MEETING OF THE
BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
November 2, 2015, 8:30 a.m.
MWDOC Conference Room 101

P&O Committee:
Director Osborne, Chair
Director Barbre
Director Hinman

Staff: R. Hunter, K. Seckel, R. Bell,
H. De La Torre, K. Davanaugh, J. Berg

Ex Officio Member: L. Dick

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.

PRESENTATION

1. PRESENTATION BY KELLY HUBBARD RE VALLEY FIRE RESPONSE
(Approximate Presentation time: 10 minutes)

ACTION ITEM

2. SCOPE OF WORK FOR PHASE 1 EXTENSION OF THE OC WATER RELIABILITY STUDY

DISCUSSION ITEMS

3. STATUS UPDATE ON THE OC WATER RELIABILITY STUDY – NOVEMBER 2015

4. UPDATE ON SECONDARY ASSIGNMENT OF SURPLUS MET ALLOCATION (oral update)

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.)

5. WEROC RADIO ASSESSMENT

6. STATUS REPORTS
   a. Ongoing MWDOC Reliability and Engineering/Planning Projects
   b. WEROC
   c. Water Use Efficiency Projects
   d. Water Use Efficiency Programs Savings and Implementation Report

7. REVIEW OF ISSUES RELATED TO CONSTRUCTION PROGRAMS, WATER USE EFFICIENCY, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, 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.

Valley Fire Response & El Nino Prep

KELLY HUBBARD, WEROC EMERGENCY MANAGER

MWDOC P&O COMMITTEE – NOVEMBER 2, 2015

Valley Fire

Start Date: September 12, 2015

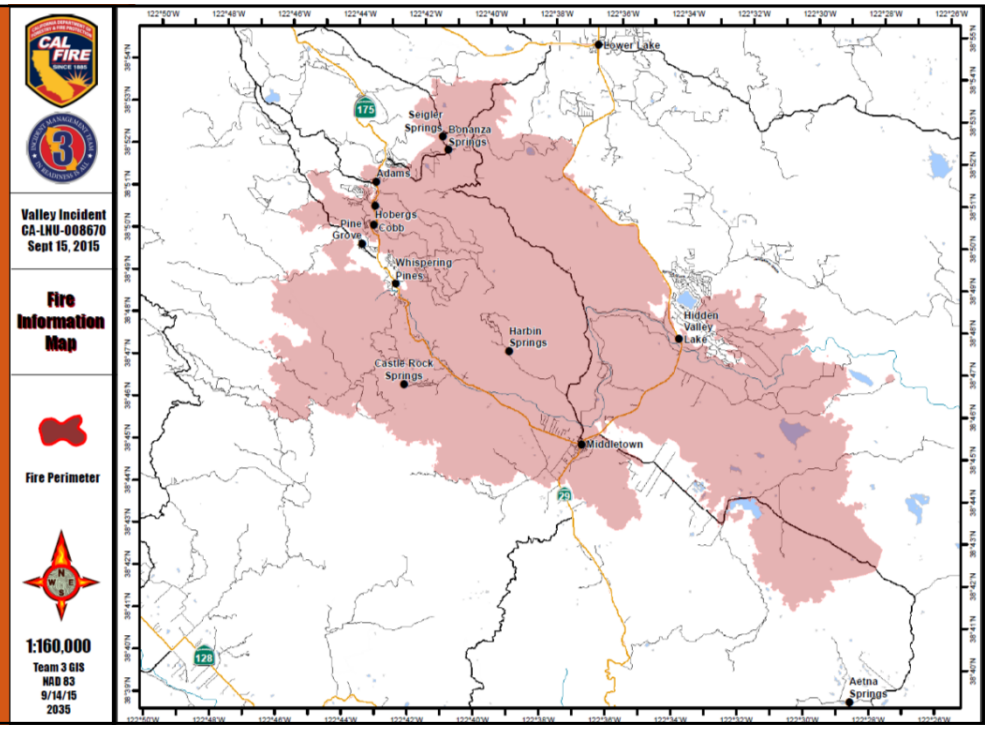
Total Acres Burned: 76,067

Counties Impacted: Lake, Napa and Sonoma

Water Systems:
- 16 small systems
- Private wells and springs

Total Properties Destroyed (1,958):
- 1,280 homes
- 27 multi-family structures
- 66 commercial properties
- 585 other minor structures (many water structures are in this)
- Estimated 3,000 homeless

Valley Fire Burn Zone



California Water/Wastewater Agency Response Network's (CalWARN)Role

Conference Calls @ Request of Lake County EOC

Goal – To facilitate water utility information sharing and mutual aid if requested

Requested Mutual Aid:

- Infrastructure Coordinator @ Lake County EOC
- Incident Management Team (IMT) Water Liaison @ Field Incident Command Post
- Field Water Utility Damage Assessment position @ Field Incident Command Post

Possible Future Needs Identification (proactive – never requested):

- Type II Water Production Teams
- Type II Damage Assessment and Repair Teams

Fire Incident Management Team (IMT) Water Liaison

Kelly Hubbard Deployed
- Friday, September 18th – Sunday, September 20th
- Only Water Responder in State with IMT Liaison Training & experience

Liaison between:
- Fire Incident Command Post
- Lake County Operational Area EOC
- State Water Resource Control Board, Division of Drinking Water
- Impacted Utilities

Expected Actions:
- Reporting of Damage Assessments in coordination with Field Damage Inspector
- Assist Impacted Utilities with understanding FEMA Public Assistance Documentation and Process
- Provide input on Repopulation Decisions based on water and wastewater impacts
- Coordinate water quality public notifications

Middleton Area

Callayomi County Water District

Other systems

Valley Fire Incident Command Post, Staging Area & Base Camp

Lessons Learned

Repopulation of evacuated areas is complex
- Need a county-wide procedure

Water Distribution Plans
- Who needs water?

Policies for recovery
- 12 out of 147 connections remaining

Just in Time Training
- IMT Water Liaison
- FEMA Public Assistance Process

Simplify tracking of damage and impacts

Fire IMT incorporation of Water Liaison

Jurisdictional authorities discussion

OC El Nino Preparations

Coordination Meetings:

- OC Winter Weather Workshop
- Southern Region Mutual Aid Regional Advisory Committee (MARAC) Workshop on El Nino
- WEROC Quarterly Meeting – November 3rd
- Agency internal tabletop exercises

Areas of emphasis for planning:

- Coordination of remote access roads
- Communications with Edison
- Drought messaging
- DWR Flood Fight Class
- Outreach on sewer manholes
- Mitigation and prevention steps

Questions

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 2

ACTION ITEM
November 18, 2015

TO: **Planning & Operations Committee**
(Directors Osborne, Barbre, Hinman)

FROM: **Robert Hunter, General Manager**

Staff Contact: Karl Seckel/Richard Bell

SUBJECT: **Scope of Work for Phase 1 Extension of the OC Water Reliability Study**

STAFF RECOMMENDATION

Staff recommends the Board of Directors authorizes the General Manager to augment the CDM-Smith OC Water Reliability Study Scope of Work and fee estimate by $40,935 for the Phase 1 Extension as outlined below and in the attached scope of work.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

At the October Groundwater Producer's meeting a request was made for a "pause" at the end of Phase 1 to allow all of the agencies to participate in a series of Workshops to review the Phase 1 work, fully understand the implications of the work and to develop a work plan for any subsequent efforts under a Phase 2 Scope of Work, also to be developed through the workshop process. It is expected that up to five workshops will take place in Nov, Dec and January. A scope of work to secure additional technical assistance from CDM-Smith for the workshops is attached.

Staff is supportive of the approach of conducting additional workshops. The overall analysis and implications are complex and time should be taken to fully evaluate and understand the work.

Budgeted (Y/N): Yes	Budgeted amount: $150,000	Core ✓	Choice __
Action item amount: $40,935	Line item: 02-21-7010 & 02-23-7010		
Fiscal Impact (explain if unbudgeted):			

The P&O Agenda includes further information in a Status Report Update for the OC Water Reliability Study where a presentation on the DRAFT summary results from Phase 1 will be provided.

600 Wilshire Blvd, Suite 750
Los Angeles, CA 90017
tel: 213 457-2200

October 27, 2015

Karl Seckel
Municipal Water District of Orange County
P.O. Box 20895
Fountain Valley, CA 92728

Subject: Scope and Fee for Phase 1 Extension of Orange County Reliability Study

Dear Mr. Seckel:

CDM Smith is pleased to provide you with a scope and fee for Phase 1 Extension of the Orange County Reliability Study (Reliability Study), as requested. This effort builds on our work with MWDOC, OCWD and the water agencies participating in the Orange County Reliability Study Workgroup (Workgroup) for Phase 1. Our scope and fee is based on the following tasks:

- Assist with Communication of Results of Phase 1
- Test Phase 1 Water Supply Gap Under Additional Assumptions
- Develop and Sample Test Financial Tool for Portfolio Cost-Effectiveness
- Develop Scope/Fee for Phase 2
- Workshop Meetings with Agencies
- Project Management

Task 1 – Assist with Communication of Results of Phase 1

Phase 1 of the Reliability Study developed a comprehensive simulation model (Model) that compared water demands and supplies at the MET regional level and for Orange County for 93 different hydrologic sequences, with and without climate change, with and without California WaterFix for the Delta, and for different levels of water demand and supplies. The Model represents the first time such a tool was developed to allow for testing of water reliability and estimation of supply gaps under various scenarios, including analysis of impacts on the Orange County Groundwater Basin (OC Basin). Phase 1 also summarized various new water supply projects and programs that could be implemented by MET, Orange County water agencies or some combination of both to mitigate the water shortages estimated by the Phase 1 Model.

Phase 1 of the Reliability Study produced an enormous amount of information for six different planning scenarios and for three areas within Orange County (Brea/La Habra, Orange County Basin, and South County) plus a County summary that included: (1) regional and Orange County water demands and supplies; (2) MET water supply reliability and purchases of water by Orange County water agencies; (3) OC Basin production and storage levels, including MET

WATER + ENVIRONMENT + TRANSPORTATION + ENERGY + FACILITIES

replenishment availability; and (4) maximum annual water shortages, average annual water shortages, and frequency of shortages.

Before launching a Phase 2 effort in which various portfolios of water supply projects identified in Phase 1 will be tested in terms of effectiveness in reducing the Gap between water demands and supplies, it is important take the time to fully communicate the results of Phase 1 to the Orange County water agencies, to set the foundation for additional Phase 2 work. This effort will include CDM Smith working closely with MWDOC and OCWD staff to develop communication materials including PowerPoint presentations, handouts, and other technical information for sharing with the water agencies in Orange County in a workshop setting.

It is assumed that there would be four (4) workshops with Orange County water agencies on the technical and policy issues associated with the Gap analysis, with each workshop being approximately 4 hours. A Final Workshop (5th) with all agencies is anticipated to get concurrence on the Scope of Work and costs for Phase 2. The Task 2 effort only includes preparation of materials as the time to attend the workshops is shown in Task 5. CDM Smith's level of effort for Task 1 is 22 hours, with a fee of $4,680.

Task 2 – Test Water Supply Gap Under Additional Assumptions

It is anticipated that during the communication of Phase 1 results there will be the desire by water agency participants to test additional assumptions for the model and gap analysis. We have assumed three (3) additional Model runs/simulations for this effort. The additional assumptions might include different OC Basin operations, different assumptions regarding MET replenishment, and different assumptions regarding MET reliability.

CDM Smith will work closely with MWDOC and OCWD staff to finalize these assumptions for additional model runs. This effort only includes Model programming and Model runs. Time to attend MWDOC/OCWD technical meetings to support this task are shown in Task 5. CDM Smith's level of effort for Task 2 is 52 hours, with a fee of $9,640.

Task 3 – Develop and Test Financial Tool

To help evaluate the effectiveness of portfolios (various combinations of new MET and OC water supply projects) on mitigating water supply gaps, a financial tool is needed. The financial tool will work hand in hand with the Model developed in Phase 1. The financial tool will be used to estimate a Levelized Unit Cost (LUC) for entire portfolios (not individual projects).

LUC is a standard economic measure used by many power and water utilities and takes into consideration the lifecycle costs and amount of water that is beneficially delivered. Lifecycle costs include the projected fixed costs (capital debt service as well as any other fixed payments), escalated project O&M costs, and MET water purchases. The lifecycle costs will also include the cost of projected water shortages using MWDOC's study on Determining the Value of Water Supply Reliability (2003). All future costs over the lifecycle, which is anticipated to be 2015-2040, will be discounted and summed to estimate a total present value cost. The present value cost will be divided by the sum of beneficially delivered water. Beneficially delivered water will

be simulated by the Model from Phase 1 and only include water that is directly needed in a particular hydrologic year, or stored and extracted during a subsequent year. This method correctly accounts for unused base-loaded water supplies that are not used or stored in very wet or wet/normal years. The method also accounts for the financial impact that water use efficiency has on existing fixed costs in Orange County.

LUC differs significantly from the simple unit cost approach that takes annualized costs divided by the supply capacity of projects/portfolios. In the simple unit cost method, water supply that is not beneficially used or stored remains in the denominator of the unit cost formula—thereby making projects/portfolios that produce more water than truly needed look more favorably. The simple unit cost also does not take into account the impact of water use efficiency on current fixed costs, which can be significant.

CDM Smith will work with the water agency representatives in the workshops to identify, develop and sample test how the components/analysis for a financial tool would be utilized in subsequent work. CDM Smith's level of effort for Task 3 is 62 hours, with a fee of $11,720.

Task 4 – Develop Scope and Fee for Phase 2

CDM Smith will work closely with MWDOC and OCWD, along with input from Orange County water agencies, to develop the scope and fee for Phase 2. It is anticipated that at a minimum, Phase 2 will develop a range of portfolios of water supply projects and evaluate the effectiveness, including cost, to meet water supply gaps in various scenarios.

CDM Smith's level of effort for Task 4 is 5 hours, with a fee of $1,325.

Task 5 – Meetings and Project Management

All meetings are included in this task. We have assumed 5 workshops (4 hour duration) for Orange County water agencies to communicate results of Phase 1 and to demonstrate sensitivity of the Model and go over financial tool. In addition, we have assumed 4 technical meetings (1.5 hour duration) with MWDOC and OCWD, via telephone or face to face to prepare for workshops and direct technical work.

This task also includes budget and schedule tracking and invoicing.

CDM Smith's level of effort for Task 5 is 70 hours, with a fee of $13,570.

Schedule and Budget

It is anticipated that this Phase 1 Extension effort will take three (3) months, and conclude by end of January 2016.

CDM Smith's total budget for this effort is $40,935 with the details shown in Table 1.

Table 1. CDM Smith Budget for Phase 1 Extension

Tasks	Labor Hours					Labor Dollars	Other Costs	Total Fee
	Project Manager	Planner Lev. 5	Engineer Lev. 4	Admin	Total			
Task 1. Assist with Communicating Results of Phase 1	12	-	10	-	22	$ 4,680	$ -	$ 4,680
Task 2. Test Supply Gap Under Additional Assumptions	16	-	36	-	52	$ 9,640	$ -	$ 9,640
Task 3. Develop Financial Tool to Evaluate Portfolio Cost Effectiveness	20	24	18	-	62	$ 11,720	$ -	$ 11,720
Task 4. Develop Scope/Fee for Phase 2	5	-	-	-	5	$ 1,325	$ -	$ 1,325
Task 5. Meetings and Project Management	26	12	24	8	70	$ 13,270	$ 300	$ 13,570
Total	**79**	**36**	**88**	**8**	**211**	**$ 40,635**	**$ 300**	**$ 40,935**
Billing Rate ($/Hour)	*$265*	*$155*	*$150*	*$115*				

Number of Meetings	
MWDOC & OCWD Meetings (1.5 hr each)	4
OC Water Agency Workshops (4 hr each)	5
Total	**9**

If you have any questions regarding this scope and fee, please do not hesitate to call me at 213-798-6142. We look forward to continuing to serve MWDOC in this important effort.

Sincerely,

Dan Rodrigo
Senior Vice President
CDM Smith Inc.

cc: Lanaya Voelz, CDM Smith

Item No. 3

INFORMATION ITEM
November 2, 2015

TO: **Planning & Operations Committee**
(Directors Osborne, Barbre, Hinman)

FROM: **Robert Hunter, General Manager**

Staff Contact: Karl Seckel/Richard Bell

SUBJECT: **Status Update on the OC Water Reliability Study – November 2015**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

By the date of the P&O Committee meeting, staff will have already shared a high level overview of the OC Water Reliability Study at the Joint MWDOC/OCWD Board meeting. An even higher level review will be offered at the November 5 Elected Official's meeting. For the purposes of discussion, staff is able to share with the P&O Committee the more detailed version of the Phase 1 Supply Gap Analysis at the meeting. The attached slides should be considered as draft work in progress at this time as work is still proceeding by MWDOC staff, OCWD staff, our Consultant and our agencies.

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

The next meeting of the OC Water Reliability Workgroup is scheduled for November 5. The topics to be discussed include:

- Review of Phase 1 SUPPLY GAP Analysis
- Review of Phase 1 SYSTEM GAP Analysis
- Review of Potential Projects
- Scheduling of Additional Workshops on Phase 1 to digest the results and scope out Phase 2
- Outreach for Phase 1

Attachments:

1. **OC Water Reliability Meeting #13 PowerPoint, October 15, 2015**

OC Water Reliability Study Workgroup Meeting #13

Gap Analysis - Planned Supplies

October 15, 2015

Municipal Water District of Orange County

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Agenda

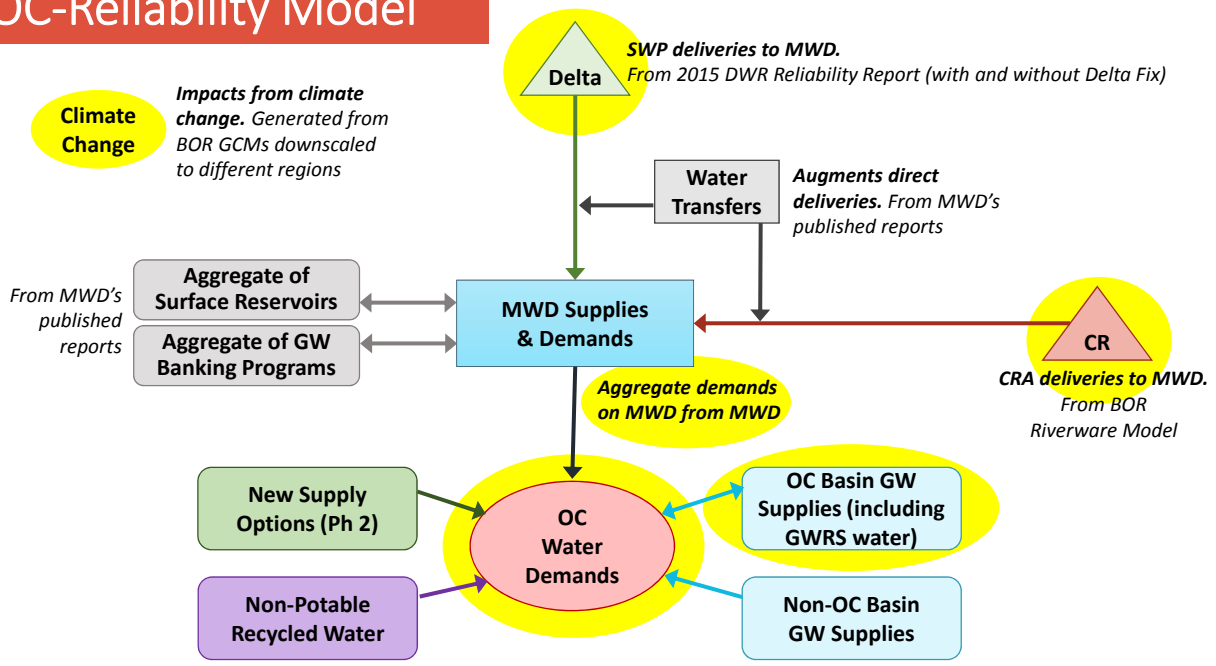
- Supply Gap Methodology (quick review)
- Supply Gap Assumptions (quick review)
- Supply Gap Results
- Compare Supply and System Gap
- Next Steps for Phase 1 Study

2

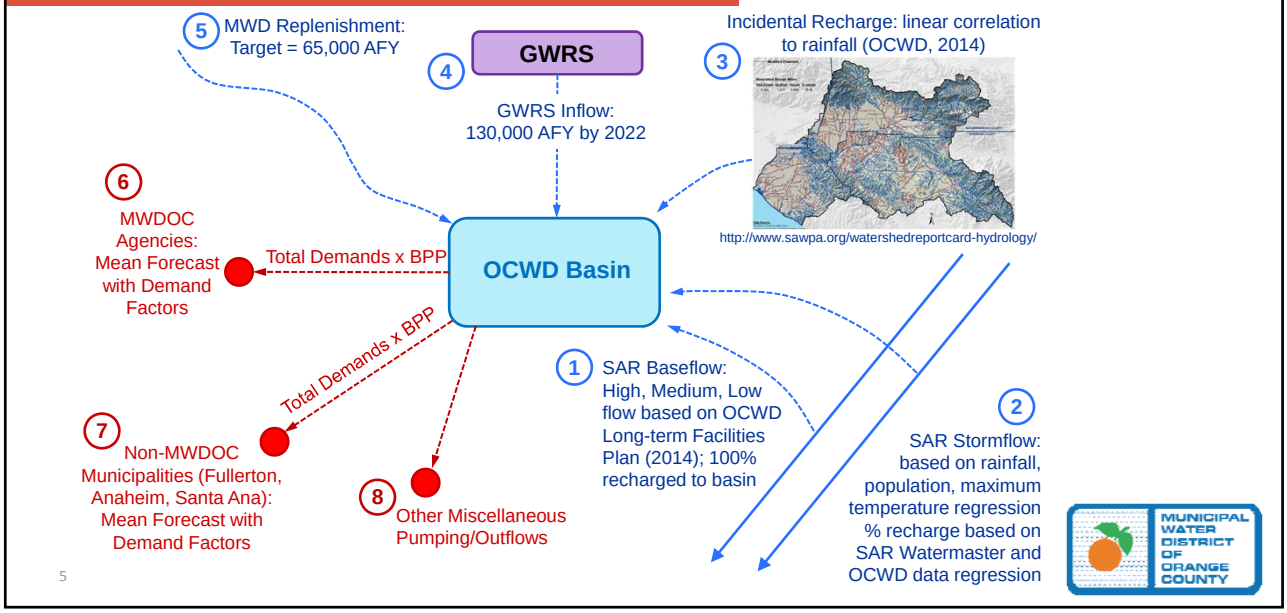
Supply Gap Methodology

3

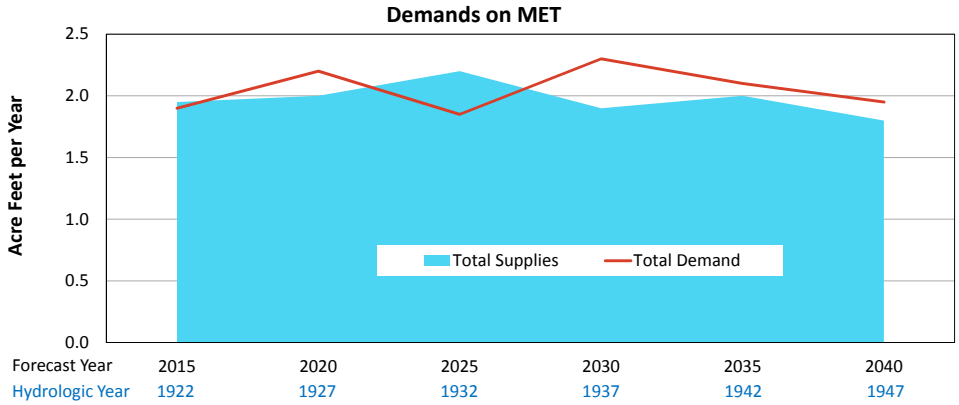
OC-Reliability Model



OC Basin Model Component



Explanation of Indexed Sequential Method for Supply Simulation



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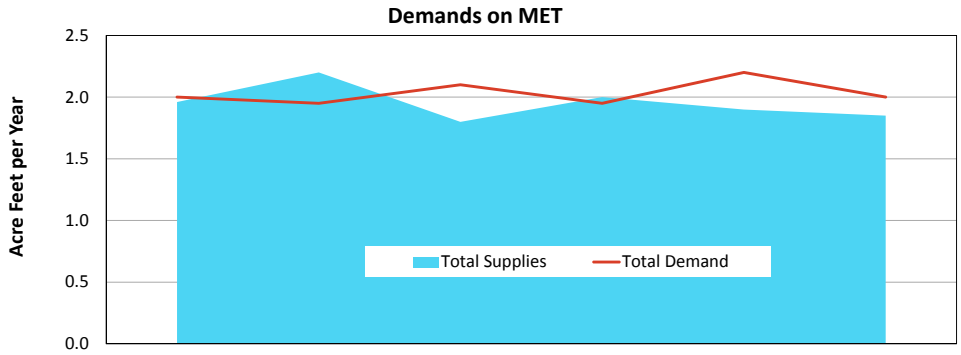
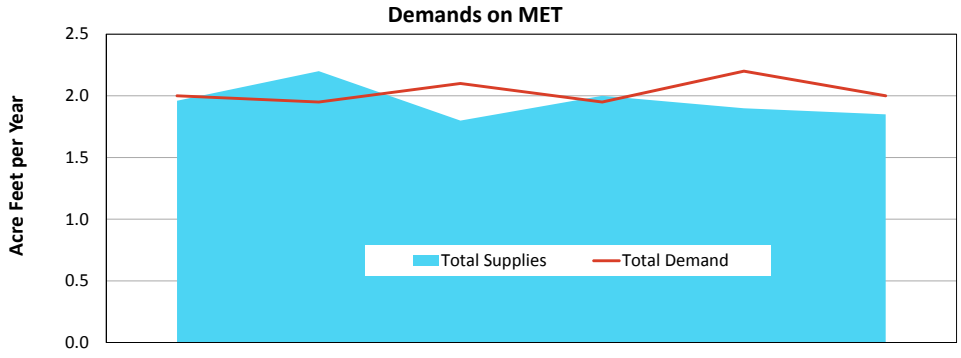


Forecast Year	2015	2020	2025	2030	2035	2040
Hydrologic Year	1923	1928	1933	1938	1943	1948

7

Explanation of Indexed Sequential Method for Supply Simulation



Forecast Year	2015	2020	2025	2030	2035	2040
Hydrologic Year	1923	1928	1933	1938	1943	1948
Hydrologic Year	1924	1929	1934	1939	1944	1949
Hydrologic Year	1989	1994	1999	2004	2009	2014

93 hydrologic sequences

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Hydrologic Variables

Variables that vary due to weather and hydrology:

- MET demands (data from MET)
- SWP supplies (data from MET and DWR)
- CRA supplies (data from MET and Bureau of Rec)
- OC demands (data from CDM Smith)
- SAR stormflows (data from OCWD)
- SAR incidental recharge (data from OCWD)
- San Juan GW (data from Geoscience/MWDOC)

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Constant Variables

Variables that may or may not grow over time, but are not assumed to vary due to weather and hydrology:

- SAR baseflows (upstream WW discharge)
- GWRS supply
- Brea/La Habra GW supply
- MET and OC GW recovery and recycled water
- MET SWP water transfers (only taken when needed)
- MET storage accounts (only used when needed)

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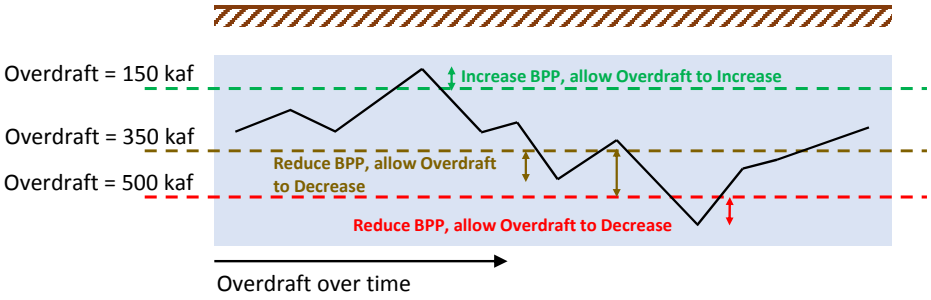
OCWD BPP Calculation

Overdraft at the next time step = Current Overdraft + ***BPP****Basin Demand + ∑non-basin pumping – ∑basin recharge



Start a numerical iteration that finds the BPP to constraint the overdraft, starting with an initial BPP of 75%

Set the BPP at the next annual time step to constrain the cumulative overdraft between ***150*** and ***350 kaf***

If next year's overdraft with a BPP of 75% is larger than 500 kaf, constrain the overdraft to ***500 kaf***

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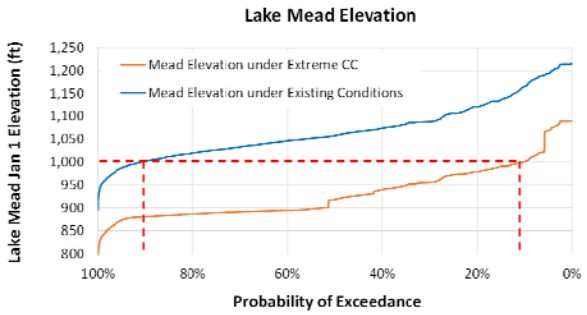
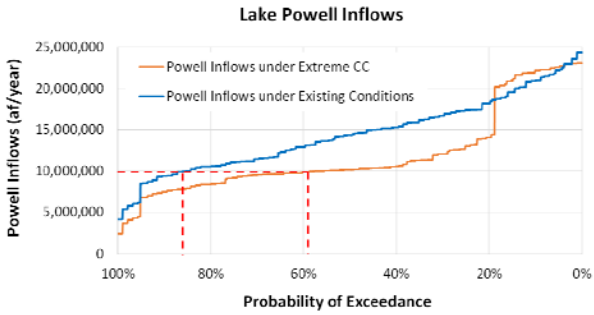
Climate Change Impacts on CRA

- For moderate climate change impacts, only assumes that surplus water is not available (MET's baseline CRA deliveries only)
- For significant climate change impacts, use BOR hot/dry climate change model sequence (which reduces MET's baseline CRA deliveries during times when a combination of Lake Mead elevation below 1,000 feet and Lake Powell inflows are below 10,000,000 AFY):





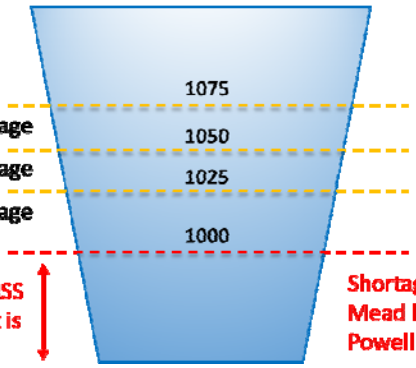
Assumption for MET CRA Supply Under Extreme Climate Change

Annual Lower Basin Delivery Schedule:
0.3 MAF Nevada
2.8 MAF Arizona
4.4 MAF California
7.5 MAF Total
(9 MAF with Mexico)

2007 Guidelines:
AZ + NV take 333,000 af/year shortage
AZ + NV take 417,000 af/year shortage
AZ + NV take 500,000 af/year shortage

Uncharted Territory:
Insufficient storage in Mead causes CRSS to compute a hydrologic shortage that is not assigned to any state

Jan 1st Lake Mead Elevation (feet msl)



MWD's share of the shortage at each time step is calculated by assuming California may take a portion of the shortage according to its respective river allocation:

$$\frac{4.4}{(4.4+2.8+0.3+1.5)} = 48\%$$

And assuming that MWD takes a percentage proportionate to its allocation within the state:

$$48\% \times \left(\frac{0.55}{4.4}\right) = 6\%$$

Shortage is well correlated to Lake Mead levels below 1000 feet and Lake Powell inflows

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

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Supply Gap Assumptions

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

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Major Assumptions

Water Demands (AFY)	FY 2014 Actual	FY 2015 Estimated	2040 Projected
MET Demands*	2,300,000	1,850,000	2,028,000
OC Total Demands**	610,000	554,000	579,000

* With future passive conservation only ** With future passive and baseline new active conservation

Starting Year MET Drought Storage	Starting Year OCWD Overdraft
1,430,000 Acre-Feet (50% of total cap.)	400,000 Acre-Feet

OC Groundwater (AFY)	Brea/La Habra	Net OC Basin	South County	Total
Average Inflows/Safe Yield	15,000	169,500*	10,000	197,000

* Net of misc. pumping and includes MET replenishment

Orange County Recycled Water (AFY)	2015	2040
Groundwater Replenishment System	100,000	130,000
Basin Recycled Water (non-potable)	15,000	26,000
South County Recycled Water (non-potable)	22,000	56,000
Total	137,000	212,000

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Major Assumptions (cont.)

OCWD Net Groundwater (AFY)*	Near-Term	Long-Term
SAR Baseflow (mid level assumption)	53,000	53,000
SAR Stormflow (average of all hydrologies)	53,000	53,000
SAR Incidental Recharge (average of all hydrologies)	59,000	59,000
MET Replenishment (average of all hydrologies)**	22,000	22,000
BEA Outflows	-22,000	-9,000
Misc. Pumping (golf courses, etc.)	-8,500	-8,500
Net Groundwater for OC Agencies	**156,500**	**169,500**

* Not including GWRS, which is shown as recycled water in previous slide.

** While target is 65,000 AFY, replenishment water is not available during certain allocations in which MET is in allocation and overdraft is not greater than 400,000 AFY. OCWD also does not take MET replenishment during very wet years. Thus the average MET replenishment reflects these assumptions.

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MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Major Assumptions (cont.)

Simulation Assumptions	MET IRP	OC Reliability Study
Period of Simulation	1922-2012 (91 years)	1922-2014 (93 years)
Year that additional "Delta Fix" Supplies Begin*	2020	2030
Climate Change Impacts on Supplies	Minimal Impacts to SWP Supply (other impacts will be tested under policy portion of IRP)	Moderate to Significant Impacts to Water Demands; and SWP, CRA, SAR Supplies
Allocation of MET Shortages to Orange County	Not Applicable (MET's IRP does not show member agency details)	Based on Drought Formula: (12-15% of MET shortages allocated to Orange County)

* Although MET assumes construction of Delta Fix will occur around year 2030, they assume regulatory relief and additional SWP supplies will begin by 2020.

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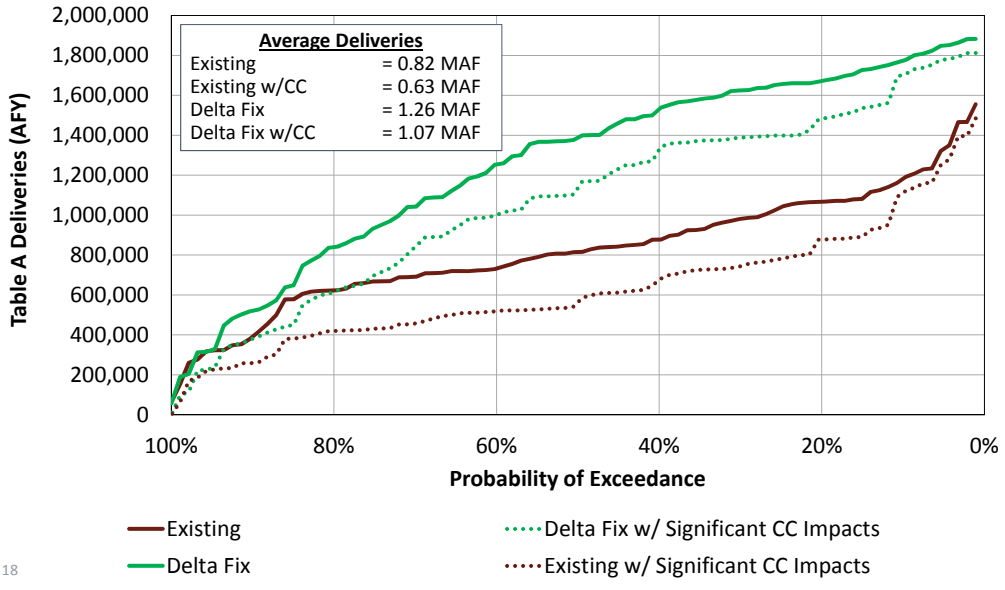
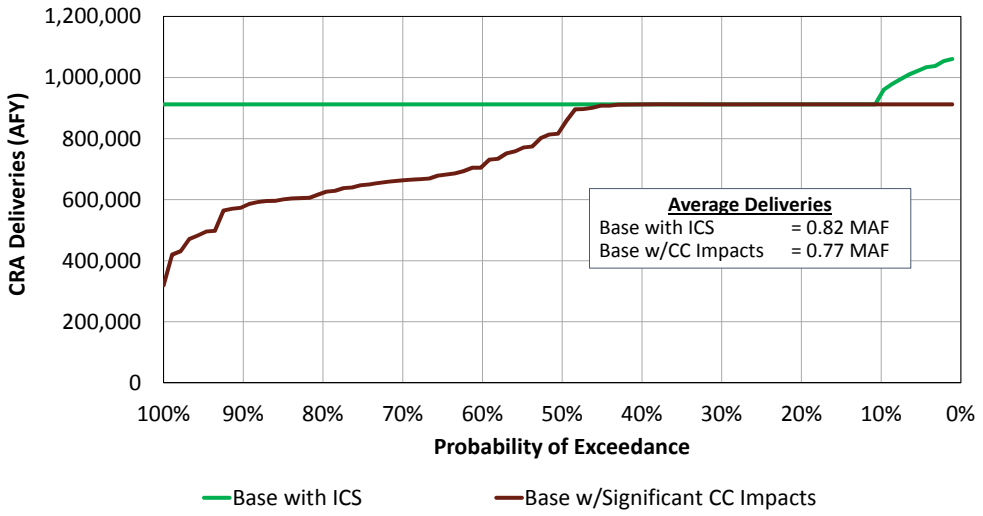
SWP Deliveries to MET (2040)



18

CRA Deliveries to MET (2040)



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Planning Scenarios

Planning Scenario *	Local Water Supplies	Water Demands	Climate Change Impacts	OCWD Baseflows
1) Planned Conditions: Essentially representing MET assumptions for IRP GAP without new investments	• Planned MET local supplies • Planned OC local supplies	• MET demands without new active conservation • OC demands with new baseline active conservation	• Minimal impacts on SWP supplies	• Medium levels of Santa Ana baseflows

* All scenarios run with and without Delta Fix

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Planning Scenarios

Planning Scenario *	Local Water Supplies	Water Demands	Climate Change Impacts	OCWD Baseflows
1) Planned Conditions: Essentially representing MET assumptions for IRP GAP without new investments	• Planned MET local supplies • Planned OC local supplies	• MET demands without new active conservation • OC demands with new baseline active conservation	• Minimal impacts on SWP supplies	• Medium levels of Santa Ana baseflows
2) Moderately Stressed Conditions: Lower local supplies, higher demands, moderate climate change impacts	• Lower-than-planned MET local supplies • Planned OC local supplies	• 4% higher MET demands (growth & climate change related) • 4% higher OC demands (growth & climate change related)	• Moderate impacts on SWP supplies • Moderate impacts on CRA supplies • Moderate impacts on Santa Ana River	• Medium levels of Santa Ana baseflows

* All scenarios run with and without Delta Fix

21

Planning Scenarios

Planning Scenario *	Local Water Supplies	Water Demands	Climate Change Impacts	OCWD Baseflows
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2) Moderately Stressed Conditions: Lower local supplies, higher demands, moderate climate change impacts	• Lower-than-planned MET local supplies • Planned OC local supplies	• 4% higher MET demands (growth & climate change related) • 4% higher OC demands (growth & climate change related)	• Moderate impacts on SWP supplies • Moderate impacts on CRA supplies • Moderate impacts on Santa Ana River	• Medium levels of Santa Ana baseflows
3) Significantly Stressed Conditions: Planned local supplies, higher demands, significant climate change impacts	• Planned MET local supplies • Planned OC local supplies	• 8% higher MET demands (growth & climate change related) • 8% higher OC demands (growth & climate change related)	• Significant impacts on SWP supplies • Significant impacts on CRA supplies • Significant impacts on Santa Ana River	• Low levels of Santa Ana baseflows

* All scenarios run with and without Delta Fix

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Supply Gap Results

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Supply GAP Reminder

- The supply gaps presented do not assume future projects that could be implemented by MET and/or OC agencies, thus they reflect potential shortages with planned investments only
- The scenarios (climate, population growth, Delta Fix) represent plausible futures, but no attempt was made to assess the likelihood that any of these scenarios occur
- All assumptions made, as well as the simulations used to estimate supply gaps were done using best available data using a structured, transparent systems model

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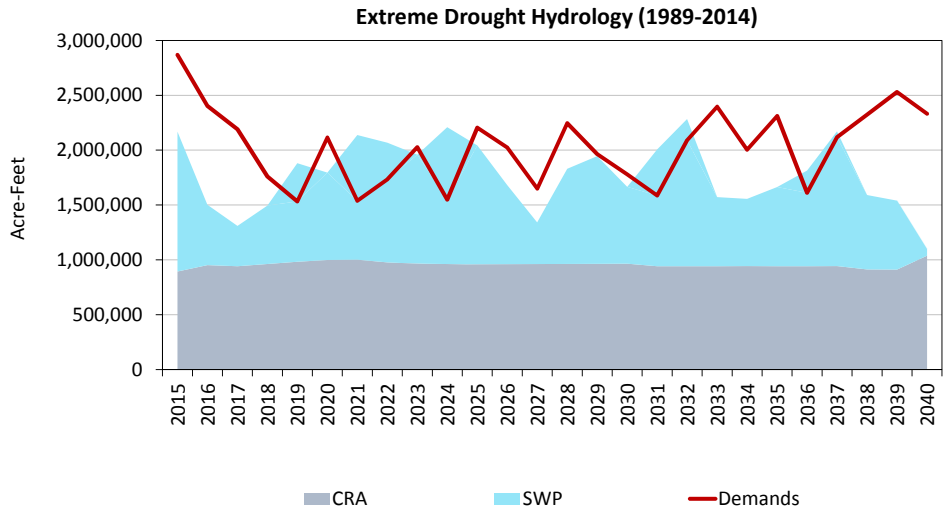
Example Water Balance – MET Scenario 1 – No Delta Fix



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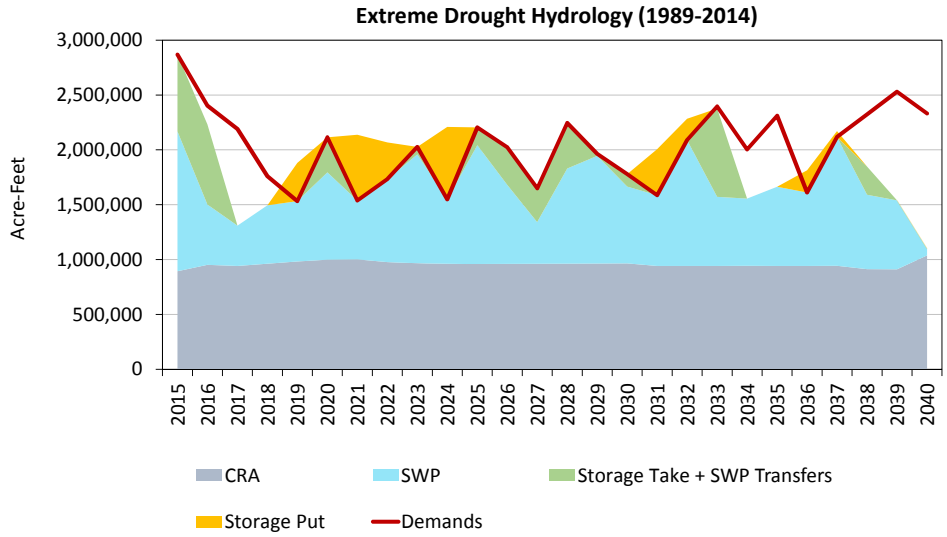
Example Water Balance – MET Scenario 1 – No Delta Fix



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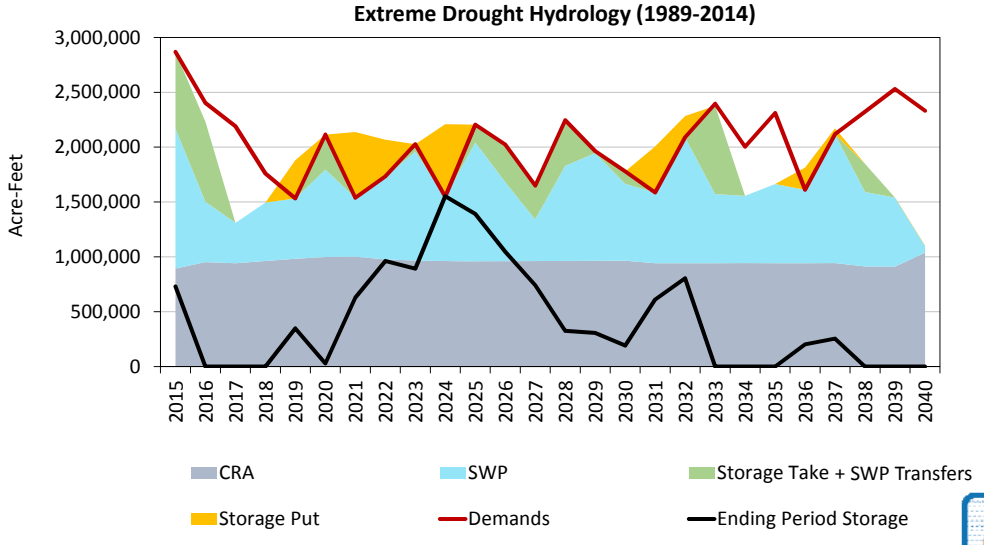
Example Water Balance – MET Scenario 1 – No Delta Fix



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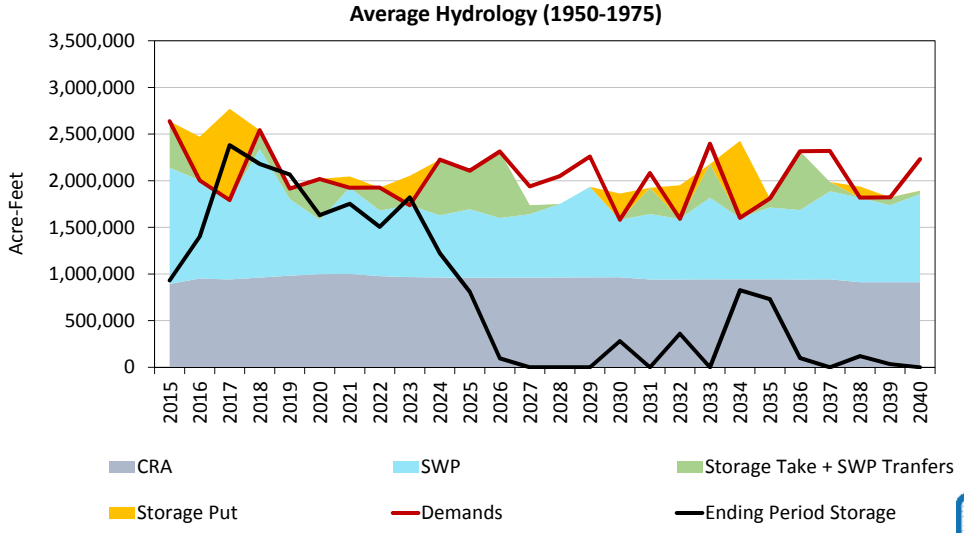
Example Water Balance – MET Scenario 1 – No Delta Fix



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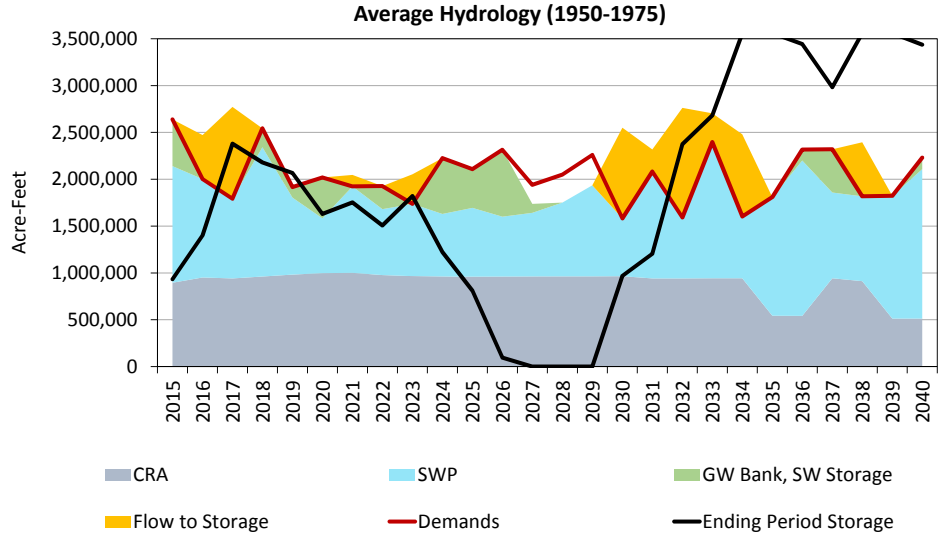
Example Water Balance – MET Scenario 1 – with Delta Fix



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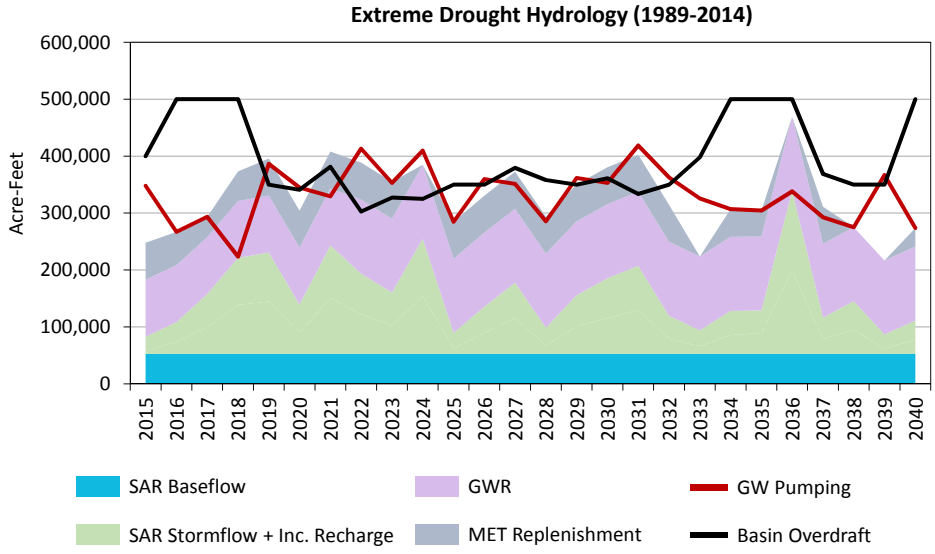
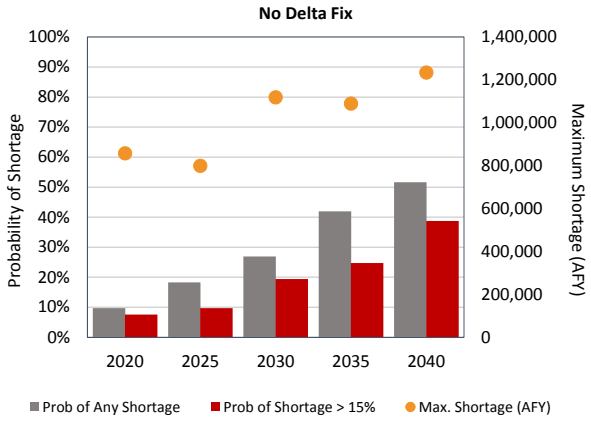
Example Water Balance – OCWD Scenario 1 – No Delta Fix

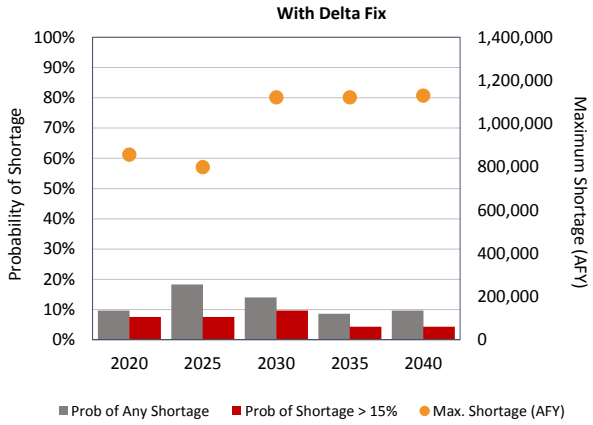


Average Basin BPP = 71

30

Supply Gap – Scenario 1
MET Reliability





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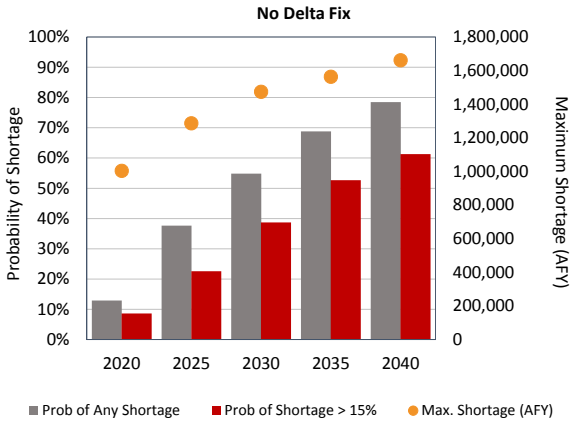
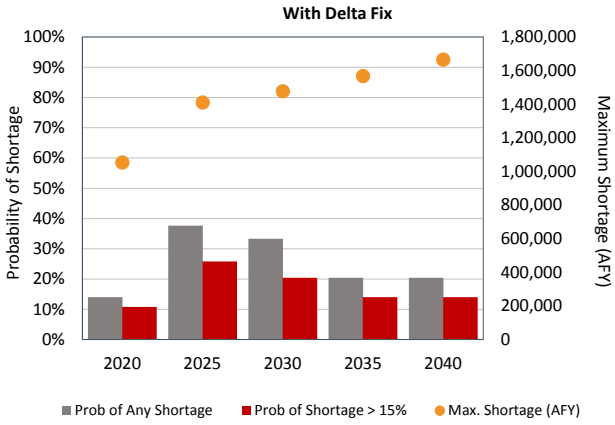
Supply Gap – Scenario 2
MET Reliability





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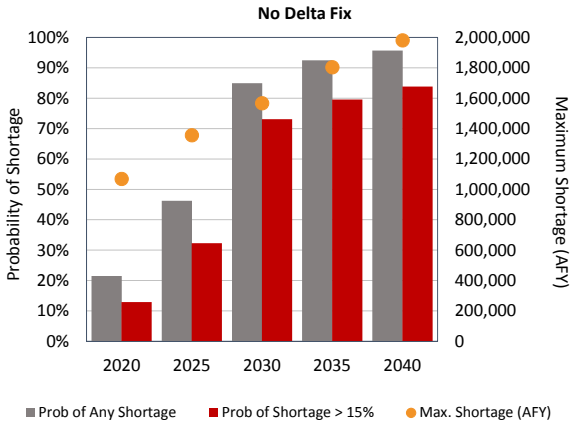
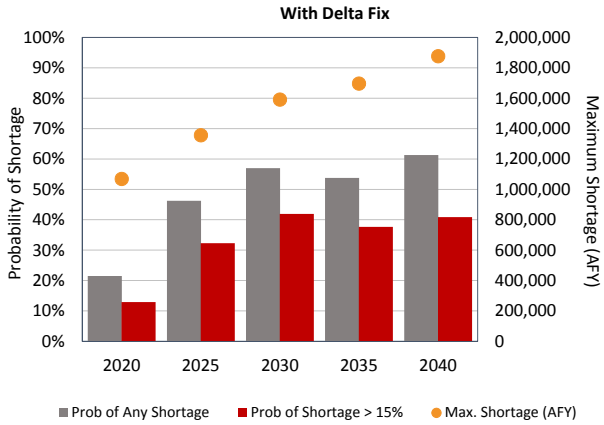
Supply Gap – Scenario 3
MET Reliability





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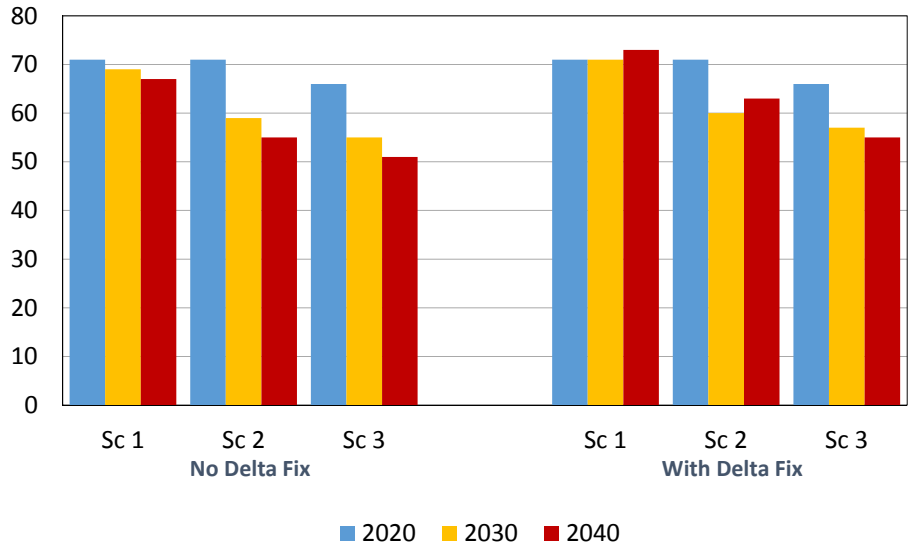
OC Basin
Average BPP (over all 93 hydrologies)



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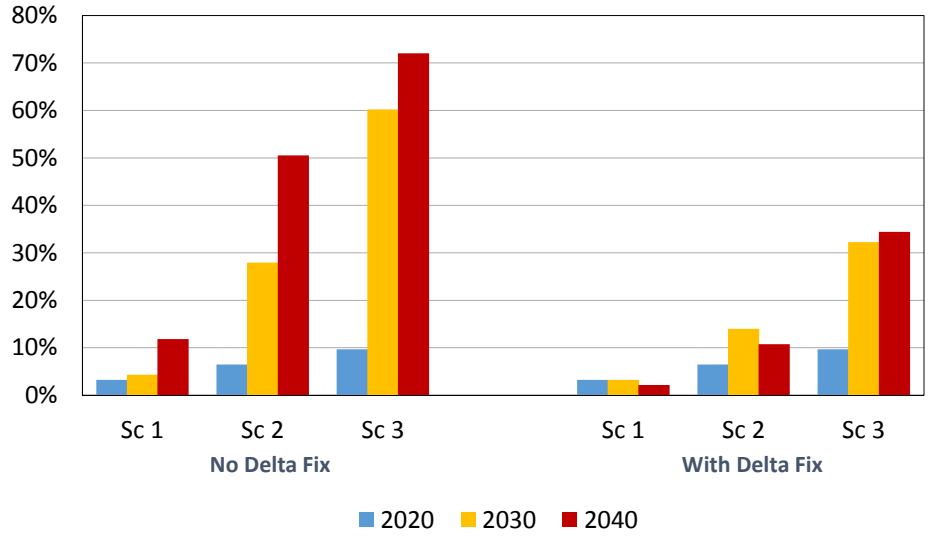
Probability of Shortage > 15% (~ 90,000 AFY) for Orange County Total



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Supply Gap – Average Shortage (AFY) *Possible* Proxy for Base-loaded Need*

Area	Scenario 1		Scenario 2		Scenario 3	
Brea / La Habra	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**
2020	100	100	150	150	200	200
2030	400	220	1,000	600	2,200	1,200
2040	800	130	1,800	430	3,100	1,600
OC Basin	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**
2020	5,000	4,800	7,000	7,000	11,000	10,600
2030	11,000	6,000	32,000	19,000	70,000	39,000
2040	23,000	3,700	55,000	12,600	93,000	49,000
South County	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**	**No Delta Fix**	**Delta Fix**
2020	2,100	2,100	3,000	3,000	4,600	4,600
2030	5,300	3,200	14,000	7,900	29,200	15,800
2040	9,800	1,600	20,000	4,900	33,100	17,200

* Examples of base-loaded supplies include active conservation, desalination, new indirect potable reuse, agricultural land fallowing, and take or pay water transfers that are implemented by MET and OC.

Supply Gap – Average Shortage (AFY) *Possible* Proxy for Base-loaded Need*

Area	Scenario 1		Scenario 2		Scenario 3	
OC Total	No Delta Fix	Delta Fix	No Delta Fix	Delta Fix	No Delta Fix	Delta Fix
2020	7,200	7,000	10,150	10,150	15,800	15,400
2030	16,700	9,420	47,000	27,500	101,400	56,000
2040	33,600	5,430	76,800	17,930	129,200	67,800

* Examples of base-loaded supplies include active conservation, desalination, new indirect potable reuse, agricultural land fallowing, and take or pay water transfers that are implemented by MET and OC.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Supply GAP Findings

- Orange County supply reliability will be dependent on actions taken by MET and/or OC agencies
- Using Scenario 1 (MET's assumptions), things do not look all that bad, especially if we assume there is success with the Delta Fix
- Our list of projects includes enough options to satisfy demands under Scenario 1 (with or without Delta Fix)
- Testing tougher scenarios with respect to increased demands and climate change impacts on the SWP, CRA and local hydrology, supply reliability looks much worse
- There is a substantially more bleak outlook under 3 <u>without</u> the Delta Fix
- Phase 2 testing of portfolios will have to be approached in a manner to account for the uncertainty of things to come (MET IRP success and/or climate and population growth scenarios)

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MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Compare Supply and System Gap

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System Gap Summary

Preliminary Summary of System Gap(1)			
Scenario	Brea/La Habra	OCWD	SOC(2)
1. No MET Deliveries	No Needs	No Needs	14-62 cfs
2. No MET Deliveries, No Grid	Back-up Power for 7 days	Back-up Power 25 – 50 wells for 7 days	6-37 cfs and/or Back-up power for 7 days
	Countywide need for fueling plans		

(1) These numbers could change with additional input from the local agencies and therefore should be considered as preliminary at this time
(2) Assumes Baker Plant is operational under both scenarios

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Comparing Supply and System Gap for South County

Range of Baseload Supply Gap	Range of System Gap
2,100 to 33,100 AFY	1,700 to 7,400 AF (60 days)
3 to 46 cfs	14 to 62 cfs (total)

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Next Steps for Phase 1 Study

- November 5 – Initial summary of MET and OC projects that could meet supply and system gaps, and present Phase 2 scope of work
- November and December – Board presentations and outreach to OC agencies and other OC organizations
- December – Anticipated start date for Phase 2
  - OCWD suggested a series of GM workshops prior to startup of Phase 2

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Questions
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Item No. 5

INFORMATION ITEM
November 2, 2015

TO: **Planning & Operations Committee**
(Directors Osborne, Barbre, Hinman)

FROM: **Robert Hunter, General Manager**

Staff Contact: Kelly Hubbard, WEROC Manager

SUBJECT: **WEROC Radio Assessment**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee read the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

WEROC hired Eagle Communications in May of 2015 to complete a WEROC Member Agency Radio Assessment and Report. Eagle Communications was to meet with each Member Agency and to provide an assessment of their radio systems, as well as provide documentation of equipment, a mini-training to agency staff and to complete small repairs at each agency not to exceed $50 per agency. A preliminary detailed summary report of the WEROC Radio Sites and Assessment has been provided to staff with the final Summary Report being submitted on November 6, 2015 by Eagle Communications. The preliminary information shared with staff is sufficient to bring this report forward at this time.

The detailed preliminary report provided to WEROC staff includes important information about the equipment that each Member Agency is using and how it's programmed. This provides WEROC staff with the appropriate background information to trouble shoot communication issues with agencies during communication drills and in response to an

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

incident. Moving forward, WEROC staff will work with member agencies to ensure any recommended repairs or enhancements are implemented.

DETAILED REPORT

Background:
The WEROC radio system operates on a VHF Low Band repeater system. The FCC license and repeaters are maintained by the Municipal Water District of Orange County (MWDOC), on behalf of WEROC. WEROC maintains two (2) repeater sites, one at Black Jack Peak and one at Pleasants Peak (these were not part of the assessment) and then three (3) base radio stations. It is the responsibility of each Member Agency to purchase and maintain their own equipment in proper operational condition. Every WEROC Member Agency has or should have at least one WEROC Radio. Agencies are encouraged to have more than one WEROC radio located at separate locations as back-up to each other. Radio installations include both base stations within utility facilities and mobile radios within utility vehicles.

In January 1987, WEROC provided the initial procurement and installation of the WEROC radio system for its offices and its Member Agencies. Since that initial installation, the Member Agencies have been responsible for the repair, replacement and programming of their own WEROC radio equipment. Over the years, WEROC staff provided recommendations for replacement of equipment and programming. However, Agencies purchased the equipment that made the most sense for their agency and often programmed the radios differently.

Radio Assessment Purpose & Deliverables:
The purpose of the radio system assessment is to provide a comprehensive report on all of the operational components of the radio network, so that the WEROC program staff can assist member agencies in the proper use of the system and most efficiently manage the network.

As part of the Assessment, the role of Eagle Communications was to (1) document the specific model of equipment being used by each member agency at each site, (2) evaluate and document the antenna system connected to each user radio evaluated, (3) document how each radio is programmed for each repeater, (4) label all equipment and buttons appropriately (for each repeater) when applicable, (5) deliver a quick (10-15 min) training seminar to staff on-site, (6) document any recommended maintenance or reliability changes/improvements that should be made, and (7) lastly provide a summary report to WEROC for future reference.

Report Conclusions:
The detailed preliminary report provided to WEROC staff includes important information about the equipment that each Member Agency is using and how it’s programmed. This provides WEROC staff with the appropriate background information to trouble shoot communication issues with agencies during communication drills and in response to an incident. Additionally, the report provided some key recommendations for agencies to consider for maintenance and programming of their radios to enhance sound quality and reception. The recommendations on maintenance and programming will be provided to each member agency, as it is their responsibility to maintain the equipment.

Main conclusion points:

- In total there are 58 radios at 33 agencies.
- Three agencies require new radios or installation.
    - The City of Westminster's radio is currently not installed due to construction at their City Yard and will be added to the report once installed at the new yard.
    - The City of Newport Beach and Seal Beach both require new radios, because both radios are non-operational.
- Two agencies have been identified as having too many internal radios programmed with the WEROC frequency which could lead to a violation of our FCC license. The two agencies have been instructed and understand the need to reduce the number of radios with the WEROC programming; these radios would still be used for their internal communications. The FCC restriction on number of radios with the WEROC frequencies is to safeguard the WEROC frequency from being overwhelmed during a large response.
- It is recommended that 4 radios from among the member agencies be replaced in the near future because of the age of the equipment.
- And that 16 radios be serviced to enhance sound quality and reception.

WEROC staff will continue to work with Member Agencies to ensure system improvements are made to provide for continuity of communications during a disaster response.

Status of Ongoing MWDOC Reliability and Engineering and Planning Projects

October 27, 2015

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Baker Treatment Plant or Expansion of Baker Water Treatment Plant	IRWD, MNWD, SMWD, ETWD Trabuco CWD		On line date is summer 2016	No NEW Information; construction is proceeding towards a start-up in 2016
Doheny Desalination Project	South Coast Water District, Laguna Beach CWD			South Coast WD's Doheny Program Manager from the consulting firm of GHD, Mark Donavan, made a presentation to the South Coast Board on October 22. The presentation covered their scope of work and anticipated schedule for the initial 4 to 5 mgd project, anticipated as a demonstration project. They are planning on getting the project operational as early as 2019, although all involved indicated that the schedule is tight. MWDOC Directors Susan Hinman and Sat Tamaribuchi attended as did Karl Seckel. MWDOC has been working to ensure that the Program Manager and South Coast WD have all of the technical information from the years of MWDOC managing the project MWDOC's files are in the process of being copied and provided to both parties. A copy of the presentation is attached to this report.
Poseidon Resources Ocean Desalination Project in				OCWD has continued work on evaluating where the product water produced from the Poseidon Project would be utilized, either for the seawater barrier operations, injection or replenishment in the

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Huntington Beach				groundwater basin, for direct delivery to other agencies or some combination thereof. OCWD's report on the costs involved in using 100% of the Poseidon water to replenish the groundwater basin will be presented to the OCWD Board on December 16. The report will also have the other delivery options included, but the main focus of the report is what it will take to replenish all 50 mgd into the groundwater basin. Karl Seckel participated with OCWD in a meeting with the City of Huntington Beach to discuss the various project concepts and how the City's water system might be utilized to provide Poseidon water to other agencies under the various options.
Orange County Water Reliability Study				At the October 1 meeting, the main item of discussion included: • Phase 1 Completion Schedule • Phase 2 Work Plan • Status Report on SUPPLY GAP Analysis • OC Seismic Impacts Analysis • Discussion on SYSTEM GAP Analysis • List of Proposed Local Projects or Project Yield At the October 15 meeting, the main item of discussion was the initial release of the modeling work on the Supply Gap. The Workgroup spent about 2 hours working through the Supply Gap analysis and what it means. One last meeting of the Workgroup is scheduled for Nov 5 to reconsider the Supply Gap and to review the List of Potential OC Projects generated in this phase of the study. At the October Groundwater Producer's meeting a request was made

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				for a "pause" at the end of Phase 1 to allow all of the agencies to participate in a series of Workshops to review the work, fully understand the implications and to develop a work plan for any subsequent efforts under a Phase 2 Scope of Work, also to be developed through the workshop process. It is expected that these workshops will take place in Nov, Dec and January. A scope of work to secure additional technical assistance for the workshops is being provided to MWDOC's P&O Committee. A presentation on the summary results from Phase 1 will be made at the P&O Committee.
California WaterFix & EcoRestore				MWDOC completed and submitted its comment letter on the Recirculated EIR/EIS for the California WaterFix (previously called the BDCP).
Other Meetings/Work				
				SMWD worked on and submitted responses to MET questions on the Cadiz Project. The comments were in the following categories: • Reservoir sizing at the connection of the Cadiz Project to MET's Colorado River Aqueduct] • Operationally how to integrate the water seamlessly into MET's operations • Treatment for Chromium VI • Water quality sampling within the Fenner Groundwater Basin.

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				MWDOC and SMWD are awaiting a time to meet with MET to go over the comments and continue the discussions.
				Karl Seckel participated with OCWD staff in a meeting regarding the Cadiz Project; OCWD is considering whether or not to enter into negotiations with Cadiz.
				Keith Lyon and Kevin Hostert participated in a meeting on the South County Pump Station shutdown (flow reduction for one week) with MET, SMWD and the South County Pipeline participants. During the partial shutdown to perform maintenance work on the electrical equipment at the facility by MET crews, some water will be available through OC-88A (a small temporary pump station built in 1990 prior to the start-up of the large pump station) as well as MET making one of the large pumps available as they work on the others.
				Karl Seckel, Keith Lyon and Kevin Hostert participated in a meeting with EOCWD staff and MET staff to discuss a flow testing process along with a visual inspection of a check valve and a venture meter at the OC-70 service connection. The work is intended on locating an apparent flow discrepancy between the EOCWD system and the MET meter. Complicating factors include a check valve that may be malfunctioning and the potential for hydraulic swirls to be causing metering discrepancies at the facility. The work will be scheduled over four days beginning Nov 30 to complete a methodical testing and visual inspections.

Status of Ongoing WEROC Projects
October 2015

Description	Comments
General Activities	On October 15, 2015 at 10 am all MWDOC staff participated in the Great California Shakeout. Shakeout is the same day and time every year in which government agencies, businesses, schools, etc. are encouraged to practice "Drop, Cover and Hold on" and other preparedness activities. MWDOC staff did the "Drop, Cover and Hold on", as well as an evacuation of the building. Preparedness items (emergency supply backpack, emergency water cans and a 4-1 utility shut-off wrench) are on display in the front entry and can be ordered with a 25% discount for emergency kits. Brandon Stock and Kelly Hubbard attended the 31st Annual Disaster Preparedness Academy on 10/28/15 at the Anaheim Convention Center. The training day had strong keynote speakers, including Dr. Lucy Jones, and a plethora of emergency management breakout sessions that enhance staff's knowledge of current topics and issues in emergency management. The Academy always has great vendors that provide staff with additional resources for preparedness and response. Kelly facilitated a tour for MWDOC Staff of the Diemer Filtration Plant, Prado Dam and OCWD Field Headquarters Groundwater Replenishment Operations on 10/29/15. Fifteen MWDOC staff participated. Kelly provided a training presentation to the American Public Works Association southern chapter group as a component of their Public Works certification program. Kelly presented on Emergency Planning for Public Works. Many WEROC member agencies had staff in attendance. Kelly participated in a conference call brainstorming session for the Water Research Foundation on Innovative Preparedness and Response Practices. Kelly was asked to share information on WEROC and lessons learned from response coordination and mutual aid.

Description	Comments
Coordination with Member Agencies	Kelly has been working with FEMA Region 9 and the California Office of Emergency Services (CalOES) Hazard Mitigation Division on the Orange County Multi-Jurisdictional Water and Wastewater Multi-Hazard Mitigation Plan approval since 2012. The plan is required for any agency who wishes to pursue hazard mitigation grant funds, which are available annually, as well as following major declared disasters for the impacted counties. MWDOC submitted the updated plan (revision is required every 5 years) in 2012 and has struggled with having the plan fully approved as submitted. FEMA's concern is that the plan only includes the water and wastewater divisions/departments of the Cities that participated and not the cities' entire scope of services. Kelly has brought in assistance from MWDOC legal counsel to write a formal letter of re-consideration by FEMA for full plan approval for all participating agencies as the plan is written. Kelly is also in the process of scheduling a meeting with FEMA Region 9 and CalOES for early December. It is important that this issue be resolved as Southern California transitions into El Nino response, recovery and mitigation.
Coordination with the County of Orange	Brandon and Kelly attended the Orange County Emergency Management Organization (OCEMO) meeting on 10/6/15 at the American Red Cross in Santa Ana. The meeting provided recovery training on Initial Damage Assessment and Preliminary Damage Overview, as well as information on the updated Dam and Reservoir Failure Annex and the County of Orange Hazard Mitigation Plan revisions. Kelly attended the OCEMO Exercise Design Steering Committee. This group is working on how to get agencies involved in emergency planning and training who have not traditionally participated. This is a significant area of interest for WEROC since it tends to be the same WEROC Member Agencies that participate in each year's exercises as well. The Steering Committee has identified general concepts for trainings and support that may help to increase participation on an annual basis. In November the group will work on defining these concepts further and assigning them to individuals to support their development. Brandon attended the ReadyOC and See Something Say Something Steering Committee meeting on 10/22/2015 at the Santa Ana Police Department. There was a presentation on a national study

Description	Comments
	performed by Chapman University on the association of fear and disaster preparedness. The biggest take away from the study was to incorporate pictures in “all” sources of disaster preparedness and response. This supports the coordination WEROC has been doing with MWDOC Public Affairs on ways to present concepts, such as Boil Order Notices, in a public friendly visual manner. There was also a presentation on a best practice for a “whole community” approach in Fullerton that demonstrated the effectiveness of a program when exercised in a school atmosphere. Whole Community planning is a relatively new concept in emergency planning that talks about the inclusion of everyone who is impacted by disasters to be involved in the planning process, including the private sector and public. Brandon attended the Orange County Critical Infrastructure Protection Working Group meeting on 10/22/2015. The purpose of the meeting is for law agencies to meet with critical sector representatives to discuss current issues and concerns. One incident discussed occurred in Southern California, in which a small, independently owned water utility (not in OC) thought their enterprise computer services and SCADA had been compromised. The incident was investigated and not deemed a cyber security threat. Cyber security and the water sector was emphasized throughout the entire meeting, including some upcoming federally sponsored training and exercises for cyber security. Kelly attended the OC Quarterly Drought Task Force meeting on 10/29/2015. The group continues to address drought concepts for emergency planning; including the tracking of dry wells in OC (2 agriculture wells & 3 private potable wells along Ortega Hwy), incorporating drought as a planning concept in emergency plans, and how the county would need to respond if the drought continues.
Coordination with Outside Agencies	Kelly met with the CalOES regional representative to Orange County in regards to how the response to the Valley Fire worked for water utilities. They discussed areas of improvement and how to improve the coordination of resources for OC water utilities during large events. Kelly attended the Southern Region Mutual Aid Regional Advisory Committee (MARAC)

Description	Comments
	quarterly meeting on October 22. The entire meeting was used to provide information on El Nino response and to tabletop concepts of mutual aid coordination. Presentations were provided by NOAA, the US Army Corp of Engineers and the Ca Department of Water Resources. The tabletop discussion included roundtable discussion on preparedness actions, response protocols, the mutual aid request process and disaster proclamation process.
WEROC Emergency Operations Center (EOC) Readiness	WEROC staff checked in on the Operational Area and MET MARS Radio checks this month from the MWDOC offices. Both radios were operational. The WEROC In Case of Crisis mobile application has been updated to a new platform. Brandon and Kelly have started to work with MWDOC, WEROC EOC and Member Agency staff to download the new platform titled “Crisis Plan”. This is a simple process, but also a required step due to technology enhancements.

Status of Water Use Efficiency Projects

October 2015

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	Ongoing	For September 2015, 48 residential and 7 commercial smart timers were installed in Orange County. For program water savings and implementation information, see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	For September 2015, 3,067 rotating nozzles were installed in Orange County. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Water Smart Landscape Program	MWDOC	On-going	November 2015	In September 2015, a total of 12,690 meters received monthly irrigation performance reports comparing actual water use to a landscape irrigation budget customized to each meter. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
SoCal Water$mart Residential Indoor Rebate Program	MWDSC	On-going	On-going	In September 2015, 570 high efficiency clothes washers and 2,164 high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.

SoCal Water$mart Commercial Rebate Program	MWDSC	On-going	On-going	In September 2015, no indoor commercial devices were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Industrial Process Water Use Reduction Program	MWDOC	95%	December 2015	A total of 41 Focused Surveys and 19 Comprehensive Surveys have been completed or are in progress. To date, 14 companies have signed Incentive Agreements. Updated discharger lists have been obtained, and outreach is continuing to sites with feasible water savings potential. As a result of this program, 357 AFY of water savings is being achieved.
MWDOC Conservation Meeting	MWDOC	On-going	Monthly	This month's meeting was held on October 22, 2015 at MWDOC. The next meeting will be on November 5, 2015 at MWDOC.
Metropolitan Conservation Meeting	MWDSC	On-going	Monthly	This month's meeting was held on October 15, 2015. The next meeting will be November 19, 2015 at Metropolitan.
Water Smart Hotel Program	MWDOC	90%	December 2015	MWDOC was awarded a Bureau of Reclamation grant, to be matched with Metropolitan funds, to conduct up to 30 commercial and landscape audits of hotels. Enhanced financial incentives will be provided to augment the current SoCal Water$mart rebates. All grant funding for this program has all been reserved, and a wait list for has been created. In the event that any of the sites with reserved funding are unable to complete their projects, wait list sites would then become eligible on a first-come, first-served basis. The program received an extension from the Bureau through December 2015 to allow all hotels currently in process to complete their retrofits.

Turf Removal Program	MWDOC	On-going	Ongoing	In October 2015, 244 rebates were paid, representing $1,987,394 in rebates paid this month in Orange County. Throughout all programs data, the Turf Removal Program has removed approximately 10,000,000 square feet of turf. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator	MWDOC	45%	December 2015	MWDOC was awarded an additional grant from the Bureau of Reclamation to develop the Base Irrigation Schedule Calculator in support of the California Sprinkler Adjustment Notification System (CSANS). This system will e-mail or "push" an irrigation index to assist property owners with making global irrigation scheduling adjustments. Participants will voluntarily register to receive this e-mail and can unsubscribe at any time. EcoLandscape California (ELC) was selected and approved by the Board to develop the Base Irrigation Schedule Calculator and instructional videos. Development of the calculator is well under way, and production of the promotional and how-to videos will start by year's end.
Public Spaces Program	MWDOC	85%	December 2015	This program targets publicly-owned landscape properties located in the South Orange County IRWM Plan area and encourages the removal of non-functional turfgrass, the upgrade of antiquated irrigation timers, and the conversion of high-precipitation-rate fixed spray irrigation to low-precipitation-rate rotating nozzles and/or drip irrigation. To date, 10 cities, water districts, or other special districts (i.e., school districts) have applied for funding through this program, of which eight have followed through with projects. Three of those projects were funded in August 2015, with the remaining five to be funded at the end of Calendar Year 2015.

Home Certification Program	MWDOC	100%	September 2015	This program provides single-family sites with indoor and outdoor audits to identify areas for water savings improvements and opportunities and offers rebates for the installation of residential water efficiency devices, including smart timers and high efficiency rotating nozzles. As of September 2015, the USBR grant that was paying for the Home Certification Program has termed out. Once final numbers are known, the overall program numbers will be reported on. In September 2015, 19 residential surveys were conducted, and survey results are pending.
Landscape Irrigation Survey Program	MWDSC	Ongoing	June 2016	Through this program, Metropolitan offers, at no cost, the services of a certified landscape irrigation auditor who will survey and provide written recommendations for qualifying non-residential properties within Metropolitan's service area. To date, 146 sites in the MWDOC service area have contacted Metropolitan to request surveys.
Spray to Drip Conversion Pilot Program	MWDOC	35%	April 2016	This is a pilot program designed to test the efficacy of replacing conventional spray heads in shrub beds with low-volume, low-precipitation drip technology. Through a rebate program format, residential sites will be encouraged to convert their existing spray nozzles to drip. To date, 128 residential sites and 28 commercial sites have completed spray to drip conversion projects.
CII Performance-Based Water Use Efficiency Program	MWDOC	2%	December 2017	This program will provide enhanced rebate incentives to commercial, industrial, and institutional sites and large-landscape properties (landscapes $\geq$ 1 acre). The program launched during the first Quarter of 2015.

Landscape Training and Outreach	MWDOC & County Stormwater	Ongoing	Ongoing	The Orange County Garden Friendly (OCGF) Pilot Program promotes the use of climate appropriate plants and water efficient irrigation practices, with the overall goals of reducing water runoff and improving outdoor water use efficiency. The OCGF Pilot Program is a collaborative effort of the Orange County Stormwater Program (OCSP) and the University of California Cooperative Extension (UCCE). Each partner plays a role in planning and implementing the Program. Fall OCGF events included October 3rd at the Home Depot in Orange, October 10th at the Home Depot in Brea, and October 24th at the Home Depot in Tustin. At these events, more than 250 customers engaged in discussions with MWDOC staff relating to ways they could implement water savings. Rebate eligible products purchased at these events included rotating sprinkler nozzles, drip irrigation, weather-based irrigation controllers, and rain barrels.

Orange County

Water Use Efficiency Programs Savings
and
Implementation Report

Retrofits and Acre-Feet Water Savings for Program Activity

Program	Program Start Date	Retrofits Installed in	Month Indicated		Current Fiscal Year		Overall Program		
			Interventions	Water Savings	Interventions	Water Savings	Interventions	Annual Water Savings[4]	Cumulative Water Savings[4]
High Efficiency Clothes Washer Program	2001	September-15	570	1.64	1,712	9.71	105,079	3,625	20,690
Smart Timer Program - Irrigation Timers	2004	September-15	55	0.60	370	15.65	13,437	4,654	28,933
Rotating Nozzles Rebate Program	2007	September-15	3,067	12.26	14,355	135.73	475,225	2,407	9,706
SoCal Water$mart Commercial Plumbing Fixture Rebate Program	2002	September-15	0	0.00	855	7.80	49,021	3,518	34,052
Water Smart Landscape Program [1]	1997	September-15	12,690	905.55	12,690	2,710.58	12,690	10,632	71,574
Industrial Process Water Use Reduction Program	2006	September-15	0	11.26	1	11.26	14	357	1,357
Turf Removal Program[3]	2010	October-15	919,746	10.72	2,868,923	68	10,386,596	1,454	2,982
High Efficiency Toilet (HET) Program	2005	September-15	2,164	7.67	5,765	61.30	52,039	1,924	11,340
Home Water Certification Program	2013	September-15	19	0.037	42	0.147	301	7.080	15.007
Synthetic Turf Rebate Program	2007						685,438	96	469
Ultra-Low-Flush-Toilet Programs [2]	1992						363,926	13,452	162,561
Home Water Surveys [2]	1995						11,867	160	1,708
Showerhead Replacements [2]	1991						270,604	1,667	19,083
Total Water Savings All Programs				**950**	**2,904,713**	**3,020**	**12,426,237**	**43,954**	**364,469**

[1] Water Smart Landscape Program participation is based on the number of water meters receiving monthly Irrigation Performance Reports.
[2] Cumulative Water Savings Program To Date totals are from a previous Water Use Efficiency Program Effort.
[3] Turf Removal Interventions are listed as square feet.
[4] Cumulative & annual water savings represents both active program savings and passive savings that continues to be realized due to plumbing code changes over time.

HIGH EFFICIENCY CLOTHES WASHERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14	FY14/15	FY15/16	Total	Current FY Water Savings Ac/Ft (Cumulative)	Cumulative Water Savings across all Fiscal Years	15 yr. Lifecycle Savings Ac/Ft
Brea	132	175	156	42	186	144	93	115	114	33	1,767	0.17	346.56	914
Buena Park	85	114	146	59	230	145	105	106	91	22	1,410	0.12	263.06	730
East Orange CWD RZ	18	22	17	3	23	10	10	8	8	3	184	0.02	38.17	95
El Toro WD	91	113	130	32	162	112	134	121	111	25	1,434	0.15	267.33	742
Fountain Valley	205	219	243	72	289	158	115	102	110	24	2,283	0.13	467.10	1,181
Garden Grove	238	304	332	101	481	236	190	162	165	35	3,220	0.24	641.68	1,666
Golden State WC	339	401	447	168	583	485	265	283	359	81	4,698	0.49	908.47	2,431
Huntington Beach	761	750	751	211	963	582	334	295	319	64	7,905	0.38	1,648.44	4,090
Irvine Ranch WD	1,972	2,052	1,844	1,394	2,621	2,170	1,763	1,664	1,882	498	22,270	2.68	4,154.94	11,523
La Habra	96	136	83	22	179	128	82	114	87	17	1,225	0.09	230.00	634
La Palma	33	35	51	25	76	46	34	25	34	8	427	0.04	78.85	221
Laguna Beach CWD	57	77	77	27	96	57	38	37	39	17	898	0.09	180.82	465
Mesa Water	239	249	246	73	232	176	114	86	89	19	2,344	0.13	498.40	1,213
Moulton Niguel WD	652	716	742	250	1,127	679	442	421	790	260	8,918	1.45	1,689.09	4,614
Newport Beach	245	270	259	57	197	142	116	92	95	31	2,528	0.18	540.74	1,308
Orange	366	365	403	111	349	262	218	163	160	46	3,740	0.28	781.45	1,935
Orange Park Acres	4	8	-	-	-	-	-	-	-	-	12	0.00	3.09	6
San Juan Capistrano	109	103	127	43	190	110	76	73	92	30	1,393	0.21	270.94	721
San Clemente	204	261	278	63	333	206	140	94	141	31	2,506	0.18	494.30	1,297
Santa Margarita WD	654	683	740	257	1,105	679	553	662	792	177	8,860	1.04	1,659.19	4,584
Seal Beach	47	46	57	7	81	51	31	29	38	10	580	0.07	113.08	300
Serrano WD	30	31	23	7	21	20	13	10	26	3	341	0.02	71.83	176
South Coast WD	107	130	148	43	183	112	89	79	68	20	1,517	0.10	297.22	785
Trabuco Canyon WD	69	60	62	28	82	62	30	45	47	14	750	0.09	146.36	388
Tustin	152	146	144	45	174	97	78	59	80	25	1,527	0.14	314.14	790
Westminster	213	171	233	74	329	208	121	82	109	20	2,373	0.12	480.39	1,228
Yorba Linda	288	350	367	117	394	273	181	167	156	53	3,626	0.28	749.71	1,876
MWDOC Totals	7,406	7,987	8,106	3,331	10,686	7,350	5,365	5,094	6,002	1,566	88,736	8.89	17,335.37	17,143
Anaheim	854	847	781	860	910	477	331	285	295	80	10,283	0.40	2,141.00	5,321
Fullerton	269	334	330	69	397	270	200	186	211	43	3,466	0.26	644.33	1,793
Santa Ana	236	235	257	87	355	190	163	131	132	23	2,594	0.15	569.69	1,342
Non-MWDOC Totals	1,359	1,416	1,368	1,016	1,662	937	694	602	638	146	16,343	0.81	3,355.02	3,157
Orange County Totals	8,765	9,403	9,474	4,347	12,348	8,287	6,059	5,696	6,640	1,712	105,079	9.71	20,690.39	20,301

SMART TIMERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 08/09		FY 09/10		FY 10/11		FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm.	
Brea	3	9	0	0	2	0	8	0	9	8	4	0	43	6	5	0	85	72	398.22
Buena Park	3	1	0	0	0	0	4	19	3	0	0	0	4	10	0	0	14	30	85.75
East Orange CWD RZ	0	0	0	0	1	0	5	0	2	0	0	0	2	0	0	0	13	0	3.55
El Toro WD	0	25	2	18	5	5	26	2	7	2	11	0	8	9	4	0	77	330	1,976.03
Fountain Valley	1	0	0	6	2	2	8	2	3	2	4	0	7	10	2	0	47	27	114.99
Garden Grove	2	1	6	0	5	4	7	0	5	2	9	0	10	14	3	3	63	30	106.46
Golden State WC	1	2	9	22	7	4	13	3	9	49	9	25	39	12	1	0	135	139	520.07
Huntington Beach	13	1	6	27	6	36	15	4	18	33	20	35	19	2	11	0	153	162	665.38
Irvine Ranch WD	29	56	14	145	28	153	267	71	414	135	71	59	67	310	9	0	1,195	1,659	7,923.73
La Habra	0	0	0	21	0	0	3	0	4	7	2	0	4	7	57	43	78	79	171.24
La Palma	0	0	0	0	0	0	1	0	1	0	2	0	2	0	1	1	7	1	1.60
Laguna Beach CWD	2	0	2	14	4	1	109	2	76	2	71	0	86	0	0	0	384	19	157.52
Mesa Water	6	7	13	7	7	22	21	0	10	2	15	2	17	28	5	0	138	101	486.67
Moulton Niguel WD	21	23	17	162	36	60	179	31	51	74	40	45	46	95	2	0	517	572	2,337.11
Newport Beach	10	27	7	58	6	0	275	12	242	26	168	75	11	9	53	25	1,033	379	1,957.82
Orange	5	2	2	13	5	8	25	0	20	24	13	9	18	31	4	0	169	142	667.97
San Juan Capistrano	10	0	7	49	13	1	103	2	14	18	6	11	6	19	3	2	183	111	448.68
San Clemente	81	20	13	209	46	11	212	17	26	7	28	2	28	24	16	6	1,004	364	2,056.38
Santa Margarita WD	25	44	10	152	61	53	262	7	53	171	64	93	53	321	8	0	647	1,015	3,563.97
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	1	31	1	2.10
Seal Beach	0	0	0	1	0	0	0	3	1	0	1	36	1	12	0	0	3	52	104.07
Serrano WD	0	0	11	0	4	0	3	0	1	0	0	0	4	0	1	0	24	0	5.95
South Coast WD	11	6	3	10	13	3	78	10	13	16	8	4	104	73	4	0	266	201	828.89
Trabuco Canyon WD	1	0	2	0	2	10	12	0	6	0	2	0	6	1	6	0	80	104	695.27
Tustin	7	9	10	14	10	0	11	0	8	4	9	1	18	14	8	0	85	49	211.62
Westminster	3	0	3	0	1	1	2	0	1	1	2	0	13	17	4	0	45	31	130.93
Yorba Linda	8	5	5	21	25	0	22	0	20	0	12	5	32	2	15	1	220	86	529.19
MWDOC Totals	242	238	142	949	289	374	1,671	185	1,017	583	571	402	648	1,026	253	82	6,696	5,756	26,151.15
Anaheim	9	59	5	46	12	11	23	60	19	10	9	26	7	52	6	7	133	420	1,949.05
Fullerton	2	2	2	39	9	33	22	51	9	29	8	0	40	26	5	6	119	186	641.99
Santa Ana	2	4	1	8	8	0	6	5	8	19	7	8	9	27	10	1	55	72	190.50
Non-MWDOC Totals	13	65	8	93	29	44	51	116	36	58	24	34	56	105	21	14	307	678	2,781.54
Orange County Totals	255	303	150	1,042	318	418	1,722	301	1,053	641	595	436	704	1,131	274	96	7,003	6,434	28,933

ROTATING NOZZLES INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 10/11			FY 11/12			FY 12/13			FY 13/14			FY 14/15			FY 15/16			Total Program			Cumulative Water Savings across all Fiscal Years
	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	
	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	
Brea	32	0	0	130	0	0	65	120	0	84	0	0	157	45	0	0	842	0	498	1,107	0	13.71
Buena Park	29	0	0	32	0	0	65	0	0	53	0	0	248	0	0	0	0	0	464	75	2,535	450.81
East Orange	0	0	0	340	0	0	55	0	0	30	0	0	221	0	0	0	0	0	751	0	0	9.60
El Toro	174	0	0	357	76	0	23	6,281	0	56	3,288	0	1,741	28,714	0	90	4,457	0	2,674	45,980	890	635.80
Fountain Valley	83	0	0	108	0	0	35	0	0	0	0	0	107	0	0	18	0	0	506	0	0	7.95
Garden Grove	38	0	0	119	0	0	95	0	0	80	0	0	88	50	0	44	0	0	812	201	0	17.16
Golden State	303	943	0	294	0	0	257	2,595	0	192	0	0	583	1,741	0	65	0	0	2,218	5,308	0	102.89
Huntington Beach	203	625	0	458	0	0	270	0	0	120	0	0	798	1,419	0	48	1,030	0	2,351	7,358	2,681	744.51
Irvine Ranch	2,411	2,861	0	1,715	4,255	0	25,018	1,014	0	11,010	4,257	0	1,421	632	0	156	1,110	0	44,969	81,113	2,004	2,656.31
La Habra	0	0	0	33	90	0	0	0	0	15	0	0	109	338	0	21	0	0	202	1,236	900	217.49
La Palma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0.24
Laguna Beach	156	0	0	763	0	0	3,596	0	0	2,948	878	0	2,879	1,971	0	0	0	0	10,749	2,896	0	164.42
Mesa Water	118	0	0	297	277	0	270	0	0	361	0	0	229	0	0	0	0	0	1,751	385	343	116.95
Moulton Niguel	1,578	0	0	1,225	0	0	512	1,385	0	361	227	0	1,596	4,587	0	325	62	0	6,554	13,264	2,945	904.88
Newport Beach	337	1,208	0	640	3,273	0	25,365	50	0	19,349	6,835	0	460	3,857	0	187	0	0	46,517	20,743	0	947.06
Orange	135	30	0	343	0	0	264	0	0	245	120	0	304	668	0	244	0	0	2,783	981	0	58.07
San Clemente	2,612	851	0	4,266	117	1,343	631	172	0	415	5,074	0	326	0	0	149	0	0	9,712	7,538	1,343	386.48
San Juan Capistrano	1,452	0	0	949	0	0	684	30	0	370	0	0	495	737	0	15	0	0	5,125	8,136	0	239.81
Santa Margarita	3,959	3,566	0	4,817	0	0	983	0	0	389	0	0	1,207	1,513	0	261	0	0	14,591	6,084	611	413.71
Seal Beach	0	0	0	0	0	0	0	0	0	0	0	0	40	5,261	0	0	0	0	155	5,552	0	50.97
Serrano	364	0	0	58	0	0	190	0	0	105	0	0	377	0	0	165	0	0	2,875	0	0	47.64
South Coast	318	1,772	0	688	359	0	435	0	0	70	0	0	4,993	13,717	0	101	179	0	6,794	16,160	0	213.07
Trabuco Canyon	0	0	0	379	0	0	34	0	0	0	0	0	56	0	0	77	0	0	2,033	791	0	52.43
Tustin	512	0	0	476	1,013	0	378	0	0	329	0	0	408	0	0	70	45	0	3,059	1,058	0	59.85
Westminster	0	0	0	26	0	0	15	0	0	0	0	0	54	0	0	57	0	0	343	0	0	5.47
Yorba Linda	529	0	0	559	0	0	730	0	0	40	990	0	921	0	0	483	0	0	4,636	4,359	500	255.02
MWDOC Totals	15,343	11,856	0	19,072	9,460	1,343	59,970	11,647	0	36,622	21,669	0	19,818	65,250	0	2,576	7,725	0	173,132	230,325	14,752	8,772.29
Anaheim	372	382	0	742	38,554	0	459	813	0	338	0	0	498	712	0	152	3,690	0	3,231	44,315	105	569.75
Fullerton	416	0	0	409	0	0	119	0	0	107	0	0	684	1,196	0	212	0	0	2,536	1,260	1,484	306.17
Santa Ana	53	0	0	22	65	0	99	0	0	86	2,533	0	310	0	0	0	0	0	859	3,226	0	57.47
Non-MWDOC Totals	841	382	0	1,173	38,619	0	677	813	0	531	2,533	0	1,492	1,908	0	364	3,690	0	6,626	48,801	1,589	933.40
Orange County Totals	16,184	12,238	0	20,245	48,079	1,343	60,647	12,460	0	37,153	24,202	0	21,310	67,158	0	2,940	11,415	0	179,758	279,126	16,341	9,705.68

SOCAL WATER$MART COMMERCIAL PLUMBING FIXTURES REBATE PROGRAM[1]
INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	Totals	Cumulative Water Savings across all Fiscal Years
Brea	27	113	24	4	1	234	0	10	49	**589**	**346**
Buena Park	153	432	122	379	290	5	23	56	0	**1,765**	**904**
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	**0**	**0**
El Toro WD	0	92	143	1	137	0	212	6	1	**760**	**512**
Fountain Valley	17	35	0	2	314	0	0	1	0	**623**	**517**
Garden Grove	5	298	130	22	0	4	1	167	42	**1,407**	**1,300**
Golden State WC	46	414	55	68	135	0	1	0	0	**1,804**	**1,677**
Huntington Beach	48	104	126	96	156	104	144	7	0	**1,530**	**1,351**
Irvine Ranch WD	121	789	2,708	1,002	646	1,090	451	725	213	**11,021**	**5,872**
La Habra	191	75	53	4	0	0	0	0	41	**584**	**476**
La Palma	0	140	21	0	0	0	0	0	0	**166**	**74**
Laguna Beach CWD	20	137	189	0	0	0	27	0	0	**446**	**281**
Mesa Water	141	543	219	669	41	6	0	79	152	**2,963**	**1,812**
Moulton Niguel WD	9	69	151	6	0	0	0	3	0	**583**	**722**
Newport Beach	98	27	245	425	35	0	0	566	0	**1,834**	**1,144**
Orange	18	374	67	1	73	1	271	81	62	**1,966**	**1,560**
San Juan Capistrano	2	1	1	0	0	0	14	0	0	**260**	**367**
San Clemente	2	18	43	0	19	0	0	1	0	**432**	**350**
Santa Margarita WD	6	23	11	0	0	0	0	2	0	**117**	**182**
Santiago CWD	0	0	0	0	0	0	0	0	0	**0**	**0**
Seal Beach	1	2	124	0	0	0	0	0	0	**354**	**383**
Serrano WD	0	0	0	0	0	0	0	0	0	**0**	**0**
South Coast WD	9	114	56	422	84	148	0	382	0	**1,320**	**441**
Trabuco Canyon WD	0	4	0	0	0	0	0	0	0	**11**	**14**
Tustin	115	145	25	230	0	0	0	75	0	**832**	**720**
Westminster	40	161	16	63	35	1	28	0	0	**815**	**898**
Yorba Linda	10	24	8	30	0	1	0	0	135	**420**	**498**
MWDOC Totals	**1,079**	**4,134**	**4,537**	**3,424**	**1,966**	**1,594**	**1,172**	**2,161**	**695**	**32,602**	**22,400**
Anaheim	766	3,298	582	64	48	165	342	463	122	**10,494**	**6,068**
Fullerton	133	579	29	4	0	94	0	178	0	**1,681**	**1,424**
Santa Ana	493	815	728	39	12	16	17	5	38	**4,244**	**4,160**
Non-MWDOC Totals	**1,392**	**4,692**	**1,339**	**107**	**60**	**275**	**359**	**646**	**160**	**16,419**	**11,653**
Orange County Totals	**2,471**	**8,826**	**5,876**	**3,531**	**2,026**	**1,869**	**1,531**	**2,807**	**855**	**49,021**	**34,052**

[1] Retrofit devices include ULF Toilets and Urinals, High Efficiency Toilets and Urinals, Multi-Family and Multi-Family 4-Liter HETs, Zero Water Urinals, High Efficiency Clothes Washers, Cooling Tower Conductivity Controllers, Ph Cooling Tower Conductivity Controllers, Flush Valve Retrofit Kits, Pre-rinse Spray heads, Hospital X-Ray Processor Recirculating Systems, Steam Sterilizers, Food Steamers, Water Pressurized Brooms, Laminar Flow Restrictors, and Ice Making Machines.

Water Smart Landscape Program

Total Number of Meters in Program by Agency

Agency	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	Overall Water Savings To Date (AF)
Brea	0	0	0	0	0	22	22	22	22	22	62.80
Buena Park	0	0	0	17	103	101	101	101	101	101	455.49
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	0.00
El Toro WD	227	352	384	371	820	810	812	812	812	812	4,798.99
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0.00
Garden Grove	0	0	0	0	0	0	0	0	0	0	0.00
Golden State WC	0	14	34	32	34	32	32	32	32	32	198.31
Huntington Beach	0	0	0	31	33	31	31	31	31	31	146.22
Irvine Ranch WD	646	708	1,008	6,297	6,347	6,368	6,795	6,797	6,769	6,780	37,821.08
Laguna Beach CWD	0	0	57	141	143	141	124	124	124	124	724.23
La Habra	0	0	23	22	24	22	22	22	22	22	135.15
La Palma	0	0	0	0	0	0	0	0	0	0	0.00
Mesa Water	138	165	286	285	288	450	504	511	514	515	2,906.82
Moulton Niguel WD	113	180	473	571	595	643	640	675	673	695	4,073.55
Newport Beach	23	58	142	171	191	226	262	300	300	300	1,479.78
Orange	0	0	0	0	0	0	0	0	0	0	0.00
San Clemente	204	227	233	247	271	269	269	299	407	438	2,336.02
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0.00
Santa Margarita WD	618	945	1,571	1,666	1,746	1,962	1,956	2,274	2,386	2,386	14,007.83
Seal Beach	0	0	0	0	0	0	0	0	0	0	0.00
Serrano WD	0	0	0	0	0	0	0	0	0	0	0.00
South Coast WD	0	62	117	108	110	118	118	118	164	164	818.21
Trabuco Canyon WD	0	12	49	48	62	60	60	60	60	60	346.24
Tustin	0	0	0	0	0	0	0	0	0	0	0.00
Westminster	0	10	18	18	20	18	18	18	18	18	115.17
Yorba Linda WD	0	0	0	0	0	0	0	0	0	0	0.00
MWDOC Totals	**1,969**	**2,733**	**4,395**	**10,025**	**10,787**	**11,273**	**11,766**	**12,196**	**12,435**	**12,500**	**70,425.9**
Anaheim	0	0	0	142	146	144	190	190	190	190	1,147.97
Fullerton	0	0	0	0	0	0	0	0	0	0	0.00
Santa Ana	0	0	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	**0**	**0**	**0**	**142**	**146**	**144**	**190**	**190**	**190**	**190**	**1,147.97**
Orange Co. Totals	**1,969**	**2,733**	**4,395**	**10,167**	**10,933**	**11,417**	**11,956**	**12,386**	**12,625**	**12,690**	**71,573.83**

INDUSTRIAL PROCESS WATER USE REDUCTION PROGRAM

Number of Process Changes by Agency

Agency	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	Overall Program Interventions	Annual Water Savings[1]	Cumulative Water Savings across all Fiscal Years[1]
Brea	0	0	0	0	0	0	0	0	0	0	0	0
Buena Park	0	1	0	0	0	0	0	0	0	1	54	365
East Orange	0	0	0	0	0	0	0	0	0	0	0	0
El Toro	0	0	0	0	0	0	0	0	0	0	0	0
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0	0
Garden Grove	0	0	0	0	0	0	0	0	0	0	0	0
Golden State	1	0	0	0	0	0	0	0	0	1	3	22
Huntington Beach	0	0	0	0	0	2	0	1	0	3	127	234
Irvine Ranch	0	0	2	1	1	1	1	0	0	6	98	366
La Habra	0	0	0	0	0	0	0	0	0	0	0	0
La Palma	0	0	0	0	0	0	0	0	0	0	0	0
Laguna Beach	0	0	0	0	0	0	0	0	0	0	0	0
Mesa Water	0	0	0	0	0	0	0	0	0	0	0	0
Moulton Niguel	0	0	0	0	0	0	0	0	0	0	0	0
Newport Beach	0	0	0	0	0	0	0	1	0	1	21	18
Orange	1	0	0	0	0	0	0	0	0	1	43	330
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0	0
San Clemente	0	0	0	0	0	0	0	0	0	0	0	0
Santa Margarita	0	0	0	0	0	0	0	0	0	0	0	0
Seal Beach	0	0	0	0	0	0	0	0	0	0	0	0
Serrano	0	0	0	0	0	0	0	0	0	0	0	0
South Coast	0	0	0	0	0	0	0	0	0	0	0	0
Trabuco Canyon	0	0	0	0	0	0	0	0	0	0	0	0
Tustin	0	0	0	0	0	0	0	0	0	0	0	0
Westminster	0	0	0	0	0	0	0	0	0	0	0	0
Yorba Linda	0	0	0	0	0	0	0	0	0	0	0	0
MWDOC Totals	2	1	2	1	1	3	1	2	0	13	346	1335
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0
Fullerton	0	0	0	0	0	0	0	0	0	0	0	0
Santa Ana	0	0	0	0	0	0	0	0	1	1	11	23
OC Totals	2	1	2	1	1	3	1	2	1	14	357	1357

[1] Acre feet of savings determined during a one year monitoring period.

If monitoring data is not available, the savings estimated in agreement is used.

HIGH EFFICIENCY TOILETS (HETs) INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	Total	Cumulative Water Savings across all Fiscal Years
Brea	0	2	7	43	48	8	0	0	38	146	83	375	**55.33**
Buena Park	0	1	2	124	176	7	0	0	96	153	59	618	**125.42**
East Orange CWD RZ	0	0	10	12	1	0	0	0	13	26	15	77	**12.73**
El Toro WD	0	392	18	75	38	18	0	133	218	869	110	1,871	**344.30**
Fountain Valley	0	69	21	262	54	17	0	0	41	132	92	688	**167.43**
Garden Grove	0	14	39	443	181	24	0	0	63	350	197	1,311	**278.00**
Golden State WC	2	16	36	444	716	37	80	2	142	794	278	2,547	**510.37**
Huntington Beach	2	13	59	607	159	76	0	0	163	1,190	349	2,618	**439.46**
Irvine Ranch WD	29	1,055	826	5,088	2,114	325	0	1,449	810	1,777	981	14,454	**3,767.16**
Laguna Beach CWD	0	2	17	91	28	11	0	0	45	112	25	331	**65.84**
La Habra	0	3	18	296	34	20	0	0	37	94	36	538	**138.44**
La Palma	0	1	10	36	26	13	0	0	21	59	26	192	**36.39**
Mesa Water	0	247	19	736	131	7	0	0	147	162	72	1,521	**439.42**
Moulton Niguel WD	0	20	104	447	188	46	0	0	400	2,497	1,088	4,790	**578.21**
Newport Beach	0	5	19	163	54	13	0	0	49	168	102	573	**109.21**
Orange	1	20	62	423	79	40	0	1	142	978	251	1,997	**322.73**
San Juan Capistrano	0	10	7	76	39	11	0	0	35	140	106	424	**68.14**
San Clemente	0	7	22	202	66	21	0	0	72	225	138	753	**139.42**
Santa Margarita WD	0	5	14	304	151	44	0	0	528	997	549	2,592	**342.86**
Seal Beach	0	678	8	21	12	1	0	2	17	50	32	821	**310.72**
Serrano WD	2	0	1	13	5	0	0	0	2	40	23	86	**11.87**
South Coast WD	2	2	29	102	41	12	23	64	102	398	111	886	**130.32**
Trabuco Canyon WD	0	0	4	23	23	0	0	0	10	108	81	249	**30.13**
Tustin	0	186	28	387	479	17	0	0	64	132	103	1,396	**392.48**
Westminster	0	17	25	541	167	23	0	0	35	161	75	1,044	**278.00**
Yorba Linda WD	0	14	89	323	96	18	0	0	40	280	215	1,075	**221.31**
MWDOC Totals	38	2,779	1,494	11,282	5,106	809	103	1,651	3,330	12,038	5,197	43,827	**9,315.67**
Anaheim	0	255	78	2,771	619	114	0	0	156	1,188	279	5,460	**1,428.28**
Fullerton	0	4	28	286	60	23	0	0	61	293	145	900	**172.45**
Santa Ana	0	11	25	925	89	23	0	0	33	602	144	1,852	**423.16**
Non-MWDOC Totals	0	270	131	3,982	768	160	0	0	250	2,083	568	8,212	**2,023.90**
Orange County Totals	**38**	**3,049**	**1,625**	**15,264**	**5,874**	**969**	**103**	**1,651**	**3,580**	**14,121**	**5,765**	**52,039**	**11,339.57**

TURF REMOVAL BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	3,397	9,466	7,605	0	5,697	0	71,981	30,617	12,421	0	101,101	40,083	**46.12**
Buena Park	0	0	0	0	0	0	11,670	1,626	5,827	0	17,497	1,626	**4.54**
East Orange	0	0	0	0	1,964	0	18,312	0	6,921	0	27,197	0	**6.92**
El Toro	4,723	0	4,680	72,718	4,582	0	27,046	221,612	15,277	86,846	56,308	381,176	**132.49**
Fountain Valley	1,300	0	682	7,524	4,252	0	45,583	5,279	5,869	0	57,686	12,803	**22.35**
Garden Grove	14,013	0	4,534	0	8,274	0	67,701	22,000	13,443	0	107,965	68,177	**81.61**
Golden State	42,593	30,973	31,813	3,200	32,725	8,424	164,507	190,738	29,919	0	301,557	233,335	**192.04**
Huntington Beach	27,630	48,838	9,219	12,437	20,642	0	165,600	58,942	54,016	7,426	277,908	131,294	**149.53**
Irvine Ranch	6,450	1,666	32,884	32,384	36,584	76,400	234,905	317,999	70,450	1,174,609	386,696	1,615,852	**434.10**
La Habra	0	8,262	0	0	0	0	14,014	1,818	6,127	2,936	20,141	20,791	**18.02**
La Palma	0	0	0	0	0	0	4,884	0	500	57,400	5,384	57,400	**9.47**
Laguna Beach	2,533	0	2,664	1,712	4,586	226	13,647	46,850	2,693	0	27,101	48,788	**24.38**
Mesa Water	6,777	0	10,667	0	22,246	0	131,675	33,620	18,947	0	190,312	33,620	**68.99**
Moulton Niguel	4,483	26,927	11,538	84,123	14,739	40,741	314,250	1,612,845	80,041	127,043	426,007	1,907,818	**681.78**
Newport Beach	3,454	0	3,548	2,346	894	0	33,995	65,277	1,064	55,287	42,955	122,910	**41.78**
Orange	12,971	0	15,951	8,723	11,244	0	120,093	281,402	19,781	0	180,040	290,125	**142.80**
San Clemente	21,502	0	16,062	13,165	18,471	13,908	90,349	1,137	18,718	392,742	165,102	420,952	**128.24**
San Juan Capistrano	22,656	103,692	29,544	27,156	12,106	0	101,195	32,366	13,778	19,598	179,279	182,812	**167.35**
Santa Margarita	1,964	11,400	10,151	11,600	17,778	48,180	211,198	514,198	104,454	178,666	350,028	769,605	**300.42**
Seal Beach	0	0	3,611	0	0	0	15,178	504	2,159	0	20,948	504	**6.72**
Serrano	0	0	0	0	2,971	0	41,247	0	32,545	0	76,763	0	**17.35**
South Coast	6,806	0	9,429	4,395	15,162	116,719	84,282	191,853	46,342	0	162,021	329,291	**165.41**
Trabuco Canyon	272	0	1,542	22,440	2,651	0	14,771	0	5,436	66,964	24,672	89,404	**29.00**
Tustin	0	0	9,980	0	1,410	0	71,285	14,137	13,567	1,700	96,242	15,837	**32.24**
Westminster	0	0	0	0	0	0	14,040	34,631	11,354	0	25,394	34,631	**15.22**
Yorba Linda	0	0	0	0	0	0	112,136	12,702	51,470	54,587	174,955	67,289	**59.33**
MWDOC Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**304,598**	**2,195,544**	**3,692,153**	**643,119**	**2,225,804**	**3,501,259**	**6,876,123**	**2,978.20**
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Fullerton	0	0	0	0	0	9,214	0	0	0	0	0	9,214	**3.87**
Santa Ana	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Non-MWDOC Totals	**0**	**0**	**0**	**0**	**0**	**9,214**	**0**	**0**	**0**	**0**	**0**	**9,214**	**3.87**
Orange County Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**313,812**	**2,195,544**	**3,692,153**	**643,119**	**2,225,804**	**3,501,259**	**6,885,337**	**2,982**

[1]Installed device numbers are listed as square feet

HOME WATER SURVEYS PERFORMED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 13/14		FY 14/15		FY 15/16		Total		Cumulative
	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Water Savings
Brea	1	0	2	0	0	0	3	0	0.16
Buena Park	0	0	1	0	0	0	1	0	0.05
East Orange	19	0	1	0	0	0	20	0	1.39
El Toro	0	0	3	0	0	0	3	0	0.14
Fountain Valley	3	0	4	0	0	0	7	0	0.40
Garden Grove	0	0	6	0	1	0	7	0	0.31
Golden State	0	0	0	0	0	0	0	0	0.00
Huntington Beach	2	0	5	0	2	0	9	0	0.42
Irvine Ranch	1	0	3	0	5	0	9	0	0.33
La Habra	0	0	1	0	0	0	1	0	0.05
La Palma	0	0	0	0	0	0	0	0	0.00
Laguna Beach	4	0	8	0	1	0	13	0	0.68
Mesa Water	0	0	0	0	0	0	0	0	0.00
Moulton Niguel	4	0	4	0	0	0	8	0	0.47
Newport Beach	2	0	8	0	3	0	13	0	0.59
Orange	2	0	18	0	1	0	21	0	1.01
San Clemente	15	0	13	0	0	0	28	0	1.67
San Juan Capistrano	4	0	13	0	2	0	19	0	0.94
Santa Margarita	15	0	40	1	12	0	67	1	3.22
Seal Beach	0	0	1	0	1	0	2	0	0.07
Serrano	0	0	2	0	0	0	2	0	0.09
South Coast	6	0	4	0	1	0	11	0	0.64
Trabuco Canyon	0	0	4	0	0	0	4	0	0.19
Tustin	0	0	10	0	4	0	14	0	0.56
Westminster	0	0	0	0	0	0	0	0	0.00
Yorba Linda	0	0	13	0	8	0	21	0	0.80
MWDOC Totals	78	0	164	1	41	0	283	1	14.18
Anaheim	0	0	0	0	0	0	0	0	0.00
Fullerton	0	0	17	0	1	0	18	0	0.82
Santa Ana	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	0	0	17	0	1	0	18	0	0.82
Orange County Totals	78	0	181	1	42	0	301	1	15.007

SYNTHETIC TURF INSTALLED BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08		FY 08/09		FY 09/10		FY 10/11		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	0	0	2,153	2,160	500	0	0	0	2,653	2,160	3.30
Buena Park	0	0	1,566	5,850	0	0	0	0	1,566	5,850	5.19
East Orange	0	0	0	0	983	0	0	0	983	0	0.55
El Toro	3,183	0	2,974	0	3,308	0	895	0	10,360	0	6.98
Fountain Valley	11,674	0	1,163	0	2,767	0	684	0	16,288	0	12.46
Garden Grove	1,860	0	0	0	3,197	0	274	0	5,331	0	3.47
Golden State	6,786	0	13,990	0	15,215	0	2,056	0	38,047	0	24.88
Huntington Beach	15,192	591	12,512	0	4,343	1,504	0	0	32,047	2,095	25.29
Irvine Ranch	11,009	876	13,669	0	2,585	0	0	0	27,263	876	21.00
La Habra	0	0	0	0	0	0	0	0	0	0	-
La Palma	429	0	0	0	0	0	0	0	429	0	0.36
Laguna Beach	3,950	0	3,026	0	725	0	0	0	7,701	0	5.84
Mesa Water	4,114	0	3,005	78,118	4,106	0	2,198	0	13,423	78,118	63.46
Moulton Niguel	14,151	0	25,635	2,420	7,432	0	0	0	47,218	2,420	35.69
Newport Beach	2,530	0	6,628	0	270	0	0	0	9,428	0	6.92
Orange	4,169	0	7,191	0	635	0	0	0	11,995	0	8.89
San Clemente	9,328	0	11,250	455	2,514	1,285	500	0	23,592	1,740	18.37
San Juan Capistrano	0	0	7,297	639	2,730	0	4,607	0	14,634	639	9.02
Santa Margarita	12,922	0	26,069	0	21,875	0	7,926	0	68,792	0	44.68
Seal Beach	0	0	817	0	0	0	0	0	817	0	0.57
Serrano	7,347	0	1,145	0	0	0	0	0	8,492	0	6.97
South Coast	2,311	0	6,316	0	17,200	0	1,044	0	26,871	0	16.43
Trabuco Canyon	1,202	0	9,827	0	0	0	0	0	11,029	0	7.89
Tustin	6,123	0	4,717	0	2,190	0	0	0	13,030	0	9.67
Westminster	2,748	16,566	8,215	0	890	0	0	0	11,853	16,566	22.47
Yorba Linda	11,792	0	12,683	0	4,341	5,835	0	0	28,816	5,835	24.48
MWDOC Totals	132,820	18,033	181,848	89,642	97,806	8,624	20,184	0	432,658	116,299	384.83
Anaheim	4,535	0	7,735	20,093	13,555	65,300	4,122	0	29,947	85,393	69.18
Fullerton	4,865	876	5,727	0	6,223	0	105	0	16,920	876	12.36
Santa Ana	0	0	2,820	0	525	0	0	0	3,345	0	2.27
Non-MWDOC Totals	9,400	876	16,282	20,093	20,303	65,300	4,227	0	50,212	86,269	83.81
Orange County Totals	142,220	18,909	198,130	109,735	118,109	73,924	24,411	0	482,870	202,568	468.63

[1]Installed device numbers are calculated in square feet

ULF TOILETS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	Previous Years	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	Total	Cumulative Water Savings across all Fiscal Years
Brea	378	189	299	299	122	144	867	585	341	401	26	48	17	4	0	**3,720**	**1,692.64**
Buena Park	361	147	331	802	520	469	524	1,229	2,325	1,522	50	40	18	9	0	**8,347**	**3,498.37**
East Orange CWD RZ	2	0	33	63	15	17	15	50	41	44	19	18	13	2	0	**332**	**138.23**
El Toro WD	1,169	511	678	889	711	171	310	564	472	324	176	205	61	40	0	**6,281**	**3,091.16**
Fountain Valley	638	454	635	858	1,289	2,355	1,697	1,406	1,400	802	176	111	58	32	0	**11,911**	**5,383.10**
Garden Grove	1,563	1,871	1,956	2,620	2,801	3,556	2,423	3,855	3,148	2,117	176	106	67	39	0	**26,298**	**12,155.41**
Golden State WC	3,535	1,396	3,141	1,113	3,024	2,957	1,379	2,143	3,222	1,870	167	116	501	43	0	**24,607**	**11,731.47**
Huntington Beach	3,963	1,779	2,600	2,522	2,319	3,492	3,281	2,698	3,752	1,901	367	308	143	121	0	**29,246**	**13,854.70**
Irvine Ranch WD	4,016	841	1,674	1,726	1,089	3,256	1,534	1,902	2,263	6,741	593	626	310	129	0	**26,700**	**11,849.23**
Laguna Beach CWD	283	93	118	74	149	306	220	85	271	118	32	26	29	6	0	**1,810**	**845.69**
La Habra	594	146	254	775	703	105	582	645	1,697	1,225	12	31	6	7	0	**6,782**	**2,957.73**
La Palma	65	180	222	125	44	132	518	173	343	193	31	27	20	17	0	**2,090**	**927.52**
Mesa Water	1,610	851	1,052	2,046	2,114	1,956	1,393	1,505	2,387	988	192	124	56	14	0	**16,288**	**7,654.27**
Moulton Niguel WD	744	309	761	698	523	475	716	891	728	684	410	381	187	100	0	**7,607**	**3,371.14**
Newport Beach	369	293	390	571	912	1,223	438	463	396	1,883	153	76	36	16	0	**7,219**	**3,166.77**
Orange	683	1,252	1,155	1,355	533	2,263	1,778	2,444	2,682	1,899	193	218	88	53	4	**16,600**	**7,347.93**
San Juan Capistrano	1,234	284	193	168	323	1,319	347	152	201	151	85	125	42	39	0	**4,663**	**2,324.42**
San Clemente	225	113	191	65	158	198	667	483	201	547	91	66	37	34	0	**3,076**	**1,314.64**
Santa Margarita WD	577	324	553	843	345	456	1,258	790	664	260	179	143	101	29	0	**6,522**	**3,001.01**
Seal Beach	74	66	312	609	47	155	132	81	134	729	29	10	6	12	0	**2,396**	**1,073.80**
Serrano WD	81	56	68	41	19	52	95	73	123	98	20	15	14	2	0	**757**	**338.66**
South Coast WD	110	176	177	114	182	181	133	358	191	469	88	72	32	22	0	**2,305**	**990.05**
Trabuco Canyon WD	10	78	42	42	25	21	40	181	102	30	17	20	12	14	0	**634**	**273.02**
Tustin	968	668	557	824	429	1,292	1,508	1,206	1,096	827	69	89	26	12	0	**9,571**	**4,423.88**
Westminster	747	493	969	1,066	2,336	2,291	2,304	1,523	2,492	1,118	145	105	70	24	0	**15,683**	**7,064.28**
Yorba Linda WD	257	309	417	457	404	1,400	759	1,690	1,155	627	158	136	81	41	0	**7,891**	**3,409.49**
MWDOC Totals	24,256	12,879	18,778	20,765	21,136	30,242	24,918	27,175	31,827	27,568	3,654	3,242	2,031	861	4	**249,336**	**113,878.61**
Anaheim	447	1,054	1,788	3,661	1,755	7,551	4,593	6,346	9,707	5,075	473	371	462	341	1	**43,625**	**18,359.52**
Fullerton	1,453	1,143	694	1,193	1,364	2,138	1,926	2,130	2,213	1,749	172	77	44	23	2	**16,321**	**7,435.23**
Santa Ana	1,111	1,964	1,205	2,729	2,088	8,788	5,614	10,822	10,716	9,164	279	134	25	5	0	**54,644**	**22,887.95**
Non-MWDOC Totals	3,011	4,161	3,687	7,583	5,207	18,477	12,133	19,298	22,636	15,988	924	582	531	369	3	**114,590**	**48,682.70**
Orange County Totals	27,267	17,040	22,465	28,348	26,343	48,719	37,051	46,473	54,463	43,556	4,578	3,824	2,562	1,230	7	**363,926**	**162,561.30**