinary water conservation efforts.
2	Up to 20%	A Level 2 Water Supply Shortage – Condition exists when MWDOC notifies its member agencies that due to drought or other supply reductions, a consumer imported 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, MWDOC shall implement the mandatory Level 2 conservation measures identified in this WSCP.

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
3	Up to 30%	A Level 3 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 30% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
4	Up to 40%	A Level 4 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 40% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
5	Up to 50%	A Level 5 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
6	>50%	A Level 6 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that greater than 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
NOTES:		

9 DEMAND MANAGEMENT MEASURES

The goal of the Demand Management Measures (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 used reduction targets. The reporting of DMMs were significantly modified in 2014 by Assembly Bill 2067 to streamline the DMM reporting requirements. For retail suppliers the requirements changed from 14 specific measures to six more general requirements plus an "other" category:

- 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 demand management measures that have a significant impact on water use as measured in GPCD, including innovative measures, if implemented;
- Programs to assist retailers with Conservation Framework Compliance

Wholesale agencies must now provide narrative descriptions of metering, public education and outreach, water conservation program coordination and staffing support, and other DMMs, as well as a narrative of asset management and the wholesale supplier assistance programs.

9.1 Overview

MWDOC demonstrated its commitment to water use efficiency in 1991 by voluntarily signing the MOU Regarding Urban Water Conservation in the California Urban Water Conservation Council. As a signatory to the MOU, MWDOC has committed to a good-faith-effort to implement all cost-effective best management practices (BMPs) as demand management measures DMMs.

An ethic of efficient use of water has been developing over the last 30 years of implementing water use efficiency programs. Retail water agencies throughout Orange County also recognize the need to use existing water supplies efficiently – implementation of water efficiency programs makes good economic sense and reflects responsible stewardship of the region's water resources. All retail water agencies in Orange County are actively implementing DMM-based programs.

MWDOC still honors its commitment to urban water efficiency, and continues to implement BMP-based DMMs through multi-faceted, holistic water use efficiency programs today. As a wholesaler, to help facilitate implementation of DMM throughout Orange County, MWDOC's efforts focus on the following three areas: Regional Program Implementation, Local Program Assistance, and Research and Evaluation. This both complies with and goes beyond the Foundational BMPs of Utility Operations Programs requirements:

Regional Program Implementation - MWDOC develops, obtains funding for, and implements regional water savings programs on behalf of all retail water agencies in Orange County. This approach minimizes confusion to consumers by providing the same programs with the same participation guidelines, maintains a consistent message to the public to use water efficiently, and provides support to retail water agencies by acting as program administrators for the region. As a leader of water efficiency in Orange County, MWDOC provides a holistic suite of programs that are accessible by all consumer groups in the region. Many of these programs have been structured through Integrated Regional Water Management Planning processes in north, central and south Orange County.

Local Program Assistance - When requested, MWDOC assists retail agencies to develop and implement local programs within their individual service areas. This assistance includes collaboration with each retail agency to design a program to fit that agency's local needs, which may include providing staffing, targeting customer classes, acquiring grant funding from a variety of sources, and implementing, marketing, reporting, and evaluating the program. MWDOC provides assistance with a variety of local programs including, but not limited to: Pressure Regulation Valve Replacement Pilot, local Smart Timer Distributions, Sub-Metering, Custom Commercial Retrofits, HOA and Public Information, School Education, Conservation Pricing, Leak Detection, and Water Waste Prohibitions.

Research and Evaluation - An integral component of MWDOC's water use efficiency program is the research and evaluation of potential and existing programs. Research allows an agency to measure the water savings benefits of a specific program and then compare those benefits to the costs of implementing the program in order to evaluate the economic feasibility of the program when compared to other efficiency projects or existing or potential sources of supply. MWDOC regularly conducts statistical water savings (impact evaluations) and program process evaluations to determine how to best invest and run its water efficiency programs. From 2016-2020, MWDOC conducted process and impact evaluations on its Spray-to-Drip Program, the results of which have created a starting point of a standardized rebate program throughout the MET service area, and its Landscape Design Assistance Program. Additionally, an evaluation was conducted of MWDOC's Comprehensive Landscape Water Use Efficiency (CLWUE) Program, which included smart timers, rotating nozzles, turf removal, drip irrigation, and recycled water conversions. This study evaluated how much water was saved at properties implementing these measures and compared savings among landscapes that implemented one versus two of the measures (e.g., a turf removal site compared to a turf removal site that also installed a smart irrigation timer). Additionally, MWDOC is currently piloting a research program investigating water savings associated with the replacement of broken pressure regulating valves at residential homes. The results of this study are expected in 2023.

Furthermore, in 2013 MWDOC published its first Orange County Water Use Efficiency Master Plan to define how Orange County will comply with, or exceed, the state mandate of a 20 percent reduction in water use by 2020, and how MWDOC will achieve its share of MET's Integrated Resources Plan water savings goal. The Master Plan is being used to achieve the water savings goal at the lowest possible costs while maintaining a mix of programs desired by water agencies and consumers throughout Orange County. MWDOC is planning an update to the 2013 Orange county Water Use Efficiency Master Plan in 2023 that will integrate all necessary measures relevant to SB 606 and AB 1668.

Table 9-1 summarizes DMM implementation responsibilities of MWDOC as Orange County's wholesale supplier and responsibilities of MWDOC's retail agencies.

Table 9-1: DMM Implementation Responsibility and Regional Programs in Orange County

Efficiency Measure	Applies to:		MWDOC Regional Program
	Retailer	MWDOC as a Wholesaler	
Operations Practices			
Wholesale Agency Assistance Programs	-	✓	✓
Conservation Pricing	✓	✓	✓
Conservation Coordinator	✓	✓	✓
Water Waste Prevention	✓	-	✓
Water Loss Control (System Water Audits, Leak Detection and Repair)	✓	(1)	✓
Metering with Commodity Rates	✓	(1)	(1)
Commercial, Industrial, and Institutional (CII) Programs	✓	-	✓
Large Landscape Conservation Programs	✓		✓
Landscape Programs			
Residential and CII Landscape Rebate Programs (Turf Removal, Spray-to-Drip, Smart Timer, High Efficiency Sprinkler Nozzles (HENs), Rain Barrels, Large Rotary Nozzles, In-stem Flow Regulators)	✓	-	✓
Residential Landscape Design and Maintenance Assistance Programs	✓	-	✓
Qualified Water Efficient Landscaper (QWEL) Training Program	✓	✓	✓
Residential Implementation			
High-Efficiency Washing Machine Rebate Program	✓	-	✓

Efficiency Measure	Applies to:		MWDOC Regional Program
	Retailer	MWDOC as a Wholesaler	
WaterSense Specification Toilets (Residential Plumbing Fixture Retrofits[(1)])	✓	-	✓
WaterSense Specification for Residential Development	✓	-	-
Commercial, Industrial, Institutional Implementation			
Water Savings Incentive Program	✓	-	✓
On-site Retrofit Program	✓	-	✓
Direct Install High Efficiency Toilets (HET) (DAC and Non-DAC)	✓	-	✓
CII Rebate Programs (HET and Urinals, Plumbing Flow Control Valves, Connectionless Food Steams, Air-cool Ice Machines, Cooling Tower Conductivity Controllers and pH Controllers, Dry Vacuum Pumps, Laminar Flow Restrictors	✓	-	✓
Education Programs			
Public Information Programs	✓	✓	✓
School Education Programs	✓	✓	✓
Boy Scouts/Girl Scouts Water Conservation Badges/Patches	✓	✓	✓
Water Energy Education Alliance	✓	✓	✓

(1) MWDOC does not own or operate a distribution system; water wholesaled by MWDOC is delivered through the MET distribution system and meters.

9.2 DMM Implementation in MWDOC Service Area

Successful strategies are built by leveraging opportunities and creating customer motivation to take action to begin a market transformation. For Water Use Efficiency programs specifically, this starts by selecting the highest water consuming sectors and then creating an attractive implementation package. The next step is to identify ways to break through traditional market barriers by testing out innovative technologies and/or delivery mechanisms. Additionally, a program marketing campaign is launched, employing a full spectrum of varying outreach methods. Furthermore, Programs are thoroughly evaluated to maximize water savings, break down barriers to participation, or other ways that effectiveness may be increased. The Implementation Design Steps are illustrated on Figure 9-1.

Figure 9-1: Implementation Design Steps

MWDOC's water use efficiency programs cut across all consumer segments and differ in their delivery formats. There are intentional reasons for this varied approach. Through evaluation of past programs, it has been shown that there are three implementation approaches that are particularly effective at securing water savings in a cost-effective and persistent manner. These implementation approaches have been built into each of MWDOC's program offerings and matched up with the appropriate program sector as follows:

Performance based incentives - This payment format works especially well for the large landscape and CII sectors due to the array of site-specific needs and custom processes and equipment at these sites. This program pays a flat incentive per acre foot saved that scales to the water saved at each site so the more they save the higher the incentive. This approach provides an avenue for high water using sites that will save the most water through a custom approach that works for each particular site. Additionally, this method provides an even greater incentive for the highest water users to engage in water savings activity and create a most attractive return on investment for site decision makers.

Standardized device rebates - Rebates are most applicable for the more "cookie cutter" type measures where there is a limited number of products and styles and well-defined water savings rates. These incentives are the predominant payment method for residential, small commercial, and small to medium sized landscape markets. There are a wide variety of standardized device rebates available to all water-users of all water sectors.

Technical assistance, surveys, and education - All customer segments benefit from additional technical support services. MWDOC offers water efficiency educational programs to primary school-age children, residential homeowners, property managers, professional landscapers, or any other interested water-user. These programs provide public awareness of the importance of water efficiency and provide the technical support to implement appropriate water savings measures.

9-2 shows MWDOC's programs under each of the three implementation approaches.

Program Segments:	*Field Implementation Approaches*: Performance Based Incentives	Device Based Incentives	Audits, Assistance & Education
Commercial, Industrial, & Institutional	Water Savings Incentive Program On-site Retrofit Program	• DAC/Non-DAC Direct Install HET • SoCal Water$mart Device Rebates • ULV Urinals • HET • Food Steamers • Ice Machines • pH & Conductivity Controllers • Laminar Flow Restrictors • Dry Vacuum Pumps	Large Landscape Surveys QWEL
Landscape	Water Savings Incentive Program On-site Retrofit Program	• SoCal Water$mart Device Rebates (Commercial and Residential) • Smart Controllers • Large Rotary Nozzles • In-stem Flow Regulators • Turf Removal Incentive Program	Landscape Design Assistance Landscape Maintenance Assistance CA Friendly Landscape Classes

	Field Implementation Approaches		
Program Segments:	Performance Based Incentives	Device Based Incentives	Audits, Assistance & Education
Residential	Single Family -- None Available Multi Family—Landscape planning and future pay for performance.	• SoCal Water$mart Device Rebates • High Efficiency Washers • HET	Residential-direct information/resources
Utility Operations	Distribution System Audits and Technical Support Leak Detection	Budget-Based Rate Technical Assistance Sub-Metering	School Education Public Information Dedicated Irrigation Landscape Measurements

Figure 9-2: Demand Management Measure Implementation Approaches

9.3 Wholesale Supplier Assistance Programs

As described in the sections above, MWDOC provides financial incentives, conservation-related technical support, and regional implementation of a variety of demand management programs. In addition, MWDOC is providing assistance with compliance of the Conservation Framework and conducts research projects to evaluate implementation of both existing programs and new pilot programs. On behalf of its member agencies, MWDOC also organizes and provides the following:

- Monthly coordinator meetings
- Marketing materials
- Public speaking
- Community events
- Legislation compliance assistance

The many programs that MWDOC offers to Orange County on behalf of retail water agencies are described in detail in Appendix K.

9.4 Water Use Objectives (Future Requirements)

To support Orange County retailers with compliance of SB 606 and AB 1668 (Conservation Framework), MWDOC is providing multi-level support to assist agencies 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 BMP CII performance measures.

Urban Water Use Objective

An Urban Water Supplier's urban water use objective (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 9.3, that will assist Orange County retailers in meeting and calculating their WUO.

Table 9-2 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 9-2: MWDOC Programs to Help Agencies Meet their WUO

WUO Component	Calculation	Program	Impact
Indoor Residential	Population and GPCD standard	**Direct Impact** • High Efficiency Washer • HET • Multi-Family HET (DAC/ non-DAC)	**Direct Impact** Increase of indoor residential efficiencies and reductions of GPCD use

<table>
<tr><th>WUO Component</th><th>Calculation</th><th>Program</th><th>Impact</th></tr>
<tr><td>Outdoor Residential</td><td>Irrigated/irrigable area measurement and a percent factor of local ETo</td><td><u>Direct Impact</u>
Turf Removal
Spray-to-Dip
Smart Timer
HEN
Rain Barrels/Cisterns
<u>Indirect Impact</u>
Landscape Design and Maintenance Assistance
OC Friendly Gardens Webpage
CA Friendly/Turf Removal Classes
QWELL</td><td><u>Direct Impact</u>
Increase outdoor residential efficiencies and reductions of gallons per ft^2 of irrigated/ irrigable area used
<u>Indirect Impact</u>
Provide information, resources, and education to promote efficiencies in the landscape</td></tr>
<tr><td>Outdoor Dedicated Irrigation Meters</td><td>Irrigated/irrigable area measurement and a percent factor of local ETo</td><td><u>Direct Impact</u>
Turf Removal
Spray-to-Dip
Smart Timer
HEN
Central Computer Irrigation Controllers
Large Rotary Nozzles
In-Stem Flow Regulators
<u>Indirect Impact</u>
OC Friendly Gardens Webpage
CA Friendly/Turf Removal Classes
QWELL</td><td><u>Direct Impact</u>
Increase outdoor residential efficiencies and reductions of gallons per ft^2 of irrigated/ irrigable area used
<u>Indirect Impact</u>
Provide information, resources, and education to promote efficiencies in the landscape</td></tr>
</table>

WUO Component	Calculation	Program	Impact
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:** 1. Volume of potable reuse water from existing facilities, not to exceed 15% of WUO 2. Volume of potable reuse water from new facilities, not to exceed 10% of WUO	**Direct Impact** • GWRS **Indirect Impact** • On Site Retrofit Program (ORP)	**Direct Impact** The GWRS (run by OCWD) significantly increases the availability of potable reuse water **Indirect Impact** The ORP expands the recycled water supply grid that will be used for future projects

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 9-3).

Table 9-3: MWDOC BMP and Water Efficiency Programs and Incentives

Component	Program Offered	Impact
CII Performance Measures	• Water Savings Incentive Program (WSIP) • HET • High Efficiency 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. Additional CII rebates based on BMPS increase the economic feasibility of increasing water efficiencies.

These efforts to assist OC 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 MWDOC 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, MWDOC worked closely with many other entities, including representation from diverse social, cultural, and economic elements of the population within MWDOC's service area, to develop and update this planning document. MWDOC 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 MWDOC 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 city or county within supplier's service area that water supplier is preparing an updated UWMP (at least 60 days prior to public hearing)	2/24/2021	Appendix L
Public Hearing Notice	5/3/2021 - 5/10/2021	Appendix L
Held Public Hearing	5/19/2021	Appendix L
Adopted UWMP and WSCP	5/19/2021 or 6/16/2021	Appendix M
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	-
Submitted UWMP to the cities and county 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)	8/1/2021	-

This UWMP was adopted by the MWDOC Board of Directors on May 19, 2021. A copy of the adopted resolution is provided in Appendix M.

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, MWDOC sent a Letter of Notification to the County of Orange and the cities within its service area on February 2, 2021 to state that it was in the process of preparing an updated UWMP (Appendix L).

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

<table>
<tr><th colspan="3">DWR Submittal Table 10-1 Wholesale: Notification to Cities and Counties</th></tr>
<tr><td>☑</td><td colspan="2">Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642.
Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.</td></tr>
<tr><td>Appendix L</td><td colspan="2">Provide the page or location of this list in the UWMP.</td></tr>
<tr><td>☐</td><td colspan="2">Supplier has notified 10 or fewer cities or counties.
Complete the table below.</td></tr>
<tr><td>City Name</td><td>60 Day Notice</td><td>Notice of Public Hearing</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>County Name</td><td>60 Day Notice</td><td>Notice of Public Hearing</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="3">NOTES:</td></tr>
</table>

The MWDOC's water supply planning relates to the policies, rules, and regulations of its regional and local water providers. The MWDOC is dependent on imported water from MET. As such, MWDOC involved MET and other relevant agencies in this 2020 UWMP at various levels of contribution as summarized in Table 10-3.

Table 10-3: Coordination with Appropriate Agencies

	Participated in Plan Development	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Copy of Draft Plan	Sent Notice of Public Hearing	Not Involved/ No Information
Cities within service area	-	-	-	-	✓	✓	✓
County of Orange	-	-	-	-	✓	✓	✓
MET	✓	-	-	✓	✓	✓	✓
MWDOC 28 Retail Agencies	✓	✓	✓	✓	✓	✓	✓
OC San	✓	-	-	✓	✓	-	-
OCWD	✓	-	-	✓	✓	✓	✓
Public Library	-	-	-	-	-	✓	-
SJBA	✓	-	-	✓	✓	-	-
SOCWA	✓	-	-	✓	✓	-	-

MET - As a member agency of MET, MWDOC developed this UWMP in collaboration with MET's 2020 UWMP to ensure consistency between the two documents.

MWDOC Retail Agencies - MWDOC provided assistance to its retail agencies' 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 retailers' 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.

Groundwater Management Agencies - MWDOC also worked with the following five agencies to obtain information for the five groundwater basin resources in its service area: OCWD for Lower Santa Ana River Basin, SJBA for San Juan Basin, City of La Habra for La Habra Basin, City of San Clemente for San Mateo Basin, and LBCWD for Laguna Canyon Basin. Details of the basin information are described in Section 6.3.

Wastewater Management Agencies - To meet the requirements of the Act in the preparation of this UWMP, MWDOC contacted individual wastewater collection and treatment providers and other water agencies within its service area for data on recycled water and associated projects in the region. The information MWDOC obtained was then combined with a review of several completed Orange County studies. The information MWDOC obtained from wastewater collection and treatment providers allows the UWMP to describe wastewater discharge methods, treatment levels, discharge volumes, and recycled use in the region.

10.3 Public Participation

MWDOC encouraged community and public interest involvement in the Plan update through a public hearing and inspection of the draft document on May 19 2021. Copies of the draft 2020 UWMP were placed for public inspection at MWDOC's office and made available for the public on MWDOC's website on April X, 2021.

Public hearing notifications were sent to retail agencies and other interested parties. A copy of the Notice of Public Hearing is included in Appendix L.

The hearing was conducted during a regularly scheduled meeting of the MWDOC Board of Directors. A staff report and presentation reviewed the process, key components of the UWMP and the conclusions that served as the basis of the UWMP. The President of the Board of Directors then opened the Public Hearing where all comments were recorded.

10.4 UWMP Submittal

The Board of Directors reviewed and approved the 2020 UWMP at its May 19, 2021 meeting after the public hearing. See Appendix M for the resolution approving the Plan.

By July 1, 2021, the Adopted 2020 MWDOC UWMP was filed with DWR, California State Library, County of Orange, and cities within MWDOC's service area. The submission to DWR was done electronically through the online submittal tool – WUE Data Portal. MWDOC 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, MWDOC 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 MWDOC 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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APPENDIX A

UWMP Water Code Checklist

APPENDIX B

DWR Standardized Tables

APPENDIX C

MWDOC's Reduced Delta Reliance Reporting

MWDOC's
REDUCED DELTA RELIANCE REPORTING

C.1 Background

Under the Sacramento-San Joaquin Delta Reform Act of 2009, state and local public agencies proposing a covered action in the Delta, prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the Delta Stewardship Council. Anyone may appeal a certification of consistency, and if the Delta Stewardship Council grants the appeal, the covered action may not be implemented until the agency proposing the covered action submits a revised certification of consistency, and either no appeal is filed, or the Delta Stewardship Council denies the subsequent appeal.

An urban water supplier that anticipates participating in or receiving water from a proposed covered action such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta should provide information in their 2015 and 2020 Urban Water Management Plans (UWMPs) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (WR P1).

WR P1 details what is needed for a covered action to demonstrate consistency with reduced reliance on the Delta and improved regional self-reliance. WR P1 subsection (a) states that:

(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:

> *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed inparagraph*
> *(1) of subsection (c);*
>
> *(2) That failure has significantly caused the need for the export, transfer, or use; and*
>
> *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.*

WR P1 subsection (c)(1) further defines what adequately contributing to reduced reliance on the Delta means in terms of (a)(1) above.

(c)(1) Water suppliers that have done all the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:

> *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;*
>
> *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and*
>
> *(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self- reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).*

The analysis and documentation provided below include all of the elements described in WR P1(c)(1) that need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action.

C.2 Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1 (c)(1)(C), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self- reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

The expected outcomes for MWDOC's regional self-reliance were developed using the approach and guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 – Final Draft (Guidebook Appendix C) issued in March 2021. The data used in this analysis represent the total regional efforts of Metropolitan, MWDOC, and its member agencies and were developed in conjunction with Metropolitan as part of the UWMP coordination process.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for MWDOC's Delta reliance and regional self-reliance. The results show that as a region, MWDOC, Metropolitan, and its member agencies are measurably reducing reliance on the Delta and improving regional self-reliance, both as an amount of water used and as a percentage of water used.

Expected Outcomes for Regional Self-Reliance for MWDOC

- Near-term (2025) – Normal water year regional self-reliance is expected to increase by 243 TAF from the 2010 baseline; this represents an increase of about 37 percent of 2025 normal water year retail demands (Table C-2).
- Long-term (2040) – Normal water year regional self-reliance is expected to increase by nearly 265 TAF from the 2010 baseline, this represents an increase of about 38 percent of 2045 normal water year retail demands (Table C-2).

C.3 Demonstration of Reduced Reliance on the Delta

The methodology used to determine MWDOC's reduced Delta reliance and improved regional self-reliance is consistent with the approach detailed in DWR's UWMP Guidebook Appendix C, including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Some of the key assumptions underlying MWDOC's demonstration of reduced reliance include:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.
- All analyses were conducted at the service area level, and all data reflect the total contributions of MWDOC and its member agencies in conjunction with information provided by Metropolitan.
- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

Baseline and Expected Outcomes

In order to calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C. Data for the 2010 baseline were taken from MWDOC's 2005 UWMP as the UWMPs generally do not provide normal water year data for the year that they are adopted (i.e., 2005 UWMP forecasts begin in 2010, 2010 UWMP forecasts begin in 2015, and so on).

Consistent with the 2010 baseline data approach, the expected outcomes for reduced Delta reliance and improved regional self-reliance for 2015 and 2020 were taken from MWDOC's 2010 and 2015 UWMPs respectively. Expected outcomes for 2025-2040 are from the current 2020 UWMP. Documentation of the specific data sources and assumptions are included in the discussions below.

Service Area Demands without Water Use Efficiency

In alignment with the Guidebook Appendix C, this analysis uses normal water year demands, rather than normal water year supplies to calculate expected outcomes in terms of the percentage of water used. Using normal water year demands serves as a proxy for the amount of supplies that would be used in a normal water year, which helps alleviate issues associated with how supply capability is presented to fulfill requirements of the UWMP Act versus how supplies might be accounted for to demonstrate consistency with WR P1.

Because WR P1 considers water use efficiency savings a source of water supply, water suppliers such as MWDOC needs to explicitly calculate and report water use efficiency savings separate from service area demands to properly reflect normal water year demands in the calculation of reduced reliance. As explained in the Guidebook Appendix C, water use efficiency savings must be added back to the normal year demands to represent demands without water use efficiency savings accounted for; otherwise the effect of water use efficiency savings on regional self-reliance would be overestimated. Table C-1 shows the results of this adjustment for MWDOC. Supporting narratives and documentation for the all of the data shown in Table C-1 are provided below.

Table C -1

Service Area Water Use Efficiency Demands	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Service Area Water Demands with Water Use Efficiency	616,714	552,487	482,879	480,147	489,358	495,415	494,870
Non-Potable Water Demands	124,590	122,568	121,721	101,034	102,908	105,943	106,060
Potable Service Area Demands with Water Use Efficiency	492,124	429,919	361,158	379,113	386,450	389,472	388,810

Total Service Area Population	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Service Area Population	2,197,120	2,295,946	2,342,740	2,411,727	2,473,392	2,518,117	2,532,393

Water Use Efficiency Since Baseline	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Per Capita Water Use (GPCD)	200	167	138	140	139	138	137
Change in Per Capita Water Use from Baseline (GPCD)		(33)	(62)	(60)	(60)	(62)	(63)
Estimated Water Use Efficiency Since Baseline		84,341	163,583	161,080	167,555	174,551	178,410

Total Service Area Water Demands	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Service Area Water Demands with Water Use Efficiency	616,714	552,487	482,879	480,147	489,358	495,415	494,870
Estimated Water Use Efficiency Since Baseline	-	84,341	163,583	161,080	167,555	174,551	178,410
Service Area Water Demands without Water Use Efficiency	616,714	636,828	646,462	641,227	656,913	669,966	673,280

Service Area Demands with Water Use Efficiency

The service area demands shown in Table C-1 represent the total retail water demands for MWDOC's service area and include municipal and industrial demands, agricultural demands, recycled, seawater barrier demands, and storage replenishment demands. These demand types and the modeling methodologies used to calculate them are described in Section 4.3 of MWDOC's 2020 UWMP.

Non-Potable Water Demands

The non-potable water demands shown in Table C-1 represent demands for non-potable recycled water, water used for surface reservoir storage, and replenishment water for groundwater basin recharge and sweater barrier demands. In accordance with section C.3.6 of the UWMP Guidebook, MWDOC characterizes demands for groundwater basin recharge and seawater barrier demands as indirect uses of water. In order to avoid double counting of water use these supplies are generally excluded from demand projections, since they are already captures as part of MWDOC's retail water demand. Additionally, non-potable supplies have a demand hardening effect due to the inability to shift non-potable supplies to meet potable water demands. When water use efficiency or conservation measures are implemented, they fall solely on the potable water users. This is consistent with the approach for water conservation reporting used by the State Water Resources Control Board.

Total Service Area Population

MWDOC's total service area population as shown in Table C-1 come from the Center for Demographic Research, with actuals and projections further described in Section 3.4 of the 2020 MWDOC UWMP.

Water Use Efficiency Since Baseline

The water use efficiency numbers shown in Table C-1 represent the formulation that MWDOC utilized, consistent with Appendix C of the UWMP Guidebook approach.

Service area demands, excluding non-potable demands, are divided by the service area population to get per capita water use in the service area in gallons per capita per day (GPCD) for each five-year period. The change in per capita water use from the baseline is the comparative GPCD from that five-year period compared to the 2010 baseline. Changes in per capita water use over time are then applied back to the MWDOC service area population to calculate the estimated WUE Supply. This estimated WUE Supply is considered an additional supply that may be used to show reduced reliance on Delta water supplies.

The demand and water use efficiency data shown in Table C-1 were collected from the following sources:

- Baseline (2010) values – MWDOC's 2005 UWMP, Table 2-2-1-A and Table 2-2-1-A
- 2015 values – MWDOC's 2010 UWMP, Table 2-10
- 2020 values – MWDOC's 2015 UWMP, Table 2-3
- 2025-2040 values – MWDOC's 2020 UWMP, Table 4-1

It should be noted that the results of this calculation differ from what MWDOC calculated under MWDOC's 2020 UWMP Section 5.2 pertaining to the Water Conservation Act of 2009 (SB X7-7) due to differing formulas.

C.4 Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table C-2 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The numbers shown in Table C-2 represent efforts to improve regional self-reliance for MWDOC's entire service area and include the total contributions of MWDOC and its member agencies. Supporting narratives and documentation for the all of the data shown in Table C-2 are provided below.

The results shown in Table C-2 demonstrate that MWDOC's service area is measurably improving its regional self-reliance. In the near-term (2025), the expected outcome for normal water year regional self-reliance increases by 126 TAF from the 2010 baseline; this represents an increase of about 19.3 percent of 2025 normal water year retail demands. In the long-term (2040), normal water year regional self-reliance is expected to increase by more than 265 TAF from the 2010 baseline; this represents an increase of about 38 percent of 2040 normal water year retail demands.

Table C-2 – Supplies Contributing to Regional Self Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	2010	2015	2020	2025	2030	2035	2040
Water Use Efficiency	-	84,341	163,583	161,080	167,555	174,551	178,410
Water Recycling	34,393	41,690	42,330	52,017	53,891	59,926	57,043
Stormwater Capture and Use	-	-	-	-	-	-	-
Advanced Water Technologies	66,083	100,347	94,235	130,000	130,000	130,000	130,000
Conjunctive Use Projects	-	-	-	-	-	-	-
Local and Regional Water Supply and Storage Projects	-	-	-	-	-	-	-
Other Programs and Projects the Contribute to Regional Self-Reliance	-	-	-	-	-	-	-
Water Supplies Contributing to Regional Self-Reliance	100,476	226,377	300,148	343,097	351,446	364,477	365,453

Service Area Water Demands without Water Use Efficiency	2010	2015	2020	2025	2030	2035	2040
Service Area Water Demands without Water Use Efficiency	616,714	636,828	646,462	641,227	656,913	669,966	673,280

Change in Regional Self Reliance (Acre-Feet)	2010	2015	2020	2025	2030	2035	2040
Water Supplies Contributing to Regional Self-Reliance	100,476	226,377	300,148	343,097	351,446	364,477	365,453
Change in Water Supplies Contributing to Regional Self-Reliance		125,901	199,672	242,621	250,970	264,001	264,977

Change in Regional Self Reliance (As a Percent of Water Demand w/out WUE)	2010	2015	2020	2025	2030	2035	2040
Water Supplies Contributing to Regional Self-Reliance	16.3%	35.5%	46.4%	53.5%	53.5%	54.4%	54.3%
Change in Water Supplies Contributing to Regional Self-Reliance		19.3%	30.1%	37.2%	37.2%	38.1%	38.0%

Water Use Efficiency

The water use efficiency information shown in Table C-2 is taken directly from Table C-1 above.

Water Recycling

The water recycling values shown in Table C-2 reflect the total recycled water production in MWDOC's service area as described in Section X.X of MWDOC's UWMP.

Advanced Water Technologies

The advanced water technologies data shown in Table C-2 include total indirect potable reuse for the Orange County Groundwater Replenishment System (GWRS) production in MWDOC's service area as described in more detail in Section 6.6 of MWDOC's UWMP.

C.5 Reliance on Water Supplies from the Delta Watershed

Metropolitan's service area as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies and demand management measures. Quantifying MWDOC's and its member agencies investments in self-reliance, locally, regionally, and throughout Southern California is infeasible for the reasons as noted in Section C.6. Due to the regional nature of these investments, MWDOC is relying on Metropolitan's regional accounting of measurable reductions in supplies from the Delta Watershed.

The results shown in Table A.11-3 demonstrate that Metropolitan's service area, including MWDOC, is measurably reducing its Delta reliance. In the near-term (2025), the expected outcome for normal water year reliance on supplies from the Delta watershed decreased by 301 TAF from the 2010 baseline; this represents a decrease of 3 percent of 2025 normal water year retail demands. In the long- term (2045), normal water year reliance on supplies from the Delta watershed decreased by 314 TAF from the 2010 baseline; this represents a decrease of just over 5. percent of 2045 normal water year retail demands.

Table C-2
Metropolitan Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions	-	-	-	-	-	-	-	-
Transfers and Exchanges of Supplies from the Delta Watershed	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed	-	-	-	-	-	-	-	-
Total Water Supplies from the Delta Watershed	**1,492,000**	**1,073,000**	**1,075,000**	**1,191,000**	**1,182,000**	**1,180,000**	**1,178,000**	**1,178,000**

Service Area Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,938,000	5,019,000	5,143,000	5,248,000	5,361,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Supplies from the Delta Watershed	**NA**	**(419,000)**	**(417,000)**	**(301,000)**	**(310,000)**	**(312,000)**	**(314,000)**	**(314,000)**
Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	**Baseline (2010)**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
Percent of Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.1%	23.6%	22.9%	22.4%	22.0%
Change in Percent of Supplies from the Delta Watershed	**NA**	**-7.6%**	**-6.6%**	**-3.0%**	**-3.6%**	**-4.2%**	**-4.7%**	**-5.2%**

C.6 Metropolitan Member and Sub-Member Agency Infeasibility of Accounting Supplies from the Delta Watershed

Metropolitan's member agencies and retail subagencies individually contribute to reduced reliance on the Delta in two ways. First, through the development of local projects and demand management measures in their own service areas, and second through their investments in regional projects and programs through Metropolitan. Regional investments are funded through revenues from water purchases from Metropolitan or one or more of its member agencies. Metropolitan uses a portion of revenues from those purchases to fund projects and programs that contribute to the region's reduced reliance on Delta water supplies. Because some or all of these regional investments may not be constructed or implemented directly in a particular water supplier's service area, a water supplier's demands on Metropolitan or one or more of its member agencies will not accurately reflect that water supplier's total contributions to reduced reliance on supplies from the Delta watershed. It infeasible for a water supplier that makes investments in regional projects and programs to quantify its individual contributions to reduced reliance and reflect them properly in its demands on Metropolitan or one or more of Metropolitan's member agencies.

The following discussions outline how regional funding is provided through Metropolitan's local resources and conservation incentive programs and how funding for those programs is collected through Metropolitan's water rates. The history and participation of Metropolitan's member agencies and the local agencies that purchase water from Metropolitan's members in local resource and demand management in the region has spanned more than four decades, and thus makes accounting of these contributions at the individual agency level infeasible for those agencies to calculate.

Local Resources Programs

In 1982, Metropolitan began providing financial incentives to its member agencies to develop new local supplies to assist in meeting the region's water needs. Because of Metropolitan's regional distribution system these programs benefit all member agencies regardless of project location because they help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs and free up conveyance capacity to the benefit of all the agencies that rely on water from Metropolitan. For example, the Groundwater Replenishment System (GWRS) operated by the Orange County Water District, is the world's largest water purification system for indirect potable reuse and was funded, in part, by Metropolitan's local resource program and its Member Agencies. Annually, GWRS produces approximately 103,000 acre-feet of reliable, locally controlled, drought-proof supply of high-quality water to recharge the Orange County Groundwater Basin and protect it from seawater intrusion. GWRS is a premier example of a regional project that significantly reduced the need to utilize imported water for groundwater replenishment in the Metropolitan Service area, increasing regional and local supply reliability and reducing the region's reliance on imported supplies, including supplies from the State Water Project.

Metropolitan's local resource programs have evolved through the years to better assist Metropolitan's member agencies in increasing local supply production. The following is a description and history of the local supply incentive programs.

Local Projects Program

In 1982, Metropolitan initiated the Local Projects Program (LPP), which provided funding to member agencies to facilitate the development of recycled water projects. Under this approach, Metropolitan contributed a negotiated up-front funding amount to help finance project capital costs. Participating member agencies were obligated to reimburse Metropolitan over time. In 1986, the LPP was revised. Changing the up-front funding approach to an incentive-based approach. Metropolitan contributed an amount equal to the avoided State Water Project pumping costs for each acre-foot of recycled water delivered to end-use consumers. This funding incentive was based on the assumption that local projects resulted in the reduction of water imported from the Delta and the associated pumping cost. The incentive amount varied from year to year depending on the actual variable power cost paid for State Water Project imports. In 1990, Metropolitan's Board increased the LPP contribution to a fixed rate of $154 per acre-foot, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area demands.

Groundwater Recovery Program

The drought of the early 1990s sparked the need to develop additional local water resources, aside from recycled water, to meet regional demand and increase regional water supply reliability. In 1991, Metropolitan conducted the Brackish Groundwater Reclamation Study which determined that large amounts of degraded groundwater in the region were not being utilized. Subsequently, the Groundwater Recovery Program (GRP) was established to assist the recovery of otherwise unusable groundwater degraded by minerals and other contaminants, provide access to the storage assets of the degraded groundwater, and maintain the quality of groundwater resources by reducing the spread of degraded plumes.

Local Resources Program

In 1995, Metropolitan's Board adopted the Local Resources Program (LRP), which combined the LPP and GRP into one program. The Board allowed for existing LPP agreements with a fixed incentive rate to convert to the sliding scale up to $250 per acre-foot, similar to GRP incentive terms. Those agreements that were converted to LRP are known as

"LRP Conversions."

Competitive Local Projects Program

In 1998, the Competitive Local Resources Program was established. The competitive program encouraged development of recycled water and recovered groundwater through a process that emphasized cost-efficiency to Metropolitan, timing new production according to regional need while minimizing program administration cost. Under the competitive program, agencies requested an incentive rate up to $250 per acre-foot of production over 25 years under a Request for Proposals (RFP) for the development of up to 53,000 acre-feet per year of new water recycling and groundwater recovery projects. In 2003, a second RFP was issued for the development of an additional 65,000 acre-feet of new recycled water and recovered groundwater projects through the LRP.

Seawater Desalination Program

Metropolitan established the Seawater Desalination Program (SDP) in 2001 to provide financial incentives to member agencies for the development of seawater desalination projects. In 2014, seawater desalination projects became eligible for funding under the LRP and the SDP was ended.

2007 Local Resources Program

In 2006, a task force comprising member agency representatives was formed to identify and recommend program improvements to the LRP. As a result of the task force process the 2007 LRP was established with a goal of 174,000 acre-feet per year of additional local water resource development. The new program allowed for an open application process and eliminated the previous competitive process. This program offered sliding scale incentives of up to $250 per acre-foot, calculated annually based on a member agency's actual local resource project costs exceeding Metropolitan's prevailing water rate.

2014 Local Resources Program

A series of workgroup meetings with member agencies was held to identify the reasons why there was a lack of new LRP applications coming into the program. The main constraint identified by the member agencies was that the $250 per acre-foot was not providing enough of an incentive for developing new projects due to higher construction costs to meet water quality requirements and to develop the infrastructure to reach end-use consumers located further from treatment plants. As a result, in 2014, the Board authorized an increase to the maximum incentive amount, provided alternative payment structures, included onsite retrofit costs and reimbursable services as part of the LRP and added eligibility for seawater desalination projects. The current LRP incentive payment options are structured as follows:

- Option 1 – Sliding scale incentive up to $340/AF for a 25-year agreement term
- Option 2 – Sliding scale incentive up to $475/AF for a 15-year agreement term
- Option 3 – Fixed incentive up to $305/AF for a 25-year agreement term

On-site Retrofit Programs

In 2014, Metropolitan's Board also approved the On-site Retrofit Pilot Program which provided financial incentives to public or private entities toward the cost of small-scale improvements to their existing irrigation and industrial systems to allow connection to existing recycled water pipelines. The On-site Retrofit Pilot Program helped reduce recycled water retrofit costs to the end-use consumer which is a key constraint that limited recycled water LRP projects from reaching full production capacity. The program incentive was equal to the actual eligible costs of the on-site retrofit, or $975 per acre-foot of up-front cost which equates to $195 per acre-foot for an estimated five years of water savings ($195/AF x 5 years) multiplied by the average annual water use in previous three years, whichever is less. The Pilot Program lasted two years and was successful in meeting its goal of accelerating the use of recycled water.

In 2016 Metropolitan's Board authorized the On-site Retrofit Program (ORP), with an additional budget of $10 million. This program encompassed lessons learned from the Pilot Program and feedback from member agencies to make the program more streamlined and improve its efficiency. As of fiscal year 2019/20, the ORP has successfully converted 440 sites increasing the use of recycled water by 12,691 acre-feet per year.

Stormwater Pilot Programs

In 2019, Metropolitan's Board authorized both the Stormwater for Direct Use Pilot Program and a Stormwater for Recharge Pilot Program to better understand stormwater in Southern California. These pilot programs are intended to encourage the development, monitoring, and study of new and existing stormwater projects by providing financial incentives for their construction/ retrofit and monitoring/reporting costs. These pilot programs will help evaluate the potential water supply benefits delivered by stormwater capture projects and provide a basis for potential future funding approaches. Metropolitan's Board authorized a total of $12.5 million for the stormwater pilot programs ($5 million for the District Use Pilot and $7.5 million for the Recharge Pilot).

Current Status

Today, nearly one-half of the total recycled water and groundwater recovery production in the region is developed with an LRP incentive by Metropolitan. During fiscal year 2019/20, Metropolitan provided about $13 million for production of 71,000 acre-feet of recycled water for non-potable and indirect potable uses. Metropolitan provided about $4 million to support projects that produced about 50,000 acre-feet of recovered groundwater for municipal use. Since 1982, Metropolitan has invested $680 million to fund 85 recycled water projects and 27 groundwater recovery projects that have produced a cumulative total of about 4 million acre-feet.

Conservation Programs

Metropolitan's regional conservation programs and approaches have a long history. Decades ago, it was recognized that demand management would be an important part of balancing regional supplies and demands. By reducing the demand for water, water conservation efforts were seen as a way to reduce the need of imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area. The actual conservation of water takes place at the retail consumer level. Regional conservation approaches have proven to be effective at reaching retail consumers throughout the service area and successfully implementing water saving devices, programs, and practices. Regional investments in demand management programs, of which conservation is a key part along with local supply programs, benefit all member agencies regardless of project location. These programs help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on the district's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all system users.

Incentive-Based Conservation Programs

Conservation Credits Program

In 1988, Metropolitan's Board approved the Water Conservation Credits Program (Credits Program). The Credits Program is similar in concept to the Local Projects Program (LPP). The purpose of the Credits Program is to encourage local water agencies to implement effective water conservation projects through the use of financial incentives. The Credits Program provides financial assistance for water conservation projects that reduce demands on Metropolitan's imported water supplies and require Metropolitan's assistance to be financially feasible.

Initially, the Credits Program provided 50 percent of a member agency's program cost, up to a maximum of $75 per acre-foot of estimated water savings. The $75 Base Conservation Rate was established based Metropolitan's avoided cost of pumping SWP supplies. The Base Conservation Rate has been revisited by Metropolitan's Board and revised twice since 1988, from $75 to $154 per acre-foot in 1990 and from $154 to $195 per acre-foot in 2005.
In fiscal year 2019/20 Metropolitan processed more than 30,400 rebate applications totaling $18.9 million.

Member Agency Administered Program

Some agencies also have unique programs within their service areas that provide local rebates that may differ from Metropolitan's regional program. Metropolitan continues to support these local efforts through a member agency administered funding program that adheres to the same funding guidelines as the Credits Program. The Member Agency Administered Program allows member agencies to receive funding for local conservation efforts that supplement, but do not duplicate, the rebates offered through Metropolitan's regional rebate program.

Water Savings Incentive Program

There are numerous commercial entities and industries within Metropolitan's service area that pursue unique savings opportunities that do not fall within the general rebate programs that Metropolitan provides. In 2012, Metropolitan designed the Water Savings Incentive Program (WSIP) to target these unique commercial and industrial projects. In addition to rebates for devices, under this program, Metropolitan provides financial incentives to businesses and industries that created their own custom water efficiency projects. Qualifying custom projects can receive funding for permanent water efficiency changes that result in reduced potable demand.

Non-Incentive Conservation Programs

In addition to its incentive-based conservation programs, Metropolitan also undertakes additional efforts throughout its service area that help achieve water savings without the use of rebates. Metropolitan's non-incentive conservation efforts include:

- residential and professional water efficient landscape training classes
- water audits for large landscapes
- research, development and studies of new water saving technologies
- advertising and outreach campaigns
- community outreach and education programs
- advocacy for legislation, codes, and standards that lead to increased water savings

Current Status

Since 1990, Metropolitan has invested $824 million in conservation rebates that have resulted in a cumulative savings of 3.27 million acre-feet of water. These investments include $450 million in turf removal and other rebates during the last drought which resulted in 175 million square feet of lawn turf removed. During fiscal year 2019/20, 1.06 million acre-feet of water is estimated to have been conserved. This annual total includes Metropolitan's Conservation Credits Program, code-based conservation achieved through Metropolitan-sponsored legislation; building plumbing codes and ordinances; reduced consumption resulting from changes in water pricing; and pre-1990 device retrofits.

Rate Structure

Metropolitan's regional demand management programs and approaches have a long history. Decades ago, it was recognized that demand management would be an important part of balancing regional supplies and demands. Developing new local projects and increasing water conservation efforts were seen as ways to reduce the need of increased imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area, reducing infrastructure costs.

The actual production and use of local resources and conservation of water under Metropolitan's demand management programs takes place at the member agency or end-user level, meaning they produce or conserve water for their own use, and the water is not Metropolitan's. Metropolitan determined decades ago that regional investments in demand management—both conservation and local resource development—benefit all member agencies regardless of project location. These programs help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all system users.

Infeasibility of Accounting

The accounting of the regional investments that contribute to reducing Metropolitan's reliance on the Delta is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible at the individual member or sub-member agency level. As described above, the region (through Metropolitan) makes significant investments in resources and programs that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies (and their subagencies) through rates and charges. The relative contributions for a member agency may be able to be approximately quantified or estimated by proxy through relative water purchases, however making an estimate of any quantifiable savings in gallons or acre-feet is not feasible. Water purchases cannot, with any accuracy or precision, be tied to the actual projects or programs that deliver water to the collective member agencies and their subagencies. Additionally, using water purchases as a proxy for member agency and subagencies would result in projects and programs done outside of the Metropolitan incentive programs to be omitted and discounted. Accounting at the regional level allows for the incorporation of these local supplies and water use efficiency programs done by member agencies and subagencies in both the regional programs and their own specific local programs. Projects and programs each have different online dates, useful lives, production, incentive rates and contributions that cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within Metropolitan's service area. As shown above, despite that infeasibility, Metropolitan's members and their subagencies have together made substantial contributions to the region's reduced reliance.

C.7 2015 UWMP Appendix

The information contained in this Appendix C is also intended to be a new Appendix H attached to MWDOC's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). MWDOC provided notice of the availability of the draft 2020 UWMP (including this Appendix X which will also be a new Appendix X to its 2015 UWMP) and 2020 WSCP and the public hearing to consider adoption of both plans in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The public review drafts of the 2020 UWMP, Appendix X to the 2015 UWMP, and the 2020 WSCP were posted prominently on MWDOC's website, mwdoc.com. The notice of availability of the documents was sent to MWDOC's member agencies, as well as cities and counties in MWDOC's service area. In addition, a public notice advertising the public hearing was published in XXX Southern California newspapers on May X and X, 2021. Copies of: (1) the notification letter sent to the member agencies, cities, and county in MWDOC's service area, and (2) the notice published in the newspapers are included in the 2020 UWMP Appendix L. Thus, this Appendix C to MWDOC's 2020 UWMP, which will be adopted with MWDOC's 2020 UWMP, will also be recognized and treated as Appendix X to MWDOC's 2015 UWMP.

C.8 References

http://www.mwdh2o.com/WhoWeAre/Board/Board-Meeting/Board%20Archives/2017/12-Dec/Reports/064863458.pdf
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APPENDIX D

2017 Basin 8-1 Alternative

APPENDIX E

San Juan Basin Groundwater and Facilities Management Plan

arcadis.com

APPENDIX F

2020 Adaptive Pumping Management Plan Technical Memorandum

APPENDIX G

Amended Main San Gabriel Basin Judgment

APPENDIX H

2021 OC Water Demand Forecast for MWDOC and OCWD Technical Memorandum

APPENDIX I

MWDOC's 2020 Water Shortage Contingency Plan

Municipal Water District of Orange County

2020 Water Shortage Contingency Plan

DRAFT Document V1.0

April 1, 2021

2020 Water Shortage Contingency Plan

April 1, 2021

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Acronyms and Abbreviations

%	Percent
Act	Urban Water Management Planning Act
AF	Acre-Feet
AFY	Acre-Feet per Year
Annual Assessment	Annual Water Supply and Demand Assessment
BPP	Basin Production Percentage
cfs	cubic feet per second
CRA	Colorado River Aqueduct
CVP	Central Valley Project
CWC	California Water Code
DDW	Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DRA	Drought Risk Assessment
DVL	Diamond Valley Lake
DWR	California Department of Water Resources
EBSD	Emerald Bay Services District
EOCWD	East Orange County Water District
EOC	Emergency Operation Center
EOP	Emergency Operations Plan
ERP	Emergency Response Plan
ETWD	El Toro Water District
FVCSP	MWDOC Crossings Specific Plan
FY	Fiscal Year
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GSP	Groundwater Sustainability Plan
GSWC	Golden State Water Company
HMP	Hazard Mitigation Plan
IRP	Integrated Water Resource Plan
IRWD	Irvine Ranch Water District
LBCWD	Laguna Beach County Water District
M&I	Municipal and industrial
MAF	Million Acre-Feet
MCL	Maximum Contaminant Level
Mesa Water	Mesa Water District
MET	Metropolitan Water District of Southern California
Metropolitan Act	Metropolitan Water District Act
MGD	Million Gallons per Day
MNWD	Moulton Niguel Water District

MWDOC	Municipal Water District of Orange County
OC	Orange County
OC San	Orange County Sanitation District
OCWD	Orange County Water District
SCAB	South Coast Air Basin
SCWD	South Coast Water District
Serrano	Serrano Water District
SMWD	Santa Margarita Water District
sf	Square Foot
Supplier	Urban Water Supplier
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TCWD	Trabuco Canyon Water District
UWMP	Urban Water Management Plan
WEROC	Water Emergency Response Organization of Orange County
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management Plan
WUE	Water Use Efficiency
YLWD	Yorba Linda Water District

1 Introduction and WSCP Overview

The Water Shortage Contingency Plan is a strategic planning document designed to prepare for and respond to water shortages. This Water Shortage Contingency Plan (WSCP) complies with California Water Code (CWC) Section 10632, which requires that every urban water supplier shall prepare and adopt a WSCP as part of its Urban Water Management Plan (UWMP). This level of detailed planning and preparation is intended to help maintain reliable supplies and reduce the impacts of supply interruptions.

The WSCP is MWDOC's operating manual that is used to prevent catastrophic service disruptions through proactive, rather than reactive, management. 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 and land use growth, climate change, drought, and catastrophic events. This Plan provides a structured guide for MWDOC to deal with water shortages, incorporating prescriptive information and standardized action levels, along with implementation actions in the event of a catastrophic supply interruption. This way, if and when shortage conditions arise, MWDOC's governing body, its staff, and retail agencies can easily identify and efficiently implement pre-determined steps to manage a water shortage. 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.

The WSCP also describes MWDOC's procedures for conducting an Annual Water Supply and Demand Assessment (Annual Assessment) that is required by CWC Section 10632.1 and is to be submitted to the California Department of Water Resources (DWR) on or before July 1 of each year, or within 14 days of receiving final allocations from the State Water Project (SWP), whichever is later. MWDOC's 2020 WSCP is included as an appendix to its 2020 UWMP which will be submitted to DWR by July 1, 2021. However, this WSCP is created separately from MWDOC's 2020 UWMP and can be amended, as needed, without amending the UWMP. Furthermore, the CWC does not prohibit an urban water supplier from taking actions not specified in its WSCP, if needed, without having to formally amend its UWMP or WSCP.

1.1 Water Shortage Contingency Plan Requirements and Organization

The WSCP provides the steps and water shortage response actions to be taken in times of water shortage conditions. WSCP has prescriptive elements, such as: an analysis of water supply reliability; the water shortage response 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; reevaluation and improvement procedures for evaluating the WSCP.

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

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

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

Section 3 Water Shortage Contingency Plan

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 percent 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 is not required by wholesale water providers.

Section 3.7 Legal Authorities is a description of the legal authorities that enable MWDOC 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 is not required by wholesale water providers.

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

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

1.2 Integration with Other Planning Efforts

As a retail water supplier in Orange County (OC), MWDOC considered other key entities in the development of this WSCP, including the Metropolitan Water District of Southern California (MET) (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), and OCWD (OC Groundwater Basin manager and provider of recycled water in North OC). As a wholesale water provider, MWDOC also worked with its retail agencies to align WSCP strategies to ensure robust water shortage planning and response across the District. The DWR Submittal tables for MWDOC's WSCP can be found in Appendix A.

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

- **MWDOC's 2020 UWMP** provides the basis for the projections of the imported supply availability over the next 25 years for MWDOC's service area.

- **MWDOC's Orange County Reliability Study** provides the basis for water demand projections for MWDOC's member agencies as well as Anaheim, Fullerton, and Santa Ana.
- **MET's 2020 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.
- **OCWD's 2021 Water Reliability Plan** provides the latest information on groundwater management and supply projection for the OC Groundwater Basin, the primary source of groundwater for a significant number of water suppliers in OC.
- **OCWD's 2018-19 Engineer's Report** provides information on the groundwater conditions and basin utilization of the OC Groundwater Basin.
- **OCWD's 2017 Basin 8-1 Alternative Plan i**s an alternative to the Groundwater Sustainability Plan (GSP) for the OC Groundwater Basin and provides significant information related to sustainable management of the basin in the past and hydrogeology of the basin, including groundwater quality and basin characteristics.
- **2020 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 a comprehensive service review of the municipal services provided by MWDOC.
- **Water Master Plan and Sewer Master Plan** of MWDOC provide information on water infrastructure planning projects and plans to address any required water system improvements.
- **Groundwater Management Plans** provide the groundwater sustainability goals for the basins in the MWDOC's service area and the programs, actions, and strategies activities that support those goals.

2 Background Information

MWDOC was formed by OC voters in 1951 under the Municipal Water District Act of 1911 to provide imported water to inland areas of OC. Governed by an elected seven-member Board of Directors, MWDOC is MET's third largest member agency based on assessed valuation.

MWDOC is a regional water wholesaler and resource planning agency, managing all of OC's imported water supply except for water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC is committed to ensuring water reliability for more than 2.34 million residents in its 600-square-mile service area. To that end, MWDOC focuses on sound planning and appropriate investments in water supply, water use efficiency, regional delivery infrastructure, and emergency preparedness.

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, MWDOC's service area in the North OC is almost built out with predominantly residential units with pockets dedicated to commercial, institutional, governmental uses and open space and parks and the existing vacant lots in South OC are gradually transitioning to residential and commercial mixed-use areas. The current population of 2,342,740 is projected to increase by 8% over the next 25 years.

MWDOC is governed by an elected seven-member Board of Directors, with each board member representing a specific area of the County and elected to a four-year term by voters who reside within that part of the MWDOC service area. Each director is a member of at least one of the following standing committees: Planning and Operations; Administration and Finance; and Executive.

2.1 MWDOC Service Area

MWDOC serves more than 2.34 million residents in a 600-square-mile service area (Figure 2-1). Although MWDOC does not have its own water facilities and does not have jurisdiction over local supplies, it works to ensure the delivery of reliable water supplies to the region.

MWDOC serves imported water in OC to 28 water agencies. These entities, comprised of cities and water districts, are referred to as MWDOC member agencies and provide water to approximately 2.34 million customers. MWDOC retail agencies include:

- City of Brea
- City of Buena Park
- City of Fountain Valley
- City of Garden Grove
- City of Huntington Beach
- City of La Habra
- City of La Palma
- City of Newport Beach
- City of Orange
- East Orange County Water District (EOCWD)
- El Toro Water District (ETWD)
- Emerald Bay Services District (EBSD)
- Irvine Ranch Water District (IRWD)
- Golden State Water Company (GSWC)
- Laguna Beach County Water District (LBCWD)
- Mesa Water District (Mesa Water)
- Moulton Niguel Water District (MNWD)
- Orange County Water District (OCWD)

- City of San Clemente
- City of San Juan Capistrano
- City of Seal Beach
- City of Tustin
- City of Westminster
- Santa Margarita Water District (SMWD)
- Serrano Water District (Serrano)
- South Coast Water District (SCWD)
- Trabuco Canyon Water District (TCWD)
- Yorba Linda Water District (YLWD)

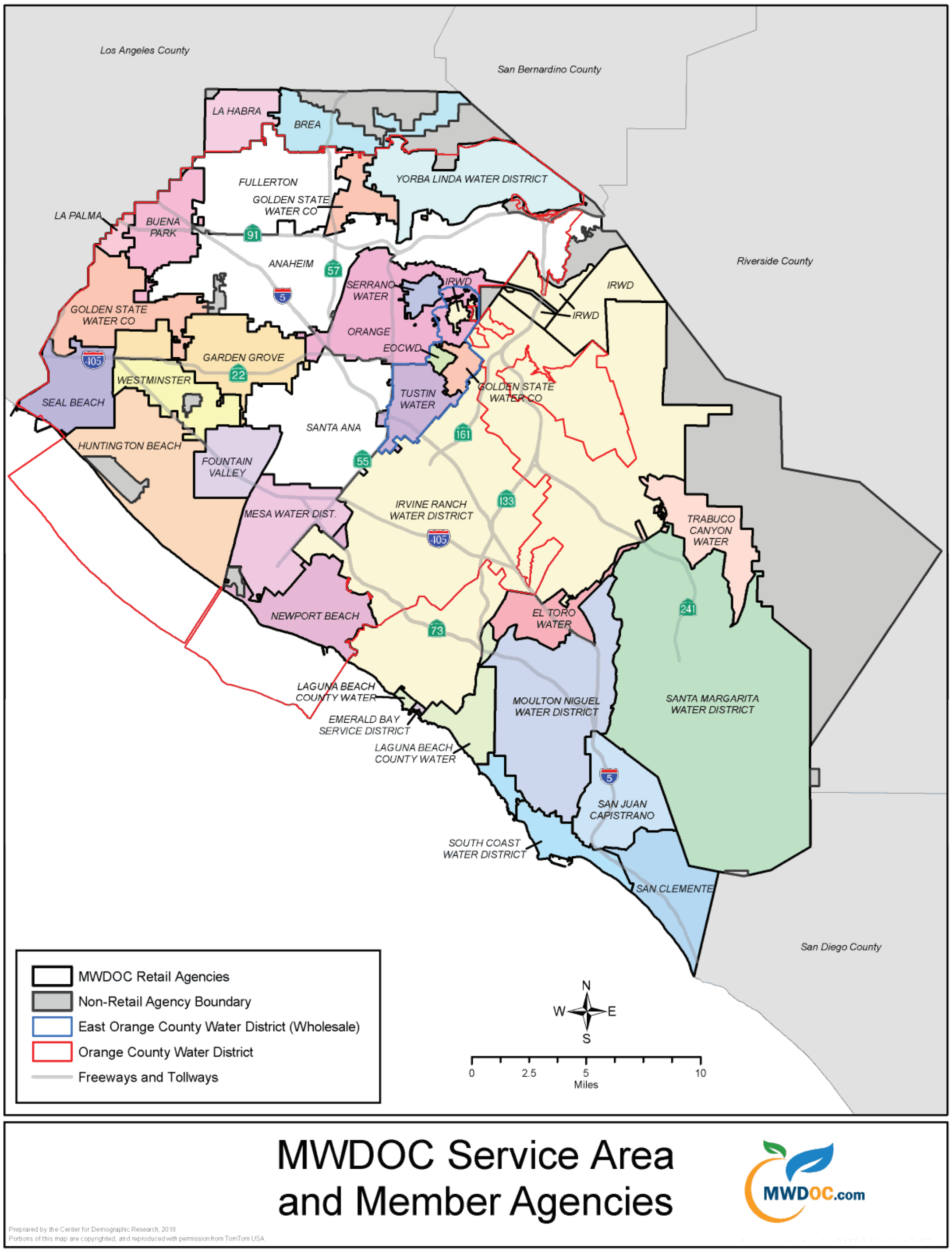

Figure 2-1: MWDOC Service Area

2.2 Relationship to MET

MWDOC became a member agency of MET in 1951 to bring supplemental imported water supplies to parts of Orange County. MET is the largest water wholesaler for domestic and municipal uses in California, serving approximately 19 million customers. MET wholesales imported water supplies to 26 member cities and water districts in six southern California counties. Its service area covers the southern California coastal plain, extending approximately 200 miles along the Pacific Ocean from the City of Oxnard in the north to the international boundary with Mexico in the south. This encompasses 5,200 square miles and includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. The regional locations of MET's member agencies are shown in Figure 2-2. Approximately 85% of the population from the aforementioned counties reside within MET's boundaries.

MET is governed by a Board of Directors comprised of 38 appointed individuals with a minimum of one representative from each of MET's 26 member agencies. The allocation of directors and voting rights are determined by each agency's assessed valuation. Each member of the Board shall be entitled to cast one vote for each ten million dollars ($10,000,000) of assessed valuation of property taxable for district purposes, in accordance with Section 55 of the Metropolitan Water District Act (Metropolitan Act). Directors can be appointed through the chief executive officer of the member agency or by a majority vote of the governing board of the agency. Directors are not compensated by MET for their service.

MET is responsible for importing water into the region through its operation of the Colorado River Aqueduct (CRA) and its contract with the State of California for SWP supplies. Member agencies receive water from MET through various delivery points and pay for service through a rate structure made up of volumetric rates, capacity charges and readiness to serve charges. Member agencies provide estimates of imported water demand to MET annually in April regarding the amount of water they anticipate they will need to meet their demands for the next five years.

In Orange County, MWDOC and the cities of Anaheim, Fullerton, and Santa Ana are MET member agencies that purchase imported water directly from MET. Furthermore, MWDOC purchases both treated potable and untreated water from MET to supplement its retail agencies' local supplies.

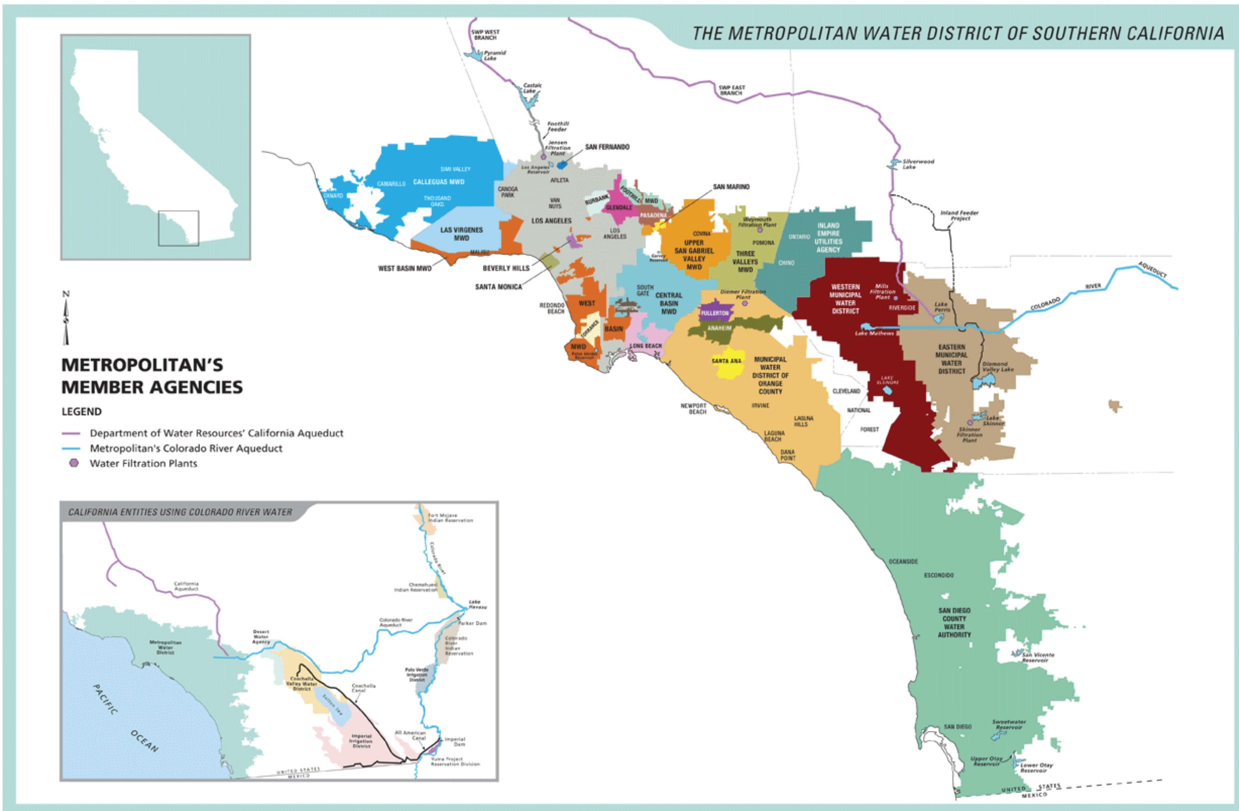

Figure 2-2: Regional Location of MET's Member Agencies

2.3 Relationship with MET Water Shortage Planning

The WSCP is designed to be consistent with MET's Water Shortage and Demand Management (WSDM) Plan, MET's Water Supply Allocation Plan (MET WSAP), MWDOC's Water Supply Allocation Plan (WSAP), and other emergency planning efforts as described below. MET and MWDOC's WSAPs are integral to the WSCP's shortage response strategy. In the event that MET determines that supply augmentation (including dedicated drought storage supply) and demand reduction measures would not be sufficient to meet a projected supply needs, MET will determine shortage conditions exist and assign a water shortage level needed to meet MWDOC service area reduced demands. In turn, MWDOC will need to further assess the shortage conditions within their service area to meet Retailer agencies' demands and as required activate MWDOC's WSAP. If applicable, MWDOC will also need to need invoke water shortage level conditions appropriate to meet projected Retailer demands as described further in Section 2.3.3 below.

2.3.1 MET Water Surplus and Drought Management Plan

MET evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage annually. Each stage is associated with specific resource management actions to avoid extreme shortages to the extent possible and minimize adverse impacts to retail customers should an extreme shortage occur. The sequencing outlined in the WSDM Plan reflects anticipated responses towards MET's existing and expected resource mix.

Surplus stages occur when net annual deliveries can be made to water storage programs. Under the WSDM Plan, there are four surplus management stages that provides a framework for actions to take for surplus supplies. Deliveries in Diamond Valley Lake (DVL) and in SWP terminal reservoirs continue through each surplus stage provided there is available storage capacity. Withdrawals from DVL for regulatory purposes or to meet seasonal demands may occur in any stage.

The WSDM Plan distinguishes between shortages, severe shortages, and extreme shortages.
The differences between each term are listed below.

- Shortage: MET can meet full-service demands and partially meet or fully meet interruptible demands using stored water or water transfers, as necessary.
- Severe Shortage: MET can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation.
- Extreme Shortage: MET must allocate available supply to full-service customers.

There are six shortage management stages to guide resource management activities. These stages are defined by shortfalls in imported supply and water balances in MET's storage programs. When MET must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Figure 2-3 gives a summary of actions under each surplus and shortage stages when an allocation plan is necessary to enforce mandatory cutbacks. The goal of the WSDM plan is to avoid Stage 6, an extreme shortage (MET, 1999).

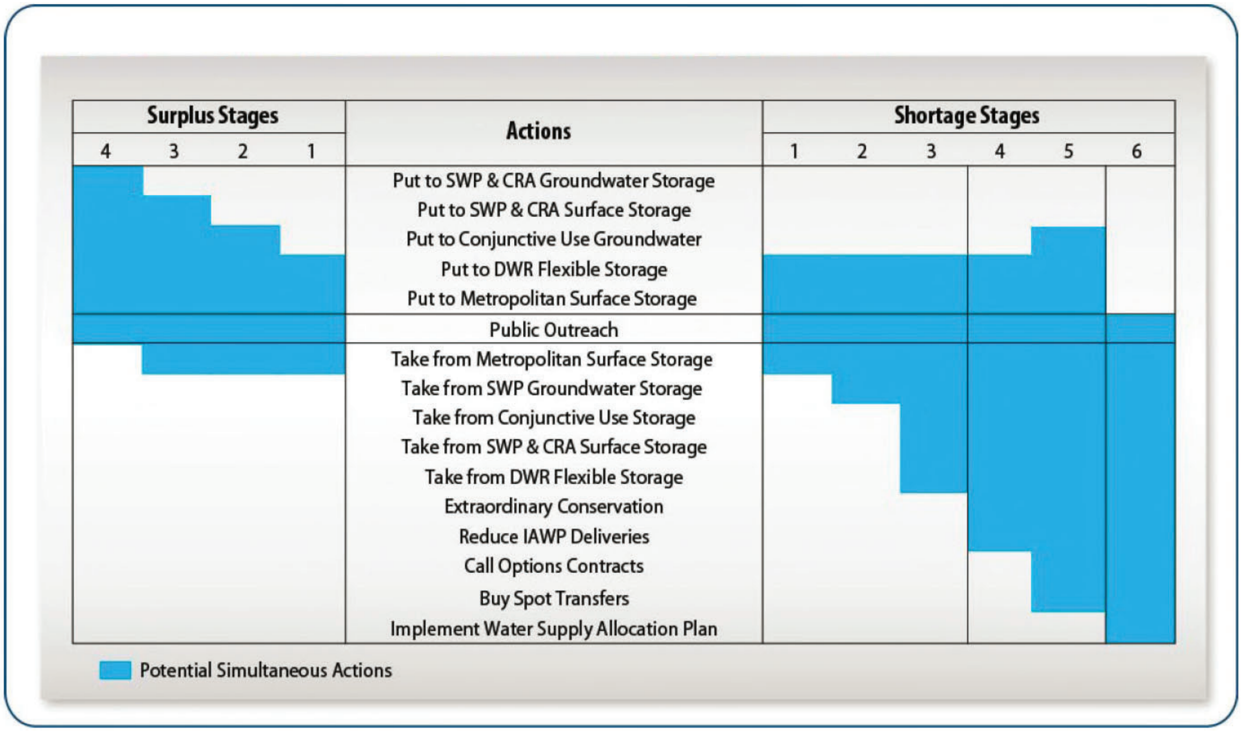

Figure 2-3: Resource Stages, Anticipated Actions, and Supply Declarations

MET's Board of Directors adopted a Water Supply Condition Framework in June 2008 in order to communicate the urgency of the region's water supply situation and the need for further water conservation practices. The framework has four conditions, each calling increasing levels of conservation. Descriptions for each of the four conditions are listed below:

- Baseline Water Use Efficiency: Ongoing conservation, outreach, and recycling programs to achieve permanent reductions in water use and build storage reserves.
- Condition 1 Water Supply Watch: Local agency voluntary dry-year conservation measures and use of regional storage reserves.
- Condition 2 Water Supply Alert: Regional call for cities, counties, member agencies, and retail water agencies to implement extraordinary conservation through drought ordinances and other measures to mitigate use of storage reserves.
- Condition 3 Water Supply Allocation: Implement MET's WSAP.

As noted in Condition 3, should supplies become limited to the point where imported water demands cannot be met, MET will allocate water through the WSAP (MET, 2021a2021).

2.3.2 MET Water Supply Allocation Plan

MET's imported supplies have been impacted by a number of water supply challenges as noted earlier. In case of extreme water shortage within the MET service area is the implementation of its WSAP.

MET's Board of Directors adopted the WSAP in February 2008 to fairly distribute a limited amount of water supply and applies it through a detailed methodology to reflect a range of local conditions and needs of the region's retail water consumers.

The WSAP includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering an allocation. MET's WSAP is the foundation for the urban water shortage contingency analysis required under CWC Section 10632 and is part of MET's 2015 UWMP.

MET's WSAP was developed in consideration of the principles and guidelines in MET's 1999 WSDM Plan with the core objective of creating an equitable "needs-based allocation". The WSAP's formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of MET supplies of up to 50%. The formula takes into account a number of factors, such as the impact on retail customers, growth in population, changes in supply conditions, investments in local resources, demand hardening aspects of water conservation savings, recycled water, extraordinary storage and transfer actions, and groundwater imported water needs.

The formula is calculated in three steps: 1) based period calculations, 2) allocation year calculations, and 3) supply allocation calculations. The first two steps involve standard computations, while the third step contains specific methodology developed for the WSAP.

Step 1: Base Period Calculations – The first step in calculating a member agency's water supply allocation is to estimate their water supply and demand using a historical based period with established water supply and delivery data. The base period for each of the different categories of supply and demand is calculated using data from the two most recent non-shortage years.

Step 2: Allocation Year Calculations – The next step in calculating the member agency's water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population growth and changes in local supplies.

Step 3: Supply Allocation Calculations – The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2.

In order to implement the WSAP, MET's Board of Directors makes a determination on the level of the regional shortage, based on specific criteria, typically in April. The criteria used by MET includes, current levels of storage, estimated water supplies conditions, and projected imported water demands. The allocations, if deemed necessary, go into effect in July of the same year and remain in effect for a 12-month period. The schedule is made at the discretion of the Board of Directors.

Although MET's 2020 UWMP forecasts that MET will be able to meet projected imported demands throughout the projected period from 2025 to 2045, uncertainty in supply conditions can result in MET needing to implement its WSAP to preserve dry-year storage and curtail demands (MET, 2021b2021).

2.3.3 MWDOC Water Supply Allocation Plan

To prepare for the potential allocation of imported water supplies from MET, MWDOC worked collaboratively with its 28 retail agencies to develop its own WSAP that was adopted in January 2009 and amended in 2015. The MWDOC WSAP outlines how MWDOC will determine and implement each of its retail agencies' allocation during a time of shortage.

The MWDOC WSAP uses a similar method and approach, when reasonable, as that of the MET's WSAP. However, MWDOC's plan remains flexible to use an alternative approach when MET's method produces a significant unintended result for the member agencies. The MWDOC WSAP model follows five basic steps to determine a retail agency's imported supply allocation.

Step 1: Determine Baseline Information – The first step in calculating a water supply allocation is to estimate water supply and demand using a historical based period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the last two non-shortage years.

Step 2: Establish Allocation Year Information – In this step, the model adjusts for each retail agency's water need in the allocation year. This is done by adjusting the base period estimates for increased retail water demand based on population growth and changes in local supplies.

Step 3: Calculate Initial Minimum Allocation Based on MET's Declared Shortage Level – This step sets the initial water supply allocation for each retail agency. After a regional shortage level is established, MWDOC will calculate the initial allocation as a percentage of adjusted Base Period Imported water needs within the model for each retail agency.

Step 4: Apply Allocation Adjustments and Credits in the Areas of Retail Impacts and Conservation– In this step, the model assigns additional water to address disparate impacts at the retail level caused by an across-the-board cut of imported supplies. It also applies a conservation credit given to those agencies that have achieved additional water savings at the retail level as a result of successful implementation of water conservation devices, programs and rate structures.

Step 5: Sum Total Allocations and Determine Retail Reliability – This is the final step in calculating a retail agency's total allocation for imported supplies. The model sums an agency's total imported allocation with all of the adjustments and credits and then calculates each agency's retail reliability compared to its Allocation Year Retail Demand.

The MWDOC WSAP includes additional measures for plan implementation, including the following:

- **Appeal Process** – An appeals process to provide retail agencies the opportunity to request a change to their allocation based on new or corrected information. MWDOC anticipates that under most circumstances, a retail agency's appeal will be the basis for an appeal to MET by MWDOC.
- **Melded Allocation Surcharge Structure** – At the end of the allocation year, MWDOC would only charge an allocation surcharge to each retail agency that exceeded their allocation if MWDOC exceeds its total allocation and is required to pay a surcharge to MET. MET enforces allocations to retail agencies through an allocation surcharge to a retail agency that exceeds its total annual allocation at the end of the 12-month allocation period. MWDOC's surcharge would be assessed according to the retail agency's prorated share (AF over usage) of MWDOC amount with MET. Surcharge funds collected by MET will be invested in its Water Management Fund, which is used to in part to fund expenditures in dry-year conservation and local resource development.
- **Tracking and Reporting Water Usage** – MWDOC will provide each retail agency with water use monthly reports that will compare each retail agency's current cumulative retail usage to their

allocation baseline. MWDOC will also provide quarterly reports on its cumulative retail usage versus its allocation baseline.

- **Timeline and Option to Revisit the Plan** – The allocation period will cover 12 consecutive months and the Regional Shortage Level will be set for the entire allocation period. MWDOC only anticipates calling for allocation when MET declares a shortage; and no later than 30 days from MET's declaration will MWDOC announce allocation to its retail agencies.

3 Water Shortage Contingency Planning

MWDOC's WSCP is a detailed guide of how MWDOC intends to act in the case of an actual water shortage condition. The WSCP anticipates a water supply shortage and provides pre-planned guidance for managing and mitigating a shortage. Regardless of the reason for the shortage, 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.

3.1 Water Supply Reliability Analysis

Per CWC Section 10632 (a)(1), the WSCP shall provide an analysis of water supply reliability conducted pursuant to CWC Section 10635, and the key issues that may create a shortage condition when looking at MWDOC's water asset portfolio.

Understanding water supply reliability, factors that could contribute to water supply constraints, availability of alternative supplies, and what effect these have on meeting customer demands provides MWDOC with a solid basis on which to develop appropriate and feasible response actions in the event of a water shortage. In the 2020 UWMP, MWDOC conducted a Water Reliability Assessment to compare the total water supply sources available to the water supplier with long-term projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years.

MWDOC also conducted a Drought Risk Assessment (DRA) to evaluate a drought period that lasts five consecutive water years starting from the year following when the assessment is conducted. An analysis of both assessments determined that MWDOC is capable of meeting all of its member agencies' demands from 2021 through 2045 for a normal year, a single dry year, and a drought lasting five consecutive dry years with significant supplemental dedicated drought supplies from MET and ongoing conservation program efforts from its member agencies. MET's projections take into account the imported demands from Orange County and as so, MET's water reliability assessments determine that demands within MWDOC can be met, and the development of numerous local sources further augments the reliability of the imported water system. As a result, there is no projected shortage condition due to drought that will trigger agency demand reductions until MET notifies MWDOC of its implementation of its WSAP. More information is available in MWDOC's 2020 UWMP Section 6 and 7.

3.2 Annual Water Supply and Demand Assessment Procedures

Per CWC Section 10632.1, MWDOC will conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and by July 1st of each year, beginning in 2022, submit an annual water shortage assessment with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan.

MWDOC must include in its WSCP the procedures used for conducting an Annual Assessment. The Annual Assessment is a determination of the near-term outlook for supplies and demands and how a perceived shortage may relate to WSCP shortage stage response actions in the current calendar year. This determination is based on information available to MWDOC at the time of the analysis. Starting in 2022, the Annual Assessment will be due by July 1 of every year.

This section documents the decision-making process required for formal approval of MWDOC's Annual Assessment determination of water supply reliability each year and the key data inputs and the methodologies used to evaluate the water system reliability for the coming year, while considering that the year to follow would be considered dry.

3.2.1 Decision-Making Process

The following decision-making process describes the functional steps that MWDOC will take to formally approve the Annual Assessment determination of water supply reliability each year.

3.2.1.1 MWDOC Steps to Approve the Annual Assessment Determination

The MWDOC Annual Assessment will be predicated on MET's WSDM supply demand tracking, which is reported monthly to their Board of Directors. MET WSDM planning involves the examination of developing demand and supply conditions for the calendar year, as well as considerations of potential actions consistent with the WSDM Plan. Additionally, MWDOC staff simultaneously provides water supplies and demand reports to its Board of Directors to inform them of emerging demand and supply conditions. These monthly analyses provide key information for MWDOC and MET to manage resources to meet a range of estimated demands and adjust to changing conditions throughout the year.

For many of MWDOC's member agencies, their primary source of water is produced locally from groundwater basins, recycle water projects, surface reservoirs, and groundwater recovery projects. Their remaining source to meet retail demands comes from the purchase of imported water from MWDOC. However, some member agencies, particularly in South Orange County, rely heavily on imported water due to limited local supplies. As described below, MWDOC surveys each member agency to project near term and long-term consumptive and replenishment imported water demands.

Annually, MWDOC surveys its member agencies for anticipated water demands and supplies for the upcoming year. MWDOC utilizes this information to plan for the anticipated imported water supplies for the MWDOC service area. This information is then shared and coordinated with MET and is incorporated into their analysis of their service area's annual imported water needs. Based on the year's supply conditions and WSDM actions, MET will present a completed Annual Assessment for its member agencies' review from which they will then seek Board approval in April of each year. Additionally, MET expects that any triggers or specific shortage response actions that result from the Annual Assessment would be approved by their Board at that time. Based upon MET's Assessment and taking into consideration information provided to MWDOC through the annual survey, MWDOC will provide each member agency an anticipated estimate of imported supplies by member agency to be incorporated into each agency's annual supply and demand assessment. MWDOC will then adopt its completed Annual Assessment prior to the July 1 deadline, so MWDOC's member agencies will be able to submit their annual assessment by the July 1 DWR deadline. Figure 3-1 provides a breakdown of the decision-making process.

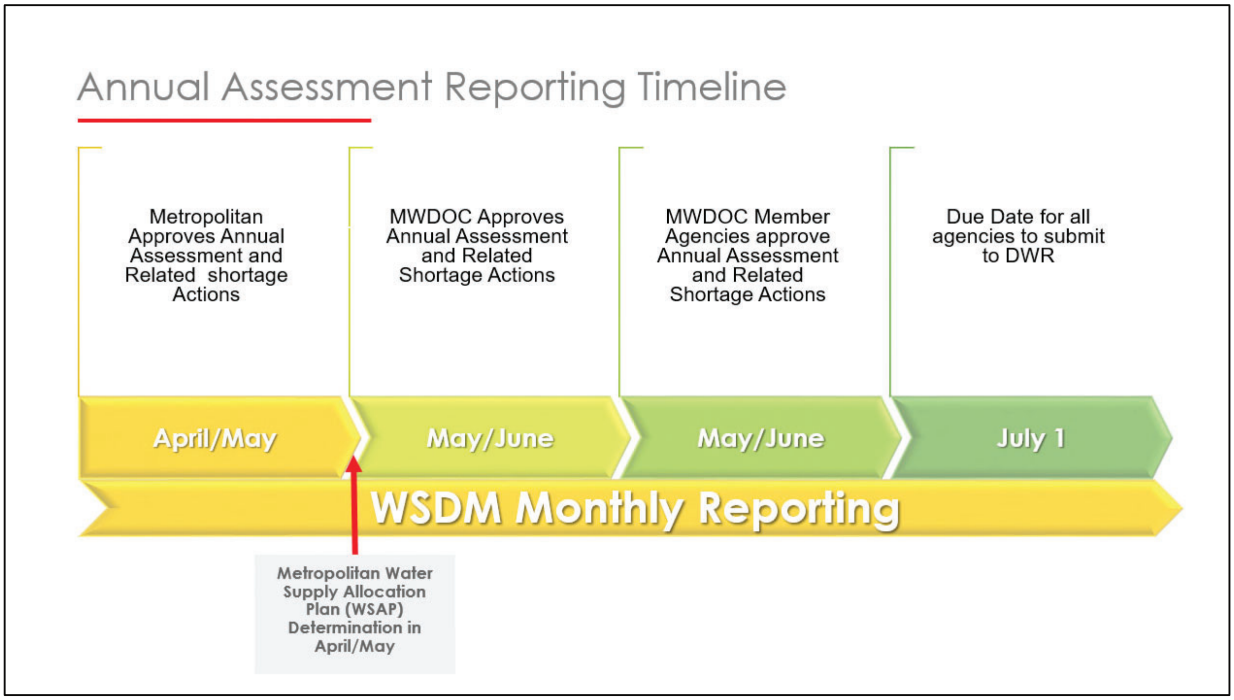

Figure 3-1: Sample Annual Assessment Reporting Timeline

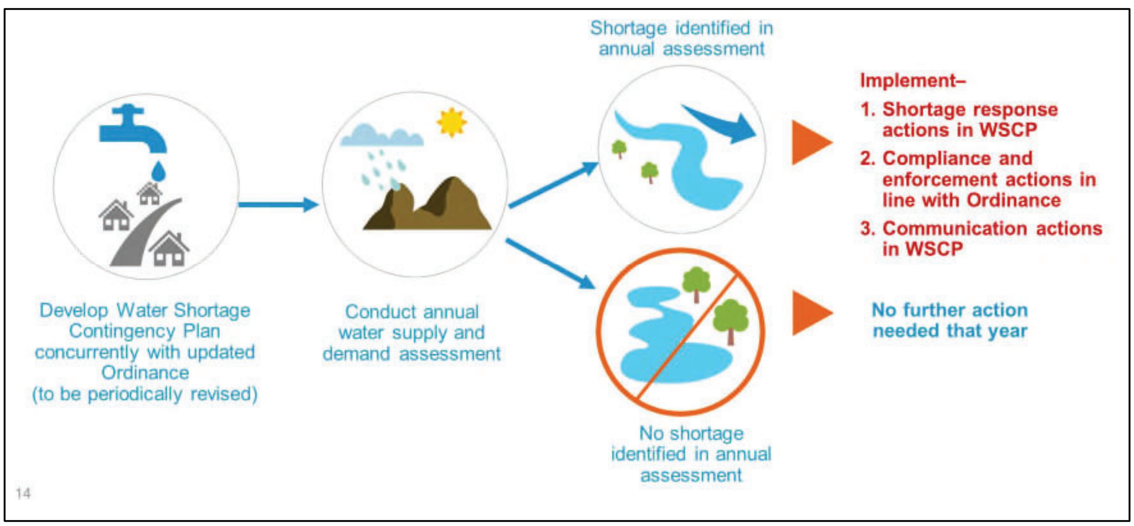

Figure 3-2: Water Shortage Contingency Plan Actions

3.2.2 Data and Methodologies

The following paragraphs document the key data inputs and methodologies that are used to evaluate MWDOC's water system reliability for the coming year, while considering that the year to follow would be considered dry.

3.2.2.1 Assessment Methodology

MWDOC will evaluate water supply reliability for the current year and one dry year for the purpose of the Annual Assessment. The Annual Assessment determination will be based on considerations of unconstrained water demand, local water supplies, MET imported water supplies, planned water use, and infrastructure considerations. The balance between projected in-service area supplies, coupled with MET imported supplies, and anticipated unconstrained demand will be used to determine what, if any, shortage stage is expected under the WSCP framework. The WSCP's standard shortage stages are defined in terms of shortage percentages. Shortage percentages will be calculated by dividing the difference between water supplies and unconstrained demand by total unconstrained demand. This calculation will be performed separately for anticipated current year conditions and for assumed dry year conditions.

3.2.2.2 Locally Applicable Evaluation Criteria

The information and analyses that comprise the Annual Assessment are based on ongoing planning processes that include the monthly WSDM supply-demand reporting. The Annual Assessment represents a mid-year evaluation at a given point in time; even after formal approval and submittal of the Annual Assessment determination by July 1, MWDOC will continue to monitor emerging supply and demand conditions and take appropriate actions consistent with the flexibility and adaptiveness inherent to the Water Shortage Contingency Plan. Some conditions that affect MWDOC's wholesale supply and demand, such as groundwater replenishment, surface water and local supply production, can differ significantly from earlier projections throughout the year.

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 have the ability to meet a majority of their demands through groundwater with very little limitation, except for the OCWD Basin Production 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 damage 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, 2021b).

3.2.2.3 Water Supply

MWDOC is the regional wholesaler of imported water that provides treated and untreated water purchased from MET for Municipal and Industrial (M&I) (direct) and non-M&I (indirect) uses within its service area. Imported water represents 35% of total water supply in MWDOC's service area. As detailed in MWDOC's 2020 UWMP, water supplies within MWDOC's service area are from local and imported sources. Local supplies developed by other entities and retail agencies include groundwater, recycled water, and surface water, accounting for 65% of the service area's water supplies. In North Orange County, imported water from MWDOC is supplemental, as agencies can pump a significant amount of their water demand from the OC Basin as set by the BPP; however, member agencies in South Orange County rely more heavily on imported water due to limited local resources.

3.2.2.4 Unconstrained Customer Demand

The WSCP and Annual Assessment define unconstrained demand as expected water use prior to any projected shortage response actions that may be taken under the WSCP. Unconstrained demand is distinguished from observed demand, which may be constrained by preceding, ongoing, or future actions, such as emergency supply allocations during a multi-year drought. WSCP shortage response actions to constrain demand are inherently extraordinary; routine activities such as ongoing conservation programs and regular operational adjustments are not considered as constraints on demands.

MWDOC's DRA reveals that its supply capabilities are expected to balance anticipated total water use and supply, assuming a five-year consecutive drought with a six percent increase in potable water demand above a normal year from 2021 through 2045. MWDOC purchases a fixed amount of untreated imported water from MET for use in groundwater recharge for the OC Basin and surface storage in Irvine Lake, which accounts for its non-potable demand that does not experience a six percent increase in demand, as these volumes are not affected by changes in hydrological conditions. MWDOC purchases a fixed amount of untreated imported water from MET for use in groundwater recharge for the OC Basin and surface storage in Irvine Lake, which accounts for its non-potable demand that does not experience a six percent increase in demand, as these volumes are not directly affected by changes in hydrological conditions.

3.2.2.5 Planned Water Use for Current Year Considering Dry Subsequent Year

CWC Section 10632(a)(2)(B)(ii) requires the Annual Assessment to determine "current year available supply, considering hydrological and regulatory conditions in the current year and one dry year."

The Annual Assessment will include two separate estimates of MWDOC's annual water supply and unconstrained demand using: 1) current year conditions, and 2) assumed dry year conditions. Accordingly, the Annual Assessment's shortage analysis will present separate sets of findings for the current year and dry year scenarios. The CWC does not specify the characteristics of a dry year, allowing discretion to the Supplier. MWDOC will use its discretion to refine and update its assumptions for a dry year scenario in each Annual Assessment as information becomes available and in accordance with best management practices.

In MWDOC's 2020 UWMP, the "single dry year" is characterized to resemble conditions as a year in which conditions reflect the lowest water supply available to the Supplier. Supply and demand analyses for the single-dry year case was based on conditions affecting the SWP as this supply availability fluctuates the most among MET's, and therefore MWDOC's, sources of supply. Fiscal Year 2013-14 was the single driest year for SWP supplies with an allocation of 5% to M&I uses. Unique to this year, the 5% SWP allocation was later reduced to 0%, before ending up at its final allocation of 5%, highlight the stressed water supplies for the year. Furthermore, on January 17, 2014 Governor Brown declared the drought State of Emergency, citing 2014 as the driest year in California history. Additionally, within MWDOC's service area, precipitation for FY 2013-14 was the second lowest on record, with 4.37 inches of rain, significantly impacting water demands.

3.2.2.6 Infrastructure Considerations

With the sale of the Allen-McColloch Pipeline to MET in 1995, MWDOC no longer owns or operates a distribution system. However, as the regional wholesale agency, MWDOC closely coordinates with MET and its member agencies on any planned infrastructure work that may impact water supply availability. The Annual Assessment will include consideration of any infrastructure issues that may pertain to near-term water supply reliability, including repairs, construction, and environmental mitigation measures that may temporarily constrain capabilities, as well as any new projects that may add to system capacity. Throughout each year, MET regularly carries out preventive and corrective maintenance of its facilities within the MWDOC service area that may require shutdowns. MET plans and performs shutdowns to inspect and repair pipelines and facilities and support capital improvement projects. These shutdowns involve a high level of planning and coordination between MWDOC, MWDOC's Member Agencies, and MET. These shutdowns are scheduled to ensure that major portions of the distribution system are not out of service at the same time. Operational flexibility within MET's system and the cooperation of member agencies allow shutdowns to be successfully completed while continuing to meet all system demands.

Table 3-1: Water Shortage Contingency Plan Levels

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description)*
0	0% (Normal)	A Level 0 Water Supply Shortage –Condition exists when MWDOC notifies its water users that no supply reductions are anticipated in this year. MWDOC proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local MWDOC goals for water supply reliability.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when no supply reductions are anticipated, a consumer imported demand reduction of up to 10% is recommended to make more efficient use of water and respond to existing water conditions. Upon the declaration of a Water Aware condition, MWDOC shall implement the mandatory Level 1 conservation measures identified in this WSCP. The type of event that may prompt MWDOC to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider (MET) calls for extraordinary water conservation efforts.
2	Up to 20%	A Level 2 Water Supply Shortage – Condition exists when MWDOC notifies its member agencies that due to drought or other supply reductions, a consumer imported 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, MWDOC shall implement the mandatory Level 2 conservation measures identified in this WSCP.

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
3	Up to 30%	A Level 3 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 30% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
4	Up to 40%	A Level 4 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 40% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
5	Up to 50%	A Level 5 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
6	>50%	A Level 6 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that greater than 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation, and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
NOTES:		

3.3 Six Standard Water Shortage Levels

Per CWC Section 10632 (a)(3)(A), MWDOC must include the six standard water shortage levels that represent shortages from the normal reliability as determined in the Annual Assessment. The shortage levels have been standardized to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. This is an outgrowth of the severe statewide drought of 2012-2016, and the widely recognized public communication and state policy uncertainty associated with the many different local definitions of water shortage Levels.

The six standard water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10%, 20%, 30%, 40%, 50%, and greater than 50% shortage compared to the normal reliability condition) and align with the response actions MWDOC would implement to meet the severity of the impending shortages.

3.4 Shortage Response Actions

CWC Section 10632 (a)(4) requires the WSCP to specify shortage response actions that align with the defined shortage levels. MWDOC has defined specific shortage response actions that align with the defined shortage levels in DWR Tables 8-2 and 8-3 (Appendix A). These shortage response actions were developed with consideration to the system infrastructure and operations changes, supply augmentation responses, customer-class or water use-specific demand reduction initiatives, and increasingly stringent water use prohibitions.

3.4.1 Demand Reduction

The demand reduction measures that would be implemented to address shortage levels are described in DWR Table 8-2 (Appendix A). This table indicates which actions align with specific defined shortage levels and 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. This table also identifies the enforcement action, if any, associated with each demand reduction measure.

MWDOC's demand reduction actions correspond to shortage Levels 0 through 6, with coordination with the Water Emergency Response Organization of Orange County (WEROC) anticipated to begin at Level 4 or greater. At Level 0, MWDOC has ongoing long-term conservation savings measures including providing rebates for landscape irrigation efficiency, plumbing fixtures and devices, and turf replacement and providing programmatic support to retail agencies to reduce system water loss. For Shortage Levels 1 through 6, MWDOC will continuously expand public awareness campaigns to encourage consumers to reduce their water usage and implement voluntary demand reduction and its WSAP to further reduce the imported water shortage gap at each level, reaching up to greater than 50% of the shortage gap at Level 6.

3.4.2 Supply Augmentation

Supply Augmentation actions represent short-term management objectives triggered by the MET's WSDM Plan and do not overlap with the long-term new water supply development or supply reliability enhancement projects. Supply Augmentation is made available to MWDOC through MET. MWDOC relies on MET's reliability portfolio of water supply programs including existing water transfers, storage, and exchange agreements to supplement gaps in the supply/demand balance. MET has developed significant storage capacity (over 5 MAF) in reservoirs and groundwater banking programs both within and outside of the Southern California region. Additionally, MET can pursue additional water transfer and exchange programs with other water agencies to help mitigate supply/demand imbalances and provide additional dry-year supply sources.

MWDOC will work in close coordination with MET on their supply augmentation projects during normal conditions and shortage Levels 1 through 6 to ensure reliability of imported water for the service area. MWDOC's supply augmentation actions are described in DWR Table 8-3 (Appendix A).

3.4.3 Operational Changes

During shortage conditions, water operations in Orange County may be affected depending on the specific condition or situation. As noted in section 3.2.2.6, MWDOC does not own any infrastructure, nor does it direct the operations of infrastructure in Orange County. MWDOC will coordinate and facilitate operational changes that may result from shortage conditions or arise from an emergency situation.

3.4.4 Additional Mandatory Restrictions

CWC Section 10632(a)(4)(D) calls for "additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions" to be included among the WSCP's shortage response actions. These prohibitions are in addition to the proposed State Board regulation in California Code of Regulations, title 23, division 3, a new chapter 3.5 on Conservation and the Prevention of Waste and Unreasonable Use; and within chapter 3.5, a new article 2 pertaining to Wasteful and Unreasonable Uses. Mandatory prohibitions include:

- Hosing off sidewalks, driveways, and other hardscapes;
- Washing automobiles with hoses not equipped with a shut-off nozzle;
- Using non-recirculated water in a fountain of other decorative water feature;
- Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation;
- Irrigating ornamental turf on public street medians.

MWDOC currently does not have any additional restrictions above the Statewide Mandatory prohibitions. However, State law gives substantial discretion to wholesale and retail water agencies to promulgate regulations and restrictions to conserve and allocate water in the event of a water shortage.

3.4.5 Emergency Response Plan (Hazard Mitigation Plan)

A catastrophic water shortage would be addressed according to the appropriate water shortage level and response actions. It is likely that a catastrophic shortage would immediately trigger Shortage Level 6 and response actions have been put in place to mitigate a catastrophic shortage. In addition, there are several Plans that address catastrophic failures and align with the WSCP, including MET's WSDM and WSAP and MWDOC's Hazard Mitigation Plan (HMP) and Emergency Response Plan (ERP).

3.4.5.1 MET's Water Surplus and Drought Management and Water Supply Allocation Plans

MET has comprehensive plans for stages of actions it would undertake to address a catastrophic interruption in water supplies through its WSDM and WSAP. MET also developed an Emergency Storage Requirement to mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the southern California region, including seismic events along the San Andreas Fault. In addition, MET is working with the state to implement a comprehensive improvement plan to address catastrophic occurrences outside of the southern California region, such as a maximum probable seismic event in the Sacramento-San Joaquin River Delta (Delta) that would cause levee failure and disruption of SWP deliveries.

3.4.5.2 Water Emergency Response of Orange County

In 1983, the Orange County water community identified a need to develop a plan on how agencies would respond effectively to disasters impacting the regional water distribution system. The collective efforts of these agencies resulted in the formation of WEROC to coordinate emergency response on behalf of all Orange County water and wastewater agencies, develop an emergency plan to respond to disasters, and conduct disaster training exercises for the Orange County water community. WEROC was established with the creation of an indemnification agreement between its member agencies to protect each other against civil liabilities and to facilitate the exchange of resources. WEROC is unique in its ability to provide a single point of contact for representation of all water and wastewater utilities in Orange County during a disaster. This representation is to the county, state, and federal disaster coordination agencies. Within the Orange County Operational Area, WEROC is the recognized contact for emergency response for the water community, including MWDOC.

3.4.5.3 MWDOC’s Emergency Response Plan

MWDOC will follow its ERP in the event of a catastrophic supply interruption. The objectives of MWDOC's ERP are listed below:

- Protect public health by maintaining water quality standards.
- Maintain, restore, or establish water services to meet requirements of emergency services and the essential needs of the community.
- Assess damage and initiate repairs within the service area and report damage to the WEROC.
- Request and coordinate mutual aid resources through WEROC.

MWDOC is responsible for managing the response effort within the service area in the event of an emergency. In order to avoid duplicating requests and efforts, MWDOC can use the California Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). SEMS and NIMS implement an organized system of information flow to ensure a timely and coordinated effort in response to any sort of disaster.

MWDOC’s emergency plan is activated once the Emergency Operations Center (EOC) is notified by telephone, oral delivered message, or radio. MWDOC’s plan may be activated automatically under rare circumstances where communication is not possible such as during a significant earthquake or state of war emergency.

MWDOC may initiate a mutual aid request in the event that MWDOC is unable to provide the level of emergency response support required by the situation. MWDOC is a part of several mutual assistance programs such as WEROC and Water Agency Response Network (WARN).

MWDOC may find it necessary to release information to the public in order to safeguard public health and safety. MWDOC personnel and supervisors shall discuss any water quality issues as soon as possible to determine if a maximum contaminant level (MCL) has been exceeded or other water system violation has occurred.

MWDOC distributes to all news media the necessary public notification to the affected service area. If the affected area is deemed to be small (10 percent or less than the total service area), the use of sound trucks and/or informational flyer distribution is considered an appropriate means of public notification. There are three unsafe water notices that can be issued to MWDOC. They are listed below.

- Boil Water Notice: The water supply is contaminated with microbes that can be rendered safe by boiling or disinfecting the affected water. This is the most commonly used notice.
- Do Not Drink Notice: The water supply contains an acute contaminant that cannot be rendered safe by boiling or disinfecting the affected water.
- Do Not Use Notice: The water supply contains a contaminant that is unknown or exposure to the water supply can impact the health of the consumer.

3.4.6 Seismic Risk Assessment and Mitigation Plan

Per CWC Section 10632.5, Suppliers are required to assess seismic risk to water supplies as part of their WSCP. The plan also must include the mitigation plan for the seismic risk(s). Given the great distances that imported supplies travel to reach Orange County, the region is vulnerable to interruptions along hundreds of miles aqueducts, pipelines and other facilities associated with delivering the supplies to the region. Additionally, the infrastructure in place to deliver supplies are susceptible to damage from earthquakes and other disasters.

MWDOC’s HMP evaluates hazards applicable to all jurisdictions in its entire planning area, prioritized based on probability, location, maximum probable extent, and secondary impacts. Earthquake fault rupture and seismic hazards, including ground shaking and liquefaction, are among the highest ranked hazards to the region as a whole because of its long history of earthquakes, with some resulting in considerable damage. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to infrastructure, fires, damages and outages of water and wastewater facilities, and other threats to life and property.

Nearly all of Orange County is at risk of moderate to extreme ground shaking, and the areas most susceptible to damage include Yorba Linda Water District and the Cities of La Habra and Buena Park. Liquefaction is also possible throughout much of Orange County, with the most extensive liquefaction zones occurring in coastal areas including the Cities of Huntington Beach and Newport Beach. Based on the amount of seismic activity that occurs within the region, there is no doubt that communities within MWDOC’s service area will continue to experience future earthquake events, and it is a reasonable assumption that a major event will occur within a 30-year timeframe.

It was determined that the overarching mitigation goals were the same for all of MWDOC’s member agencies, and thus, one set of goals were identified for MWDOC’s HMP, which include:

Goal 1: Minimize vulnerabilities of critical infrastructure to minimize damages and loss of life and injury to human life caused by hazards.

Goal 2: Minimize security risks to water and wastewater infrastructure.

Goal 3: Minimize interruption to water and wastewater utilities.

Goal 4: Improve public outreach, awareness, education, and preparedness for hazards in order to increase community resilience.

Goal 5: Eliminate or minimize wastewater spills and overflows.

Goal 6: Protect water quality and supply, critical aquatic resources, and habitat to ensure a safe water supply.

Goal 7: Strengthen Emergency Response Services to ensure preparedness, response, and recovery during any major or multi-hazard event.

The process used by the Planning Team to identify hazard mitigation actions for MWDOC's HMP include the below. The mitigation actions identify the hazard, proposed mitigation action, location/facility, local planning mechanism, risk, cost, timeframe, possible funding sources, status, and status rationale, as applicable.

- Review of the Risk Assessment presented in Section 3 of the HMP (Appendix D).
- Review of the Capabilities Assessment presented for each member agency in the Jurisdictional Annexes.
- Team discussion of new concerns and issues that need to be addressed to reduce hazards to critical water and wastewater infrastructure.

For detailed hazard identification and prioritization and mitigation strategies of MWDOC and its member agencies, refer to MWDOC's HMP (Appendix D).

3.4.7 Shortage Response Action Effectiveness

For each specific Shortage Response Action identified in the plan, the WSCP also estimates the extent to which that action will reduce the gap between supplies and demands identified in DWR Table 8-2 (Appendix A). To the extent feasible, MWDOC has estimated percentage savings for the chosen suite of shortage response actions, which can be anticipated to deliver the expected outcomes necessary to meet the requirements of a given shortage level.

3.5 Communication Protocols

Timely and effective communication is a key element of the WSCP implementation. Per CWC Section 10632 (a)(5), MWDOC has established communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments regarding any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1; any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1; and any other relevant communications.

This section includes specific communications protocols that would be triggered to address each shortage level and response actions implemented. This element is focused on communicating the water shortage contingency planning actions that can be derived from the results of the Annual Assessment, and it would likely trigger based upon the decision-making process in Section 3.2 and/or emergency communications protocols to address earthquakes, fires, infrastructure failures, civil unrest, and other catastrophic events.

Strategic communication is an ongoing activity where the purpose, audience, message, tools, and channels may change at any given moment. In the context of water shortage response, the purpose may be an emergency water shortage situation, such as may result from an earthquake, or a longer-term, non-emergency, shortage condition, such as may result from a drought. In an emergency, MWDOC will activate the communication protocol detailed in the WEROC Emergency Operations Plan. In a non-emergency water shortage situation, MWDOC will implement the procedures identified in the Strategic Communications Program and Plan.

3.5.1 WEROC Emergency Operations Plan

This Plan defines the actions to be taken by WEROC EOC staff to reduce the loss of water and wastewater infrastructure; to respond effectively to a disaster; and to coordinate recovery operations in the aftermath of any emergency involving extensive damage to Orange County water and wastewater utilities. The EOC Plan includes activation notification protocol that will be used to contact partner agencies to inform them of the situation, activation status of the EOC, known damage or impacts, or resource needs. The EOC Plan is a standalone document that is reviewed annually and approved by the Board every three years.

The WEROC EOC is responsible for assessing the overall condition and status of the Orange County regional water distribution and wastewater collection systems including MET facilities that serve Orange County.
The EOC can be activated during an emergency situation that can result from both natural and man-made causes, and can be activated through automatic, manual, or standby for activation. The WEROC EOC activation decision steps include the following:

- **Categorize incident:** Using information gathered from one or more sources, the WEROC primary contact will categorize the incident as a natural disaster, manmade disaster, terrorist threat, or terrorist physical attack.
- **Initial determination of situation:** WEROC and MWDOC management will make an initial determination of the situation based on scope and severity of incident, damage to affected agencies, and potential impacts.
- **WEROC activation level:** WEROC and MWDOC management will determine the appropriate level of WEROC activation.
- **Groups that will be notified:** When the EOC is activated, at a minimum, WEROC EOC staff, affected water utilities, MET's EOC at Eagle Rock, the Operational Area EOC, the Division of Drinking Water, health care agency, and California Department of Public Health should be notified.

For full details on the WEROC EOC procedures, refer to the WEROC Emergency Operations Plan (EOP) (Appendix C).

3.5.2 Strategic Communications Program and Plan

Strategic Communications Program and Plan serves as a blueprint, establishing a baseline understanding for how MWDOC's programs will provide information and value to its various stakeholders, partners, and employees during normal and shortage conditions. The MWDOC Public Affairs Department (Department), tasked to elevate public awareness, garner support, and establish confidence in the District's initiatives, attends the monthly general manager meetings where supply conditions are shared and is therefore kept up-to-date on shortage actions. The Department is tasked with providing transparent, reliable, and accurate information to the public, our partners, and our member agencies. With 28 member agencies in the District's service area, MWDOC utilizes various communications tools and channels to reach and unify such a vast and diverse group of stakeholders and audiences. Upon declaration of a shortage condition, the Department will collaborate agencies and internal staff to implement the communication protocols defined in the Strategic Communications Program and Plan.

The MWDOC Strategic Communications Program and Plan aligns the District's identified goals and objectives with the respective audiences, and outlines the appropriate communications tools and channels used to connect them all together, defines an implementation plan, and then monitors the program for effectiveness.

3.5.2.1 Goals & Objectives

The Board of Directors, executive management, and the District's Mission Statement have defined MWDOC'S three primary goals and associated objectives in the Strategic Communications Program and Plan. Water shortage communication will follow the protocols designed to communicate Goal #2, Objective 2.2:

- **Goal #2:** Examine, develop, and implement sound policies and programs that support Orange County water investments, and provide recognized value to the region.
- **Objective 2.2:** Be the trusted, leading voice for the region on water reliability, water policy, efficient water use, water education, and emergency preparedness and response.

3.5.2.2 Target Audiences

The ability to understand MWDOC's identified audience groups will make it possible to logically align messaging with the appropriate communications tools and channels to reach the District's during a water shortage.
The Department has identified several key audience groups for communication purposes as defined in the Strategic Communications Program and Plan.

3.5.2.3 Communications Tools and Channels

During a normal and water shortage condition, MWDOC will utilize a defined set of communication tools and channels based to reach the relevant audiences as defined in the Strategic Communications Program and Plan.

3.5.2.4 Implementation, Assignments, and Schedules

Public sector organizations shoulder a unique responsibility to be transparent, accountable, and have a positive impact on the community. A carefully developed and executed communications plan can establish trust and credibility for our stakeholders, partners, audience members, and employees during a water shortage.

To effectively communicate water shortage, water shortage communication will include basic strategic targets such as goals, intended audiences, messages, and tools. To ensure the benefit or value received is worth the time, money, talent, and effort expended by the District and its staff, the water shortage communication planning should start with the question "Why are we doing this?" This is an important question during water shortage as it likely the situation will change and evolve, sometimes rapidly. Once defined, all strategic water shortage targets will be followed by an *implementation plan* which identifies tactics and logistics, and eventually, active monitoring, evaluation, and amending.

Assignments are essential to maintaining productivity and accountability as well as collectively accomplishing the goals of a project. The MWDOC Public Affairs Department has developed a Programs and Responsibility flowchart which breaks down the Department's primary roles and assignments by team member (See Strategic Communications Program and Plan). Additionally, the MWDOC Public Affairs Department has developed a series of logistical checklists to efficiently plan, implement, and control the flow of information during water shortage, and will continue to do so as the situation evolves. Furthermore, the Department uses robust program management software tools such as Asana and CoSchedule to stay in touch with impending deadlines and to keep everything, including assignments and checklists, organized and in one place.

3.5.2.5 Monitor, Evaluate, and Amend

The effectiveness of the MWDOC Strategic Communications Program and Plan depends on a large variety of factors including technological advancements or changes, the rise and fall of audience engagement, current news or media concentration, political changes in leadership and focus, and even the weather. The Strategic Communications Program and Plan identifies Key Performance Indicators (KPI), metrics and measurements that the MWDOC Public Affairs Department currently uses to track program effectiveness. Program and activity evaluation is constant, and through this evaluation process the District's messaging and activities are shaped and refined.

3.5.2.6 Water Shortage Communication

The type and degree of communication varies with each shortage level, thus predefined and actionable communication protocols improve MWDOC's ability to message necessary events. These communication protocols and procedures are summarized in Table 3-2.

Table 3-2: Communication Procedures

Communications Procedures Matrix				
Level 0 Permanent Water Waste Prohibitions	**Level 1 Up to 10% Voluntary Conservation**	**Level 2 Up to 20% Mandatory Conservation**	**Levels 3-4 Up to 30% or 40% Mandatory Conservation**	**Levels 5-6 Up to 50% or >50% Mandatory Conservation**
Standard outreach efforts in effect (media relations, social media, websites, etc.)	Update message platform to reflect conditions and needed actions from public	Update campaign and messages to generate immediate actions/behaviors by public	Update campaign and messages to raise awareness for more severe water-saving actions/behaviors by public	Update campaign and messages to reflect extreme or emergency condition and likely need to focus water use on health/safety needs
Promote ongoing WUE programs/tools/ partnerships designed to achieve long-term water management goals	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)

Communications Procedures Matrix				
Standard coordination with member agencies	Include increased conservation messages on MWDOC.com and in standard outreach efforts; provide regular condition updates to stakeholders/media	Supplement Level 1 activities with additional tactics (mass media ads, partnerships, events,, etc.) as needed; provide regular condition updates to stakeholders/media	Supplement Level 2 outreach with additional tactics (supplemental ads, etc.) as needed; provide regular updates to stakeholders/media on conditions	Supplement Level 3-4outreach with additional tactics as needed; provide regular condition updates to stakeholders/media on conditions
As-needed Board reports on public communication andwater-use efficiency outreach activities	Enhance promotion ofongoing WUE programs/tools; deploy targeted advertising	Conduct issue briefings with electedofficials, other key civic and business leaders	Conduct specialized outreach to reduce discretionary outdooruse while minimizing landscape damage	Suspend promotion oflong-term WUE programs/ tools to focus on imminent needs
	Increase coordinationwith member agencies	Continue promotion ofongoing WUE programs/tools	Promote available water assistance resources for vulnerable populations; specialized outreach to impacted industries	Continue enhanced coordination with member agencies asneeded (daily or weekly briefings or email updates, etc.)
		Enhance coordination with member agenciesas needed	Continue enhanced coordination with member agencies asneeded	Analyze water use andother data to determine any appropriate supplemental actions
	Analyze water use andother data to determine any appropriate supplemental actions	Analyze water use andother data to determine any appropriate supplemental actions	Analyze water use andother data to determine any appropriate supplemental actions	

3.6 Compliance and Enforcement

Per the CWC Section 10632 (a)(6), wholesale water providers are subject to these requirements.

3.7 Legal Authorities

Per CWC Section 10632 (a)(7)(A), MWDOC has provided a description of the legal authorities that empower MWDOC to implement and enforce its shortage response in (Appendix X). Per CWC Section 10632 (a)(7)(A), MWDOC has provided a description of the legal authorities that empower MWDOC to implement and enforce its shortage response in Appendix X.

Per CWC Section 10632 (a)(7) (B), MWDOC shall declare a water shortage emergency condition to prevail within the area served by such wholesaler whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

Per CWC Section 10632 (a)(7)(C), MWDOC shall coordinate with any agency or county within which it provides water supply services for the possible proclamation of a local emergency under California Government Code, California Emergency Services Act (Article 2, Section 8558). Table 3-3 identifies the contacts for all cities or counties for which the Supplier provides service in the WSCP, along with developed coordination protocols, can facilitate compliance with this section of the CWC in the event of a local emergency as defined in subpart (c) of Government Code Section 8558.

Table 3-3: Agency Contacts and Coordination Protocols

Contact	Agency	Coordination Protocols
Assistant General Manager, Water Services	Anaheim Public Utilities	Notification, Coordination, and provide supportive actions
Public Works Director	City of Brea	Notification, Coordination, and provide supportive actions
Director of Public Works/City Engineer	City of Buena Park	Notification, Coordination, and provide supportive actions
Director of Public Works/City Engineer	City of Fountain Valley	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Fullerton	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Garden Grove	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Huntington Beach	Notification, Coordination, and provide supportive actions

Contact	Agency	Coordination Protocols
Director of Public Works	City of La Habra	Notification, Coordination, and provide supportive actions
Public Works & Community Services Director	City of La Palma	Notification, Coordination, and provide supportive actions
Utilities Director	City of Newport Beach	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Orange	Notification, Coordination, and provide supportive actions
Public Works Director	City of San Clemente	Notification, Coordination, and provide supportive actions
Director of Public Works	City of San Juan Capistrano	Notification, Coordination, and provide supportive actions
Acting Public Works Director	City of Santa Ana	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Seal Beach	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Tustin	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Westminster	Notification, Coordination, and provide supportive actions
General Manager	East Orange County Water District	Notification, Coordination, and provide supportive actions
General Manager	El Toro Water District	Notification, Coordination, and provide supportive actions
General Manager	Emerald Bay Service District	Notification, Coordination, and provide supportive actions

Contact	Agency	Coordination Protocols
General Manager, Orange County	Golden State Water Company	Notification, Coordination, and provide supportive actions
General Manager	Irvine Ranch Water District	Notification, Coordination, and provide supportive actions
General Manager	Laguna Beach County Water District	Notification, Coordination, and provide supportive actions
General Manager	Mesa Water	Notification, Coordination, and provide supportive actions
General Manager	Moulton Niguel Water District	Notification, Coordination, and provide supportive actions
General Manager	Orange County Water District	Notification, Coordination, and provide supportive actions
General Manager	Santa Margarita Water District	Notification, Coordination, and provide supportive actions
General Manager	Serrano Water District	Notification, Coordination, and provide supportive actions
General Manager	South Coast Water District	Notification, Coordination, and provide supportive actions
General Manager	Trabuco Canyon Water District	Notification, Coordination, and provide supportive actions
General Manager	Yorba Linda Water District	Notification, Coordination, and provide supportive actions
Public Works Director	Orange County	Notification
Public Works Director	City of Aliso Viejo	Notification
Director of Public Services	City of Costa Mesa	Notification
Public Works Director	City of Cypress	Notification
Public Works Director	City of Dana Point	Notification

Contact	Agency	Coordination Protocols
Public Works Director	City of Irvine	Notification
Public Works Director	City of Laguna Beach	Notification
Public Works Director	City of Laguna Hills	Notification
Public Works Director	City of Laguna Niguel	Notification
City Engineer	City of Laguna Woods	Notification
Public Works Director	City of Lake Forest	Notification
City Engineer	City of Los Alamitos	Notification
Public Works Director	City of Mission Viejo	Notification
Public Works Director	City of Placentia	Notification
Public Works Director	City of Rancho Santa Margarita	Notification
Public Works Director	City of Stanton	Notification
Public Works Director	City of Villa Park	Notification
Public Works Director	City of Yorba Linda	Notification

3.8 Financial Consequences of WSCP

Per CWC Section 10632(a)(8), Suppliers must include a description of the overall anticipated financial consequences to the Supplier of implementing the WSCP. This description must include potential reductions in revenue and increased expenses associated with implementation of the shortage response actions. This should be coupled with an identification of the anticipated mitigation actions needed to address these financial impacts.

MWDOC's rates and fees fall into three general categories: (1) the pass through of costs from MET for imported water rates and charges; (2) specific charges for MWDOC services contracted by our Member Agencies (Choice Budget); and (3) charges for MWDOC services that apply to all our Member Agencies (Core Budget). Below is a more detail description on each category:

1. The pass-through rates and charges from Metropolitan are billed on a monthly basis to our Member Agencies with the majority of the cost allocation based on their volumetric purchases. MWDOC does not collect any revenue from these charges.
2. The Choice Budget fees are primarily associated with the water education school program and the water use efficiency program, including conservation rebates. MWDOC Member Agencies elect to subscribe to specific programs and can opt-out of program participation. These fees are assessed to recover the entire cost of these "choice" programs. Any additional revenue collected is either reimbursed to the participating agencies at the end of the year or credited the following year. No additional revenue is collected for MWDOC.

3. MWDOC's Core Budget includes all other programs and functions provided to our Member Agencies. Among them are: Water Reliability Planning, Metropolitan Activities, Government Affairs, Public Affairs, Water Use Efficiency, Emergency Response, Board Functions, Finance, Information Technology, and Administration.

MWDOC's Core budget is funded through a fixed charge assessed on each agency's retail meter and a fixed groundwater service charge, which are both collected at the beginning of each fiscal year.
Because MWDOC's rate structure is completely fixed and does not fluctuate with volumetric sales, the implementation of the WSCP will not impact MWDOC's revenues. There may be an increase in MWDOC's expenditures as it relates to additional public and media outreach. However, as experienced in the last drought of 2014-2015, MWDOC coordinated such outreach efforts with its member agencies and most costs were shared among the participating agencies. Therefore, any additional expenditures are not anticipated to be significant and can be recovered by MWDOC reserves.

MWDOC's choice budget would also not be adversely impacted by implementation of the WSCP. Although we anticipate during a shortage there will be an increase in funding to support the implementation of Member Agency WSCPs, as described above programs, MWDOC's Choice Budget are selected by our member agencies to participate and pay their share according to the service received.

Lastly, the pass through rates and charges from MET do not have a financial impact on MWDOC and will not be adversely impacted by the implementation of the WSCPs.

3.9 Monitoring and Reporting

Per CWC Section 10632(a)(9), water provider wholesalers are not subject to this requirement.

3.10 WSCP Refinement Procedures

Per CWC Section 10632 (a)(10), MWDOC must provide reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

MWDOC's WSCP is prepared and implemented as an adaptive management plan. MWDOC will use the monitoring and reporting process defined in section 3.9 to refine the WSCP. In addition, if certain procedural refinements or new actions are identified by MWDOC staff, or suggested by customers or other interested parties, MWDOC will evaluate their effectiveness, incorporate them into the WSCP, and implement them quickly at the appropriate water shortage level.

It is envisioned that the WSCP will be periodically re-evaluated to ensure that its shortage risk tolerance is adequate, and the shortage response actions are effective and up to date based on lessons learned from implementing the WSCP. The WSCP will be revised and updated during the UWMP update cycle to incorporate updated and new information. For example, new supply augmentation actions will be added, and actions that are no longer applicable for reasons such as program expiration will be removed. However, if revisions to the WSCP are warranted before the UWMP is updated, the WSCP will be updated outside of the UWMP update cycle. In the course of preparing the Annual Assessment each year, MWDOC staff will routinely consider the functionality the overall WSCP and will prepare recommendations for MWDOC Board of Directors if changes are found to be needed.

3.11 Special Water Feature Distinction

As a wholesaler, CWC Section 10632 (b) is not applicable to MWDOC.

3.12 Plan Adoption, Submittal, and Availability

Per CWC Section 10632 (a)(c), MWDOC provided notice of the availability of the draft 2020 UWMP and draft 2020 WSCP and notice of the public hearing to consider adoption of the WSCP. The public review drafts of the 2020 UWMP and the 2020 WSCP were posted prominently on MWDOC's website, in advance of the public hearing on May 19, 2021. Copies of the draft WSCP were also made available for public inspection at MWDOC Clerk's and Utilities Department offices and public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix F.

MWDOC held the public hearing for the draft 2020 UWMP and draft WSCP on May 19, 2021 at the Board meeting. MWDOC Board reviewed and approved the 2020 UWMP and the WSCP at its May 19, 2021 meeting. See Appendix G for the resolution approving the WSCP.

By July 1, 2021, MWDOC's adopted 2020 UWMP and WSCP was filed with DWR, California State Library, and the County of Orange. MWDOC will make the WSCP available for public review on its website no later than 30days after filing with DWR.

Based on DWR's review of the WSCP, MWDOC will make any amendments in its adopted WSCP, as required and directed by DWR.

If MWDOC 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

4 References

Metropolitan Water District of Southern California (MET). (2021a, February). *Water Shortage Contingency Plan.* http://www.mwdh2o.com/PDF_About_Your_Water/Draft_Metropolitan_WSCP_February_2021.pdf

Metropolitan Water District of Southern California (MET). (2021b, June). *2020 Urban Water Management Plan.*

Metropolitan Water District of Southern California (MET). (1999, August). *Water Surplus and Drought Management Plan*. http://www.mwdh2o.com/PDF_About_Your_Water/2.4_Water_Supply_Drought_Management_Plan.pdf

Appendix A

DWR Submittal Tables

DWR Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description)*
0	0% (Normal)	A Level 0 Water Supply Shortage –Condition exists when MWDOC notifies its water users that no supply reductions are anticipated in this year. MWDOC proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local MWDOC goals for water supply reliability.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when no supply reductions are anticipated, a consumer imported demand reduction of up to 10% is recommended to make more efficient use of water and respond to existing water conditions. Upon the declaration of a Water Aware condition, MWDOC shall implement the mandatory Level 1 conservation measures identified in this WSCP. The type of event that may prompt MWDOC to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider (MET) calls for extraordinary water conservation efforts.
2	Up to 20%	A Level 2 Water Supply Shortage – Condition exists when MWDOC notifies its member agencies that due to drought or other supply reductions, a consumer imported 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, MWDOC shall implement the mandatory Level 2 conservation measures identified in this WSCP.
3	Up to 30%	A Level 3 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 30% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
4	Up to 40%	A Level 4 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 40% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
5	Up to 50%	A Level 5 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
6	>50%	A Level 6 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that greater than 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
NOTES:		

DWR Submittal Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
0	Provide Rebates for Landscape Irrigation Efficiency	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agencies and their customers through Landscape Irrigation Efficency rebates.	No
0	Provide Rebates on Plumbing Fixtures and Devices	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agencies and their customers through water saving device rebates.	No
0	Provide Rebates for Turf Replacement	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agecies and their customers through MWDOC's Turf Removal Program.	No
0	Reduce System Water Loss	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of programatic support to retail agencies through MWDOC's Water Loss Program.	No
1	Expand Public Information Campaign	0 to 5% of total imported water use met by voluntary Demand Reduction	Expand Public Awareness to encourage residents and industries to reduce their usage of water.	No
1	Other	0 to 10% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
1	Other	0 to 10% of total imported base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
2	Expand Public Information Campaign	0 to 20% of total imported water use met by voluntary Demand Reduction	Increase Public Awareness efforts to encourage residents and industries to reduce their usage of water.	No
2	Other	0 to 20% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Recommended Demand Reduction	No
2	Other	0 to 20% of total imported base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
3	Expand Public Information Campaign	0 to 30% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of	No
3	Other	0 to 30% of total imported water use met by voluntary Demand Reduction	Work with retail agencies to review and update as needed water waste prohibitions and ordinances to discourage unnecessary water usage.	No
3	Other	0 to 30% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
3	Other	0 to 30% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
4	Expand Public Information Campaign	0 to 40% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.	No
4	Other	0 to 40% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
4	Other	0 to 40% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes

DWR Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
5	Expand Public Information Campaign	0 to 50% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.	No
5	Other	0 to 50% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
5	Other	0 to 50% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
6	Other	0 to 50% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
6	Other	>50% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes

NOTES:
Coordination with WEROC is anticipated to begin at Level 4 or greater. In the event of a short or long-term emergency MWDOC will utilize the WEROC Emergency Operations Plan and follow the detailed steps and process as specified.

DWR Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
0 through 6	Other Actions (describe)	TBD	MWDOC will work in close coordination with MET on their supply augmentation projects during this time to ensure reliability for the service area.
NOTES:			

Appendix B

MWDOC Water Supply Allocation Plan

Municipal Water District of Orange County

Water Supply Allocation Plan

DRAFT
Revised 2016

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List of Tables and Figures

TABLES

FIGURES

Section 1: Introduction

The Municipal Water District of Orange County (MWDOC) is dedicated to ensuring water reliability for the communities we serve. Hundreds of thousands of Orange County residents have taken advantage of our water conservation rebates to install water saving toilets, clothes washers, and other water saving devices. We continue to partner with our client agencies to develop new local supplies such as recycled water, brackish water desalting, ocean water desalination, and the Groundwater Replenishment System.

However, a combination of water supply challenges have brought about the possibility that MWDOC may not have access to the imported supplies necessary to meet the demands of its client agencies in the coming years. The following factors have dramatically impacted water supply conditions not only in Orange County, but all of Southern California:

- In CY 2013 many areas of California experienced the driest year on record. California received record low snowpack in FY 2014-15. On January 17, 2014, Governor Brown proclaimed a statewide drought emergency. On May 5, 2015, the State Water Resources Control Board adopted an emergency conservation regulations in accordance with the Governor's directive. The provisions of the emergency regulations went into effect on May 18, 2015. On February 2, 2016, the SWRCB will consider a resolution to extend the existing May 2015 Emergency Regulation as directed in the November 2015 executive order.

- The Colorado River is recovering from a long-term drought. Reservoirs along the river are less than half full. In the summer of 2015, Lake Mead water levels reached record lows. Supplies from this source have been reduced since 2003 and will continue to be limited.

To meet the imported water demands of its member agencies, the Metropolitan Water District of Southern California (MET) is quickly withdrawing supplies from surface and groundwater storage. Over the past three years, MET has drawn down 67% of its available reserves.

The recent dry conditions and the uncertainty about future supplies from the State Water Project have raised the possibility that MET will not have access to the supplies necessary to meet the imported water demands of its member agencies. As a result, MET has developed a Water Supply Allocation Plan that allocates wholesale imported water supplies among its 26 member agencies throughout Southern California.

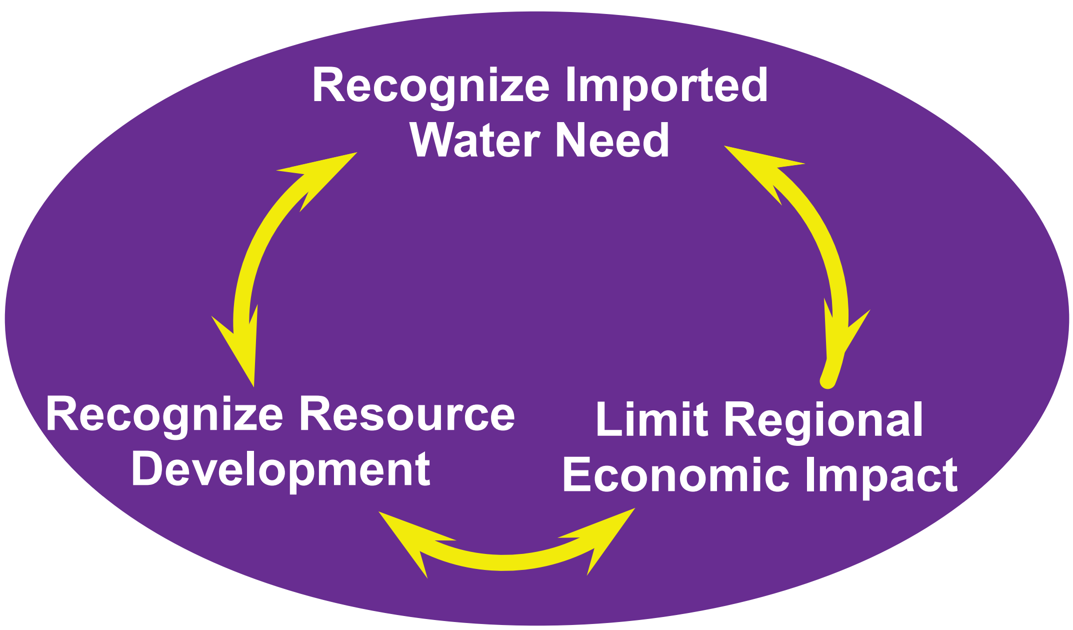
To prepare for the possibility of an allocation of imported water supplies from MET, MWDOC has worked in collaboration with its 28 client agencies to develop this Water Supply Allocation Plan to allocate imported water supplies at the retail level. This document lays out the essential components of how MWDOC plans to determine and implement each agency’s allocation during a time of shortage.

Section 2: Metropolitan Water District's Water Supply Allocation Plan

In February 2008, MET approved a Water Supply Allocation Plan (WSAP) designed to allocate imported water to all of its member agencies during a shortage. In June 2014 MET convened a member agency working group to revisit the WSAP. The purpose of the working group was to collaborate with member agencies to identify potential revisions to the WSAP in preparation for mandatory supply allocations in 2015. There were eight working group meetings and three discussions at the monthly Member Agency Managers' Meetings. The WSAP follows the principles and considerations identified in MET's Water Surplus and Drought Management Plan, which calls upon the allocation of water in a fair and equitable manner to all of MET's member agencies. To the extent possible, this means developing a plan that minimizes regional hardship during times of shortage.

The MET WSAP seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level. To achieve this, it takes into account:

- The impact to retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation
- Investments in local resources
- Investments in MET's facilities



The WSAP states that MET staff will go before the Board with a recommendation in April, from which the Board of Directors will make a determination on the level of the Regional Shortage. If the Board determines allocations are necessary, they will go into effect in July and remain for a twelve-month period. *Note: This schedule is at the discretion of the MET Board, and is subject to change.*

The recommendation to declare a regional shortage will be based upon water supply availability from the State Water Project, the Colorado River Aqueduct, and the amount of surface and groundwater storage remaining in MET's reserves. It will also take into account the implementation of MET's water management actions i.e. Five Year Water Supply Plan, extraordinary conservation efforts, the acceleration of local resource projects, and the purchases of water transfers.

A full copy of MET's Water Supply Allocation Plan as revised in December 2014 is available in Appendix B.

Section 3: Development Process

In preparation for possible allocation of imported water supplies from MET, MWDOC's Board first adopted the following policy principles to help guide staff and the client agency technical workgroup to develop a plan that is fair and equitable for everyone within its service area:

- **Seek best allocation available from MET**
- **Develop MWDOC Plan in collaboration with client agencies**
- **When reasonable, use similar method/approach as MET**
- **When MET's method would produce significant unintended result, use an alternative approach**
- **Develop accurate data on local supply, conservation, recycling, rate structures, growth and other relevant adjustment factors**
- **Seek opportunities within MWDOC service area to provide mutually beneficial shortage mitigation**

Client Agency Input

Between the months of September and January of 2014-15, MWDOC staff worked cooperatively with the client agencies through a series of technical workgroups to develop a formula and implementation plan to allocate imported supplies in the event that MET declares a regional shortage. These workgroups provided an arena for in-depth discussion of the objectives, mechanics, and policy aspects of the different parts of the Plan. MWDOC staff also met individually with a number of client agencies for detailed discussions on elements of the Plan. The discussions, suggestions, and comments expressed by the client agencies during this process played a key part in the development of this Plan.

The following MWDOC client agencies participated in the Technical Workgroup:

- **City of Buena Park**
- **City of Fountain Valley**
- **City of Garden Grove**
- **City of Huntington Beach**
- **City of Newport Beach**
- **City of Orange**
- **City of San Clemente**
- **City of San Juan Capistrano**
- **City of Tustin**
- **City of Westminster**
- **East Orange County Water District**
- **El Toro Water District**
- **Golden State Water Co.**
- **Irvine Ranch Water District**
- **Laguna Beach County Water District**

- **Mesa Water District**
- **Moulton Niguel Water District**
- **Orange County Water District**
- **Serrano Water District**
- **Santa Margarita Water District**
- **South Coast Water District**
- **Trabuco Canyon Water District**
- **Yorba Linda Water District**

In addition to the workshops, individual meetings were held between MWDOC staff and the following MWDOC client agencies to address more specific and agency-related questions.

These individual meetings provided MWDOC staff with a great deal of insight on exactly how a retail agency would implement allocations at the customer level. Such information was extremely valuable in our regional discussion at MET and in the development of this Plan.

Board of Directors Input

Throughout the Plan's development process, the MWDOC Board of Directors was provided with regular progress reports on the status of the Plan and the technical workgroup discussions. During the months the Plan was being developed, the Board Planning and Operations Committee was kept apprised of key issues regarding MET's and MWDOC's allocation plan. Moreover, the Committee played an integral part in the development of key implementation issues such as the appeal process and the surcharge rate structure.

Section 4: Water Supply Allocation Formula

The MWDOC Water Supply Allocation Model follows five (5) basic steps to determine an agency's imported supply allocation:

- Step 1: Determine Baseline Information
- Step 2: Establish Allocation Year Information
- Step 3: Assess the Shortage Reduction Stage (Based on MET's Declared Shortage Level)
- Step 4: Apply Allocation Adjustments and Credits in the areas of retail impacts, conservation, groundwater recharge.
- Step 5: Sum total allocations and determine retail reliability

A description of how the calculation is used in each step is described below:

Step 1 – Determine Baseline Information

In order to determine a client agency's retail demands and imported supply needs in the allocation year, the model needs to establish a historical base period for water supply and delivery data. The base period for each of the different categories of demands and supplies is calculated using data from fiscal years (July through June) ending 2013 and 2014.

The following is a description of the base period calculations:

Base Period Local Supplies: Local supplies for the base period are calculated using a two-year average (from fiscal years ending 2013 and 2014) of groundwater production, groundwater recovery, surface water production, and other non-imported supplies.

Base Period Wholesale ("Imported") Firm Demands: Firm demands on MWDOC for the base period are calculated using a two-year average (from fiscal years ending 2013 and 2014) of full-service, and surface storage operating agreement demands.

Base Period In-lieu Deliveries: Base period in-lieu deliveries to client agencies are calculated using a two year average (from fiscal years ending 2013 and 2014) of In-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs. In-lieu deliveries are not calculated as imported supplies from MET. They are calculated as local supplies to account for the corresponding reduction in base year local production that was required to take In-lieu deliveries.

Base Period Retail Demands: Total retail municipal and industrial demands for the base period are calculated by adding the Base Period Local Supplies, Base Period Wholesale Imported Firm Demands, and Base Period In-Lieu Deliveries.

Step 2 – Establish Allocation Year Information

In this step, the model adjusts for each member agency's water need in the allocation year. To do so, it adjusts the base period estimates for population growth and changes in local supplies.

The following is a description of how the allocation year information is established:

Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for growth. The method in which MWDOC determines each client agency's growth is through population increases for the fiscal years ending 2013 to 2014[1]. Based on the data received from California State University of Fullerton, Center for Demographic Research, MWDOC prorates each agency's population increase share to MWDOC's growth adjustment received from MET[2], as shown in Appendix C.

Growth Adjustment: The growth adjustment is calculated by taking the average percent of growth from fiscal years ending 2013 and 2014, as generated by the Center for Demographic Research at California State University, Fullerton.

Allocation Year Local Supplies: Allocation year local supplies include groundwater production, groundwater recovery, surface water production, and other imported supplies not from MET. In-lieu deliveries are considered as local supplies to account for the corresponding reduction in base year local production that was required to take in-lieu deliveries. Allocation year local supplies reflect a more accurate estimate of actual supplies in the allocation year, and in turn more accurately estimates an agency's demand for imported supplies.

Extraordinary Increased Production Adjustment: This adjustment accounts for extraordinary increases in local supplies above the base period. Extraordinary increases in production include such efforts as purchasing water transfers. In order not to discourage such extraordinary efforts, a percentage of the yield from these supplies is added back to Allocation Year Local Supplies in shortage levels as shown below. This has the effect of "setting aside" the majority of the yield for the agency who procured the supply. The percentage of the extraordinary increases in local supply corresponds according to the regional shortage level, as shown in Table 4.1.

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[1] Although many options were discussed in the technical workgroup sessions, this option was chosen to best reflect the increase in water demand due to population growth as intended by MET's allocation formula for each client agency in the MWDOC service area.

[2] MET's growth adjustment is calculated by using the average of the last two year County-wide population growth rates, which include not only MWDOC's service area but also the cities of Fullerton, Anaheim, and Santa Ana.

Table 4.1
Extraordinary Increased Production Adjustment

Regional Shortage Level	Regional Shortage Percentage	Extraordinary Increase Percentage
1	5%	5%
2	10%	10%
3	15%	15%
4	20%	20%
5	25%	25%
6	30%	30%
7	35%	35%
8	40%	40%
9	45%	45%
10	50%	50%

Step 3 – Calculate Initial Minimum Allocation Based on Declared Shortage Level

This step sets the initial allocation. After a regional shortage level is established, MWDOC will calculate the initial allocation as a percentage of adjusted Demand for Firm MET Supplies within the model for each client agency.

Regional Shortage Levels: The model allocates shortages of supplies over ten levels: from 5 to 50 percent, in 5 percent increments.

Initial (Wholesale Minimum) Allocation: The Wholesale Minimum Allocation is established to ensure a minimum level of imported supplies. The Wholesale Minimum Allocation ensures that client agencies will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of MET's regional water supplies. As illustrated in Table 4.2, the Wholesale Minimum Allocation percentage is equal to 100 minus one-and-a-half times the shortage level. The allocation is based on each agency's demand of firm MET water.

Table 4.2
Wholesale ("Imported")
Supply Minimum Allocation

Regional Shortage Level		Wholesale Minimum Allocation
1		92.5%
2		85.0%
3		77.5%
4		70.0%
5		62.5%
6		55.0%
7		47.5%
8		40.0%
9		32.5%
10		25.0%

Step 4 – Assign Allocation Adjustments and Conservation Credit

In this step, the model assigns additional water to address disparate impacts at the retail level caused by an across-the-board cut of imported supplies. It also applies a conservation credit given to those agencies that have achieved additional water savings at the retail level as a result of successful implementation of water conservation devices, programs and rate structures.

Retail Impact Adjustment: The Retail Impact Adjustment is the factor used to address major differences in retail level shortages associated with across-the-board cuts. The purpose of this adjustment is to ensure that agencies with a high level of dependence on MET do not experience highly disparate shortages compared to other agencies when faced with a reduction in imported supplies. The Retail Impact Adjustment is calculated as the difference between the Regional Shortage Percentage and the Wholesale Imported Minimum Allocation. The amount of the adjustment each client agency receives is prorated on a linear scale, based on its dependence on imported water at the retail level. The prorated amount of allocation is referred to as the Retail Impact Adjustment Allocation. Table 4.3 below illustrates the maximum adjustment an agency may receive according to the regional shortage level.

Table 4.3
Retail Impact Adjustment

Regional Shortage Level	Regional Shortage Percentage	Retail Impact Adjustment Maximum
1	5%	2.5%
2	10%	5.0%
3	15%	7.5%
4	20%	10.0%
5	25%	12.5%
6	30%	15.0%
7	35%	17.5%
8	40%	20.0%
9	45%	22.5%
10	50%	25.0%

Unfortunately, the Retail Impact Adjustment MWDOC receives from MET may be less than the aggregate retail impact adjustment for its client agencies. To mitigate this difference, MWDOC decreases each client agency's retail impact adjustment according to their prorated share.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit addresses the increased difficulty in achieving additional water savings at the retail level that comes as a result of successful implementation of water conserving devices and conservation savings programs. To estimate conservation savings, each member agency has a historical baseline Gallons Per Person Per Day (GPCD) calculated by the maximum usage from fiscal year ending 2004 to fiscal year ending 2014. Reductions from the baseline GPCD to the Allocation Year are used to calculate the equivalent conservation savings in acre-feet. The Conservation Demand Hardening Credit is based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board during implementation of the WSAP. The credit will also be adjusted for:

- The overall percentage reduction in retail water demand

- The member agency's dependence on Metropolitan

The credit is calculated using the following formula:

Conservation Demand Harding Credit = Conservation Savings x (10% + Regional Shortage Level Percentage) x (1 +((Baseline GPCD – Allocation Year GPCD)/Baseline GCPD))x Dependence on MWD Percentage.

Minimum Per-Capita Water Use Credit: This adjustment creates a minimum daily gallons per capita (GPCD) water use threshold. Member agencies' retail-level water use is compared to a total water use of 100 GPCD. Agencies that fall below this threshold receive additional allocation to bring them up to the minimum GPCD water use level[3].

Step 5 – Sum Total Allocations and Calculate Retail Reliability

This is the final step in calculating an agency's total allocation for imported supplies. The model sums an agency's total imported allocation with all of the adjustments and credits and then calculates each agency's retail reliability compared to its Allocation Year Retail Demand.

Final Metropolitan Allocation: The final allocation of imported supplies to an agency for its retail demand is the sum of the Wholesale Imported Minimum Allocation, their Retail Impact Adjustment, their Conservation Demand Hardening Credit, and Per-Capita Adjustment Allocation (if applicable).

Total Metropolitan Supply Allocations: In addition to the WSAP Allocation described above, agencies may also receive separate allocations of supplies for seawater barrier and groundwater replenishment demands. Allocations of supplies to meet seawater barrier demands are to be determined by the MET Board of Directors independently, but in conjunction with the WSAP. Separating the seawater barrier allocation from the WSAP allocation allows the MET Board to consider actual barrier requirements in the Allocation Year and address the demand hardening issues associated with cutting seawater barrier deliveries. According to the principles outlined for allocating seawater barrier demands, allocations should be no deeper than the WSAP Wholesale Minimum Percentage implemented at that time. The WSAP also provides a limited allocation for drought-impacted groundwater basins based on the following framework:

1. Metropolitan staff will hold a consultation with the requesting member agency and the appropriate groundwater basin manager to document whether the basin is in one of the following conditions:

    a. Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
    b. Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries.

2. An allocation is provided based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level.

Agency's Retail Reliability: This calculates an agency's total MET allocation versus their allocation year retail demands to determine their overall reliability percentage (supplies

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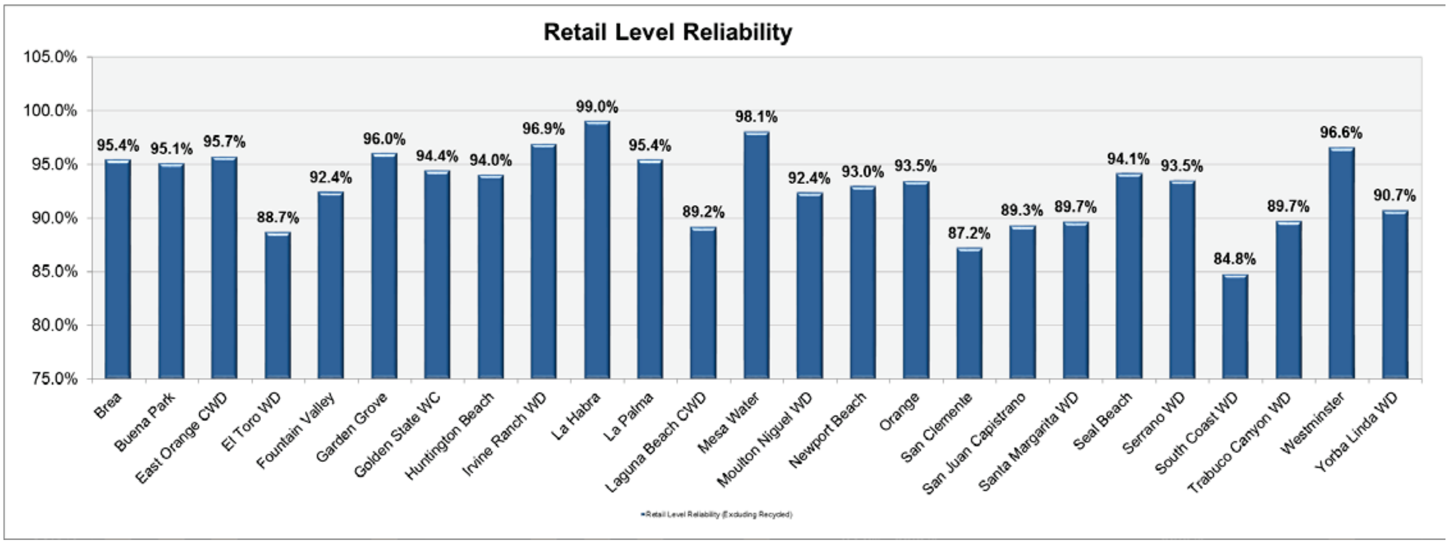
3 Per capita water used based on Total Retail-Level Use and population data received from California State University of Fullerton, Center for Demographic Research

as a percentage of retail demand) under a regional shortage level. This percentage excludes recycled water supplies from an agency's total water supply. Figure 4.1 illustrates the MWDOC client agencies' reliability percentages under a stage 3 regional shortage level (15%).

Figure 4.1
MWDOC's Water Supply Allocation Plan
Stage 3 with a Regional Shortage of 15%*



Source: MWDOC Allocation Model Version 3.1 and assumes a BPP of 75%.
[*] These are estimated reliability percentages for MWDOC client agencies under a regional shortage stage 3 (15%) based on initial local supply data received from the client agencies and OCWD's projected BPP for 2015/16.

Section 5: Plan Implementation

This section covers implementation issues which include: the appeal process, penalties rate structure and billing, tracking and reporting water usage, timeline and option to revisit the plan.

Allocation Appeals Process

The purpose of the appeals process is to provide client agencies the opportunity to request a change to their allocation based on new or corrected information. The grounds for appeal can include but are not limited to:

- Adjusting errors in historical data used in the Base period calculations
- Adjusting for unforeseen losses or gains in local supplies
- Adjusting for extraordinary increases in local supplies
- Adjusting for population growth rates
- Adjusting for credits with the Conservation base data, including Conservation Rate Structure

MWDOC anticipates that under most circumstances, a client agency's appeal will be the basis for an appeal to MET by MWDOC. MWDOC staff will work with client agencies to ensure that such an appeal is a complete and accurate reflection of the client agency's allocation and is properly reviewed by MET. To accomplish this, MWDOC will require the following information from the client agency submitting an appeal:

- ➢ Written letter (in the form of a letter or e-mail) from the client agency requesting an appeal
- ➢ Brief description of the type of appeal e.g. incorrect base data, loss/gain in local supply, extraordinary increase in local supply, adjustment in agency's conservation base data, or other
- ➢ Rationale for the appeal
- ➢ Quantity in acre-feet in question
- ➢ Verifiable documentation that supports the rationale i.e. billing statements, invoices for conservation device installations, Groundwater reports

To provide clarity of the process and ensure your appeal is properly handled, the following steps will occur:

Step 1 – Submit Appeal – Client agency will submit the necessary information, described above, to MWDOC.

Step 2 – Notification of Response and Appeal Meeting – Once MWDOC staff receives the appeal information, MWDOC will send a response and schedule a meeting with MWDOC staff and the client agency, within two weeks of receiving the information, to discuss the appeal in further detail.

Step 3 – Submittal to MET & MWDOC Board Notification – Using the information received from the client agency, MWDOC will prepare and submit the appeal to MET no later than one month of receiving the information. In addition, MWDOC staff will notify its Board of the submittal to MET.

Step 4 – MET Appeal Process - MWDOC will follow the terms of MET's appeal process, as described in Appendix B. Client agencies will also be invited, as deemed appropriate, by MWDOC to attend any meetings with MET on their appeal.

Step 5 –Client Agency Notification of MET's Decision – Once MET has made a determination of the appeal, MWDOC staff will notify the client agency of the decision and determine if additional actions are needed i.e. Appeal to MET Board.

In the event that MET denies the appeal, MWDOC staff will continue to work with the appealing agency to resolve their issue(s). Any action that will result in adjustments to client agency's allocation will be submitted to the Board for review and approval.

Allocation Surcharge Rates & Billing

MET's Surcharge Rates

MET will enforce its allocations through a tiered surcharge rate structure. MET will assess surcharge rates to a member agency that exceeds its total annual allocation at the end of the twelve-month allocation period, according to the rate structure below:

Table 5.1: Metropolitan Water District Allocation Surcharge Rate Structure (FY2015/16 Rates)*

Water Use up to:	(1) **Base Rate**	(2) **Surcharge Rate****	(1)+(2) = **Total Rate**
100% Allocation	Tier 1 ($942/AF)	-	**$942/AF**
100% < = 115%	Tier 1 ($942/AF)	Tier 1 + (1,480/AF)***	**$2,422/AF**
Use > 115%	Tier 1 ($942/AF)	Tier 1 + (2,960/AF)***	**$3,902/AF**

[*] The base rate shall be the applicable water rate for the water being purchased (Model shows CY 2016 rate).
[**] If MWDOC exceeds its allocation limit but is within its equivalent preferential right amount, MET will decrease the surcharge rate by one level.
[***] Surcharge rate is applied to water use in excess of an agency's WSAP allocation.

These surcharge rates will be assessed according to MET water rates in effect at the time of billing. Any surcharge funds collected by MET will be invested back to the MET member agency through conservation and local resource development.

MWDOC Surcharge Rates

As a water wholesaler, MWDOC has the opportunity to assess penalties in many different ways. A number of options were discussed and analyzed with the client agencies and Board Committee members. The key components that helped guide development of a surcharge structure included:

- A financial incentive to discourage water usage above a client agency's allocation
- A surcharge rate structure that is administratively easy to understand and implement
- Surcharge rates that are fair and appropriate during a shortage

From these components and input received from both the MWDOC Board and the client agencies, a melded surcharge rate structure was recommended. This was mainly due to its "region-wide" style approach and similar structure to other MWDOC rates and charges.

MWDOC Surcharge Rate Structure – At the end of the allocation year, MWDOC would charge a surcharge to each client agency that exceeded their allocation. This surcharge would be assessed according to the client agency's prorated share (acre-feet over usage) of MWDOC surcharge amount with MET. Below is an example of how this surcharge rate structure would apply:

Under the melded surcharge rate structure, client agencies will only be assessed penalties if MWDOC exceeds its total allocation and is required to pay a surcharge to MET.

MWDOC Billing

During the allocation period, MWDOC billing will remain the same. Only at the end of the twelve-month allocation period will MWDOC calculate each member agency's total potable water use based on the local supply certification and MWDOC allocation model and determine which agencies exceeded their annual allocation. From those agencies that exceeded their allocation, MWDOC will assess surcharge rates according to the melded surcharge rate structure on their next water invoice.

Understanding that the penalties can be significant to a retail agency, MET and MWDOC will allow payment of these penalties to be spread over three monthly billing periods. Therefore, a third of the penalties will be applied each month to the agency's water invoice over a three-month period

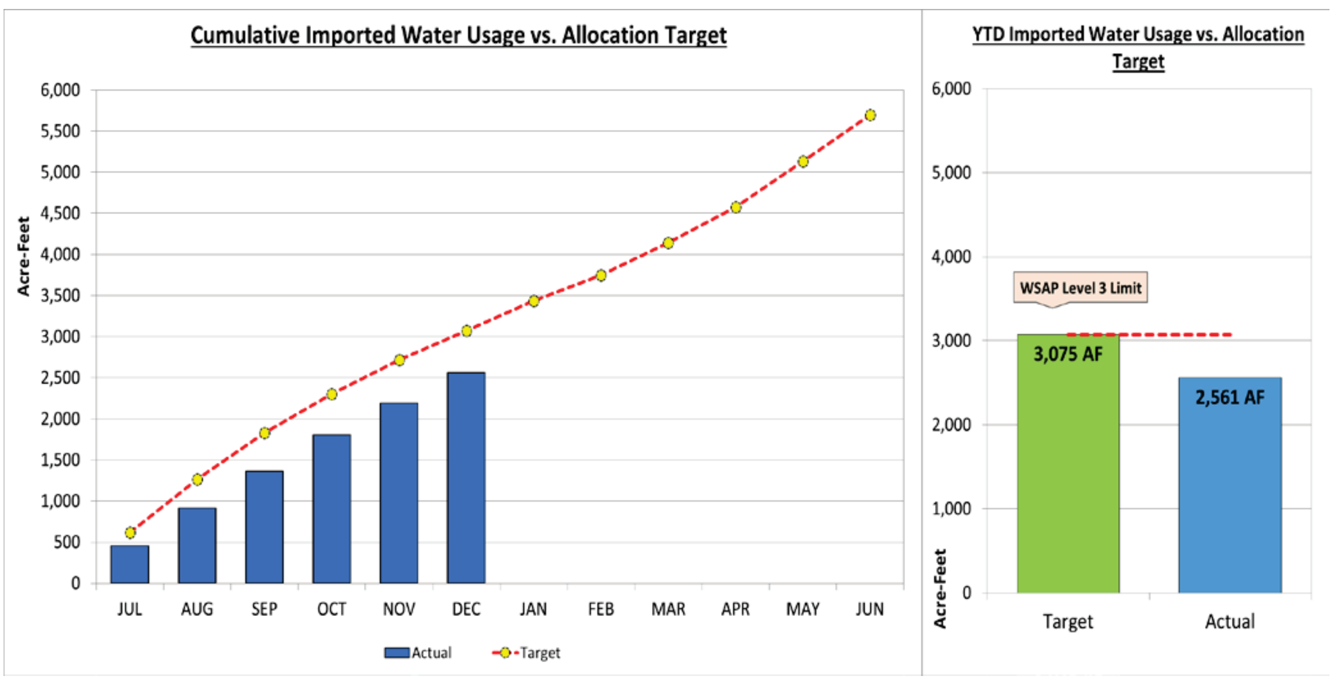
Tracking and Reporting

In preparing for allocations, it is important to track the amount of water the region and each client agency is using monthly. This data is important to help MWDOC and client agencies project their annual usage, evaluate their current demands, and avoid any over usage that will result in allocation penalties. MWDOC will provide water use monthly reports upon request or when necessary that will compare each client agency's current cumulative imported usage to their allocation target (Based off historical monthly percentages of imported usage). In addition, MWDOC will provide quarterly reports on its cumulative retail usage compared to its allocation baseline.

To develop these reports, MWDOC will need to work closely with each client agency to get their local supply data on a monthly basis. This data will not only be used by MWDOC to track monthly usage, but also by MET to assess MWDOC's total projected water demands.

Below in Figure 5.2 is an example of the type of monthly report MWDOC will provide to each client agency during the allocation period.

Figure 5.2
Example of a Client Agency's Monthly Usage Report



Key Dates for Implementation

If a regional shortage is declared, the allocation period will cover twelve consecutive months, e.g. July 1st of a given year through June 30. Barring unforeseen large-scale circumstances, the Regional Shortage Level will be set for the entire allocation period, which will provide the client agencies an established water supply shortage allocation amount. Figure 5.3 Illustrates the Metropolitan timeline for allocations during a two year period.

Figure 5.3: Metropolitan Water District
Adopted Allocation Timeline

Year	Month	Year 1 Board Allocation Decision	Year 1 Allocation Year	Year 2 Board Allocation Decision	Year 2 Allocation Year
YEAR 1	January				
	February				
	March				
	April	**Declaration**			
	May				
	June				
	July		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use		
	August				
	September				
	October				
	November				
	December				
YEAR 2	January				
	February				
	March				
	April			**Declaration**	
	May				
	June				
	July				
	August		**Assess Penalties**		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use
	September				
	October				
	November				
	December				
YEAR 3	January				
	February				
	March				
	April				
	May				
	June				

It is important to note that MWDOC does not anticipate calling for allocation unless the MET Board declares a shortage through it WSAP; and no later than 30 days from MET's declaration will MWDOC announce allocation to its client agencies.

Revisiting the Plan

Calculating the amount of imported water each client agency receives during a water shortage is not an easy task. The key objective in developing this allocation plan is to ensure that a proper and fair distribution of water is given to each client agency. However, due to the complexity of this issue and the potential for unforeseen circumstances that may occur during an allocation year, MWDOC offers the opportunity to review and refine components of this plan where deemed necessary.

The MWDOC staff and client agencies have the opportunity to revisit the plan and offer any recommendations to the MWDOC Board that will improve the method, calculation, and approach of this plan.

MET has a similar process which will allow opportunity to review their plan when deemed necessary.

Appendix A

List of Acronyms:

AF- Acre-feet
M&I- Municipal and Industrial
MET-Metropolitan Water District of Southern California
SWRCB-State Water Resources Control Board
WSAP-Water Supply Allocation Plan

Definitions:

Extraordinary Increases in Production: water production efforts that increase local supplies during an allocation year such as purchasing water transfers.

Groundwater Recovery: The extraction and treatment of groundwater making it usable for a variety of applications by removing high levels of chemicals and/or salts.

In-lieu deliveries: MET-supplied water bought to replace water that would otherwise be pumped from the groundwater basin.

Overproducing groundwater yield: Withdrawal (removal) of groundwater over a period of time that exceeds the recharge rate of the supply aquifer. Also referred to as overdraft or mining the aquifer.

Seawater Barrier: The injection of water into wells along the coast to protect the groundwater basin from seawater intrusion. The injected water acts like a wall, blocking seawater that would otherwise migrate into groundwater basins as a result of pumping inland.

Appendix B

Metropolitan's Draft Water Supply Allocation Plan

MET Final Water
Supply Allocation Pl

Appendix C
MWDOC Growth Adjustment Table per Client Agency

Population of MWDOC Retail Water Agencies

Water Agency	Jan-13	Jan-14	Avg of 2013 & 2014
Brea	41,129	42,181	**41,655**
Buena Park	82,053	82,364	**82,209**
East Orange CWD Retail Zone	3,233	3,247	**3,240**
El Toro WD	48,453	48,628	**48,541**
Fountain Valley	57,129	57,590	**57,360**
Garden Grove	175,096	175,873	**175,485**
Golden State Water Company	167,779	168,561	**168,170**
Huntington Beach	193,873	196,041	**194,957**
Irvine Ranch WD	357,781	369,724	**363,753**
La Habra	60,989	61,455	**61,222**
La Palma	15,890	15,946	**15,918**
Laguna Beach CWD includ. Emerald Bay Service District	20,130	20,204	**20,167**
Mesa Water	105,779	106,152	**105,966**
Moulton Niguel WD	168,301	169,405	**168,853**
Newport Beach	65,404	65,551	**65,478**
Orange	137,814	138,182	**137,998**
San Clemente	50,757	50,960	**50,859**
San Juan Capistrano	37,943	38,491	**38,217**
Santa Margarita WD	152,245	153,358	**152,802**
Seal Beach	23,543	23,618	**23,581**
Serrano WD	6,408	6,437	**6,423**
South Coast WD	34,672	34,816	**34,744**
Trabuco Canyon WD	12,588	12,640	**12,614**
Tustin	67,445	67,700	**67,573**
Westminster	92,939	93,322	**93,131**
Yorba Linda WD	73,378	73,990	**73,684**
Total of MWDOC Agencies	**2,252,751**	**2,276,436**	**2,264,594**

Source: Center for Demographic Research, CSU Fullerton, December 2014. CDR's estimates were based on the 2010 Census. Water agency counts were made for the actual area served, which may be different than the political boundary. Numbers are tied to the State Dept. of Finance numbers for total population of Orange County.

Water Agency	Growth % from 2012 to 2013	Growth % from 2013 to 2014	Avg Growth % 2013 to 2014
Brea	1.13%	2.56%	1.84%
Buena Park	0.62%	0.38%	0.50%
East Orange CWD Retail Zone	0.56%	0.43%	0.50%
El Toro WD	0.56%	0.36%	0.46%
Fountain Valley	0.71%	0.81%	0.76%
Garden Grove	0.19%	0.44%	0.32%
Golden State Water Company	0.87%	0.47%	0.67%
Huntington Beach	0.61%	1.12%	0.87%
Irvine Ranch WD	2.68%	3.34%	3.01%
La Habra	0.53%	0.76%	0.65%
La Palma	0.75%	0.35%	0.55%
Laguna Beach CWD includ. Emerald Bay Service District	0.60%	0.37%	0.48%
Mesa Water	0.58%	0.35%	0.47%
Moulton Niguel WD	0.78%	0.66%	0.72%
Newport Beach	0.51%	0.22%	0.37%
Orange	0.59%	0.27%	0.43%
San Clemente	0.55%	0.40%	0.48%
San Juan Capistrano	0.89%	1.44%	1.17%
Santa Margarita WD	0.55%	0.73%	0.64%
Seal Beach	0.59%	0.32%	0.45%
Serrano WD	0.60%	0.45%	0.52%
South Coast WD	0.61%	0.42%	0.51%
Trabuco Canyon WD	0.55%	0.41%	0.48%
Tustin	0.63%	0.38%	0.50%
Westminster	0.64%	0.41%	0.53%
Yorba Linda WD	1.11%	0.83%	0.97%
Total of MWDOC Agencies	**0.95%**	**1.05%**	1.00%

Appendix D

MWDOC Conservation Hardening Credit Table per Client Agency

Member Agency	GPCD Baseline	GPCD for 2014	Change in GPCD	AF Savings
Brea	288.58	246.61	**41.97**	**1,983**
Buena Park	199.59	165.57	**34.02**	**3,138**
East Orange CWD includ. Tustin	196.19	170.20	**25.99**	**2,065**
El Toro WD	214.96	185.54	**29.42**	**1,748**
Fountain Valley	192.48	184.64	**7.84**	**506**
Garden Grove	166.11	133.16	**32.95**	**6,491**
Golden State Water Company	175.11	146.27	**28.84**	**5,445**
Huntington Beach	163.73	141.79	**21.94**	**4,818**
Irvine Ranch WD	304.13	244.30	**59.83**	**24,778**
La Habra	160.60	150.19	**10.41**	**717**
La Palma	154.88	123.75	**31.13**	**556**
Laguna Beach CWD includ. EBSD	203.74	173.46	**30.28**	**685**
Mesa WD	191.25	166.35	**24.90**	**2,961**
Moulton Niguel WD	236.66	194.91	**41.75**	**7,922**
Newport Beach	258.85	239.36	**19.49**	**1,431**
Orange	231.08	210.84	**20.24**	**3,134**
San Clemente	198.09	178.51	**19.58**	**1,118**
San Juan Capistrano	236.93	206.65	**30.28**	**1,306**
Santa Margarita WD	235.06	201.77	**33.29**	**5,719**
Seal Beach	157.34	147.07	**10.27**	**272**
Serrano WD	485.61	468.88	**16.73**	**121**
South Coast WD	205.86	196.91	**8.95**	**349**
Trabuco Canyon WD	314.13	270.88	**43.25**	**612**
Tustin	191.31	164.21	**27.10**	**2,055**
Westminster	145.76	120.75	**25.01**	**2,614**
Yorba Linda WD	299.73	272.75	**26.98**	**2,236**

[*] The "GPCD Baseline" is the highest Ten-year average from 2004 to present, and includes Recycled water in order to normalize the conservation savings

Source: MWDOC 20% by 2020 OC Regional Alliance Model updated in 2014

WSAP GPCD.pdf

Appendix C

WEROC 2018 Emergency Operations Plan

Appendix D

MWDOC Hazard Mitigation Plan

Appendix E

MWDOC Strategic Communications Program and Plan

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
STRATEGIC COMMUNICATIONS PROGRAM AND PLAN

MWDOC

TABLE OF CONTENTS

INTRODUCTION

"The art of communication is the language of leadership."
~ James Humes, Author & President Reagan's Speechwriter

Strategic communication is the process of relaying specific, purposeful ideas and information to targeted audience groups in order to reach identified goals and objectives. The Municipal Water District of Orange County's (MWDOC or District) goals and objectives are identified in the District's Mission Statement:

*Our mission is to **provide reliable**, high-quality **supplies** from Metropolitan Water District of Southern California and other sources **to meet present and future needs** at an **equitable and economical cost**, and **to promote water use efficiency** for **all of Orange County.***

MWDOC presently develops, coordinates, and delivers a substantial number of programs and services aimed at elevating stakeholders' awareness about water policy, efficient water use, and the District's role in advocating for sound policy and water reliability investments that are in the best interest of Orange County. As water is a necessary resource to all life, these efforts encourage and benefit all Orange County residents and businesses, across all demographics.

Over the past decade, there has been a significant shift in the way people receive information. The media market is overcrowded and constantly evolving. The public is bombarded minute by minute with news from their phones, televisions, computers and tablets. Traditional media has been on the decline and at the same time, digital media continues to explode. Water providers must prove themselves to be relatable, trustworthy, and essential. This is accomplished by communicating more frequently and more effectively using a wider array of tools and channels to meet the needs and interests of an extremely diverse demographic. It is important to recognize that no single communications tool or channel can fulfill all of the District's identified goals and objectives. Instead, a holistic approach should be taken, utilizing all the tools in the toolbox to create a compounding and inclusive impact.

Historically, and typical for the industry, MWDOC has maintained a modest public profile, however, the District's influence continues to grow, and MWDOC has quickly become a leading regional voice for water in the State. MWDOC's very vocal support for the Delta Conveyance Project (DCP), investments in quality water education, water use efficiency, and emergency management, as well as increased participation in state water regulations and policy has elevated the District's profile in the water industry. It has become necessary to expand communications efforts to reach people where they spend the most time - on social media and through other firmly established electronic channels.

Strategic communication is an ongoing activity where the purpose, audience, message, tools, and channels may change at any given moment, however, for the most part, the overarching goals remain the same. As a result of this, MWDOC's Strategic Communications Program and Plan must remain a living document in order to implement effective, relevant communication with timeliness and accuracy. This document serves as a blueprint, establishing a baseline understanding for how MWDOC's programs will provide information and value to its various stakeholders, partners, and employees; enhance the District's image; and, support MWDOC's mission, goals and objectives to secure long term water reliability for the region.

COMMUNICATIONS GOALS & OBJECTIVES

"The two words 'Information' and 'Communication' are often used interchangeably but they signify quite different things. 'Information' is getting out; 'Communication' is getting through."

~ Sydney J. Harris, American Journalist

The charge of the MWDOC Public Affairs Department (Department) is to elevate public awareness, garner support, and establish confidence in the District's initiatives. Additionally, the Department is tasked with providing transparent, reliable, and accurate information to the public, our partners, and our member agencies. These commitments support not only the MWDOC mission, but also an ongoing districtwide stance to be the leading regional voice for water issues throughout the State. With 28 member agencies in the District's service area - many with competing interests - and a complex, ever-changing landscape of water policy and regulation, MWDOC must utilize various communications tools and channels to reach and unify such a vast and diverse group of stakeholders and audiences.

The MWDOC Strategic Communications Program and Plan aligns the District's identified goals and objectives with the respective audiences, and outlines the appropriate communications tools and channels used to connect them all together. This living document will continue to be updated and amended as the District's goals and objectives evolve, shift, or change.

GOALS & OBJECTIVES

As defined by the Board of Directors, executive management, and the District's Mission Statement, MWDOC'S primary goals and present objectives are as follows:

GOAL #1: SECURE LONG TERM WATER RELIABILITY FOR ORANGE COUNTY AND THE REGION.

- **OBJECTIVE 1.1:** Provide recognized, effective leadership and sound representation across all MWDOC organizational roles, including at the District level, at Metropolitan Water District of Southern California (Metropolitan), as well as at the County, State, and Federal levels.

- **OBJECTIVE 1.2:** Provide leadership, water education, and outreach support towards the successful advancement and completion of the **Delta Conveyance Project (DCP)**.

- **OBJECTIVE 1.3:** Provide unwavering advocacy on behalf of the region to invest in, improve, and expand Orange County's water supply portfolio by continuing to study, evaluate, and recommend opportunities identified in the **Orange County Water Reliability Study.**

GOAL #2: EXAMINE, DEVELOP, AND IMPLEMENT SOUND POLICIES AND PROGRAMS THAT SUPPORT ORANGE COUNTY WATER INVESTMENTS, AND PROVIDE RECOGNIZED VALUE TO THE REGION.

- **OBJECTIVE 2.1:** Provide unbiased analysis of water reliability programs, projects, and accompanying policies that affect Orange County, and to identify and ensure implementation of cost efficient solutions for the region.

- **OBJECTIVE 2.2:** Be the trusted, leading voice for the region on water reliability, water policy, efficient water use, water education, and emergency preparedness and response.

- **OBJECTIVE 2.3:** Educate, inform, and involve Orange County stakeholders and California civic, business, education, and community leaders of today and tomorrow.

GOAL #3: PROVIDE EFFECTIVE COMMUNICATION AND ADVOCACY PROMOTING MWDOC PROGRAMS, POSITIONS, AND SERVICES.

- **OBJECTIVE 3.1** Expand and refine communications efforts to ensure stakeholders, partners, employees, and other decision makers have the information and education they need to make judicious decisions regarding water-saving opportunities and best practices, as well as pending policy matters that affect Orange County.

- **OBJECTIVE 3.2:** Grow and improve MWDOC's traditional and electronic media presence to establish trust and credibility in the District's programs, positions, and activities.

- **OBJECTIVE 3.3:** Define and enhance the District's brand identity.

This award winning Strategic Communications Program and Plan articulates the process of communicating the value of the aforementioned goals and objectives to the District's identified audience members who may *or may not* be engaged in MWDOC's programs or activities.

TARGET AUDIENCES

"To effectively communicate, we must realize that we are all different in the way we perceive the world and use this understanding as a guide in our communication with others."

~ Tony Robbins, Author & Entrepreneur

The ability to understand MWDOC's identified audience groups makes it possible to logically align messaging with the appropriate communications tools and channels to reach the District's identified goals and objectives. There are many ways to categorize MWDOC's audience groups and determine which tools and channels the District can use to best connect with those groups. These categories may include demographics, geography, employer, behavior, and attitudes, to name a few.

Accordingly, the Department has identified several key audience groups (See Appendix A). This by no means is a complete list since our business is water, and every person on the planet needs, and uses it. Water is an essential resource for all life, and for the success and sustainability for all societies regardless of how identified audience groups are categorized.

SAMPLE PERSONAS FOR TARGET AUDIENCES

TARGET AUDIENCES

Student K-6th Grade

Curious, Impressionable, Enthusiastic, Imaginative, Adaptive

Goals & Objectives

- Goal #2

Messages

- Message #1-#5
- Message #8-#10
- Message #17-#19

Activities & Partnerships

- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Channels

- Ricky Raindrop
- Community events
- Boy/Girl Scouts Program
- Choice School Programs

OC Elected Official

Ambitious, Engaged, Traditional, Invested, Informed

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Messages

- Message #1-#5
- Message #8-#9
- Message #11-#14
- Message #17

Activities & Partnerships

- Elected Officials Forum
- ACC-OC
- Metropolitan & Member Agencies
- OCBC
- SoCal Water Committee
- SWRCB
- UWI
- AMWA
- ACWA
- AWWA

Channels

- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Inspection Trips
- D.C. Luncheon
- Water Policy Forum
- O.C. Water Summit
- Speaker presentations

MESSAGING AND TACTICS

"Many attempts to communicate are nullified by saying too much."

~ Robert K. Greenleaf, Author

Modern day society is exposed to thousands of bits of information each day. The barrage of messages received through billboards, television, radio ads, as well as print media, email, and text notifications, has given many people a sense of anxiety from information saturation to overload. To be effective, the District must start by stripping out the unnecessary complexities. Messaging needs to be purposeful, simple, clear, concise, and consistent.

Messaging guidelines:

- Before engaging any audience group, be clear about what the District is trying to accomplish.
- Determine what the intended audience needs, wants, and cares about, then get to the point.
- Use words and language that the audience easily understands and can relate to. Be careful not to include industry jargon, technical terms, or excessive detail.
- Use an active voice and clearly define the call to action.

Messages also must be consistent in order to effectively engage audience groups in the District's programs and activities. Important messages become more memorable through repetition. Consistency should be practiced across all District organizational roles as it is vital to the effectiveness of MWDOC's communications efforts and can prevent confusion or misunderstanding.

MESSAGES:

1. Nearly half of all Orange County water is imported from hundreds of miles away AND local water supply sources meet only about half of what Orange County needs.
   a. Protecting our water supply is everyone's responsibility.
   b. Using water more efficiently is everyone's responsibility.
   c. We can all do our part to protect and secure Orange County's water supply for generations to come.
2. Your tap water is clean, safe, and reliable.
3. Providing a healthy, dependable supply of water is our highest priority.
4. Water is our most precious natural resource.
5. Water is life.
6. Less water, more savings.
7. MWDOC can help you save WATER, TIME, and MONEY.
8. Orange County IS Water Smart / OC IS Water Smart (Hook / Lead: Did You Know? / Hashtag: #OCisWaterSmart).
9. We're in this together.
10. Save together.
11. Orange County's primary water source from Northern California is at risk.
12. California (Orange County) needs the **Delta Conveyance Project (DCP) -** the most sound, economical, and environmentally sustainable solution for the region.
13. Climate change, droughts, and other natural disasters will happen. Californians need to invest in a variety of reliable water sources.

14. MWDOC's **Orange County Water Reliability Study** identifies the best water infrastructure projects available to the region based on reliability and value. Through MWDOC's water use efficiency programs and incentives, Orange County saves more than 17.1 billion gallons of water each year.
15. MWDOC has been educating Orange County students about the importance and value of water for nearly five decades through the MWDOC Choice School Programs.
16. Through strong leadership and sound representation, MWDOC works diligently to secure a dependable water future for all of Orange County.
17. Water industry jobs provide steady, long-term careers that ultimately contribute to the welfare of workers, their families, and to the health of the state's economy.
18. MWDOC is committed to educating and encouraging water leaders of today and tomorrow.

While strategy provides the path towards reaching an end goal, tactics define the specific actions taken along the way. Tactics have a definite beginning and end, and are more about the planning and detailed components of a plan.

Some tactics can be utilized to accomplish several, if not all objectives in some cases, however **Tactics** identified for each of the primary MWDOC GOAL objectives are as follows:

OBJECTIVE 1.1 Tactics:

- Maintain a steady, clear, accurate voice throughout the organization by ensuring that all outreach materials both traditional and digital are reviewed and updated frequently.
- Participate in one-on-one and group conversations or meetings with decision makers and partners, and provide informational materials and guidance whenever appropriate.
- Engage stakeholders, partners, and member agency representatives across all MWDOC organizational roles in order to ensure the District is providing needed and necessary support and advocacy.
- Discover common ground and identify opportunities to partner with other organizations to advance the District's goals, objectives, and initiatives.

OBJECTIVE 1.2 Tactics:

- Identify opportunities to keep **DCP** at the forefront of messaging, such as earned media, social media, print media, and other effective forms of communication.
- Identify leading voices in **DCP** as MWDOC Water Policy Forum & Dinner and OC Water Summit speakers.
- Invite speakers from both sides of the **DCP** to participate as Inspection Trip presenters.
- Provide briefing papers, hands-on activities, and presentations to educator groups, teachers, and students to integrate water supply sources and **DCP** into classroom lessons where appropriate.

OBJECTIVE 1.3 Tactics:

- Work with member agencies and partners to educate and advocate for the completion of local projects deemed most valuable by the **Orange County Water Reliability Study.**
- Produce collateral and content such as briefing papers, media kits, and videos highlighting the **Orange County Water Reliability Study** for stakeholders including elected officials, member agencies, as well as traditional and social media audiences.

OBJECTIVE 2.1 Tactics:

- Host a learning workshop targeting leaders from member agencies; include a messaging component for attendees.

OBJECTIVE 2.2 Tactics:

- Present a MWDOC Water Policy Forum & Dinner ***Speakers Series*** each fiscal year and secure top-level expert speakers to discuss timely, relevant water related topics with Orange County stakeholders and leaders.
- Develop messaging that amplifies MWDOC's opposition to any potential legislation that imposes a "public goods charge" "water user fee", or "water tax" on public water agencies or their ratepayers.
- Assume leadership roles where possible at the local, County, and State levels in all areas of expertise and District focus.
- Provide comprehensive tool kits to stakeholders, partners, and member agencies that support and promote water-centric programs, activities, and campaigns, offering direction for implementation and ensuring a unified message.
- Provide hands-on water education activities to Orange County K-12 teachers that enhance and extend classroom lessons.
- Administer the Water Energy Education Alliance that strengthens career pathways and builds and bolsters technical training programs for Southern California students.
- Administer a water-centric K-12 MWDOC Choice School Program for Orange County students that enhance their ability to become responsible environmental stewards
- Support and advance environmental literacy, giving students the knowledge and understanding they need to create ecologically sound, economically prosperous, and equitable communities.

OBJECTIVE 3.1 Tactics:

- Provide stakeholders with valuable resources such as the OC Water 101 Booklet (volume 1) and other MWDOC collateral (briefing papers).
- Integrate District partners and their target audiences (i.e. ACCOC, OCBC, and others) into Inspection Trips and Policy Dinners.
- Provide briefing papers, hands-on activities, and focused presentations where appropriate.
- Utilize all communications tools and channels to engage and inform identified audience groups.

OBJECTIVE 3.2 Tactics:

- Cultivate relationships with traditional media (Newspaper Editorial Boards, Radio and Television News outlets) to maintain a steady voice on water issues, and utilize Social Media to maximize the reach of earned media opportunities and events.
- Evaluate and amend where necessary all current communications platforms and tools to ensure the District is utilizing the most effective and contemporary systems.

OBJECTIVE 3.3 Tactics:

- Apply approved Logo and Brand Identity Guidelines to all MWDOC outreach materials and platforms, activities, programs, and events.
- Promote districtwide buy-in by implementing the MWDOC Logo and Brand Identity Guide.

COMMUNICATIONS TOOLS AND CHANNELS

"If you have an important point to make, don't try to be subtle or clever. Use a pile driver. Hit the point once. Then come back and hit it again. Then hit it a third time- a tremendous whack."

~ Winston Churchill, British Politician, Army Officer & Author

Most of the District's audience groups will already have preconceived notions about who MWDOC is based on past or current collaborations, our website structure and social media content, as well as any interaction with our communications materials including articles, print materials, and news media. To successfully reach these individuals with our intended messages, MWDOC must utilize the tried-and-true tools and resources that are readily available, and strategically place the messages where they can easily be found.

As a guiding reference, the MWDOC Public Affairs Department has defined communications tools, activities, and channels, and identified how MWDOC currently utilizes each of these resources to effectively reach the goals and objectives of the District.

A communications tool is the partnership or activity used to interface with an identified audience to achieve goals and objectives. Some examples include:

- **Partnerships -** *S*uccessful partnerships are developed through an understanding of each other's specific needs to reach identified goals and objectives. Partners typically see a reward involved with coming together and are able to offer each other a choice of tools, services, and solutions to meet those needs. Exceptional partnerships act as a catalyst for those involved to grow and prosper.

  MWDOC's RECOGNIZED PARTNERS*:

  - MWDOC member agencies
  - Metropolitan and its member agencies
  - Department of Water Resources (DWR)
  - State Water Resources Control Board (SWRCB)
  - Media
  - Technical Consultants
  - School Program Contractors
  - Educators
  - Boy Scouts/Girl Scouts Organizations
  - Association of California Cities – Orange County (ACC-OC)
  - Orange County Business Council (OCBC)
  - Association of California Water Agencies (ACWA)
  - American Water Works Association (AWWA)
  - Association of Metropolitan Water Agencies (AMWA)
  - Council for Environmental and Economic Balance (CEEB)
  - Urban Water Institute (UWI)
  - So Cal Water Committee
  - Wyland Foundation

- Bolsa Chica Conservancy
- Orange County Coastkeepers
- UCCE Master Gardeners
- Orange County Department of Education (OCDE)
- OC STEM
- California Environmental Literacy Initiative (CAELI)
- California Environmental Education Foundation (CEEF)
- Orange County and Pacific West Association of Realtors (OCAR) and (PWR)
- Other Contractors

*This is by no means an exhaustive list, but gives an indication of the many partners of the District.

- **Activities-** An activity is a planned course of action taken in order to achieve a specific aim. Activities have a distinct beginning and end and usually contain several tasks within them that once completed, conclude the activity. Examples of District activities:

    - Annual Campaigns
        - MWDOC Water Awareness Poster Contest
        - Fix-a-Leak Week
        - Irrigation Week
        - Smart Irrigation Month
        - Wyland National Mayor's Challenge for Water Conservation
        - Imagine A Day Without Water
        - Emergency Preparedness Month
        - Garden Smart campaign, and more
    - Workgroup Meetings
    - D.C. Luncheon
    - Water Energy Education Alliance (WEEA) Leadership Roundtable meetings
    - Surveys
    - Water saving programs and incentives

- **A Communications Channel** is the medium through which a message is sent to its intended receiver. The basic channels are visual, written, spoken, or electronic. Examples of District communications channels:

    - **Word of mouth**
    - **Speaker presentations**
    - **Trainings**
    - **Conferences/Meetings**
        - Elected Officials Forum
        - Water Policy Forum
        - Orange County Water Summit
    - **Community Events**
    - **Print media**
        - News stories/News Releases

- Newsletters
- Briefing papers/Talking points
- Media kits
- Written correspondence
- Introduction to Water booklet (Volumes)
- Flyers/Signage/Brochures
- Promotional giveaways
- Door hangers/Bill inserts
- Consumer Confidence Reports (CCRs)

- **Electronic media**
  - Social Media
  - Email blasts
  - Radio
  - Television
- **District Programs**
  - Choice School Programs
  - Scouts Programs
  - WEEA
  - Inspection Trip Program
  - WEROC
- **Ricky Raindrop**

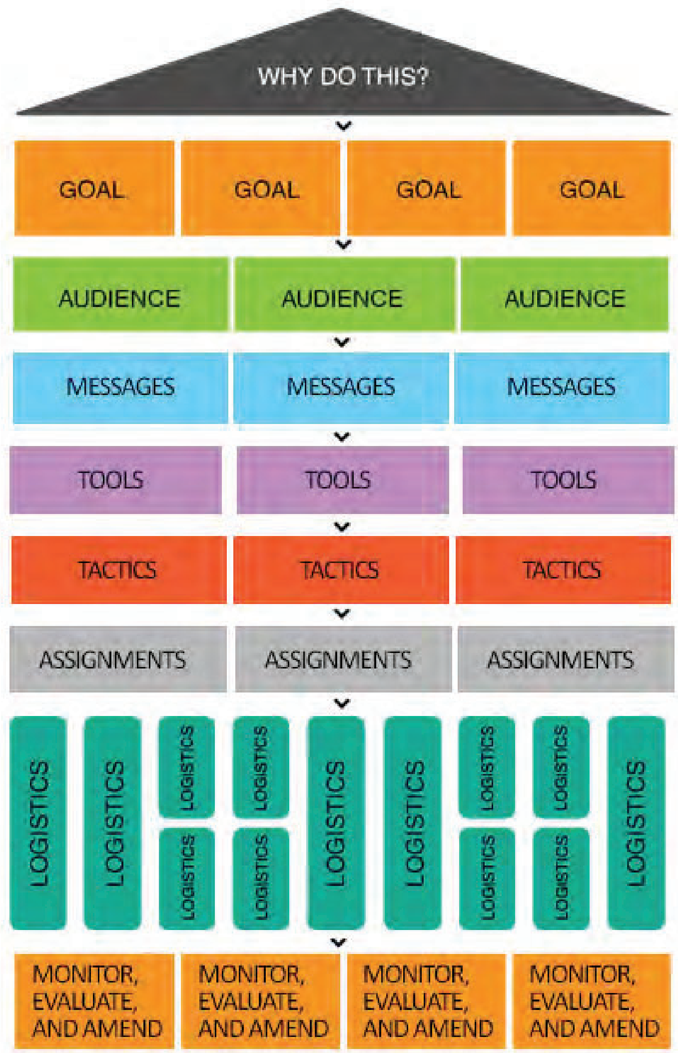
IMPLEMENTATION, ASSIGNMENTS, AND SCHEDULES

"Individual commitment to a group effort – that is what makes a team work, a company work, a society work, a civilization work."

~ Vince Lombardi, American Football Player & Coach

Public sector organizations shoulder a unique responsibility to be transparent, accountable, and have a positive impact on the community. A carefully developed and executed communications plan can establish trust and credibility in the District's programs and activities for our stakeholders, partners, audience members, and employees. This holds especially true in the water industry which is often vulnerable to changes in the political climate.

To effectively reach MWDOC's identified goals and objectives, each of the District's programs and activities must include *basic strategic targets* such as goals, intended audiences, messages, and tools. To ensure the benefit or value received is worth the time, money, talent, and effort expended by the District and its staff, every task, project, or program should start with the question "Why are we doing this?" In turn, all strategic targets should include an *implementation plan* which identifies tactics and logistics, and eventually, active monitoring, evaluation, and amending.



Assignments are essential to maintaining productivity and accountability as well as collectively accomplishing the goals of a project. The MWDOC Public Affairs Department has developed a Programs and Responsibility flowchart which breaks down the Department's primary roles and assignments by team member (See Appendix B).

Additionally, the MWDOC Public Affairs Department has developed a series of logistical checklists to efficiently plan, implement, and control the flow of information for each program and activity, and will continue to do so as new activities and programs are developed. Furthermore, the Department uses robust program management software tools such as Asana and CoSchedule to stay in touch with impending deadlines and to keep everything, including assignments and checklists, organized and in one place.

IMPLEMENTATION, ASSIGNMENTS, AND SCHEDULES

	Federal or State Elected Officials	Legislative Staffers	Orange County Elected Officials	Business Community Leaders	Environmental Organization Leaders	Community Organization Leaders	Water Industry Professionals	Landscape Contractor	Media	Educators	Students K – 6th	Students 7th-12th	College Students	Orange County Residents	Emergency Manager	Human Resources
GOALS																
Goal #1	X	X	X		X		X		X	X						
Goal #2	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Goal #3	X		X	X	X	X	X	X	X	X			X	X	X	X
MESSAGES																
Message #1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #2	X	X	X	X	X	X			X	X	X	X	X	X	X	
Message #3	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Message #4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #5	X		X	X	X	X	X			X	X	X	X	X		
Message #6				X				X					X	X		
Message #7				X		X		X					X	X		
Message #8	X		X	X	X	X	X	X		X	X	X	X	X	X	
Message #9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #10	X			X	X	X	X	X		X	X	X	X	X		
Message #11	X	X	X	X	X		X		X	X			X	X	X	
Message #12	X	X	X	X	X		X		X	X			X	X	X	
Message #13	X	X	X	X	X		X		X	X			X	X	X	
Message #14		X	X		X		X		X	X			X	X	X	
Message #15				X	X	X	X	X	X	X			X	X		
Message #16							X			X				X		
Message #17	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Message #18		X		X		X	X			X	X	X	X	X		X
Message #19	X	X		X	X	X	X			X	X	X	X	X		X
COMMUNICATIONS TOOLS AND CHANNELS																
Partnerships	X	X	X	X	X	X	X	X		X	X	X	X	X		X
Annual Campaigns	X	X	X	X	X	X	X		X	X	X	X	X	X		
Surveys	X	X	X	X	X		X	X		X				X	X	X
Word of Mouth	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Speaker Presentations	X	X	X	X	X	X	X		X	X	X	X			X	
Trainings							X	X		X				X	X	X
Conferences/Meetings	X	X	X	X	X	X	X		X	X					X	X
Community Events	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Print Media	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Electronic Media	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
District Programs	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Ricky Raindrop									X	X	X	X		X		
Virtual Platforms	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X

MONITOR, EVALUATE, AND AMEND

"Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted."

~ Albert Einstein, Theoretical Physicist

The effectiveness of the MWDOC Strategic Communications Program and Plan depends on a large variety of factors including technological advancements or changes, the rise and fall of audience engagement, current news or media concentration, political changes in leadership and focus, and even the weather.

There are a significant number of Key Performance Indicators (KPI), metrics and measurements that the MWDOC Public Affairs Department currently uses. Some of the most common include:

- Constant Contact activity reports- email marketing for surveys, events, newsletters, and news release distribution (results per activity)
  - Open rate
  - Click rate
  - Registration rate
    - Includes financial indicators
  - Responses
- Website (Google) Analytics
  - Return Visitor and First Visitor metrics
  - Web traffic and Search Engine Optimization (SEO) including landing pages and time spent on specific pages
  - Click through rate
  - Page views per session
  - Referral traffic
  - Content downloads
  - Use of forms such as newsletter, interest lists, and mailing list sign ups
- Social Media Dashboard Analytics (Facebook, Twitter, Instagram)
  - Followers
  - Likes/Fans
  - Post engagements
  - Content sharing
  - Sentiments
  - Link clicks
  - Inbound messages
  - Ad campaign performance
  - Ranking
- Verbal and Written Feedback
  - Phone calls
  - Email and written correspondence
  - Public comment at meetings

Program and activity evaluation is constant, and through this evaluation process the District's messaging and activities continue to be shaped and refined. Additionally, the tools mentioned here will remain relevant and useful no matter how the goals and objectives or messaging changes.

MWDOC BRAND

"Your brand is what people say about you when you're not in the room."

~ Jeff Bezos, American Technology Entrepreneur, Founder, Chairman, & CEO of Amazon

Many organizations downplay the value of branding because they view themselves as a business, not a brand. However, branding is a critical step to achieving success in communications, creating meaningful interactions, and establishing credibility. Branding is the sum of all the impressions an audience has of an organization. This is based on the interactions they have had with employees and Board members, as well as with the communications tools and channels that are used to reach them. Each of these interactions tells a story to the audience. For example, if materials are presented in a clean, organized, skillful, and contemporary fashion, the audience associates those materials with sophistication, expertise, and trustworthiness. The most important thing is to set expectations for the experience that the audience will have each time they interact with the brand, making it instantly recognizable. People need to identify with, and understand what information comes to them and from whom. How an audience perceives the brand will ultimately determine how successful an organization's efforts are. If an organization does not create and establish their own brand, their audience and competitors will do it for them.

Decades ago, branding was simply labeled a visual representation of an organization - a name, slogan, logo, or combination of all three. Today, it is understood that these elements, while extremely powerful and important, are just one piece of the puzzle. A brand is far more encompassing—it defines an organization's identity. Some of the benefits gained by strengthening the MWDOC brand include:

- **Builds trust and establishes credibility** – Credibility is at the heart of any successful outreach effort. Maintaining a consistent message demonstrates expertise, professionalism, and experience. Brand credibility is established by:
    - Non-verbal identifiers such as a logo or graphic materials
    - Verbal or written communications through marketing efforts
    - The organization's mission statement
    - Delivering expertise regularly through all identified channels
    - Consistently providing valuable information and resources

- **Fosters loyalty** – Once trust has been established, loyalty will soon follow. People who are loyal to a brand continue to support that organization in good times and bad, share positive messages, and introduce new audience groups to the organization.

- **Increased recognition or brand awareness** – One measurement of brand success is if an organization can be identified simply by its attributes such as the logo, tagline, or materials packaging. Brand familiarity can influence decisions when an audience must differentiate between messages that contain conflicting information. People are more likely to trust a brand they recognize.

- **Supports marketing and outreach efforts** – A brand links the name, logo, print materials, online presence, and professional services together bringing a united, clear, consistent message to all audience groups, and across all channels.

- **Extends range of influence** – Consistent branding is a powerful tool that has the potential to reach a large amount of people across a wide variety of channels including online, offline, mobile, and niche markets.

- **Motivates employees** – To build a strong brand, it is essential to have brand ambassadors – individuals, both internal and external, who are engaged, connected, and committed to the organization's activities and priorities. One of the most powerful, and more frequently overlooked brand assets is an organization's workforce. Employees spend a great deal of time at work, and as a result, form solid opinions about their employer. A contemporary, clean, consistent, and well-respected brand can institute a sense of pride, and can help inspire strong, internal brand ambassadors.

A strategic and thoughtfully developed brand should become the backbone of an organization's identity. It is a powerful communications tool which, when utilized correctly, will enable the District to build and establish credibility, as well as present an overall positive experience for identified audience groups. The MWDOC Public Affairs Department has developed the MWDOC Logo and Brand Identity Guidelines as a living document that will continue to grow and evolve along with the District (See Appendix C). The Department's consistent branding efforts align with the MWDOC Strategic Communications Program and Plan goals and objectives to successfully maintain and continue to enhance a brand presence throughout the Orange County region.

Federal or State Elected Official

Ambassador, Busy, Engaged, Educated, Driven

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Messages

- Message #1-5
- Message #8-13
- Message #17
- Message #19

Activities & Partnerships

- ACWA
- OCBC
- SoCal Water Committee
- SWRCB
- Metropolitan & Member Agencies
- Media
- D.C. Luncheon

Channels

- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Water Policy Forum
- O.C. Water Summit
- Elected Officials Forum
- Inspection Trips

Legislative Staffer

Political Emphasis, Educated, Involved, Ambitious, Adaptable

Goals & Objectives

- Goal #1
- Goal #2

Messages

- Message #1-4
- Message #9
- Message #11-14
- Message #17-19

Activities & Partnerships

- MWDOC Member Agencies
- ACC-OC
- Surveys
- D.C. Luncheon

Channels

- Introduction to Water Booklet
- Briefing papers
- Social media
- Virtual platforms
- Inspection Trips
- Water Policy Forum
- O.C. Water Summit
- Elected Officials Forum

OC Elected Official

Ambitious, Engaged, Traditional, Invested, Informed

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Messages

- Message #1-#5
- Message #8-#9
- Message #11-#14
- Message #17

Activities & Partnerships

- Elected Officials Forum
- ACC-OC
- Metropolitan & Member Agencies
- OCBC
- SoCal Water Committee
- SWRCB
- UWI
- AMWA
- ACWA
- AWWA

Channels

- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Inspection Trips
- D.C. Luncheon
- Water Policy Forum
- O.C. Water Summit
- Speaker presentations

Water Industry Professional

Authority, Steward, Knowledgeable, Focused, Forward-thinking

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Messages

- Message #1
- Message #3-#5
- Message #8-#19

Activities & Partnerships

- Water-saving programs & incentives
- MWDOC Member Agencies
- Boy/Girl Scouts Organization
- Surveys
- Annual campaigns
- SWRCB
- AWWA
- UWI
- ACWA
- So Cal Water Committee

Channels

- Trainings and Workgroup Meetings
- Print media
- Electronic media
- CCRs
- Virtual platforms
- Community events
- District Programs
- Conferences and Meetings

Media

Persistent, Proactive, Inquisitive, Adventurous, Resilient

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- Annual campaigns
- All identified partners if newsworthy

Messages

- Message #1-#4
- Message #9
- Message #11-#15
- Message #17

Channels

- Print media
- Electronic media
- Word of mouth
- Virtual platforms
- Water Policy Forum
- O.C. Water Summit
- Inspection Trips
- Ricky Raindrop

Business Community Leader

Influential, Resourceful, Accomplished, Motivated, Active

Goals & Objectives

- Goal #2
- Goal #3

Activities & Partnerships

- OCAR
- OCBC
- ACC-OC
- Imagine a Day Without Water
- Garden Smart campaign

Messages

- Messages #1-13
- Messages #15
- Messages #17-19

Channels

- Social media
- Flyers/Signage/Brochures
- Speaker presentations
- Door Hangers/Bill Inserts
- Surveys
- Word of mouth
- Virtual platforms
- WEEA
- Inspection Trips
- O.C. Water Summit
- Water Policy Forum

Community Organization Leader

Purposeful, Dynamic, Trustworthy, Dedicated, Economical

Goals & Objectives

- Goal #2
- Goal #3

Messages

- Message #1-5
- Message #7-10
- Message #15
- Message #17-19

Activities & Partnerships

- Boy/Girl Scouts Organizations
- Inspection Trips
- OCAR
- Water-saving programs & incentives
- Orange County Coastkeeper
- CAELI
- UCCE Master Gardeners
- Imagine a Day Without Water
- Garden Smart campaign
- Wyland National Mayor's Challenge for Water Conservation

Channels

- Social media
- Flyers/Signage/Brochures
- Speaker presentations
- Door Hangers/Bill Inserts
- Virtual platforms
- Word of mouth
- News stories
- Newsletters
- Briefing papers
- CCRs

Environmental Community Leader

Service-oriented, Passionate, Invested, Motivated, Aware

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Messages

- Message #1-5
- Message #8-15
- Message #17
- Message #19

Activities & Partnerships

- Orange County Coastkeeper
- Bolsa Chica Conservancy
- CAELI
- Imagine a Day Without Water
- Wyland National Mayor's Challenge for Water Conservation

Channels

- Social media
- Surveys
- Speaker presentations
- Water Policy Forum
- Briefing papers
- CCRs
- Virtual platforms
- Community events
- Inspection Trips

Emergency Manager

Organized, Persuasive, Responsible, Driven, Decisive

Goals & Objectives

- Goal #2
- Goal #3

Messages

- Message #1-4
- Message #8-9
- Message #11-14
- Message #17

Activities & Partnerships

- Surveys
- DWR
- Technical consultants
- ACWA
- Other contractors
- Imagine a Day Without Water
- Emergency Preparedness Month
- MWDOC Member Agencies

Channels

- Speaker presentations
- Electronic media
- Trainings
- Conferences
- Virtual platforms
- Community events
- WEROC

Landscape Contractor

Expert, Thrifty, Creative, Hands-on, Detail-oriented

Goals & Objectives

- Goal #3

Messages

- Message #1
- Message #4
- Message #6-10
- Message #15

Activities & Partnerships

- MWDOC Member agencies
- OCAR
- Wyland Foundation
- UCCE Master Gardeners
- Smart Irrigation Month
- Irrigation Week
- Garden Smart campaign

Channels

- Flyers/Signage/Brochures
- Door Hangers/Bill Inserts
- Social media
- Trainings
- Virtual platforms

OC Residents

Diverse, Penny-wise, Family focused, Casual, Industrious

Goals & Objectives
- Goal #2
- Goal #3

Activities & Partnerships
- MWDOC Member Agencies
- Annual campaigns
- Water-saving programs & incentives
- Orange County Coastkeeper
- UCCE Master Gardeners
- OCDE
- CAELI
- OC STEM
- Boy/Girl Scouts Organizations

Messages
- Message #1-19

Channels
- Electronic media
- Surveys
- District Programs
- Word of mouth
- Door Hangers/Bill Inserts
- CCRs
- Promotional items
- Virtual platforms
- Community events

College Student

Independent, Perceptive, Receptive, Social, Frugal

Goals & Objectives
- Goal #2
- Goal #3

Activities & Partnerships
- Educators
- Surveys
- Bolsa Chica Conservancy
- Orange County Coastkeeper
- CAELI
- Imagine a Day Without Water
- Wyland National Mayor's Challenge for Water Conservation

Messages
- Messages #1-15
- Messages #17-19

Channels
- Social media
- Word of mouth
- Print media
- Electronic media
- Virtual platforms
- Community events

Student 7-12th Grade

Opinionated, Vulnerable, Eager, Trendy, Utopian

Goals & Objectives

- Goal #2

Messages

- Message #1-#5
- Message #8-#15
- Message #17-#19

Activities & Partnerships

- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Channels

- Ricky Raindrop
- Community events
- Boy/Girl Scouts Programs
- MWDOC Choice School Programs
- Speaker presentations
- WEEA

Student K-6th Grade

Curious, Impressionable, Enthusiastic, Imaginative, Adaptive

Goals & Objectives

- Goal #2

Messages

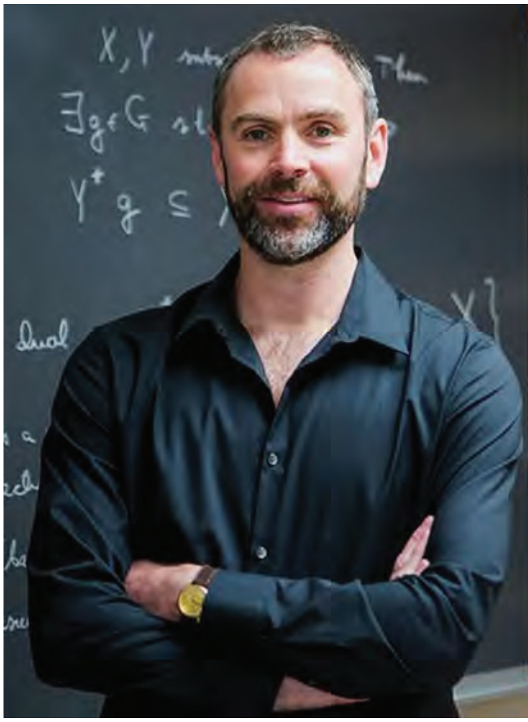
- Message #1-#5
- Message #8-#10
- Message #17-#19

Activities & Partnerships

- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Channels

- Ricky Raindrop
- Community events
- Boy/Girl Scouts Program
- Choice School Programs



Educators

Intellectual, Industrious, Influential, Inventive, Innovative

Goals & Objectives
- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships
- OCDC
- OC STEM
- CAELI
- School Program Contractor
- Imagine a Day Without Water
- MWDOC Water Awareness Poster Contest
- Wyland National Mayor's Challenge for Water Conservation

Messages
- Message #1-5
- Message #8-19

Channels
- Briefing papers
- Virtual platforms
- Trainings
- Word of mouth
- WEEA
- Boy/Girl Scouts Programs
- MWDOC Choice School Programs
- Introduction to Water Booklet
- Ricky Raindrop

APPENDIX B

Public Affairs Team Programs/Responsibilities

#P Digital Strategic Communications Consultant & Video Production

Damon Micalizzi
PA Director

- Board Liaison and Support
- Executive Management Team
- Communications Advisor
- Strategic Communications Forecasting and Planning
- Member Agency Support
- Media Relations and District Spokesperson
- Influencer Partnerships
- Interdepartmental Liaison
- Interagency Relationship Development
- Editorial Content Development
- News Releases
- OC Water Summit

Tiffany Baca
PA Manager

- Daily Program, Staff, and Project Management
- Evaluate, Refine, and Advance Existing Programs
- New Program Development
- Establish, Maintain, and Grow Strategic Partnerships
- Strategic Message Development
- Leader, Water Energy Education Alliance (WEEA)
- Develop and Advance Education Program Initiatives
- News Releases / Media Relations
- Website Management
- Social Media Oversight
- Brand Manager
- Public Affairs Workgroup

Sarah Wilson
PA Specialist

- Member Agency and Board Support
- Choice School Programs Coordination and Oversight
- Scouts Programs Oversight
- Public Outreach
- Press Kit Development
- Marketing Material Development
- Graphic Support
- Water Policy Dinners & Special Event Coordination
- eCurrents Newsletter
- Editorial Content Development
- News Releases
- Community Event Oversight

Bryce Roberto
PA Coordinator

- Member Agency and Board Support
- Inspection Trips Program Coordination
- Public Outreach
- Boy Scouts Program Coordination
- Social Media Content Development
- Marketing Material Development
- Graphic Support
- Briefing Papers/ Fact Sheets Maintenance
- Research Projects Including Event Speaker Recommendations
- Consumer Confidence Reports

Traci Muldoon
PA Assistant

- Member Agency Support
- PA Department Support
- Registration Special Events
- Social Media Content Development
- Marketing Material Development
- Graphic Support
- Poster Contest Coordination
- Community Event Coordination & Participation
- Editorial Calendar
- Research Projects
- Press Clips
- Promotional Items

Katie Vincent
Education Programs Assistant

- Water Energy Education Alliance (WEEA) Program Support
- Research Projects Related to Career Technical Education (CTE)
- Identify, Secure, and Coordinate Grant and Sponsorship Funding
- Identify and Secure WEEA Meeting Speakers
- Provide Presentations on Workforce Development and CTE
- Coordinate with Educators, Workforce Development Entities, and Industry on CTE
- Marketing Material Development Specific to WEEA
- Other Duties as Assigned

MWDOC

Municipal Water District of Orange County

Logo and Brand Identity Guidelines

Updated 06.29.2018

Brand Implementation

Introduction

Guidelines for Brand Identity and Logo Usage

This logo and brand identity resource will provide guidelines for using the Municipal Water District of Orange County (MWDOC) logo and will introduce the color, typeface, and brand voice that should be used across all MWDOC communications. The elements described in this guide are a fundamental part of how others recognize and relate to MWDOC and these standards have been established to ensure the brand remains consistent in appearance, sound, and feel. While this resource covers most basic applications and instances of the MWDOC brand and use of the logo, it cannot anticipate all possible scenarios.

Any logo or brand identity issues not covered in this guide must be referred to:

MWDOC Public Affairs
Attn: Tiffany Baca
(714) 593.5013
tbaca@Mwdoc.com
18700 Ward Street
Fountain Valley, CA 92708

Color Palette

Use these values when referring to color options

The MWDOC brand and logo color palette was selected to project a modern, clean look while remaining true to the brand's historic color background. The basic, primary colors orange, green, and blue have been used in MWDOC's visual communications since 1971.

The colors shown on the opposite page should be incorporated into all MWDOC branded materials. Spot, process, and web color equivalents have been provided as reference in order to ensure consistency.

It is important to note that it is impossible to foretell what differences will occur between every printed and digital application of these selected colors. There are countless factors in which the appearance of any color may vary. To ensure the best result, always default to this guide, or when producing print or electronic materials through a selected vendor, consult a professional graphic designer or professional printer.

MWDOC White
Pantone: Bright White
Hex: ffffff
R: 255 G: 255 B: 255
C: 0 M: 0 Y: 0 K: 0
HTML: ffffff

MWDOC Green
Pantone: 7739
Hex: 319B42
R: 49 G: 155 B: 66
C: 80 M: 14 Y: 100 K: 2
HTML: 339933

MWDOC Light Blue
Pantone: Medium Blue C
Hex: 0084CA
R: 0 G: 132 B: 202
C: 82 M: 39 Y: 0 K: 0
HTML: 0099CC

MWDOC Dark Blue
Pantone: 7693
Hex: 004976
R: 0 G: 73 B: 118
C: 100 M: 75 Y: 30 K: 14
HTML: 003366

MWDOC Orange
Pantone: 1375 C
Hex: FF9E1B
R: 248 G: 156 B: 34
C: 0 M: 45 Y: 97 K: 0
HTML: FF9933

Typeface

Simple. Legible. Clean.

All variations of the MWDOC logo use only one font, **Franklin Gothic Demi**. This font style was selected for it's simplicity and legibility, and also because it is included as a default font style with any Microsoft Office installation. The goal with all of the selected typeface across the MWDOC brand is to keep it clean and simple.

That said, when producing materials with text, the typeface used should be consistent with the brand image. Typeface to be used in instances that require text are: **Franklin Gothic Demi, Franklin Gothic Medium, Franklin Gothic Book**, **Calibri**, **Calibri Light, Arial,** and in certain cases, **English**. The typeface referenced here should be used for all internal and public documents, stationery, outreach materials, promotional items, and correspondence.

(Franklin Gothic Demi)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(Franklin Gothic Medium)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(Franklin Gothic Book)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(Calibri)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(Calibri Light)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(Arial)
Municipal Water District of Orange County
1234567890!@#$%^&*()

(English)
Municipal Water District of Orange County
1234567890!@#$%^&()*

Brand Voice and Messaging

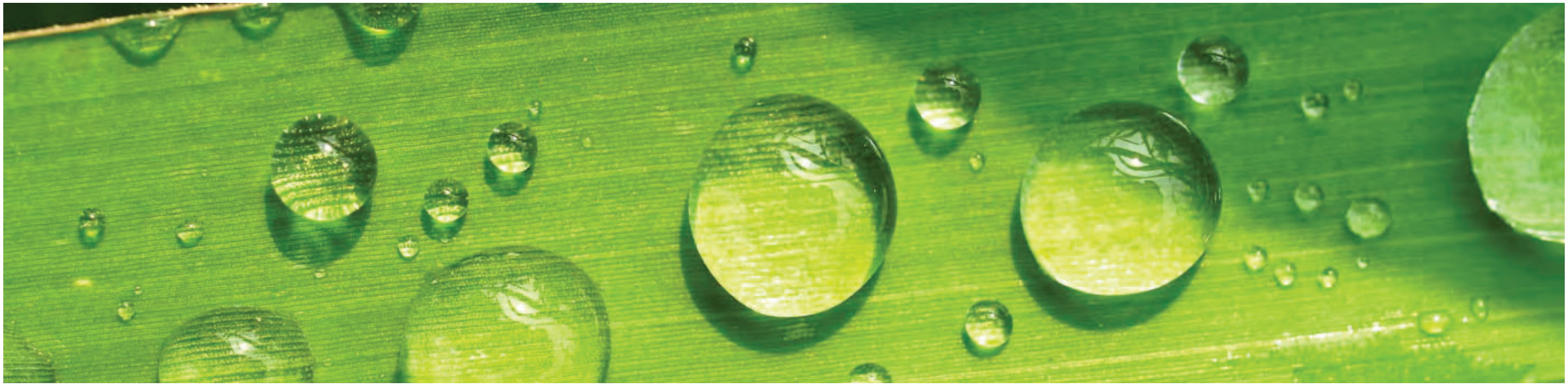
Purposeful, consistent expression through words

The brand voice consists of both **messaging** and **tone**. These two aspects come together to create an effective strategy when speaking to the public. It is important to create clear, consistent messaging that reflects the MWDOC brand personality. The brand message is simply MWDOC's mission statement. All roads lead back to the mission statement. The tone is how you are communicating the message.

Our Mission:

"To provide reliable, high-quality supplies from MWD and other sources to meet present and future needs, at an equitable and economical cost, and to promote water use efficiency for all of Orange County."

~ MWDOC



Brand Message

Have a plan – Have a goal

To create effective messaging, is important to tell a story from start to finish. Clarity and consistency are key. Always have a goal when preparing messages for both internal and external audiences. Define what you are trying to achieve. Plan key messages and action points before creating content to avoid including technical jargon and fluff where it is not needed. If your message requires the use of technical language and/or acronyms, spell it out in clear language for your audience. Avoid colloquialisms. Stick to the point, and be as succinct as possible.

The Lead

Introduction and main point(s)
Who, What, When, Where, Why

The Body

Evidence, background, primary details that support The Lead

The Tail

Least important information; details for those most interested

Brand Tone

Everything we write should be thoughtful, interesting, and human

In order to communicate effectively, you have to know who your audience is and present your message in a way that they understand and respond to. Essentially, each time you communicate with an audience, you need to tailor your message in order to engage them. Your voice is your voice, but you take on different tones depending on who you are speaking to - Elected Official vs Typical Homeowner, Education Partner vs School Children, or describing an event vs giving instructions. You may have to stretch or adapt your tone to fit the audience or platform. The tone that should be used to communicate the brand effectively should always be:

KNOWLEDGEABLE

INFORMATIVE

ENGAGING

PROFESSIONAL

TRUSTWORTHY

FOCUSED

CLEAR

CONSISTENT

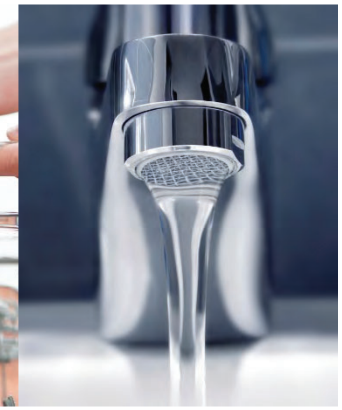
APPROACHABLE

PHOTOGRAPHY

BRANDING





PHOTOGRAPHY

BRANDING

When choosing photographs for presentations, outreach, and promotional materials, select simple, clean imagery that aligns with the MWDOC brand. Whenever possible, use professional stock images that are clean and crisp. To assist with this, the MWDOC Public Affairs Department has put together a selection of presentation images that have been saved in the Shared O drive under Presentation Images.

Logo Design

The conceptual background

The original MWDOC logo was adopted in 1971 and since that time, has represented the organization throughout Southern California's water industry. The MWDOC logo became a recognized symbol of water resource planning, advocacy, and reliability for Orange County. When preparing the design for the new logo, it became very clear that the organization's history and reputation needed to be acknowledged by maintaining several key brand elements.

Staying true to the history of the MWDOC brand, colors in the original logo design, orange, green and blue, were maintained.

The water element was reintroduced in the new MWDOC logo design in a revitalized, modern way. The cool, water-blue-colored leaf was placed in the forefront of the design to symbolize water as MWDOC's primary focus.

There are hundreds of water agencies that serve California, and it can be difficult to differentiate which agency serves who. Through the use of color, a subtle statement is made by clearly separating MWD and OC.

Since 1971, the orange has been a primary element of the MWDOC brand, and it made sense to keep it. MWDOC serves and advocates on behalf of 2.3 million Orange County residents.

The font that was selected for the refreshed MWDOC logo is nearly the same weight as the font in the original logo design. However, the new design has cleaner lines with defined space between the letters, which will make it easier to read on embroidered materials.

Logo Usage and Guidelines

Always use approved artwork

The MWDOC logo acts as the primary visual component of the MWDOC brand. Therefore, it is critical to maintain the integrity of the logo and to be consistent with its usage. Never recreate, modify, or distort the MWDOC logo in any way, and always ensure you are using the correct logo artwork for the application or occasion. If for some reason another variation is needed outside of the scope defined in this guide, refer to the Public Affairs Department representative listed on page 3.

The distinct use of color helps to define MWDOC's brand identity. The MWDOC logo was developed to be most impactful in a four-color format. Although the four-color version is preferred and should be used whenever possible, black, white, and blue versions are available for secondary use in one-color media.

Logo Variations

Approved designs

The MWDOC logo was created with three approved versions, as shown on the right. These versions allow for flexibility to optimize the logo's visual presence across multiple applications and should not be altered.

The official logo consists of the MWDOC icon and acronym and should be considered the default choice for all applications. The secondary logo consists of the MWDOC icon and the full name "Municipal Water District of Orange County" and should be used in less formal applications or when the organization name is unknown or necessary. The third logo option includes the MWDOC icon and the official MWDOC website url. This option should be used in promotional applications only or in instances where it is critical to direct others to the official MWDOC website. A gradient version for all three logos is available for use only where you have flexibility to be more artistic or expressive.

Official MWDOC logo (Acronym only)

Promotional version referencing the website

Secondary MWDOC logo

All three approved versions include a gradient option

Logo Configuration

Size relationship among the MWDOC logo elements and clearance area

The illustration below indicates the correct size relationship and configuration among the logo elements. These elements, their relative sizes, and their placement relative to each other must never be altered or modified.

Blue Water Leaf

Green Leaf

Organization Acronym

Orange Outer Circle

Clearance area is the minimum distance allowed between the logo and any other element (graphic, type, or edge of page). This helps ensure legibility and enhances recognition. The clearance area around all four sides of the MWDOC logo must never be less than the height of the uppercase "M" in the official version of the logo. This is known as the "cap-height."

Minimum Size

Maintain a minimum size for logo recognition

To ensure legibility of all versions of the MWDOC logo, a minimum size must be maintained at all times. All color and gradient variations of the **official logo** must not be displayed in any Microsoft Office program in a size smaller than 0.6 inches in height and 0.65 in width as shown in the example on the right.

All color and gradient variations of the **secondary logo** must not be displayed in any Microsoft Office program in a size smaller than 0.7 inches in height and 1.34 inches in width, as shown in the example on the right.

All color and gradient variations of the **MWDOC .com logo** must not be displayed in any Microsoft Office program in a size smaller than 0.6 inches in height and 0.88 inches in width, as shown in the example on the right.

The objective is to maintain legibility. If you cannot read the text, the logo is too small and needs to be resized.

Official version (Acronym only)
No smaller than 0.6 inches in height and 0.65 inches in width

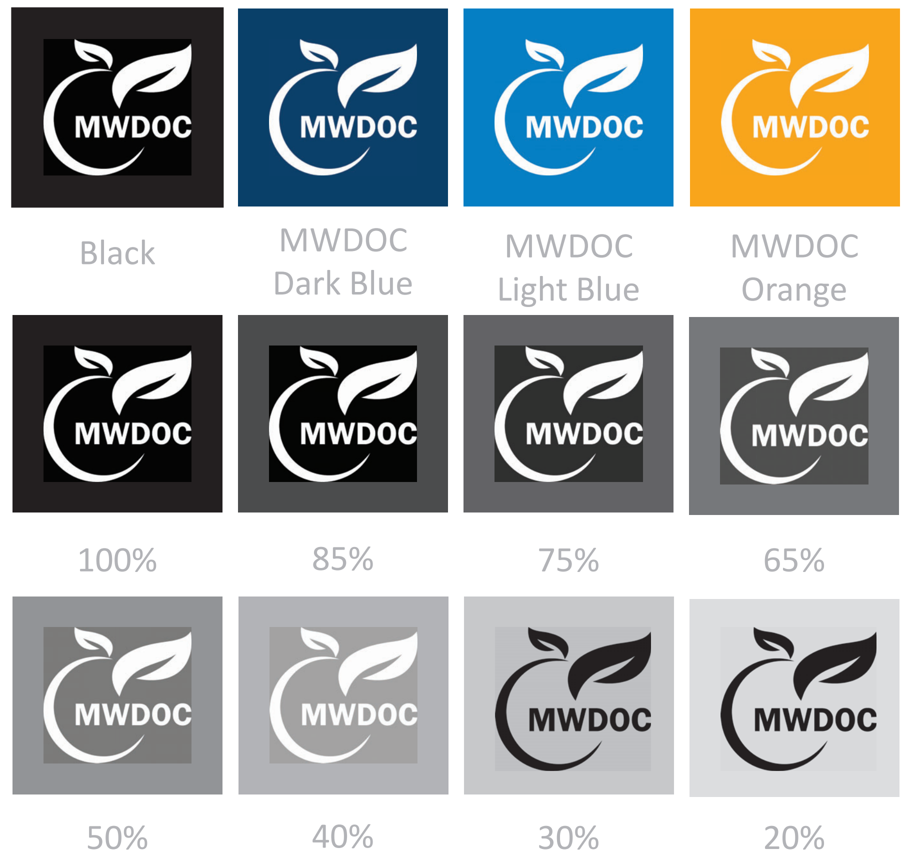
Secondary logo (full text)
No smaller than 0.7 inches in height and 1.34 inches in width

.com logo
No smaller than 0.6 inches in height and 0.88 inches in width

Reverse Treatment

When to use the black and white MWDOC logo

A reversed (white) version of the MWDOC logo can be reproduced on a black or dark colored background. In one-color applications, sufficient contrast should be maintained by using the reverse logo on tonal values of 40% black or darker and a one-color black version of the logo on tonal values of lighter than 40%. If the MWDOC logo is superimposed upon or reversed out of a photograph, it should always be placed in an area that offers a consistent background and provides sufficient contrast.



Incorrect Usage

Examples of common mistakes

In an attempt to prevent common mistakes when using the MWDOC logo, several examples of incorrect uses are displayed here for reference. These variations are representative, however, and are not all inclusive. Please refer to the overall standards throughout this guide when considering any form of reproduction or application of the MWDOC logo.

Before using any questionable variation of the logo, refer to the Public Affairs Department representative listed on page 3.

Do not change brand colors. Use the official color specification detailed in this guide.

Do not stretch, alter, or skew the logo. Resizing must be proportionate.

Do not rotate or flip the logo.

Do not reconfigure the logo elements.

Do not remove any of the logo elements.

Do not use the acronym element without the icon.

Do not crop the logo.

Do not modify the logo colors even if they look similar. Use the official color specification detailed in this guide.

Do not place the logo on top of a busy background.

Do not make the logo transparent.

Do not place the logo on top of a white box to make the logo legible, unless that box is part of an overall design.

Do not place the logo on a low-contrast or similar colored background if the logo elements are not clearly identifiable.

Logo on Low-Contrast or Similar Colored Background

Rule of thumb, refer to the Public Affairs representative on page 3

One of the most common issues with any logo placement is the unavoidable instance where the logo will be displayed on a low-contrast or similar colored background. One example of this is when you must use someone else's template for a presentation. The easiest fix is to select the white one-color logo option. However, when the best representation of the brand is to display the logo in full color, there are a few alternatives. The first is to select the full color option with MWD in white text. Another is to add a drop shadow (from the Microsoft shape options, shadow offset center option) to the logo which makes it pop out from the background. The last and least preferable option is to place a white stroke or outline around the logo. As mentioned in the introduction text, it is impossible to predict all scenarios or background variations that might come up. The rule of thumb is when in doubt, seek assistance from the Public Affairs representative on page 3 of this guide.

White stroke and drop shadow alternatives

MWD white text

THANK YOU

Thank you for supporting this significant milestone for our agency and for helping build the MWDOC brand. If you have any questions, please contact the Public Affairs representative referenced on page 3 of this guide.

Appendix F

Notice of Public Hearing

MWDOC

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
P.O. Box 20895
Fountain Valley, CA 92728-0895

(714) 963-3058
Fax: (714) 964-9389
www.mwdoc.com

February 24, 2021

Michael Moore
Assistant General Manager, Water Services
Anaheim Public Utilities
Anaheim West Tower, 201 South Anaheim Blvd.
Anaheim, CA 92805

Subject: MWDOC 2020 Urban Water Management Plan Update

The Municipal Water District of Orange County (MWDOC) is in the process of preparing and updating its 2020 Urban Water Management Plan (UWMP) in compliance with the Urban Water Management Planning Act and the Water Conservation Act of 2009, commonly referred to as SBX7-7. An update of MWDOC's UWMP is required every five (5) years.

Water Code section 10621(b) requires an urban water supplier updating its UWMP to notify cities and counties within its service area of the update at least sixty (60) days prior to holding a public hearing. This letter serves as MWDOC's notice that it is preparing and updating its 2020 UWMP, to be adopted and submitted to the California Department of Water Resources before the July 1, 2021 deadline. Additionally, MWDOC will be adopting its Water Shortage Contingency Plan as part of the 2020 UWMP.

MWDOC is also considering an Addendum to the 2015 UWMP to demonstrate consistency with the Delta Plan Policy to Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (California Code Reg., tit. 23, § 5003). The 2015 UWMP Addendum and a copy of MWDOC's draft 2020 UWMP will be available for review on the MWDOC website (www.mwdoc.com) in spring of 2021, and MWDOC will subsequently hold noticed public hearings on the 2020 UWMP, Water Shortage Contingency Plan, and 2015 UWMP Addendum in advance of their adoption.

MWDOC invites you to submit comments and consult with MWDOC regarding its 2020 UWMP update, Water Shortage Contingency Plan, and 2015 UWMP Addendum. MWDOC anticipates holding a public comment period in spring 2021, with a public hearing planned during that time.

If you have any input for the matters contained in this notice letter, require additional information, or would like to set up a meeting to discuss MWDOC's 2020 UWMP update, please contact me at (714) 593-5027, or by email at hdelatorre@mwdoc.com.

Sincerely,

Harvey F. De La Torre

Harvey De La Torre
Assistant General Manager

MWDOC

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
P.O. Box 20895
Fountain Valley, CA 92728-0895

(714) 963-3058
Fax: (714) 964-9389
www.mwdoc.com

February 24, 2021

Tony Olmos
Public Works Director
City of Brea
1 Civic Center Circle
Brea, CA 92821

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

MWDOC

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18700 Ward Street
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February 24, 2021

Nabil Henein
Director of Public Works/City Engineer
City of Buena Park
6650 Beach Boulevard
Buena Park, CA 90621

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
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February 24, 2021

Hyejin Lee
Director of Public Works/City Engineer
City of Fountain Valley
10200 Slater Avenue
Fountain Valley, CA 92708

Subject: MWDOC 2020 Urban Water Management Plan Update

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Assistant General Manager

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February 24, 2021

Meg McWade
Director of Public Works
City of Fullerton
303 W. Commonwalth Ave.
Fullerton, CA 92832

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
Assistant General Manager

MWDOC

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February 24, 2021

William Murray
Director of Public Works
City of Garden Grove
13802 Newhope Street
Garden Grove, CA 92840

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
Assistant General Manager

MWDOC

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February 24, 2021

Tom Herbel
Director of Public Works
City of Huntington Beach
2000 Main Street
Huntington Beach, ca 92648

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
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MWDOC

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February 24, 2021

Elias Saykali
Director of Public Works
City of La Habra
P.O. Box 337
La Habra, CA 90633-0337

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mike Belknap
Public Works & Community Services Director
City of La Palma
7821 Walker Street
La Palma, CA 90623

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark Vukojevick
Utilities Director
City of Newport Beach
P.O. Box 1768
Newport Beach, CA 92660

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Christopher Cash
Director of Public Works
City of Orange
P.O. Box 449
Orange, CA 92886

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Tom Bonigutt
Public Works Director
City of San Clemente
910 Calle Negocio, Suite 100
San Clemente, CA 92672

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Thomas Toman
Director of Public Works
City of San Juan Capistrano
32450 Paseo Adelanto
San Juan Capistrano, CA 92675

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Nabil Saba
Acting Public Works Director
City of Santa Ana
P.O. Box 1988, M-24
Santa Ana, CA 92702

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Steve Myrter
Director of Public Works
City of Seal Beach
211 8th Street
Seal Beach, CA 90740

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

MWDOC

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18700 Ward Street
Fountain Valley, California 92708

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February 24, 2021

Douglas Stack
Director of Public Works
City of Tustin
300 Centennial Way
Tustin, CA 92780

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Marwan Youssef
Director of Public Works
City of Westminster
8200 Westminster Boulevard
Westminster, CA 92683

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

David Youngblood
General Manager
East Orange County Water District
185 North McPherson Road
Orange, CA 92869-3720

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Dennis Cafferty
General Manager
El Toro Water District
24251 Los Alisos Boulevard
Lake Forest, CA 92630

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Michael Dunbar
General Manager
Emerald Bay Service District
600 Emerald Bay
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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MWDOC

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February 24, 2021

Ken Vecchiarelli
General Manager, Orange County
Golden State Water Company
2283 E. Via Burton
Anaheim, CA 92806

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Paul Cook
General Manager
Irvine Ranch Water District
P.O. Box 57000
Irvine, CA 92618

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Keith Van Der Maaten
General Manager
Laguna Beach County Water District
P.O. Box 987
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Paul Shoenberger, PE
General Manager
Mesa Water
1965 Placentia Avenue
Costa Mesa, CA 92627

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Joone Lopez
General Manager
Moulton Niguel Water District
P.O. Box 30203
Laguna Hills, CA 92607-0203

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Michael Markus
General Manager
Orange County Water District
P.O Box 8300
Fountain Valley, CA 92708

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Daniel Ferons
General Manager
Santa Margarita Water District
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Jerry Vilander, Jr.
General Manager
Serrano Water District
18021 East Lincoln Street
Villa Park, CA 92861-6446

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey F. De La Torre

Harvey De La Torre
Assistant General Manager

MWDOC

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February 24, 2021

Rick Shintaku
General Manager
South Coast Water District
31592 West Street
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Fernando Paludi
General Manager
Trabuco Canyon Water District
32003 Dove Canyon Drive
Trabuco Canyon, CA 92679

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Brett Barbre
General Manager
Yorba Linda Water District
1717 East Miraloma Avenue
Placentia, CA 92870

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

James Treadaway
Public Works Director
Orange County
601 North Ross Street
Santa Ana, ca 92701

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Shaun Pelletier
Public Works Director
City of Aliso Viejo
12 Journey Suite 100
Aliso Viejo, CA 92656

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Raja Sethuraman
Director of Public Services
City of Costa Mesa
77 Fair Drive
Costa Mesa, CA 92626

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Doug Dancs
Public Works Director
City of Cypress
5275 Orange Avenue
Cypress, CA 90630

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Matt Sinacori
Public Works Director
City of Dana Point
33282 Golden Lantern
Dana Point, CA 92629

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark Steuer
Public Works Director
City of Irvine
1 Civic Center Plaza
Irvine, CA 92606

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark McAvoy
Public Works Director
City of Laguna Beach
505 Forest Avenue
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Ken Reynolds
Public Works Director
City of laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Jacki Scott
Public Works Director
City of Laguna Niguel
30111 Crown Valley Parkway
Laguna Niguel, CA 92677

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Akram Hindiyeh
City Engineer
City of Laguna Woods
24264 El Toro Road
Laguna Woods, CA 92637

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey F. De La Torre

Harvey De La Torre
Assistant General Manager

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18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
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Fax: (714) 964-9389
www.mwdoc.com

February 24, 2021

Thomas Wheeler
Public Works Director
City of Lake Forest
100 Civic Center Dr.
Lake Forest, CA 92630

Subject: MWDOC 2020 Urban Water Management Plan Update

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MWDOC

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February 24, 2021

Chris kelley
City Engineer
City of Los Alamitos
3191 Katella Avenue
Los Alimitos, CA 90720

Subject: MWDOC 2020 Urban Water Management Plan Update

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MWDOC

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February 24, 2021

Mark Chagnon
Public Works Director
City of Mission Viejo
200 Civic Center
Mission Viejo, CA 92691

Subject: MWDOC 2020 Urban Water Management Plan Update

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Assistant General Manager

MWDOC

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February 24, 2021

Luis Estevez
Public Works Director
City of Placentia
401 E Chapman Avenue
Placentia, CA 92870

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
Assistant General Manager

MWDOC

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February 24, 2021

Brendan Dugan
Public Works Director
City of Rancho Santa Margarita
22112 El Paseo
Rancho Santa Margarita, CA 92688

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Allan Rigg
Public Works Director
City of Stanton
7800 Katella Avenue
Stanton, CA 90680

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mike Knowles
Public Works Director
City of Villa Park
17855 Santiago Boulevard
Villa Park, CA 92861

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Jamie Lai
Public Works Director
City of Yorba Linda
4845 Casa Loma Avenue
Yorba Linda, CA 92886

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
Assistant General Manager

Appendix G

Adopted WSCP Resolution (Pending)

Arcadis U.S., Inc.
2240 S. County Trail, Suite 5
East Greenwich
Rhode Island 02818
Phone: 401 738 3887
Fax: 401 732 1686
www.arcadis.com

APPENDIX J

Water Use Efficiency Implementation Report

APPENDIX K

MWDOC's Demand Management Measures

APPENDIX L

Notice of Public Hearing

APPENDIX M

Adopted UWMP and WSCP Resolutions (Pending)

Arcadis U.S., Inc.

320 Commerce

Suite 200

Irvine, California 92602

Tel 714 730 9052

Fax 714 730 9345

www.arcadis.com

The County of Orange Report

Prepared for the MWDOC P&O Committee

March 30, 2021
by Lewis Consulting Group

John Moorlach Denied Return to Board of Supervisors
Costa Mesa Mayor Katrina Foley Wins Handily

WITH ALL VOTES COUNTED

FOLEY	48,346	43.8%
MOORLACH	34,747	31.5%
MULDOON	12,773	11.6%
VO	9,886	9.0%
RAPPAPORT	4,695	4.2%

With the votes tabulated for the special election, Orange County continued its recent trend of being defined as a purple county. Costa Mesa Mayor Katrina Foley will now join Doug Chaffee as the second elected Democrat on the Orange County Board of Supervisors.

The Orange County Republican establishment proved to be no match for Orange County Unions in this election, as there was no answer to the campaign mail that pilloried John Moorlach throughout the district.

Unless new redistricting maps can cement a future GOP majority, Democrats appear to be headed for a Board majority in no more than four years.

Board of Supervisors March 9th Meeting

The Board of Supervisors COVID-19 briefing this meeting had a sense of optimism as progress seemed to be the word of the day. March 9th was also the date that ended a full week of improving metrics which following a second week of the same, allowed Orange County to moved from the purple COVID-19 tier to the less onerous red tier. Of the three metrics that are considered, the daily case rate, the positivity rate and the health equity rate, one is currently in the red zone, while two others have met orange targets. A county may not improve two tiers at a time, but it is possible Orange County could be in the orange tier as early as March 31, 2021. So far 11.6 million doses of vaccine have been administered in California, resulting in 30% of the population receiving at least one dose while 15% of the population is fully vaccinated. In Orange County, about 45,000 doses per 100,000 in population have been administered. It is estimated that 90% of Orange Countians 65 years or older have been vaccinated. With the Johnson & Johnson vaccine being introduced in Orange County, more vaccination sites will continue to open.

WHAT THE TIERS MEAN FOR US

SECTORS	Widespread Tier 1	Substantial Tier 2	Moderate Tier 3	Minimal Tier 4
Critical Infrastructure	Open with modifications	Open with modifications	Open with modifications	Open with modifications
Limited Services	Open with modifications	Open with modifications	Open with modifications	Open with modifications
Outdoor Playgrounds & Outdoor Recreational Facilities **	Open with modifications	Open with modifications	Open with modifications	Open with modifications
Hair Salons & Barbershops	Open Indoors with modifications	Open indoors with modifications	Open indoors with modifications	Open indoors with modifications
All Retail (including critical infrastructure, except standalone grocers)	Open Indoors with modifications • Max 25% capacity	Open Indoors with modifications • Max 50% capacity	Open Indoors with modifications	Open Indoors with modifications
Shopping Centers (Malls, Destination Centers, Swap Meets)	Open Indoors with modifications • Max 25% capacity • Closed common areas • Closed food courts	Open indoors with modifications • Max 50% capacity • Closed common areas • Reduced capacity food courts (see restaurants)	Open indoors with modifications • Closed common areas • Reduced capacity food courts (see restaurants)	Open Indoors with modifications • Reduced capacity food courts (see restaurants)

SECTORS	Widespread Tier 1	Substantial Tier 2	Moderate Tier 3	Minimal Tier 4
Hotels and lodging	Open with modifications	Open with modifications • +Fitness centers (+10%)	Open with modifications • +Fitness centers (+25%) • +Indoor pools	Open with modifications: • +Fitness Centers (50%) • +Spa facilities etc
Gyms and Fitness Centers	Outdoor Only with modifications	Open indoors with modifications • Max 10% capacity	Open indoors with modifications • Max 25% capacity • +indoor pools	Open indoors with modifications • +Saunas • +Spas • +Steam rooms • Max 50% capacity
Restaurants	Outdoor Only with modifications	Open indoors with modifications • Max 25% capacity or 100 people, whichever is fewer	Open indoors with modifications • Max 50% capacity or 200 people, whichever is fewer	Open indoors with modifications • Max 50% capacity
Wineries	Outdoor Only with modifications	Outdoor Only with modifications	Open indoors with modifications • Max 25% capacity indoors, or 100 people, whichever is fewer	Open indoors with modifications • Max 50% capacity or 200 people indoors, whichever is fewer

County Sponsors Tom Daly O.C. Flood Control Bill

The Board approved positions on a handful of bills at the Board meeting including a sponsorship position of Assembly Bill 781 authored by Orange County Assemblyman Tom Daly. The following is the Office of Legislative Affairs analysis of the bill.

Current Law:

Existing law authorizes specified works of improvement for the control, conservation, and utilization of destructive flood waters and the reclamation and protection of lands that are susceptible to overflow by flood waters. Existing law prohibits, if there are any major project changes, as provided, money from being reallocated by the state in aid of that portion of the project until a revised plan has been reviewed and approved by the Department of Water Resources.

Background:

Federal authorization for the Westminster-East Garden Grove Flood Risk Management Project was included in the Water Resources Development Act (WRDA) of 2020.

The project area is located within the Westminster watershed in western Orange County. The watershed is approximately 87 square miles in area and is almost entirely urbanized. Cities in the watershed include Anaheim, Stanton, Cypress, Garden Grove, Westminster, Fountain Valley, Los Alamitos, Santa Ana, Seal Beach, and Huntington Beach.

The project area includes portions of four non-federal drainage channels within the watershed and the receiving waters of Outer Bolsa Bay in the Bolsa Chica Ecological Reserve. Flood Control channels within the Westminster watershed receive local storm water runoff and vary in age, size, geometry, and lining material. The channels include the Bolsa Chica Channel (1.5 miles), Westminster Channel (7.8 miles), East Garden Grove/Wintersburg Channel (11.6 miles), and Ocean View Channel (4.1 miles).

Once amended this bill would add the Westminster-East Garden Grove Flood Risk Management Project in the Orange County to the list of eligible projects to receive state flood subvention funding

As authorized by the federal government as part of the Water Resources Development Act (WRDA) of 2020, the Westminster-East Garden Grove Flood Risk Management Project has a current estimated cost of $1.25 billion, with a total federal cost share of $315 million, and a local share of $910 million. Orange County's current 20-year plan has identified $443 million in revenue to fund the local share, leaving a gap of approximately $467 million needed to bring the project to completion. As with all WRDA flood control projects, state legislation is required to make the Westminster-East Garden Grove project eligible to receive state flood subvention funding.

Over the past decades, urbanization of the Westminster watershed has increased the potential for flood related damages, and impacts associated with the overtopping of channel systems during short duration, high intensity rainfall events. Urbanization has also increased the total amount of impermeable area, resulting in higher volumes of stormwater being directed to the flood control channels due to limited infiltration opportunities.

Once completed, the project will provide flood control improvements, lead to increased flood protection, prevent approximately $4 billion in damage from a 100-year flood event, and alleviate home and business owners in the affected communities from paying flood insurance premiums totaling over $13 million annually.

The state subvention fund enables California to partner with local agencies and share in the costs of federally-authorized projects. If this project is entered into the program, the state would contribute if funds were available between 50% and 70% of Orange County's cost share for the National Economic Development components. AB 781 will make the project eligible for state flood subvention funding.

Update

The Orange County LAFCO met March 10 and concluded its business within an hour. The highlight of the meeting was the unanimous adaption of the agency's proposed 2021/2022 budget. The proposed budget will now be sent out to the County, cities and Special Districts for review and comments.

The proposed budget includes a 7% or $88,000 increase in expenditures over the current fiscal year. This amounts to a budget of $1,345,280. 66% of OCLAFCO's spending is the funding of salaries and benefits. 86% of the agency's funding is derived from funding apportionments made up of equal 1/3 amounts from the County, cities and Special Districts. Below is the Special District apportionments:

District	ISDOC Formula Calulation FY 2021-22
Silverado-Modjeska Rec. & Park	$ 463.30
Surfside Colony Stormwater	463.30
Rossmoor/Los Alamitos Area Sewer District	463.30
Surfside Colony CSD	463.30
Capistrano Bay CSD	2,277.87
Rossmoor CSD	2,277.87
Three Arch Bay CSD	2,277.87
Emerald Bay CSD	2,277.87
Buena Park Library District	2,277.87
Placentia Library District	2,277.87
Orange County Cemetery District	3,436.11
Orange County Vector Control District	4,594.35
Total Non-Enterprise Districts	**$ 23,550.88**
Sunset Beach Sanitary District	4,594.35
Serrano Water District	13,783.06
East Orange Co. Water District	13,783.06
Midway City Sanitary District	18,338.80
Trabuco Canyon Water District	13,783.06
Costa Mesa Sanitary District	18,338.80
El Toro Water District	22,933.15
Mesa Water District	22,933.15
Yorba Linda Water District	22,933.15
South Coast Water District	27,527.50
Moulton Niguel Water District	32,121.86
Santa Margarita Water District	32,121.86
Municipal Water District of O.C.	36,716.20
Orange County Water District	41,310.56
Irvine Ranch Water District	41,310.56
Total Enterprise Districts	**$ 362,529.12**
Total Special Districts	**$ 386,080.00**

In other actions, it was noted that this year's Strategic Planning meeting will be held in June. A decision has not yet been made whether it will be in person or virtual. Also, due to a lack of activity, the April OCLAFCO meeting is cancelled. The next meeting will be held on May 12, 2021.

Recent Poll Throws Cold Water on Recall Chances

A poll conducted by Probolsky Research paints a dim picture for the chances of a successful recall of Governor Newsom.

The poll, taken from March 16-19, 2021 shows that among all voters, the recall is failing 40% YES to 46% NO. Among likely voters the gap is even wider, 35% YES to 52% NO.

The poll of 900 California voters results in a margin of error of +/- 3.3%. The results of this poll varied significantly from the Berkeley based Institute of Governmental Studies whose late January poll showed the Governor with a 48%-46% disapproval rating.

Orange County COVID-19 Stats

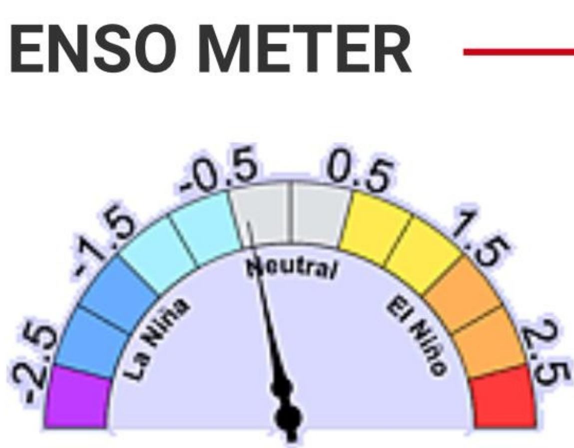
ORANGE COUNTY COVID-19 STATS	AS OF 3/30/2021	AS OF 2/23/2021
CUMULATIVE CASES TO DATE	250,537	245,135
CUMULATIVE DEATHS TO DATE	4,740	3,848
DEATHS REPORTED TODAY	14	0
CUMULATIVE TESTS TO DATE	3,332,327	2,980,667
TESTS REPORTED TODAY	7,248	12,783
CASES CURRENTLY HOSPITALIZED	143 * ↓	539 *
CASES CURRENTLY IN **ICU**	26 ↓	152
CUMULATIVE RECOVERED TO DATE	242,669 * ↑	226,386 *

***** = INCLUDES ***ICU*** CASES

Where Orange County Ranks [as of 3/30/2021]

LOCATION	POPULATION	CONFIRMED CASES	DEATHS
CALIFORNIA	40,129,160	3,566,464	57,788
LOS ANGELES COUNTY	10,247,557	1,179,736	23,180
ORANGE COUNTY	**3,228,519**	**250,537**	**4,740**
SAN BERNARDINO COUNTY	2,217,398	285,615	4,335
RIVERSIDE COUNTY	2,468,145	282,867	4,133
SAN DIEGO COUNTY	3,370,418	269,771	3,547

Despite Receding La Niña Has Abetted Drought



On March 2nd the California Department of Resources conducted it's latest analysis of the California snow-pack. It found that this year's snow-pack held a water content of only 61% of the March 2nd average. This coupled with below average reservoirs storage portends a challenging water year.

To compound matters, snow-pack in the upper Colorado River basin stands at 86% of average, while precipitation is just 77% of average. Lake Powell water inflows for this water year are 44% of the March 29th average.

ACKERMAN CONSULTING

Legal and Regulatory

April 5, 2021

1. **Old Water World:** Harvard scientists have discovered new evidence regarding the Earths beginnings. Roughly 3 billion years ago our Earth was almost completely covered with water and had very few if any landmasses. The question then becomes what happened to all that water. It turns out that the Earth's mantle absorbed much of that water due to the minerals present and high temperature of the mantle leaving roughly, what we have today. This water is stored underground in hydroxy group compounds (oxygen and hydrogen atoms). It exists in mainly high-pressure forms and we occasionally see it in volcanic eruptions. As the Earth cooled down, its ability to absorb water decreased. This finding also touches on the debate as to where early life first began, in saltwater oceans or freshwater ponds on land. More precise dating evidence could solve this mystery. This study will also be used when looking at possible life on other planets.

2. **Microplastics (PFAS):** California's attempt to regulate microplastics in drinking water is raising more questions than solutions. The State Water Resources Control Board is set to establish thresholds and testing requirements by July 1. Unfortunately, even though many studies have been done all over the world, there is little scientific data showing what a safe level might be and what the health impact may be on humans. While water is getting the most attention at this time, the biggest source of microplastics comes from breathing the air around us. The problem exists everywhere from the North Pole to the South Pole and in practically all land and water in between. While many products have discontinued the use of materials that generate the problem, it still exists in clothing and plastic in general. While problems have shown up in test mice, it has not shown to be a serious problem with humans. While, I don't generally quote the World Health Organization, it and many other groups have opined that there is not a problem in our drinking water. Even testing methods are being disputed as a result of the size and nature of the particles. Filters are being discussed but there is little agreement on their effectiveness. While California will probably come up with rules, there seems to be little agreement that they will be based on science or will actually make a difference.

3. **Fire Damage to Water:** Our last fires may have immediate danger to our water supply. Three fires, North Complex, Creek and SQF, which all became designated as high severity burn areas, impact source areas of our major water supply system. North Complex impacts Oroville water shed, Creek-San Joaquin River and Friant Dam, SQF-Kern River and Lake Isabella. The high severity areas destroy all vegetation; change the chemical composition of the soil itself, creating absorption and runoff issues. This also produces more and different types of sediment for our reservoirs. The exact impact and costs may not be known for years after the fire events.

4. **Sewage Waste to Hydrogen:** Coventry University in England is converting sewage waste into tanker fuel. The study is taking waste ammonia from sewage treatment. They produce a purified electrolyte from the ammonia,

which can then produce nitrogen and hydrogen gas. The hydrogen can then be used for tanker and other heavy vehicle fuel. As is always the next step is to determine if it is financially feasible and subject to commercial use.

5. **Reduce Electric Bills:** UC Davis and others are examining ways to cut our electric energy costs. California water transportation system is responsible for about 20% of the electric use in the State. Therefore, one way to cut electricity bills is to use less water or find cost effective ways to move water. Conservation methods prompted by our recent droughts have been large factors in reducing electric bills. The Davis study is suggesting that it is more cost effective to pay people to conserve water or make water efficiency decisions than to concentrate on conserving electricity.

6. **Water Marketing:** Selling one's water supply to users outside ones areas has always been a controversial idea. Eight water agencies in Santa Barbara County are asking the Board of Supervisors to allow them to sell surplus water outside the county. This is not a permanent deal but only as the situation may arise. Several years ago, a $72 million desal plant was built, that everyone is jointly paying for. The need for State Water in the future may be less and would certainly be determined by overall supply and demand in the area. The water districts want flexibility in the future to deal with changing circumstances. The County is not so sure and would like to expand storage in Lake Cachuma. These eight agencies have opted out of the Delta Project. Stay tuned.

7. **Tahoe Rain or Snow:** A current study, Tahoe Rain or Snow Project, is being led by Lynker Technologies and is looking at the freezing point of water. We all thought it was 32 degrees Fahrenheit but not all freezing points are equal. In weather forecasting and water predictions, this measure can be critical. Whether it will, rain or snow is very important when dealing with and predicting flooding, snow amounts and avalanche conditions. It happens in the Tahoe area that number is 39.5 degrees F. That number may vary by region. This study shows the importance of determining that number more precisely to make our forecasts and predictions more accurate.

8. **Wetlands Carbon Absorption:** The State of Louisiana is studying the benefits of costal restoration. Louisiana has a large number of marshes and wetlands that are being degraded by saltwater intrusion. The costs of maintaining and restoring them is large but the benefits may also be significant. The marshes absorb large amount of carbon, which is good for their goal of carbon neutrality. The project would also protect habitat, vegetation and soil in the area. The water quality would also improve in addition to being a storm buffer. They also could produce revenue for sale of carbon credits.

9. **More Desal Solvent:** Notre Dame is exploring directional solvent extraction as a cheaper more efficient way to desalinate water. The use of a solvent is not a new idea in the desal arena but as of now none have proven to do the job adequately. ND is using an ionic liquid to get freshwater from a saline source by using low temperature thermal energy. This saves membrane costs or high temperatures. Commercial feasibility is the next step.

10. **Japanese Delta Smelt:** Did you know that Japan has a Delta smelt? Japan has a wakasagi, which looks very much like our Delta smelt. It is believed that they once were a single species. Their real names, Hypomesus nipponensis and hypomesus transpacificus, may give you a clue. The California Department of Fish and Game actually introduced the Japanese version into the Delta in 1959 as a test. They prospered and still survive in limited numbers. They have experienced the same issues as our Delta smelt and are not doing so well now. A genetic

study showed they are distinct species and have different historical characteristics. However, they look almost identical. Experts think their probable success or failure will be the same as the Delta smelt.

11. **Micro Earthquakes Toxic:** An English study has shown the result of areas with many earthquakes, particularly those of the smaller variety. The study included England and the Swiss Alps. The mini quakes change the chemical bonds of rocks. When they come in contact with water, it creates acidic groundwater. The constant motion of the rocks enhances the acidity by spreading and contacting more elements, primarily calcium and magnesium. The flow of groundwater from one region to another can spread the toxicity to areas away from the micro quakes. This information is also valuable in finding certain ore deposits for mining purposes.

12. **San Diego Disagreement:** The San Diego Water Authority is projecting significant water use increases in the next 10 to 20 years. Along with that comes a proposal to increase rates for all their member agencies. Many of the smaller agencies disagree with those projections. They look at population projections, current usage and patterns of customers and other economic indicators. They do not want to tie their ratepayers into high rates for projections that may not come to pass. The Authority admits that sales and use has dropped but contend that everyone needs to may for fixed costs of the entire system.

13. **Klamath Dam Continues:** The Klamath Dam removal project continues to be controversial. A northern California water users association has filed an action to stop the dam removal. Their basis is damaging property values, violation of prior agreements, lack of Congressional consent, no evidence of salmon impact or improvement, not following the science of many issues. Final decision is due sometime in 2022.

Item No. 8

INFORMATION ITEM
April 5, 2021

TO: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

FROM: **Robert Hunter, General Manager**

Staff Contact: Harvey De La Torre

SUBJECT: **PUBLIC HEARING DATE SCHEDULED FOR MAY 19, 2021 RE MWDOC'S 2020 URBAN WATER MANAGEMENT PLAN**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receive and file this report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

Pursuant to the Urban Water Management Planning Act, each water supplier that is submitting an update 2020 Urban Water Management Plan with the Department of Water Resources (DWR) must conduct a public hearing as well as notice the public hearing in a local newspaper at least two times, with at least five days between publication dates.

To comply with this requirement, MWDOC is scheduling the public hearing at its Board meeting on May 19, 2021 and posting the necessary publications announcement of the Public Hearing & Adoption of our 2020 UWMP in the *OC Register* on May 3 and May 10.

Budgeted (Y/N):	Budgeted amount:	Core __	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

Item No. 9

INFORMATION ITEM
April 5, 2021

TO: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

FROM: **Robert Hunter, General Manager**

Staff Contact: Sarah Wilson

SUBJECT: **MWDOC Choice School Programs Update**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receive and file this report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

The Municipal Water District of Orange County (MWDOC) K-12 Choice School Program contractors—Shows That Teach, Discovery Cube Orange County, and Bolsa Chica Conservancy—continue to book live, virtual water lessons for the remainder of the 2020/21 school year.

As virtual sessions are confirmed with Orange County schools, MWDOC Choice School Program contractors update the shared Google Calendar so that participating member agencies are able to view presentations for their service area. Included in this report is a preview of scheduled visits for the months of April and May 2021. Please note that the shared Google Calendar is updated frequently, and will always have the most accurate information. Visits are subject to change due to school and teacher availability. Login information for the shared Google Calendar is available upon request.

DETAILED REPORT

Budgeted (Y/N): Y	Budgeted amount: $401,729	Core __	Choice X
Action item amount:	Line item: 63-7040		
Fiscal Impact (explain if unbudgeted):			

MWDOC Public Affairs staff has continued to work closely with K-12 Choice School Program contractors to provide Orange County students with safe, structured, and interactive water lessons that highlight Orange County water supply sources, the benefits of water conservation, and good water stewardship.

The current MWDOC Choice School Program goals can be accessed here.

SHOWS THAT TEACH – ELEMENTARY SCHOOL (K-2)
To date, Shows That Teach has hosted 70 live, virtual assemblies reaching more than 10,300 elementary school students through the MWDOC Choice Elementary School Program (grades K-2). At the time of this report, 6 additional presentations and approximately 630 students have been booked to receive the program through the remainder of the 2020/21 school year so far.

"My students loved it! Thank you for giving them a good laugh, and for making learning about water an enjoyable experience!"– 1st grade teacher, Truman Benedict Elementary, City of San Clemente

"The kids really enjoyed the interaction and they were very curious about water afterward. It sparked a lot of questions. Thank you!"– Kindergarten teacher, Miller Elementary, City of La Palma

DISCOVERY CUBE OC – ELEMENTARY (3-6) AND MIDDLE SCHOOL (7-8)
To date, Discovery Cube OC has hosted 102 live, virtual assemblies reaching more than 4,340 elementary school students through the MWDOC Choice Elementary School Program (grades 3-6). At the time of this report, 32 additional presentations and approximately 1,020 students have been booked to receive the program through the remainder of the 2020/21 school year so far.

To date, Discovery Cube OC has hosted 21 live, virtual assemblies for approximately 963 students participating in the MWDOC Choice Middle School Program (grades 7-8).

BOLSA CHICA CONSERVANCY – HIGH SCHOOL (9-12)
To date, the Bolsa Chica Conservancy has hosted 16 live, virtual classroom presentations reaching roughly 395 high school students. At the time of this report, 11 additional presentations at Brea Olinda High School and Tustin High School have been booked to receive the MWDOC Choice High School Program (grades 9-12) through the remainder of the 2020/21 school year so far.

MWDOC PA continues to monitor the status of the safe reopening of Orange County schools through the CA Safe Schools for All website: https://schools.covid19.ca.gov/.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	31	1 3-6 SMWD Chaparral	2 3-6 MNWD Canyon 3-6 SANTA ANA 3-6 SMWD Castille 3-6 SMWD Ladera	3
4	5 3-6 GARDEN GROVE	6	7	8 K-2 ANAHEIM Nohl	9	10
11	12 3-6 SMWD Ladera 9-12 BREA Brea	13 3-6 SMWD Ladera	14 3-6 MNWD Oak 3-6 SAN JUAN	15 3-6 MNWD Malcom 3-6 SMWD Reilly	16 "Virtual Water 3-6 SMWD Oso K-2 HUNTINGTON	17
18	19 3-6 GARDEN GROVE 3-6 SMWD Ladera	20	21 K-2 BREA Laurel	22 3-6 GARDEN GROVE	23 3-6 GARDEN GROVE 3-6 SMWD Reilly	24
25	26	27 3-6 MNWD Malcom	28	29 9-12 TUSTIN Tustin	30 K-2 WESTMINSTER	1

Sun	Mon	Tue	Wed	Thu	Fri	Sat
25	26	27 3-6 MNWD Malcom	28	29 9-12 TUSTIN Tustin	30 K-2 WESTMINSTER	1
2	3	4	5	6	7	8
9	10 K-2 SMWD Las	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Item No. 10

INFORMATION ITEM
March 1, 2021

TO: **Planning & Operations Committee**
(Directors Yoo Schneider, Nederhood, Seckel)

FROM: **Robert Hunter, General Manager**

Staff Contact: Damon Micalizzi

SUBJECT: **2021 OC Water Summit Update**

STAFF RECOMMENDATION

Staff recommends the Public Affairs & Legislation Committee: Receive and file the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

REPORT

The Orange County Water Summit has been rescheduled for Friday, October 15, 2021. The event will be held once again at the Disneyland Grand Californian Hotel. This comes after several meetings to deliberate over the viability of having the event in a hybrid or virtual fashion on the previously scheduled date of June 4. With social distancing mandates still in effect and with the Disneyland Resort not set to open until later in the year, the OC Water Summit Ad Hoc Committee opted to wait until October, giving more time for vaccination and for the possibility of maximizing the long time partnership with Disney.

The next meeting of the OC Water Summit Ad Hoc Committee is scheduled for April 19.

<table>
<tr><th colspan="2">ENGINEERING & PLANNING</th></tr>
<tr><td>Economic Benefit Studies and Modeling Work to Quantify the Benefits of Local Projects in the Context of MET's 2020 Integrated Resources Plan (IRP)</td><td>MWDOC staff is working with the Brattle Group and CDM Smith on the Economic Benefits Studies and modeling work. In this process, the consulting team will be working with MWDOC and the member agencies regarding the survey of businesses in Orange County.

CDM Smith has completed initial modeling work for a water demand analysis and presented preliminary results to MWDOC's member agencies at the Managers Meeting on January 21, 2021. Final drafts have been completed . This analysis will serve to support the Urban Water Management Plans and provide information for the Economic Benefits study.

Wallace Walrod, economist for Orange County Business Council and sub-consultant for the Brattle Group, is leading the business survey portion of the studies. MWDOC staff has been working with Dr. Walrod on the first draft of the business survey. A meeting will be scheduled with the member agencies later this month to obtain member agency input on the draft business survey.</td></tr>
<tr><td>OC-70 Meter Testing Update</td><td>MWDOC, MET and EOCWD agreed to a reference standard for testing at OC-70 using a calibrated mag meter as a reference for testing the billing meter is to be installed upstream of the OC-70 facility and then compared to the existing venturi meter.

EOCWD provided use of a new 16-inch McCrometer magnetic flow meter to MET for this testing. The mag meter was sent to Utah State Water Research Lab for calibration. The off-the-shelf calibration of this new meter (KA value) proved to be 8% off when tested in a straight pipe run against the NIST certified weight tank but with good repeatability. The calibrated meter was then tested in the simulated pipe system to the weight tank and adjusted by another 0.5%. MET then completed installation of the mag meter at OC-70. Site conditions encountered at OC-70 differed from the as-built drawings, causing MET to scramble to make several adjustments in the field.

Field testing at OC-70 began on March 1, 2021 and was completed on March 9, 2021. A second OC-70 shutdown was completed on March 22-23, 2021 to retrieve the mag meter and pipe spools which are being sent back to Utah Water Research Lab for final calibration verification. MET staff anticipate final results by the end of April 2021.</td></tr>
<tr><td>OC Hydraulic Model</td><td>Black & Veatch has constructed and calibrated the hydraulic model using Innovyze's InfoWater modeling platform. Staff and B&V are currently working with member agencies to define potential project scopes of work.</td></tr>
<tr><td>Doheny Ocean Desalination Project</td><td>South Coast Water District (SCWD) continues working on the project:
In 2019, SCWD was awarded an $8.3 million award from the Water Infrastructure Improvements for the Nation Act of 2016 (WIIN). In December 2020, the Interior Department notified SCWD that the project was selected for an additional $11.7 million for the project for FY 21 for</td></tr>
</table>

	a cumulative total of $20 million which is the existing maximum for WIIN Act Desalination Program funding. • SCWD received an extension on filing a Water Infrastructure Finance and Innovation Act (WIFIA) loan application until June 30, 2021. • SCWD submitted their NPDES permit application on March 13, 2020. Regional Board comments were received in September 2020. SCWD re-submitted in January 2021 and anticipates a Board hearing on the NPDES permit in Summer 2021. • A draft Coastal Development Permit has been submitted to Coastal Commission on 11/23/20 and the Commission staff have provided comments. Resubmission of the permit application is anticipated in Mid 2021. • Work is progressing on an Alternative Energy Study by Burns & McDonnell for the project. A draft report is under review by SCWD. • Work is also progressing on the Financial Analysis for a 2 mgd and 5 mgd scenario through Clean Energy Capital. Work is on hold pending input from the Alternative Energy Study. • Progress continues with a third-party hydrogeologic review of San Juan Creek to determine if and to what extent near shore pumping may have on inland groundwater wells. Additional geophysical field work has been completed and multiple technical working group meetings have been held to model subsurface flows for the lower portion of San Juan Creek. The geology in the vicinity of Stonehill Drive is extremely complex but modeling shows that there is a subsurface barrier which impedes groundwater flows between the upper and lower portions of the creek in the vicinity of Stonehill Drive. The hydrogeologists modeled the hydrogeologic flows between the upper and lower portions of the creek and presented 3D modeling results in March 2021. • A draft report on a Doheny/GRF Hybrid Option Study has been submitted to SCWD for review in January 2021. • SCWD has identified additional environmental permitting tasks related to preparation, technical support and submission for key resource agencies. The proposed tasks will be completed during the next 8 months, with the final public heading taking place by October 2021. On June 25, 2020 the SCWD Board approved an amendment to the Clean Energy Capital Financial Analysis to evaluate alternative project options that meet reliability benefits for SCWD similar to the Doheny Desalination Project, along with reducing overall life-cycle costs in light of the uncertain economic situation moving forward due to the COVID-19 pandemic. The Doheny Desalination Project is currently sized at a capacity of up to 5 MGD, which exceeds SCWD's average potable water demand expected during emergency situations. SCWD has only received interest from SMWD for about 1 mgd of supply from Doheny. This leaves South Coast with potential capacity for others in a 5 MGD facility. Based on this, along with regional financial

	hardships caused by the COVID-19 pandemic and potential economic recession, SCWD believes that it is necessary to consider alternative, and potentially lower cost project options, to utilize and potentially expand existing assets as a means to meet their reliability needs. This amended study is reviewing design parameters and existing conditions at SCWD's existing Groundwater Recovery Facility (GRF), to obtain a comprehensive understanding of actual production capacity of the GRF and current limitations and reliability concerns. A range of additional water production volumes needed to maintain emergency reliability for SCWD will be developed. Current estimates are that 1.2 to 2.2 mgd of additional reliability will be needed for SCWD based on a GRF production volume of 0.8 mgd.
SMWD San Juan Watershed Project	Santa Margarita WD continues to focus on diversifying its water supply portfolio toward obtaining a goal of 30% local supplies. The San Juan Watershed Project is one project SMWD is working on toward that goal. The original project was envisioned to have three Phases; Phase 1 included three rubber dams along San Juan Creek to recover about 700 Acre-Feet-per Year (AFY); Phase 2 added up to 8 additional rubber dams and the introduction of recycled water into the creek to improve replenishment of the basin to recover up to 6,120 AFY, and Phase 3 added more recycled water topping out at approximately 9,480 AFY. Under this arrangement, most or all of the production and treatment involved the existing San Juan Groundwater Desalter with expansions scheduled along the way to increase production beyond 5 mgd. Fish passage and regulatory hurdles to satisfy subsurface travel time requirements continue to be addressed. SMWD has since modified the project. Currently SMWD is working with the Ranch on the next phase of development within SMWD's service area and also working on access to riparian groundwater from the Ranch in the upper portions of the San Juan Creek watershed. SMWD plans to construct a water filtration plant to treat this additional water, which currently has the working title of 'The Ranch Water Filtration Plant' (RWFP). The draft CEQA documentation for the RWFP is going to the SMWD E&O Committee for review in February 2021. SMWD anticipates that the RWFP plant will begin operation in the 1st quarter of 2022. This new first phase will treat approximately 1,000 AFY of non-potable water to produce 800 – 900 AFY of potable water, which will then be put directly into the SMWD water system. The RWFP treatment system will consist of Microfiltration or Ultrafiltration, Reverse Osmosis and Chloramines. SMWD also continues to work with the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) on steelhead trout regulations for any work occurring within San Juan Creek stream. This new RWFP 1st phase is 'off-stream' which is allowing the project to move forward. A new 2nd phase of the project will look to use infiltration basins (stormwater/flood) that will be constructed as part of the Ranch's next phase of

	development. SMWD is looking to fill these new basins with recycled water in the summer when the basins are empty and then take it back out. By doing this SMWD anticipates being able to increase the source water supplies for the RWFP to approximately 5,000 AFY. Both State and US Bureau of Reclamation grants are being pursued for this project. SMWD has discovered that the local geology has high vertical percolation rates and sufficient groundwater basin travel time (lower horizontal conductivity) to potentially allow percolation of treated recycled water with an ability to meet the required travel time regulations. SMWD is of the opinion that permitting for percolation augmentation using recycled water from the nearby Trampas reservoir can be added as permitting allows. SMWD believes the new project may be able to ultimately produce 4,000 to 5,000 AFY; they believe the original project will continue to be developed for production out of the wells and treatment provided by San Juan Capistrano as the two agencies merge. Ultimate production out of the basin could exceed 10,000 AFY if all goes well.
South Orange County Emergency Service Program	MWDOC, IRWD, and Dudek have completed the study to determine if the existing IRWD South Orange County Interconnection capacity for providing emergency water to South Orange County can be expanded and/or extended beyond its current time horizon of 2030. Dudek participated in the November 6, 2019 SOC workshop to re-engage with the SOC agencies on this project. Support from the agencies was expressed to take a small next step to install Variable Frequency Drives at a pump station within IRWD which would be paid for by SOC to help move water from the IRWD system to SOC in an emergency. The Variable Frequency Drives will provide more flexibility to the IRWD operations staff to allow additional water to be sent to SOC while meeting all of the IRWD needs.
Strand Ranch Project	MWDOC and IRWD are continuing to exchange ideas on how to implement the program to capture the benefits that can be provided by the development of "extraordinary supplies" from the Strand Ranch Project. Staff from MWDOC and IRWD met in August 2020 and have been reaching out to other agencies to determine the level of interest in the project.
Poseidon Resources Huntington Beach Ocean Desalination Project	The Santa Ana Regional Water Quality Control Board (SARWQCB) continues to work with Poseidon on renewal of the National Pollutant Discharge Elimination System (NPDES) Permit for the proposed HB Desalination Project. The renewal of the NPDES permit for the proposed desalination facility requires a California Water Code section 13142.5(b) determination in accordance with the State's Ocean Plan (a.k.a. the Desalination Amendment). To make a consistency determination with the Desalination Amendment, the Regional Board is required to analyze the project using a two-step process:

	1. Analyze separately as independent considerations, a range of feasible alternatives for the best available alternative to minimize intake and mortality of all forms of marine life: a. Site b. Design c. Technology d. Mitigation Measures 2. Then consider all four factors collectively and determine the best combination of feasible alternatives. The key areas required by the Ocean Plan on which the Santa Ana Water Board is required to make a determination, includes: • Facility onshore location; • Intake considerations including subsurface and surface intake systems; **• Identified need for the desalinated water;** • Concentrated brine discharge considerations; • Calculation of the marine life impacts; and • Determination of the best feasible mitigation project available. On December 6, 2019, SARWQCB, Regional Board staff conducted a workshop in Huntington Beach that was heavily attended with a considerable range of views expressed at the meeting. On May 15, 2020, SARWQB held a second workshop, which focused on the identified need for the desalinated water and marine life mitigation requirements. Karl Seckel presented to the Regional Board on a number of topics including: MWDOC's role in Orange County, alternative definitions of "need" for a water supply project and the role of water agencies, Urban Water Management Plans, non-mandated planning documents, and what was and was NOT in the 2018 OC Water Reliability Study. On September 15, 2020, the Regional Board postponed action on the waste discharge permit renewal at the request of Poseidon to allow additional time to address concerns raised in three days of public hearings. **On February 12, 2021**, the Santa Ana Regional Water Board released a tentative order detailing proposed revisions to the project. The Tentative order is available at: https://www.waterboards.ca.gov/santaana/public_notices/docs/2021/NPH_Poseidon_Order_R8-2021-0011.pdf The changes include: • Revisions to the mitigation acres for the inlet dredging in Bolsa Chica so that the dredging accounts for no more than 25% of the

	mitigation acreage needed to minimize the intake and mortality of all forms of marine life. Poseidon has proposed additional mitigation to meet the requirements of the Ocean Plan and proposed additional restoration at the Bolsa Chica Wetlands and the creation of an artificial reef along the Palos Verdes Peninsula to satisfy the remaining mitigation requirements. • a finding regarding the human right to water policy adopted the State and adopted by the SARWQB as a core value. The Order is consistent with and promotes the human right to water policy. • The deadline for the Discharger to submit the Climate Change Action Plan was revised from within 3 years of the effective date of the Order to within 18 months. Continued public hearings are scheduled for **April 23, 2021** at 9:00am, and if needed April 29, 2021, to review the revisions and vote on renewing Poseidon's permit. Assuming success at the Regional Board, Poseidon would then seek its final permits from the California Coastal Commission (CCC). The CCC has committed to reviewing the permit within 90 days of the SARWQCB NPDES permit issuance.
Trampas Canyon Dam and Reservoir	Trampas Canyon Reservoir and Dam (Trampas Reservoir) is a seasonal recycled water storage reservoir, with a total capacity of 5,000 AF, of which 2,500 AF is available to meet Santa Margarita Water District's projected base recycled water demands, and 2,500 AF to meet future water supply needs. When completed, the Trampas Reservoir will allow SMWD to store recycled water in the winter and draw on that water during the peak summer months. The construction of the Trampas Canyon Recycled Water Seasonal Storage Reservoir consists of three main components: 1. Trampas Canyon Dam (Dam) 2. Conveyance facilities to transport recycled water into and out of the Reservoir (Pipelines) 3. Trampas Canyon Pump Station (Pump Station) The construction of the facilities is being completed in three phases: 1. Preconstruction/Site Preparation for the Dam and Pump Station Construction Project Status – Completed in 2018 2. Dam and Pipelines Project Status – All of the pipelines that convey the recycled water to and from the reservoir have been completed. SMWD is ready to fill, monitor, and operate the Reservoir predicated on the receipt of Permit to Operate from the Division of Safety of Dams (DSOD).

	3. Pump Station Project Status – All pre-startup work necessary for pumping has been completed. SMWD has opted not to operate and test the pumps until it has the flexibility of sending water into the Reservoir, which will make the testing activities more efficient and help conserve water. The Emergency Action Plan (EAP) for Trampas Dam has been finalized and submitted to CalOES. This satisfies the requirement for DSOD to have an EAP in place prior to issuance of a permit to impound water behind the dam.
AMP Shutdown in 2021 to Replace PCCP Sections	In 2016, MET initiated a Prestressed Concrete Cylinder Pipe (PCCP) rehabilitation program to install 100 miles of steel liner throughout the MET system to address structural issues associated with prestressed steel wire failures in PCCP. As part of the program, MET monitors PCCP for wire breaks on a regular basis. MWDOC staff was notified that an internal inspection of the AMP revealed two pipe segments with increased wire breaks within the PCCP portion south of OC-70. Metropolitan Engineering considers this section of the pipeline to be at high-risk due to pipe segments that have 20 or more wire breaks. The minimum relining length needed is approximately 1,000 feet and requires a minimum 37-day shutdown for the portion of the AMP south of OC-70. MET had originally scheduled the AMP PCCP relining to begin in about 5 years, but based on the survey, MET does not recommend that repairs to these segments wait until Fall 2021. Two MWDOC member agency projects were scheduled around the same time as the pending AMP shutdown; a South Coast Water District vault rehabilitation on the JTM that was previously postponed due to the previous Diemer shutdown, and Santa Margarita Water District relocation of a portion of the Aufdenkamp Connection Transmission Main (ACTM) to accommodate the I-5 widening project. Both projects have been completed and are back in operation. The AMP shutdown is planned for April 4, 2021 through May 10, 2021. Staff coordinated a meeting with impacted AMP agencies on February 9, 2021 to discuss scenarios regarding moving water around the impacted agencies to meet demands during the shutdown. Staff is continuing to work with affected agencies and will keep both the Board and the AMP Participants informed as more information becomes available.
Other Shutdowns	**Orange County Feeder** MET is planning to reline and replace valves in a section of the Orange County Feeder from Bristol Ave to Corona Del Mar – this is the last section of this 80-year-old pipeline to be lined.

	MET has further delayed the relining project and has proposed new shutdown dates of September 15, 2022 through June 15, 2023. **Orange County Feeder Extension** MET is planning to reline 300-linear feet of the OC Feeder extension affecting the City of Newport Beach, IRWD and LBCWD. MET has delayed the relining project by one year and has proposed new shutdown dates of June 16, 2023 through July 10, 2023. **Joint Transmission Main** SCWD has completed the rehabilitation project of their CM-10 vault on the Joint Transmission Main (JTM) which included replacement of existing valves. **Aufdenkamp Connection Transmission Main** SMWD has completed the relocation of a section of the ACTM pipeline for the I-5 widening project.
Meetings	
	MWDOC staff along with ABS Consulting, IDS Group and Optima RPM participated in several construction progress meetings in the month of March regarding the admin building seismic retrofit and remodel. Weekly progress meetings will continue through the completion of the project.
	Chris Lingad attended the OC-70 meter testing on March 1, 2021 and March 9, 2021.
	Charles Busslinger and Chris Lingad attended a meeting with LBCWD on March 2, 2021 to formally meet LBCWD's new general manager Keith Van Der Maaten and to discuss MWDOC's hydraulic model.
	Charles Busslinger and Chris Lingad attended a meeting with IRWD, TCWD, MET and MET's impacted member agencies on March 11, 2021 to discuss issues with the Lake Mathews Facility Shutdown. Additional repairs were needed for a slide gate which prompted a request from MET for a 3-day shutdown extension. The impacted agencies were quick to respond and approved the extension. MET was able to complete the repairs early and the extension was not needed.
	Charles Busslinger and Chris Lingad attended a meeting with IRWD and TCWD on March 11, 2021 to discuss Baker Water Treatment Plant operations.
	Charles Busslinger, Chris Lingad, and Kevin Hostert attended a AMP shutdown coordination meeting hosted by MET on March 15, 2021. All of the MWDOC's member agencies who are impacted by the shutdown were in attendance.
	Charles Busslinger, Chris Lingad, Kevin Hostert, and Alex Heide attended a meeting with CDR to review water agency boundary information in conjunction with member agency Urban Water Management Plans.

	Charles Busslinger and Chris Lingad attended a meeting with SCWD on March 17, 2021 to discuss water delivery reporting and billing.
	Rob Hunter, Charles Busslinger, and Chris Lingad attended a meeting with Dr. Wallace Walrod and Dr. David Sunding on March 22, 2021 to discuss the Economic Benefit Studies business survey.

MWDOC Managers Report
WEROC Status Report

March 2021

COVID-19 (CORONA VIRUS) COORDINATION

- WEROC continues to monitor the State and County for changing information and is sharing information with agencies as it becomes available.
- WEROC is participating in the weekly Operational Area Conference calls.
- WEROC continues to hold bi-weekly conference calls on Tuesdays with member agencies to report on Federal, State, and County changes. Calls continue to support the sharing of information between agencies.
- Vicki continues to support agencies daily with COVID-19 related questions and guidance needs.
- Vicki is a member of the County POD IMT coordination calls. WEROC is coordinating with any special district that wish to provide staffing to the County Super PODS.
- Vicki continued to advocate for water and wastewater workers to be added to the 1b Tier. On the Operational Area Coordination call, Vicki got Dr Chau to agree Public works, water and wastewater are Tier 1b and eligible. Vicki had another meeting with Dr. Chau and Dr CK scheduled following the Operational Area Coordination call to finalize the discussion, , but the State changed the 1B tier to include utility workers (water/wastewater) on 3/11/21 so this meeting was cancelled, and email directions was sent to WEROC agencies immediately so they could begin the registration process.
- Vicki also provided a verification letter to the agencies for staff to use at the POD locations.
- On the 3/16/21 WEROC Bi-Weekly Conference call, Vicki shared information regarding the American Rescue Plan Act COVID-19 Relief Funding. Allocations to the State, cities and Counties have been made. Cities allocations are based on if all cities participate so the funding number could change. Special Districts even though was included in the legislation has not direct allocation amounts indicated at this time. CSDA has sent information to special districts highlighting activities to be done now in preparation. This and other information is included in the WEROC Conference Call minutes to be sent later this week.
- CalOSHA is reanalyzing the Emergency Temporary Standards in place for section 3205. As of 3/28/21, CalOSHA is meeting with the California Department of Public Health on changes recommended CDC in order for both agencies to try to get on the same page, but there is still no resolution or updates to the COVID-19 ETS. To

highlight one area of conversation is the quarantine time for someone vaccinated vs not, or the mask wearing requirements WEROC will monitor the discussions and outcomes and provide information to the agencies as it is available

- Vicki and Cathy, MWDOC HR Director on working on the MWDOC Covid Control Plan updates to include resumption of business services including in person meetings, travel, etc. This plan will be tied to the current regulations, vaccine status, and MWDOC facility construction schedule.

MARCH INCIDENTS/EVENTS

(CYBER, MUTUAL ASSISTANCE COORDINATION)

- WEROC coordinated with the OCIAC and a member agency on an identified vulnerability during the month of March.
- WEROC coordinated and participated with the County during the March rain events n correlation with the Bond Fire Debris Flow Plan. There was no impacts to water/wastewater.

COORDINATION/PARTICIPATION WITH MEMBER AGENCIES AND OUTSIDE AGENCIES

Daniel is providing important cyber security information to the member agencies. The Cyber Communications group is being used to disseminate this information.

- WEROC continues to assist the County/Operational Area Emergency Management Division with getting the water and wastewater Special Districts signed Operational Area Agreements completed. The new Operational Area agreement went into effect in September 2020. Vicki attended the Board Meetings for Laguna Beach County and South Coast Water District who passed the agreement in the month of March. At this time, there is only 4 special district water agencies left that have not submitted their completed agreements.
- Vicki had a meeting with CSDA regarding the backend and history of Public Safety Power Shutoffs, generator use and SB 560 and AB 1403. Vicki provided additional information in regards to the current regulations, the proclamation process. It was a very good engagement which may lead to additional training opportunities with CSDA in the future regarding the proclamation process and the tie in to the Operational Area/County level.

- Vicki attended the State CalWARN board meeting and is assisting with the revision of the Mutual Assistance plan which has not been updated in 4 years and based on recent events, requires some changes and training.

- Vicki is assisting the Orange County Sanitation District with the field exercise in April. Vicki has been attending the internal planning meetings. The exercise will be conducted on April 28th. Vicki is evaluating the EOC Operations and Coordination activities.

- Vicki attended the COAST – County of Orange Area Safety Taskforce meeting. This group focuses on fire mitigation activities. The meeting on 3/18 focused on the revision of the Community Wildfire Protection Plan (CWPP). The revision will increase the inclusionary areas and agencies for the wildland fire areas of Laguna Beach and Brea. This document assists with grant funding as another support document highlighting mitigation and planning efforts. The other interesting topic was the seasonal weather outlook for the months of March-June (I have the report if there is an interest).

- WEROC participated in the State's Annual Tsunami Communication drill with the County Operational Area. If this was a real event, Vicki would communicate timeline, updates and actions agencies should be taking based on the seismic event that triggered a tsunami affecting all agencies along the coast.

- Daniel on 3/30, met with representatives from the UCI Emergency Management, presented our structure, and set up. UCI likes some of the process and equipment in place and wishes to replicate some of these items within their EOC

WEROC ASSESSMENT IMPLEMENTATION AND PLANNING EFFORTS

- In relation to the WEROC Assessment Report, the Records and Data Management project is 79All % completed. Janine is updating the outdated documents in safety center.

- Program, Planning Maintenance and Recommendation Matrix is 100% completed as comparison of federal and state mandates in relationship to current planning continues. This matrix includes staff program and planning assignments and each member of the WEROC team. Internal planning meeting occurred to discuss and implement this matrix.

- Staffing assignments and realignment of roles and responsibilities is 40% completed. A survey was sent to the internal members of MWDOC to highlight current assigned roles, and potential future reassignment of roles. Once this part of the realignment of the EOC responder assignment is completed, training will begin in conjunction with the updated Emergency Operations Plan.

- The WEROC EOP is 95% completed, Management has provided feedback to Daniel on the plan, and he is in the process of making final changes. This plan will be done in April.

AMERICA'S WATER INFRASTRUCTURE ACT (AWIA) PROJECT

- WEROC and its consultant, Herndon Solutions Group (HSG) continues to work with WEROC agencies to achieve compliance with America's Water Infrastructure Act (AWIA).
- Tier II agencies successfully completed their RRA submittals by the December 31, 2020 deadline. The Emergency Response Plan phase will be due in June, 2021. Tier II agencies began their Emergency Response Plan meetings at the end of January.
- All Tier III agencies have begun their workshops. The Tier III agencies RRA are due June 30, 2021.
- 8 agencies workshops were conducted in the month of March utilizing various virtual platforms dependent on the agency preference.

EMERGENCY OPERATIONS CENTER READINESS AND SYSTEMS

- Daniel is working on maintaining the operational function for the South EOC. He is focused on the projects areas with the generator and IT systems (on-going).
- There is no update from the County on the status of the WebEOC Resource Management and Resource Request board issues or timeline when the issues will be resolved. Janine attending the Operational Area Technology committee meeting on 3/24.
- Janine continues to update member agency contact information.

TRAINING AND EXERCISES

- Daniel hosted one 800 MHz radio training in March.
- WEROC is hosted a Cyber Security Training on 3/18 in partnership with the Orange County Intelligence Assessment Center. There were 68 attendees for this training. Daniel is working on scheduling additional cyber course at the request of the member agencies.

- Daniel began his National Emergency Management Advanced Academy (NEMAA). This is national offered class targeting California representatives from Federal, State, City, County, Local, Tribal, and Territorial Governments, along with Emergency Managers from Higher Education, DOD, Private Sector, American Red Cross, Public Health and Volunteers. In order to attend, you have to be sponsored and selected. This course will further enhance Daniels' experience and professional career.
- Janine is in the final stages of completed a grant writing course. This will provide her and WEROC with additional skills sets to look for additional funding for different programs.

Status of Water Use Efficiency Projects
March 2021

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	Ongoing	In February 2021, 555 smart timers were installed in Orange County. To date, 29,862 smart timers have been installed through this program.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	In February 2021, 236 rotating nozzles were installed in Orange County. To date, 571,817 rotating nozzles have been installed through this program.
SoCal Water$mart Residential Indoor Rebate Program	MWDSC	Ongoing	Ongoing	In February 2021, 317 high efficiency clothes washers and 20 premium high efficiency toilets were installed in Orange County. To date, 123,344 high efficiency clothes washers and 60,694 high efficiency toilets have been installed through this program.
SoCal Water$mart Commercial Rebate Program	MWDSC	Ongoing	Ongoing	In February 2021, 5 cooling tower conductivity controllers were installed in Orange County. To date, 110,920 commercial devices have been installed through this program.
Industrial Process/ Water Savings Incentive Program (WSIP)	MWDSC	Ongoing	Ongoing	This program is designed to improve water efficiency for commercial customers through upgraded equipment or services that do not qualify for standard rebates. Incentives are based on the amount of water customers save and allow for customers to implement custom water-saving projects. Total water savings to date for the entire program is 1,284 AFY and 5,898 AF cumulatively.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Turf Removal Program	MWDOC	Ongoing	Ongoing	In February 2021, 7 rebates were paid, representing $144,009 in rebates paid this month in Orange County. To date, the Turf Removal Program has removed approximately 23 million square feet of turf.
Spray to Drip Rebate Program	MWDOC	Ongoing	Ongoing	This is a rebate program designed to encourage residential and commercial property owners to convert their existing conventional spray heads to low-volume, low-precipitation drip technology. To date, the Spray to Drip Rebate Program has converted approximately 1,068,649 square feet of area irrigated by conventional spray heads to drip irrigation.
Recycled Water Retrofit Program	MWDSC	Ongoing	Ongoing	This program provides incentives to commercial sites for converting dedicated irrigation meters to recycled water. To date, 178 sites, irrigating a total of 1,654 acres of landscape, have been converted. The total potable water savings achieved by these projects is 3,646 AFY and 15,495 AF cumulatively.

Public & Governmental Affairs Activities Report
February 22, 2021 – March 30, 2021

Member Agency Relations	Public Affairs Staff: • Developed and distributed Wyland National Mayor's Challenge for Water Conservation Media Kit for member agencies • Attended Orange County Water District's (OCWD) 2020 Retrospective: Wildlife Populations Thrive on OCWD Lands • Attended Irvine Ranch Water District's San Joaquin Marsh & Wildlife Sanctuary Virtual Tour • Created Pressure Regulating Valve marketing materials for South Coast Water District and updated materials for Irvine Ranch Water District Governmental Affairs Staff: • Hosted a grants tracking and acquisition meeting and provided timely updates on deadlines • Worked with the City of Newport Beach on shutoff issues and answers inquiries regarding flow restrictors • Distributed the monthly grants tracking and acquisition report to member agencies • Distributed information on a webinar hosted by the California Department of Housing and Community Development to help utilities understand how to access Emergency Rental Assistance for Utility Providers under the recently adopted SB 91 COVID Relief funding bill • Provided a legislative update to the OC Met Managers group • Distributed a "save the date" to member agencies on the upcoming SCAQMD working group meeting updating regulations affecting emergency generator use
Community Relations	Public Affairs Staff: • Met with Metropolitan Water District of Southern California to discuss virtual Scouts programs • Met with Bolsa Chica Conservancy to discuss virtual Scouts program opportunities Governmental Affairs Staff: • Volunteered at a COVID-19 vaccination POD • Assisted SDCWA staff with federal RFP coordination and feedback, including sharing our distribution list
Education	Public Affairs Staff: • Met with Water Energy Education Alliance sponsors and regional leads to discuss 2020-21 and 2021-22 deliverables.

	• Submitted an article on the Water Energy Education Alliance to OC STEM • Attended the Orange County Community Foundation Workforce Initiative meeting • Met with Orange County Community Foundation regarding a grant opportunity for the Water Energy Education Alliance • Met with a teacher about building workforce pathways to water careers for Santa Ana Unified School District • Met with Strategic Competitive Gains on communications training • Met with California Environmental Literacy Initiative to discuss plans for reorganization • Met with Alison Loukeh to discuss the steps required for building Career Technical Education programs • Met with Orange County Department of Education and Hashtag Pinpoint to discuss education video series project • Met with Orange County Department of Education on a pilot water education project for San Joaquin Elementary • Hosted and led a meeting with the Water Energy Education Alliance regional leads to discuss roles and resources needed • Met with Mesa Water to discuss industry awards process • Met with UC Master Gardeners to discuss partnership opportunities • Met with UC Irvine Civil & Environmental Engineering Affiliates to discuss virtual externship opportunity • Attended the Energy, Construction, and Utilities Advisory Board meeting • Participated in a California Environmental Literacy Leadership Council meeting • Presented on Career Technical Education and the Water Energy Education Alliance at the Department of Water Resources Water Education Committee Meeting • Co-presented educational video series project at the Metropolitan Water District of Southern California's Education Coordinator's Meeting • Met with Ten Strands CTE working group to discuss integration of environmental literacy into Career Technical Education programs • Conducted interviews for RFP 0119-001: Design and Implementation of Water Education School Program Services • Provided School Program website interest forms to School Program contractors • Provided information to Director Schneider regarding school program progress in the City of San Clemente • Provided information to Moulton Niguel Water District regarding MWDOC Choice Elementary School Programs

Media Relations	Public Affairs Staff: • Prepared and distributed content for social media • Met with Strategic Digital Communications contractor Hashtag Pinpoint to discuss social media and campaign strategies • Created Content for OC Register Special Insert: California Water Orange County
Special Projects	Public Affairs Staff: • Participated in the Orange County Water Summit Committee Meetings with Orange County Water District and MWDOC Directors Yoo Schneider, Thomas, and Seckel • Selected and notified winners for the 2021 Water Awareness Poster Contest • Hosted February 24th Virtual Water Policy Forum featuring keynote speakers Nancy Vogel and Susan Tatayon • Developed Garden Smart resources for MWDOC and UC Master Gardeners partnership • Completed several website updates • Completed MWDOC workplace trust and DocuSign trainings • Attended Baywork and California Water Environmental Association's (CWEA) Women in Water: Addressing Barriers to Joining the CA Water Profession webinar • Participated in WEROC exercise/training • Assembled a Dropbox folder allowing MWDOC board access to promotional, outreach, and branding materials across 18 Public Affairs categories • Organized and participated in the creation of Speakers Bureau presentation to Newport Balboa Rotary • Participated in Communications Plan Ad Hoc Committee Governmental Affairs Staff: • Staffed the ISDOC Executive Committee meeting • Coordinated with Metropolitan staff to speak at the May WACO meeting • Staffed the WACO meeting featuring Ducks Unlimited • Prepared a support letter for Director McVicker for ISDOC 2nd VP • Staffed the WACO Planning meeting • Coordinated with SDCWA GM Sandy Kerl's office to speak at the May WACO meeting • Coordinated with Metropolitan staff who had been booked to speak at the May WACO meeting to be on stand-by for a possible future date • Fielded numerous questions and emails regarding the ISDOC 2nd VP vacancy • Drafted and distributed the ISDOC Quarterly Luncheon meeting scheduled for April 29

Legislative Affairs	Governmental Affairs Staff: • Participated in the ACWA COVID Relief and LIRA working group meeting (multiple meetings) • Participated in the Metropolitan Member Agency Legislative Coordinators meetings (multiple meetings) • Met with Capitol staff for Assembly Member Janet Nguyen • Attended the CSDA Legislative Committee meeting on March 5 and March 26 • Attended the Southern California Water Coalition Legislative Task Force meeting • Participated in the AMWA Legislative Committee meeting • Distributed a request to join Metropolitan's coalition letter on AB 442 (Mayes) • Attended CMUA's utility debt relief meeting • Participated in the ACWA Region 10 State Legislative Committee pre-meeting caucus • Met with Assembly Water, Parks and Wildlife Committee staff regarding MWDOC's position on pending legislation • Met with Assembly Member Steve Bennett's staff who assist him in his position on the Water, Parks and Wildlife Committee • Attended the CMUA Regulatory Committee meeting and the Legislative Committee meeting • Attended the ACWA Legislative Symposium featuring panels on Water Affordability Legislation (SB 222 and SB 223) and the Climate Resiliency Bonds (AB 1150 and SB 45), and closed out with a conversation with Assembly Member Luz Rivas • Participated in the ACWA State Legislative Committee meeting • Participated in the Cal-Desal Legislative Committee meeting • Attended the ACWA DC Congressional Staff Panel on various water issues • Participated in the ACWA Bond measures working group meeting