

**MEETING OF THE
BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY**
Jointly with the
PLANNING & OPERATIONS COMMITTEE
October 5, 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 ITEM

1. PRESENTATION BY GREG WOODSIDE (OCWD) RE OC GROUNDWATER MANAGEMENT PLAN (Approximate presentation time: 15 minutes)

DISCUSSION ITEMS

2. UPDATE ON OC RELIABILITY STUDY

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.)

3. METROPOLITAN'S TURF REMOVAL REBATE PROGRAM UPDATE (oral report)
4. 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
5. 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

CLOSED SESSION

6. PUBLIC EMPLOYEE PERFORMANCE EVALUATION
Title: General Manager
Government Code Section 54957

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.



INFORMATION ITEM

October 5, 2015, 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 – October 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

One purpose of the two-phase Orange County Reliability Study is to provide accurate, peer-reviewed information on future OC water demands, current water supplies and portfolios of potential projects to close the future gaps between OC supply and demand (e.g., supply reliability). Another purpose is to provide information on system reliability (i.e., the risk to the physical system from catastrophic events such as earthquakes).

In the OC Reliability Study, supply reliability is essentially a measure of the frequency and magnitude of shortages in supply. System reliability is a measure of the probable duration of supply outages caused by catastrophic events and the ability of the systems to meet water demands during those projected outages (e.g., 30-60 day outages of imported water supplies or damage to the groundwater well system).

There are many roads (and projects) to improved reliability and different priorities often lead to selecting different portfolios of projects for implementation. The results of the OC Reliability Study can assist OC decision makers (utilities, elected officials and the public) in

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

making informed decisions as to how much investment is appropriate to insure acceptable levels of reliability for Orange County while limiting under or over investment in supply and demand projects.

Phase 1 of the study develops the data and models to reach common agreement on:

- projected demands over the next 25 years
- the GAP between projected demand and existing imported and local supplies under different scenarios and assumptions (i.e., with & without the California Water Fix (aka, Bay-Delta Tunnels) or different precipitation patterns)
- the functionality of the customized WEAP model for OC reliability analyses (The WEAP model links the supply and demand scenarios yielding the gap analysis)
- the system reliability of existing transmission and treatment infrastructure
- the identification of alternate projects and policies to manage the reliability to acceptable levels balancing benefits and costs.

Phase 2 of the study will use the reliability model and future projects developed in Phase 1 to:

- Develop Project Portfolios - Quantify the projects identified in Phase 1 and develop them into themed portfolios that will produce specific gains in supply reliability (i.e., lower-cost, higher reliability, higher flexibility, hybrids)
 - each portfolio will include a brief description and summary of supply yields (both for supply and system benefits), capital and O&M costs, and implementation issues.
- Evaluate Cost & Benefits of Portfolios – Estimate the overall lifecycle costs from 2015-2040 for the portfolios with specific financial metrics. The metrics include comparisons of the project costs versus the status quo (i.e., no action) costs and the relative costs for incremental reliability gains (i.e., reduction in the frequency and magnitude of water shortages).

Project Schedule

A priority has been placed on Member Agency participation and the active discussion of project assumptions, models and products during Phase 1. This priority has led to some slippage in the project schedule but was believed essential in order to reach a workable consensus on project output. Phase 1 of the study has reached a point that work products are being generated on a weekly basis with a projected completion date in December 2015. Work group meetings are occurring every two weeks and a series of meetings will be utilized to provide study section results; to include:

- Water Demand – P&O Committee (October 5th)
- Existing Water Supply, Supply & System Gap, Seismic Issues- PAL Committee (October 19th) or BOD (October 21st)
- Project Overview & Phase 2 Discussion - Joint MWDOC/OCWD Meeting (October 28th or alternate date of October 22nd)

- OC & MET Project Alternatives, MET IRP & Phase 2 – P&O Committee (November 2nd) , Elected Officials Meeting (November 5th)
- Phase 1 Presentation – P&O Committee (December 14th)
- Start Phase 2 – (December 17th)
- Complete Phase 2 – (May 1, 2016)

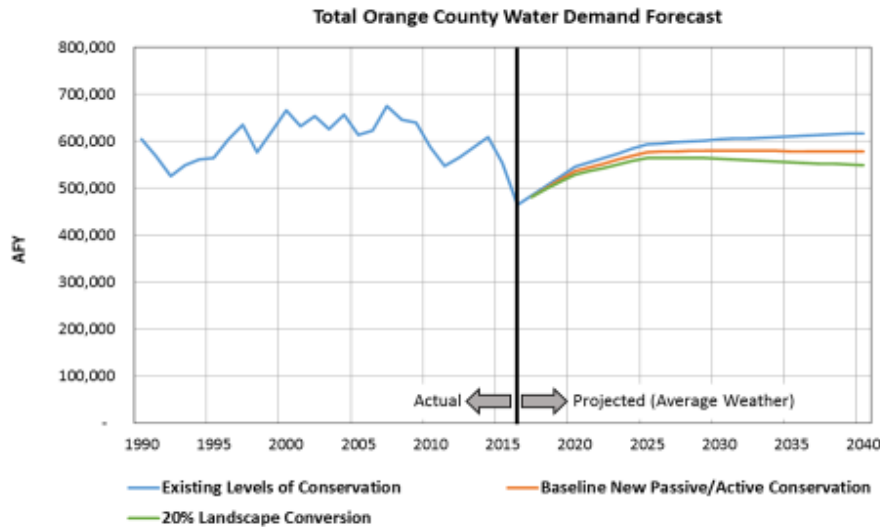
Water Demand Summary

The only guarantee when projecting conditions 25-years into the future is that to some degree they will be wrong. The goal is to make the projections as accurate as possible and to include mechanisms to assess variability in the results from deviations in the underlying assumptions. The current environment has made this process challenging. Questions of significant impact to future water demands include:

1. Will the current 25% reduction in water demands continue, accelerate or regress (i.e., bounce back towards previous demands).
 - a. If they will bounce back then by how much and how soon?
2. How accurate are the existing projections of population and economic growth for Orange County? How accurate have past projections been?
3. What will be the future impacts on demand of the existing water use efficiency investments and regulations (i.e., landscape and plumbing code requirements) and the baseline future investments in WUE?

At this point approximately a dozen meetings have been held between MWDOC staff, our Member Agency workgroup and our consultants (CDM-Smith) to discuss, test and agree upon the assumptions, model and projections for water demand. While separate analyses have been made for three sub-areas of Orange County, the past and projected water demand for the entire county is summarized in the following figure:

Water Demand Forecast



25



These projections include a substantial level of demand “bounce-back” over the next ten years. The three projection lines are based on three levels of water use efficiency: passive conservation, passive plus baseline active conservation at previous budget levels and aggressive conservation program levels and funding.

Concurrence on the water demand forecast is a foundational element of the reliability analysis. Without an agreement on future demands, it is not possible to make an assessment of the adequacy of existing supplies nor the need for projects to increase supplies or reduce demands.

Recent Investments in Turf Replacement in OC

A question was raised at the September P&O meeting regarding the level of investment to be made over recent history in Turf Replacement and the accompanying water use savings. MWDOC WUE staff estimated that in OC, there has been about 31 million ft² of turf replaced, reserved or anticipated to be replaced. The savings per ft² has been estimated at 0.00013 AF per ft², which would translate to about 4,000 AF of “permanent” water use savings. While this water demand reduction may erode over time, the working assumption is that the savings will last 20 years or more. The investment to achieve this savings was about \$55 million from the water agencies, not counting the costs to homeowners or businesses. Using to 20 year benefit life, the agency cost per acre foot of reduced demand calculates to approximately \$700.

DETAILED REPORT

In a broad sense the two-phase OC Reliability Study is designed to develop a peer-reviewed consensus on projected water supply, water demands and potential projects or actions to balance the two. The final work product is intended to provide the information and means for the interested community to make informed comparisons of potential projects and project portfolios to achieve reliability/cost outcomes.

Supply and System Reliability

While the public has a working sense of reliability, there are specific definitions and implications for reliability in a formal study.

Definition and Implications of Supply & System Reliability		
	Supply Reliability	System Reliability
Definition	Availability of water supply under different hydrologic conditions, typically measured in terms of frequency, duration and magnitude of shortages.	Ability to deliver imported water under outages of key facilities, caused by seismic events, facility failures, or other catastrophic events.
Factors Impacting	<ul style="list-style-type: none"> • BDCP implementation (SWP) • Oversubscribed Colorado River (CRA) • Climate change (SWP, CRA, local supplies) • Success of conservation and local supply development • Population and Economic Growth 	<ul style="list-style-type: none"> • Seismic risks to MET's Diemer WTP • Seismic risks to OC imported water pipelines and local infrastructure • Seismic and storm risk to Delta levees • Seismic risks to Edmonston Pumps • Seismic risks to Colorado River Aqueduct

Implications to Orange County	Portions of OC are more reliable than others because of OC Groundwater Basin. There is a potential that prolonged droughts (especially under climate change) can result in shortages to both basin and non-basin areas.	South OC is extremely vulnerable to local seismic risks due to single point of delivery for treated imported water. All of OC vulnerable for Delta, Edmonston & CRA risks.
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For the Orange County Reliability Study, **supply reliability** is defined in terms of how often demand will exceed supply by 15% or greater. This is a surrogate for conditions under which MET is likely to impose allocations. By contrast in their ongoing Integrated Resource Plan (IRP) effort, MET is defining reliability in terms of how often their storage levels dip below 1 million acre feet.

Specific Supply Reliability Criteria have not been established in the OC Study Group as yet. The general input received is that we want both MET and OC to be fully reliable under all hydrological sequences. No supply is 100% reliable and the basic question that will arise will focus on “fully reliable at what cost”. Phase 2 of the study will summarize the costs of alternative projects that can be aligned into portfolios to achieve different levels of reliability. In the MET discussions at the recent September 2015 workshop on their IRP, one of the most difficult targets to meet was the 2020 scenario because it is the most near and development of major local projects by that time is very difficult if the projects are not already well on their way. MET is considering the yield from projects towards meeting demand only if the project is already under operation or is under construction. Projects that are not currently in construction are dealt with as potential future projects. In OC we have assumed that some local projects will proceed such as the GWRS expansion to 130,000 AF and a number of recycling projects by the retail agencies.

In contrast, **system reliability** is defined in terms of the ability of the system to deliver the water supply under catastrophic events (i.e., earthquakes, facility failures, droughts, etc.). This is reliability beyond system outage for normal maintenance and operating requirements. For example, MET has a current requirement that all agencies be able to meet average annual demands for seven days without MET deliveries. The system reliability criteria target specific system components with potential catastrophic outages of a much greater duration and ranging from weeks to years.

System Reliability Criteria	
Reliability Event	Duration
OC Imported Pipeline Failures	7 to 30 Days

Diemer WTP Failure	Up to 60 Days
Delta Levee Failure	1 to 2 Years
Edmonston Pumping Plant	TBD (6 Months – 2 Years)
Colorado River Aqueduct	6 Months

OC Reliability Project Phases

Phase 1 of the OC Water Reliability Study was designed to estimate the GAPS between projected demand and existing supplies and summarize projects that could fill the supply GAPS. These projects could be from MET or projects developed from within OC or by OC agencies. Phase 1 was **NOT** designed to arrive at conclusions or recommendations on specific projects. The potential projects that could be developed will be discussed and project metrics and background will be provided in Phase 1.

Phase 1 has included:

- Development of planning scenarios
- Forecast of water demands and conservation for Orange County, Brea/La Habra, OCWD Basin and South County areas
- Assessment of MET supply reliability under various planning scenarios, including climate change
- Assessment of existing Orange County water supplies, including OCWD basin supplies and impacts of climate change
- Range of “gap” between projected water demands and existing imported and local water supplies for Orange County, Brea/La Habra, OCWD Basin and South County areas
- Summary of new local water supply options for Orange County
- Summary of policy issues for MET and Orange County to advance water supply reliability
- The System Reliability investigation and seismic assessment

The intent of **Phase 2** of the study is to provide information on costs and benefits of increasing supply reliability through a combination of Orange County local projects and operations and advocacy for MET improvements in imported water supply reliability. During Phase 1, an OC Reliability simulation model was developed using the water planning tool WEAP. WEAP is a computer model developed by Stockholm Environment Institute and used by hundreds of water agencies around the globe, including California Department of Water Resources and Metropolitan Water District. The model simulates water supply reliability of the MET system and Orange County areas using indexed-sequential hydrologic

analysis. Currently, the model includes forecasted water demands and existing water supplies. Phase 2 will include:

- Evaluating how SUPPLY projects can be developed in such a way to benefit OC. This includes examination of how supplies (local or import) would be managed between wet, normal and dry periods with examination of how often supplies from different projects can be integrated into an operating plan for OC to provide a high degree of reliability for the County. It is expected that considerable work will occur with OCWD to examine the basin operating parameters to fully evaluate the options available for the groundwater basin and how it might be operated for the benefit of the groundwater producer's. An overlay might be injected to examine how benefits of operating the basin might be approached differently to expand the benefits to other portions of the County. Conceptually, the groundwater producer's would have to support and provide the terms and conditions for changed operations.
- Having the ability to outline and model various options provides a better ability to anticipate and plan for uncertain future events. It gives us the option of answering the question "what combination of projects works best for OC, under the scenarios tested?"
- New MET and Orange County SUPPLY options, will include (but not limited to):
 - Ocean desalination
 - OCWD basin storage
 - Water transfers and banking
 - Increased groundwater yield in San Juan Basin
 - Additional Recycling
 - Water Use Efficiency
 - California Fix to Delta
 - Others.
- Projects to deal with SYSTEM (emergency) reliability gaps will also be included. Any projects that develop NEW local supplies provides both SYSTEM & SUPPLY reliability improvements. The primary risks under emergency situations are earthquakes and electrical outages.

The data on supply yield and cost of the options will come from existing reports, studies and evaluations. No new cost estimation or analysis of yield will be conducted for this task.

Develop Portfolios of Options. Working closely with MWDOC, OCWD and the OC Agency Workgroup, approximately 5 portfolios of different combinations of new supply options will be defined and tested under the Planning Scenarios. Themes will be used to help guide the definition of these portfolios (e.g., lower-cost, higher reliability, higher flexibility, and hybrids). Each portfolio will include a brief description and summary of supply yields (both for supply and system benefits), capital and O&M costs, and implementation issues.

Supply reliability will be assessed using the OC WEAP model. The supply reliability assessment will be presented in terms of how the portfolios reduce water potential shortages both in terms of magnitude and frequency.

System reliability scenarios will be assessed using a simple spreadsheet tool comparing water demands (in GPM) and 30-60 day outages of imported water supplies (also in GPM). Assessment of groundwater well system reliability will also be provided.

Evaluate Cost & Benefits of Portfolios. A spreadsheet tool will be created to estimate the overall lifecycle costs from 2015-2040 for the portfolios using several well-established financial metrics:

- Levelized Unit Cost – which is the present value of all capital and O&M costs for the portfolios, divided by the present value of water supply that is beneficially used. Beneficially used water supply is that which is tied to reducing a specific frequency and magnitude of water shortages. This metric will be vital in evaluating base-loaded vs. storage/or call-when-needed water supplies. Base-loaded supplies produce water each and every year, regardless of need; whereas storage/call-when-needed water supplies produce water only during times of need.
- Net Present Value Cost – representing the difference between total lifecycle cost of the portfolios and the cost of status quo. The status quo will be evaluated in terms of projected MET costs plus the cost of water shortages. The cost of shortages will be assessed using MWDOC's 2004 study of economic costs of water shortages. In addition, the Brattle Group's cost of unreliability of the California Delta will also be used/compared for this effort.

Phase 1 Process Descriptions

Several specific process issues are summarized below with respect to conduct of the study:

- Member Agency Involvement - The process was designed to be very interactive with our agencies. Eleven meetings have been held with representatives from the Member Agencies to insure their concurrence with project assumptions, methods and results. The most time consuming effort at this point was focused on the demand projections for Orange County.
- Modeling of the MET Supplies and Demands – OC supplies are integrally linked to MET supplies and demands in that if MET is reliable, OC will be reliable on a supply basis. The modeling undertaken as part of this effort involves mimicking MET's IRP

analysis. MET does not share their model, they only share the outcome of the published model. Therefore to test alternatives in OC, we first have to model the MET system to determine if and when shortages exist, if they can be satisfied out of MET's storage accounts and to determine how MET's storage varies over time. From MET's perspective, storage levels below 1 million acre feet (MAF) indicates that MET will be in a shortage scenario. When shortages are projected in MET's regional supplies, these shortages must then be translated to OC (and to MET's other member agencies). This is all being done under the OC Water Reliability Study to allow options to how MET is approaching their modeling to be tested and to test the frequency and magnitude of shortages in OC.

- Modeling of the Groundwater Basin Operations and linkage to MET hydrology – A key aspect of the OC work to date, was to have our consultant work directly with OCWD to include estimates of recharge to the OCWD groundwater basin under various assumptions and scenarios. The model is tied to the hydrology used in the MET modeling and in OC we have for the first time, a model to link the OCWD groundwater basin operations to imported water reliability. This provides the opportunity for OCWD, the groundwater producers and OC as a whole to “test” various operations from the basin including examining the availability of MET water for groundwater replenishment purposes and varying of the BPP based on the conditions in the basin. This model should be very valuable in Phase 2 of the study to test a variety of input operations and to determine what happens to storage in the basin under differing scenarios.
- Initial GAP Analysis – The initial GAP analysis is being conducted as of 2015 and consists of a snapshot today of mostly existing supplies with some level of planned supplies that are in the process of being developed and it tests the ability of these supplies to meet future demands. GAPS almost inevitably occur initially because you are testing the ability of mostly “existing supplies” to meet future demands. The next step in the process addresses the question of how to go about meeting these GAPS over time. The GAPS can be met by actions and activities undertaken by MET or MET's member agencies (including OC). The GAPS can be met by base loaded supply projects, transfers and exchanges managed via storage accounts or by demand reduction via Water Use Efficiency investments or some combination thereof. The path to filling the GAPS is then further tested in Phase 2 of the OC Water Reliability Study.

Demand Projections in OC

Over the past two months, MWDOC and the Member Agency workgroup on the OC Water Reliability Study discussed how best to approach future demand estimates in the County. Central to these efforts were the current demand reductions in OC compliant with the SWRCB requirements to deal with the drought on a State-wide basis (i.e., the Governor's 25% emergency mandate). Quite a bit of the discussion centered on how much demands would "bounce back" once the current drought ends. MWDOC staff worked with MET and our consultant, CDM-Smith, on suggestions for approaching this issue. What we learned was:

- Bounce-back in demands in Southern California from the droughts in 1976-77, 1987-92 and 2008-10 were usually at around 100% within a matter of several years. We did not have a full rebound following the 2008-10 drought as there was not a full rebound period between droughts. However, in discussions with a number of planning professionals, the consensus seems to be that "this current drought is different"; meaning that because of the duration and magnitude of impacts that we are beyond the levels of previous droughts and there is uncertainty as to the degree of bounce-back.
- We examined examples we could find of demand rebound in Australia. In contacting local staff there, the input we received was that a large number of factors influence the rate and timing of the bounce-back. Anecdotally, examples of both low and high bounce back in different parts of Australia occurred and are still occurring from the more than 10-years of their Millennial Drought. It was also noted that Australia was behind Southern California in respect to investments in WUE and Water Recycling and so they would have a different response pattern than what we might see here with bounce-back being less than experienced in California. Due to the magnitude of the Australian drought, any bounce-back there was expected to occur over a period of about 5 years. The price of water in Australia is significantly greater than in California both in terms of unit cost and relative to income. This would tend to suppress bounce-back in Australia more than in California.

MET's approach to demand projections in the Integrated Resource Plan (IRP) involves the following:

- The water conservation we are currently seeing comes from either (a) structural changes (change in landscape materials, sprinkler heads, Smartimers, toilet or shower change outs, etc.) or (b) behavior changes (these include being more prudent in outdoor water use, shorter showers, full loads of laundry, dishwasher less often, etc.)
- Because the recent drop in water consumption over the past several months has been so dramatic, at around 25%, the majority of savings must be attributed to behavioral changes. There simply has not been enough time to

implement enough structural changes to account for the 25% reduction. These changes have also resulted in lawns going brown and losing other plant materials. It is unknown what these will be replaced with in the future. Also because of the rather drastic reduction, the majority of the actions have to do with conservation of outdoor irrigation. MET believes this is true as the current demands they are looking at are consistent with wet winter demand levels.

- When the drought is over, some of these behavioral changes will stay and some will revert. This drought has been severe, much more so than the 1976-77, 1987-92 and 2008-2010 droughts. The bounce back in each of those three droughts was essentially 100% after a year or two. Because of the severe nature of this drought and the unprecedented coverage in the media, MET expects that 90% of the recent reduction has the “potential” to bounce back. There is no exact science as to what the actual bounce back will be, but additional conservation measures over time can be used to capture some of the current savings and it can be retained over the long run. MET is expecting 90% bounce back over approximately 5-years, with future offsets depending on active conservation investments made by customers and potential savings due to the Model Water Efficient Landscape Ordinance (MWELO).
- MET has indicated a belief that the current use levels have dampened price elasticity (i.e., demand has become somewhat desensitized to price increases). The theory is that the easier and less expensive conservation measures have largely been implemented in response to the drought. Further reductions will be more difficult and more expensive as usage levels become influenced by necessity. The easier measures associated with outdoor water use have been implemented.

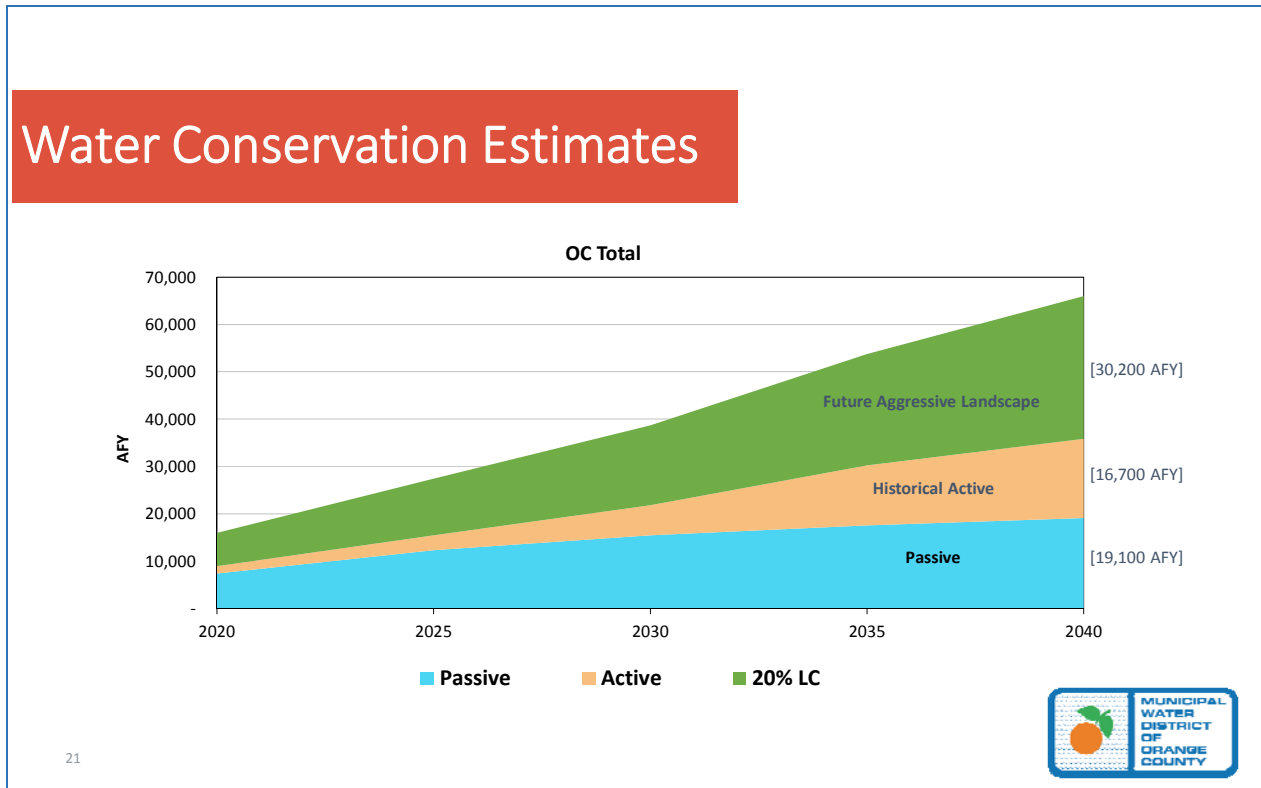
Our approach in OC, follows some of the guidance provided by MET, and is based on the following:

- The assumptions and model structure for demand projections are the foundation for the utility and credibility of the OC Reliability Study. Our approach has been to prioritize robust discussion and technical review over schedule. Projections are not reality. However, through discussion and addressing the work group concerns we have achieved a consensus approval of the demand projection process and have simultaneously increased the accuracy and reduced the variability of the projections.
- CDM-Smith's original demand estimates were developed based on demographic projections and specific customer characteristics (i.e., Unit Demand Drivers for single-family, multi-family, Commercial/Industrial/Institutional (CII)) for 2013-14 that were provided by each of our agencies. These Unit Demand Drivers already have WUE factored in through 2013-14 and were normalized for weather conditions. The

reason for using the Unit Demand Drivers is to be able to apply future demographics to derive future demands in the county that are consistent with the level of conservation in 2013-14 and then account for future growth and efficiencies that can be achieved. Conservation efficiencies to be factored-in include passive conservation (plumbing code changes), active conservation at historical levels (consistent with the MWDOC service area, but without the recent dramatic change in the turf replacement programs), impacts from the Model Water Efficient Landscape Ordinance (MWELO) that was recently adopted by the State, and a more aggressive future conservation based on future investments (for the next phase of the study, but used here as a place-holder).

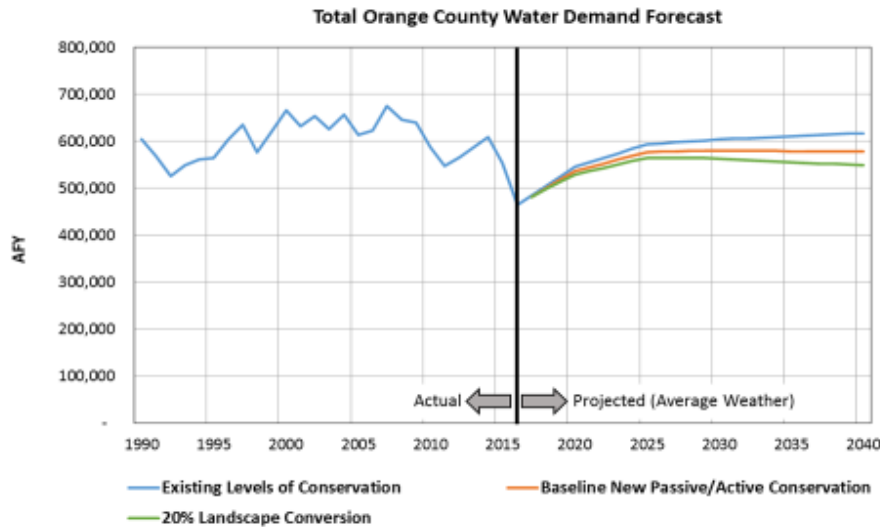
- CDM-Smith used the 2013-14 Unit Drivers and assumed that 85% of the unit drivers would rebound in 5 years and get to 90% over 10 years (i.e., water use rates by group). The other factors affecting demand over this period is growth projected by the Center for Demographic Research and additional active and passive conservation. All of these factors were accounted for in the demand rebound to 90% over time. The magnitude of the “non-rebound” is around 15,000 AF in OC that we are assuming will be institutionalized via this drought and consumers responding to behavioral changes that will remain.
- Our Member Agencies asked many questions regarding the analysis, which were appropriately responded to by CDM-Smith or our WUE staff members. The biggest concerns were whether or not the trend toward smaller lots and higher densities had been reflected in the demands and whether the use of recycled water to meet landscape demands was fully accounted for. The response was “yes”, assumptions regarding these trends, including the basic demographics accounted for these changes. The assumptions will probably not be 100% correct, but there did not seem to be any missing assumptions and our agencies seemed to be satisfied that all had been accounted for in a plausible manner.
- The last two elements added were a “historical level of WUE consistent with the MWDOC service area”. Prior to the build-up in turf replacement, MWDOC typically brought funding into the County and our agencies contributed towards active conservation at an approximate investment of \$5M per year. Our WUE group believes this will continue with funding from MET, BUREC, DWR, Prop 1 and the Integrated Water Resources Planning Grants. CDM-Smith worked with our WUE group to develop estimates of the investment and projected achieved savings, assuming no further Turf Rebate investments. Then, CDM-Smith and our WUE group estimated what could be achieved via future investments, as a project option, regarding future investments in landscape efficiencies, including conversion to California Friendly Plantings and other improvements.
- This produces three water conservation estimates as illustrated below.
 1. The blue (bottom) area in the graph is the estimated demand reduction from passive conservation which grows to 19,100 AF per year by 2040.
 2. The tan (middle) area represents the amount of demand reduction expected from the “MWDOC historical active conservation” in OC with 16,700 AF of demand

- reduction. This is the estimate under average, past conservation program funding.
3. The green (top) area is a “placeholder” estimate of the landscape savings from a future aggressive WUE program with the conversion of about 20% of applicable turf areas in OC by 2040. This would reduce demands by about 30,200 AFY. This last area will be carried as an “investment option” in the evaluation of potential projects in OC and is used herein simply to demonstrate that demands can go lower with an appropriate level of investment.



- Past and projected water demand for Orange County is summarized in the following graph. This information is developed for the county as a whole and three sub-areas (Brea/La Habra, OCWD groundwater basin and South Orange County) in order to facilitate project portfolios to address supply gaps. The graph incorporates
 - historical water demand
 - depressed water demand during the economic recession
 - suppressed demand from the mandatory use reductions
 - use rebound of 85% by 2020 and 90% by 2025
 - population growth projections
 - 3 demand projection lines based on the three conservations scenarios.

Water Demand Forecast



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The entire water demand presentation by CDM-Smith is attached for review and input.

Current activities are focused on the quantification of the current supply and the gap between supply and demand.

Seismic Assessment and SYSTEM Reliability Analysis from Phase 1

The purpose of the Seismic Assessment portion of the Phase 1 study was to better understand OC water supply risks from Seismic activity and:

- To prepare a regional-level seismic hazard assessment based on the most recent science and understanding of the principal faults in Southern California that can impact OC and to identify credible earthquake scenarios that pose significant risk to the regional water delivery transmission system and large groundwater production wells serving OC.
- To gain knowledge on how water system facilities performed under more recent large scale earthquakes and to apply this information to Orange County.
- To utilize a regional-level technical seismic risk methodology based on the seismic hazard assessment to analyze the expected range of facility outages to the imported water supply and municipal groundwater production wells that serve Orange County.
- To estimate recovery times to return facilities to service.

- To help inform regional emergency supply planning, describe mitigation and design protective measures that can be employed to strengthen existing wellheads and pipelines.

These assessments will help to update our current state of knowledge on seismic hazards and risks to the imported and groundwater supply facilities serving OC. This study did not evaluate groundwater recovery treatment plants or surface water treatment plants as this level of analysis was beyond the scope and available funds for this study. It also did not evaluate the resilience of local water systems (pipelines, pumping stations, reservoirs, etc.) to withstand seismic forces, to meet emergency fire flow requirements, or the recovery time needed to get the systems “up and delivering” water following a major damaging earthquake. This too, was beyond the scope of this study.

The assessment specifically covered:

- The MET system supplying OC, including untreated conveyance, treatment plants (as analyzed by MET) and treated distribution lines.
- Regional pipelines in OC
- Potential impacts to wells in OC or serving OC
- The State Water Project supplies via Edmonston Pump Station and the East and West Branches of the SWP were NOT included in this analysis. This is work that is anticipated to be completed by MET and DWR in the future.

The information will be used to test the ability of the local systems in OC to continue meeting customer demands with outages of various supply facilities to serve as the basis for the System (emergency) GAP Analysis.

Phase 1 Study Schedule

Questions were raised last month by the P&O Committee regarding the study efforts being late with a request for the completion schedule. The project is behind the original schedule as we have emphasized Member Agency consensus over rigid schedule compliance. Staff has worked with the Member Agencies to include three meetings between now and November 5th to complete the Phase 1 Study. The Table below outlines the upcoming meetings and roll-out schedule for the information. A fairly complete presentation should be available for the November 2nd P&O Committee although the Board of Directors may prefer that an update be provided at the October 19th PAL Committee in order to facilitate discussion prior to the Joint MWDOC/OCWD meeting currently scheduled for October 28th. We may want to move this meeting to October 22 in order to maximize the input from our consultant. Upcoming meetings with our agencies on the GAP Analysis will be held on Oct 1 and October 15 with a meeting to discuss alternative projects to close the gap scheduled for November 5th. A high level overview is being planned for the Elected Officials Event on the evening of November 5th that would include the P&O discussion of November 2nd and the Member Agency discussions. The Phase 1 Study results are likely to be presented at WACO on December 11th with the second phase of the project beginning the following week.

Potential Workshop Dates for OC Water Reliability Study Roll-Out						
	September	October		November	December	
Manager's Meeting's Workshops to Review Materials	Sep 17	Oct 1	Oct 15	Nov 5	Dec 11	Dec 17
Topics of Discussion	Demands & Rollout	Supply GAP	Supply & System GAP	Alternative Projects	Complete Overview at WACO	Start Phase 2
			Tentative			
Potential Special Meetings of MWDOC/OCWD			Oct 22 (not the normal meeting day – conflicts with MET IRP outreach) Topic would be Demands & Supply GAP intro	Nov 5 Elected Officials Meeting	WACO = Dec 11	
<u>Notes:</u>						
CDM Not Available			Week of Oct 5			
CDM Not Available			Week of Oct 26			
Cancel Joint MWDOC/OCWD Meeting			Scheduled for Oct 28			
Thanksgiving				Week of Nov 23		
MET IRP Outreach			Oct 22			

Phase 2 Schedule

It is anticipated that the Phase 2 effort will take approximately 4 months to complete after the conclusion of Phase 1 or approximately May 1, 2016. The cost was included in MWDOC's FY2015-2016 budget and will be approximately \$120,000. A major component of the budget for the effort is working through meetings with our agencies, including technical, operational and outreach meetings. The desire is to get agencies and individuals throughout the county in general agreement about future investments in water reliability in OC. This can mean simply relying on MET to meet our future needs; it can also involve a significant departure from MET in the event OC is not supportive of the evaluation of MET's overall reliability. A secondary benefit of Phase 2 is using the information as the basis of a major outreach effort for the 2015 OC Summit on Reliability.

Attachments:

- 1. OC Water Reliability Meeting #11 PowerPoint, September 17, 2015**



OC Water Reliability Study Workgroup Meeting #11 Updated Demand Forecast

September 17, 2015

Municipal Water District of Orange County

1

Agenda

- 💧 Demand Forecast Inputs
- 💧 Bounce Back from 2016 Demand Levels
- 💧 Conservation Assumptions
- 💧 Demand Forecast Results
- 💧 Proposed Schedule for Phase 1 OC Reliability Study

2



Demand Forecast Method



For each sector (e.g., single-family), historical water sales (based on utility sample) are divided by a historical driver (e.g., homes). This represents a normal weather, normal economy, non-drought unit use.

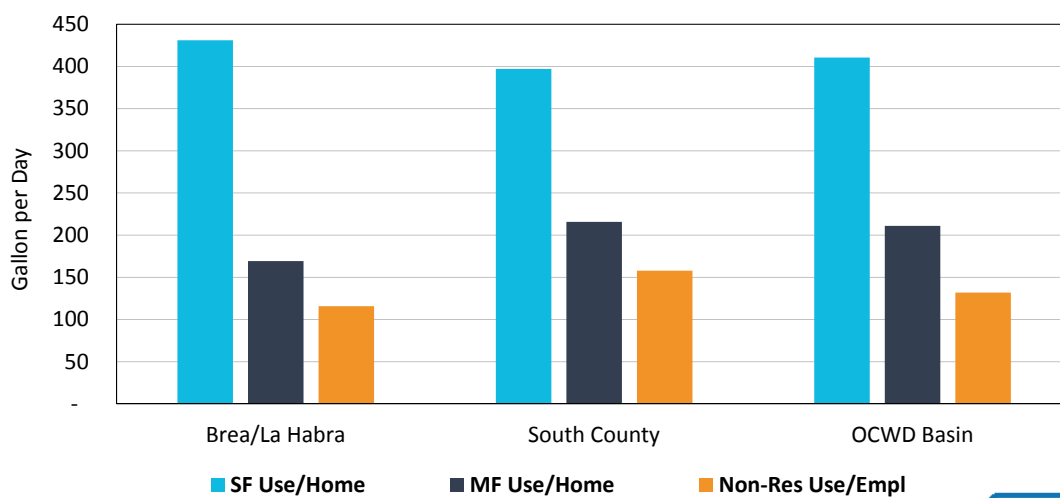
Future projections of demographics (single-family homes, multifamily homes, and total employment) that are provided by CDR for OC reliability areas: Brea/La Habra, Basin, South County.

Estimates of new passive and active conservation based on plumbing codes, model water efficient landscape ordinance, and continuation of rebates from MET.

3



Unit Use Factors by Area*

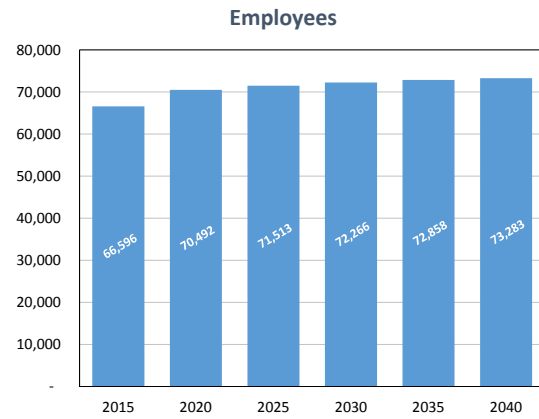
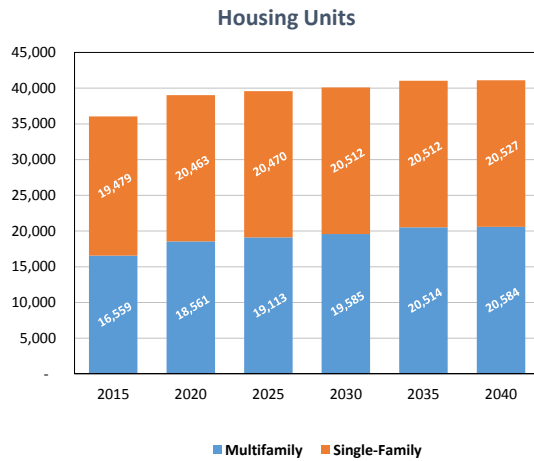


* Based on survey of OC water agencies, representing FY 2013-2014 data.

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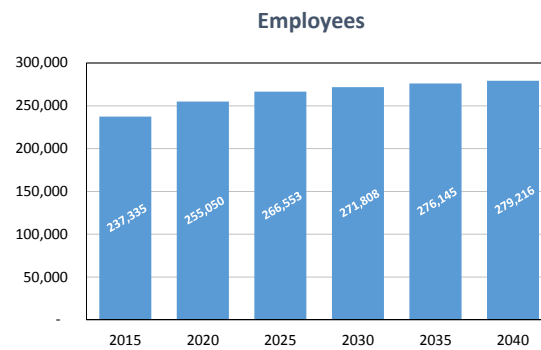
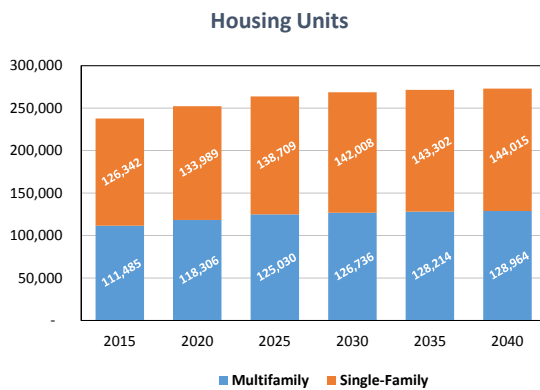


Brea / La Habra Demographics



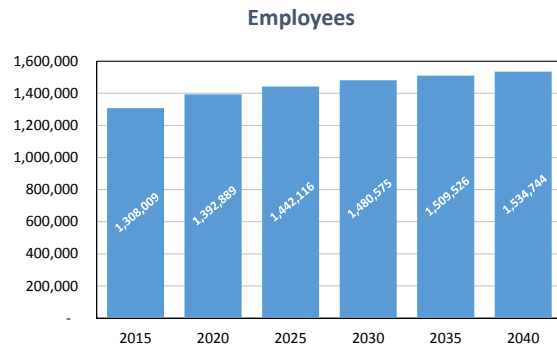
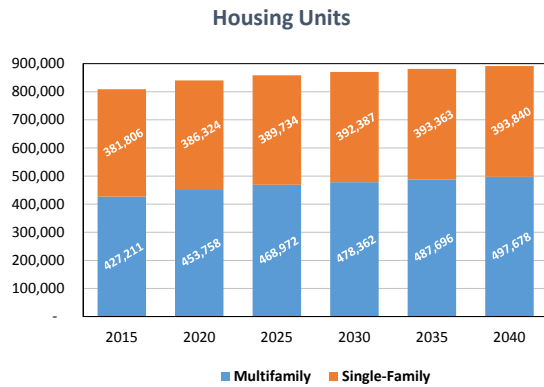
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South County Demographics



6

OCWD Basin Demographics

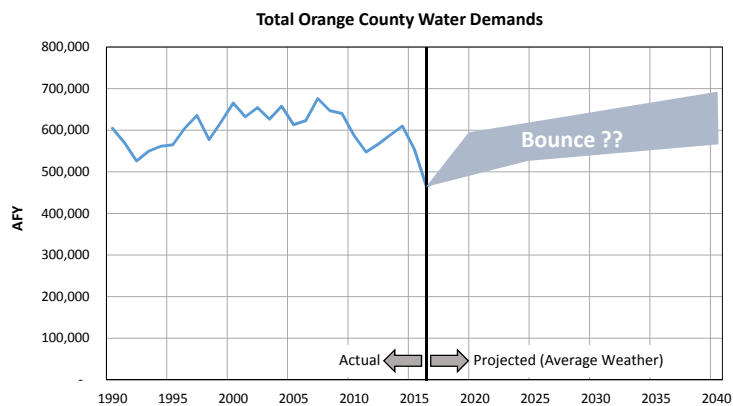


7



Bounce Back from 2016

- FY 2016 demand is expected to be ~25% less than FY 2014 levels
- This represents a significant shift in water usage
- How much of this reduction is attributed solely to drought-related mandatory restrictions that will “bounce back” once restrictions are lifted?



8



Bounce Back from 2016

Data Points:

- 💧 Insights from Australia are difficult to interpret fully as demand data is not normalized for weather, economy and implementation of passive/active conservation prior and after drought restrictions. Also, prior to the great AU drought, these cities had not implemented as much passive and active conservation as Southern California (especially indoor efficiency measures)—so demand was not as hardened.
- 💧 Statistical models for Los Angeles and San Diego that normalize for weather, economy, and passive/active conservation show that both cities bounced backed to 100% of pre-drought restrictions in 1991 and 2008/9 droughts within 2-4 years. Both cities had significant pre-drought active conservation programs heading into 2008/9 drought—so demand was fairly hardened.
- 💧 MWD is assuming 90% bounce back in 5 years, but is not including future active conservation in their forecast at this time.

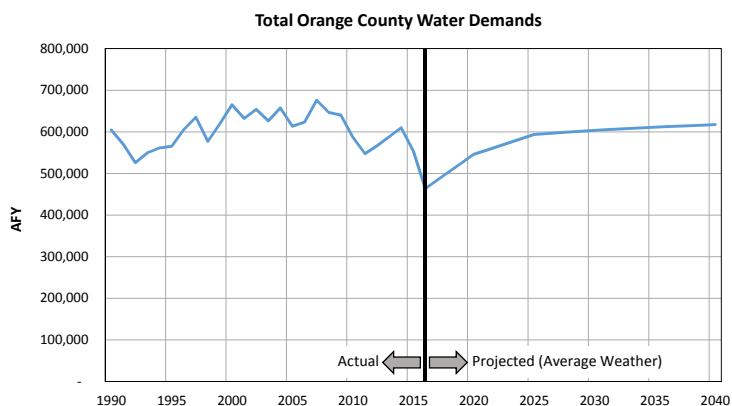
9



Bounce Back from 2016

Assumptions for OC Reliability Study

- 💧 By 2020, bounce back in **per unit** water use will be 85% of 2014 levels, without future conservation
- 💧 By 2025, bounce back in **per unit** water use will be 90% of 2014 levels, without future conservation, and continue at 90% of unit water use through 2040
- 💧 Future conservation will then be subtracted from this demand



10



Future Conservation

- 💧 Future passive measures (affects new development):
 - 💧 Model Water Efficient Landscape Ordinance (MWELO)
 - 💧 Plumbing code efficiencies for toilets
 - 💧 Expected plumbing code for high-efficiency clothes washers
- 💧 Future active measures (baseline assumptions):
 - 💧 Assumes that historical annual levels seen in Orange County continue into the future, assuming incentives from MWD continue (HEC, irrigation fixtures, CII efficiency)
- 💧 Future turf removal (range of savings based on new conceptual aggressive program):
 - 💧 Placeholder assumes that by 2040, 20% of existing eligible turf is removed and replaced by CA friendly landscaping with efficient irrigation systems.

11



Model Water Efficient Landscape Ordinance (MWELO)

- 💧 Requires combination of irrigation efficiency and California friendly plants for new development above a certain size and only if permits are pulled
- 💧 For new residential development, only 25% of total irrigable area can be turf
- 💧 For new CII development, no turf is allowed
- 💧 Exemptions include: parks, play areas, golf courses, certain open spaces
- 💧 Assumes 75% compliance

12



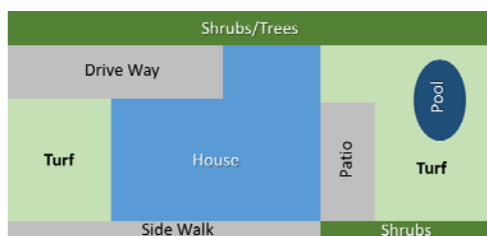
MWELO Data Sources & Calculations

- 💧 Combination parcel database, combining SCAG land use, infra-red imaging, and CDR interpretations
- 💧 For each parcel, the following is included:
 - 📏 Parcel designation (e.g., SF, MF, CII, parks, open space)
 - 📏 Total parcel size
 - 📏 Hardscape/pool size
 - 📏 Irrigable area size
 - 📏 Turf area
- 💧 MWD estimation of conservation savings per square foot of turf removal and replacement (0.00013 AFY)

13



MWELO: Residential Example – *New Growth only*



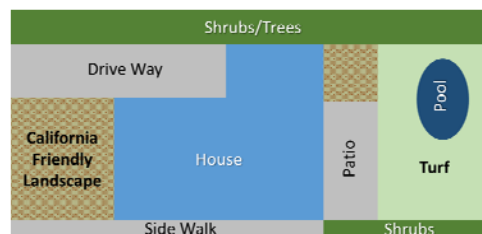
Existing Typical SF Home

- Lot size = 9,000 SqFt
- House = 3,000 SqFt
- Hardscape/pool = 1,500 SqFt
- Irrigable area = 4,500 SqFt
- Turf area = 3,000 SqFt
- % of Turf to Irrig. Area = 66%

MWELO Savings =
1,875 SqFt X 0.116 gal/day =
217 gal/day

New MWELO SF Home

- Lot size = 9,000 SqFt
- House = 3,000 SqFt
- Hardscape/pool = 1,500 SqFt
- Irrigable area = 4,500 SqFt
- Turf area = 3,000 SqFt
- % of Turf to Irrig. Area = 25%
- Conversion to CFL = 1,875 SqFt



14

* In addition, it is expected that future lot sizes will be smaller.



MWELO: Estimates for OC County

Parcel Type	Total Irrig. Area SqFT	Turf Area SqFT	Target Turf SqFT	Units*	SqFT/Unit	AFY/Unit
Single-family	2,114,679,368	897,177,779	368,507,937	527,627	698	0.091
Multifamily	155,315,983	51,697,361	12,868,365	555,255	23	0.003
CII (Non Res)	499,127,269	212,043,667	212,043,667	1,623,307	131	0.017

* Housing units for SF and MF, employment for CII

Turf in County:

SF = 897 million ft²
 MF = 52 million ft²
CII = 212 million ft²
 Total = 1.161 million ft²

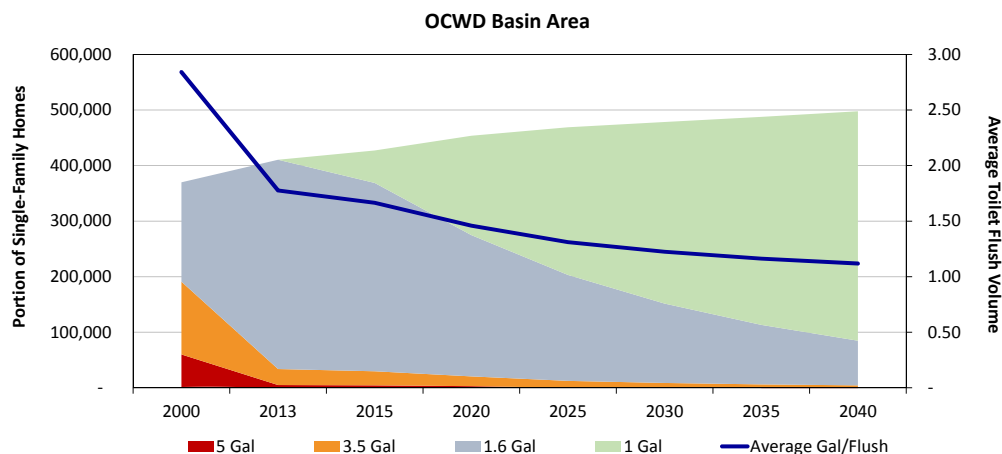
MWELO Savings by 2040:

SF = 1,600 AFY
 MF = 210 AFY
CII = 3,500 AFY
 Total = 5,310 AFY

15



Plumbing Code Efficiency: Toilets



16



Plumbing Code Efficiency: Toilets

Formula for estimating savings:

Average Flush Volume 2015 – Average Flush Volume 2040 = Savings Per Flush X No. Flushes X No. Homes

Example for OCWD Basin Single-Family:

1.69 gal/flush (2015) – 1.14 gal/flush (2040) = 0.55 gal/flush X 17 flushes (5/person) = 9.4 gal/day X 394,000 homes

Toilet Savings by 2040:

SF = 5,800 AFY

MF = 4,600 AFY

CII = 2,200 AFY

Total = 12,600 AFY

17



Plumbing Code Efficiency: Clothes Washers (New Homes Only)

Formula for estimating savings:

1 Clothes Washer/Home X Savings/HEC = Gal/Day X New Homes

Example for OCWD Basin Single-Family:

1 X 29.3 gal/day savings (MET number) = 29.3 gal/day X 12,000 New Homes

HEC Passive Savings by 2040:

Total OC = 1,000 AFY

18



Baseline Active Conservation

Assumptions for estimating savings:

Assumes continuation of past participation in HEC, irrigation devices, CII conservation tracked by MWD OC, which has been tracking at 1,580 AF for last few years. Assumes some saturation, so not entirely additive.

Baseline Active Savings by 2040:
Total OC = 16,700 AFY

19



Landscape Conversion Conceptual Active Program

Conceptual Assumption:

Converts 20% of Existing Turf (SF, MF, CII) to CA Friendly Landscaping by 2040

Orange County Total

Existing Turf = 1.16 billion square feet X 0.2 X 0.27 gal/sq ft savings (MET number)

Turf in County:

SF = 897 million ft²

MF = 52 million ft²

CII = 212 million ft²

Total = 1.161 million ft²

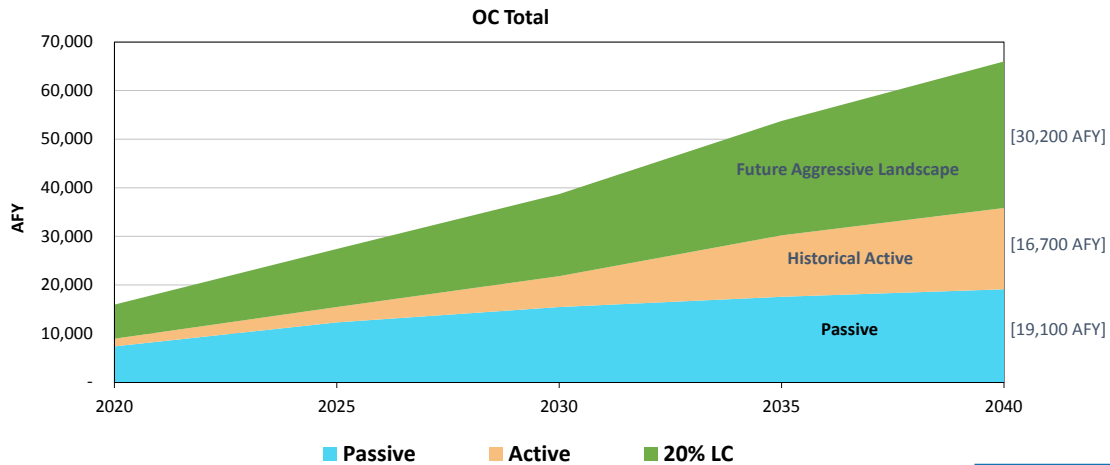
Landscape Conversion by 2040:

Total OC = 30,200 AFY

20



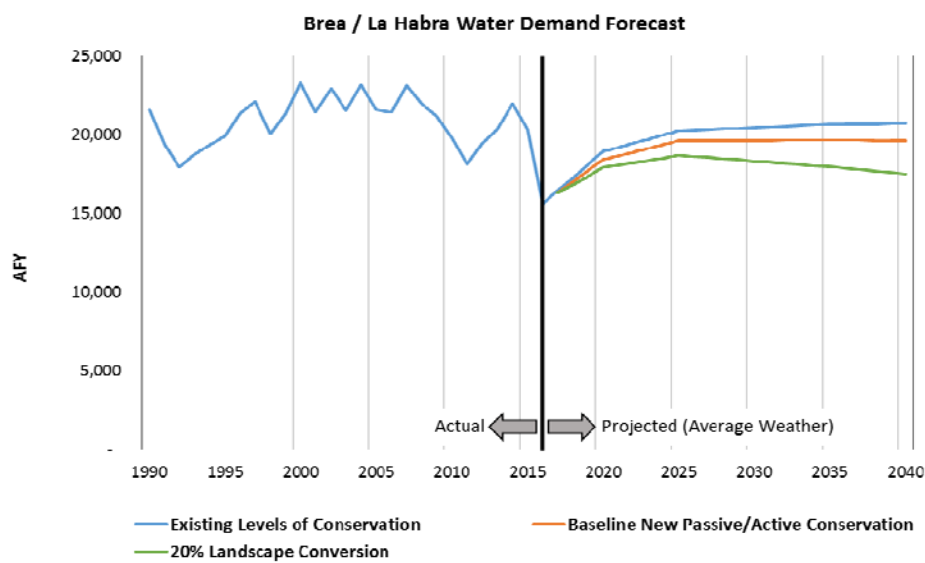
Water Conservation Estimates



21



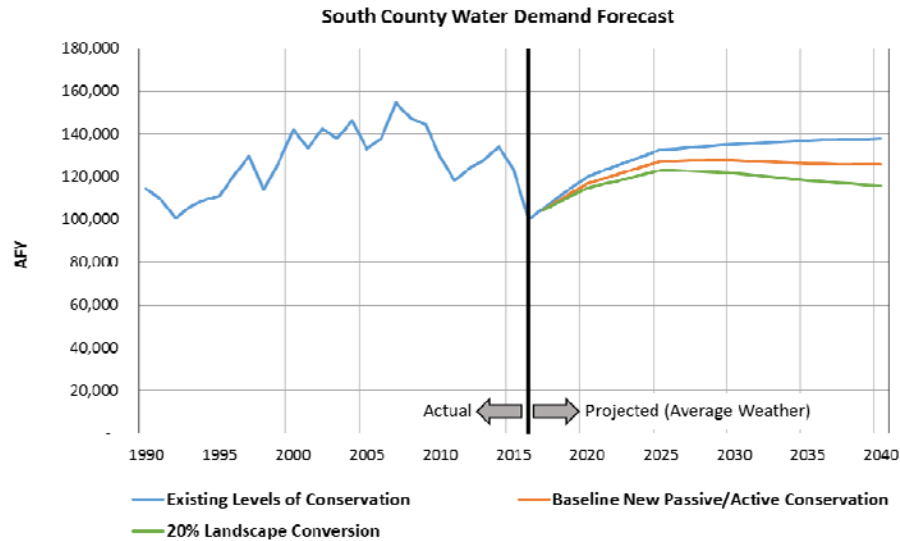
Water Demand Forecast



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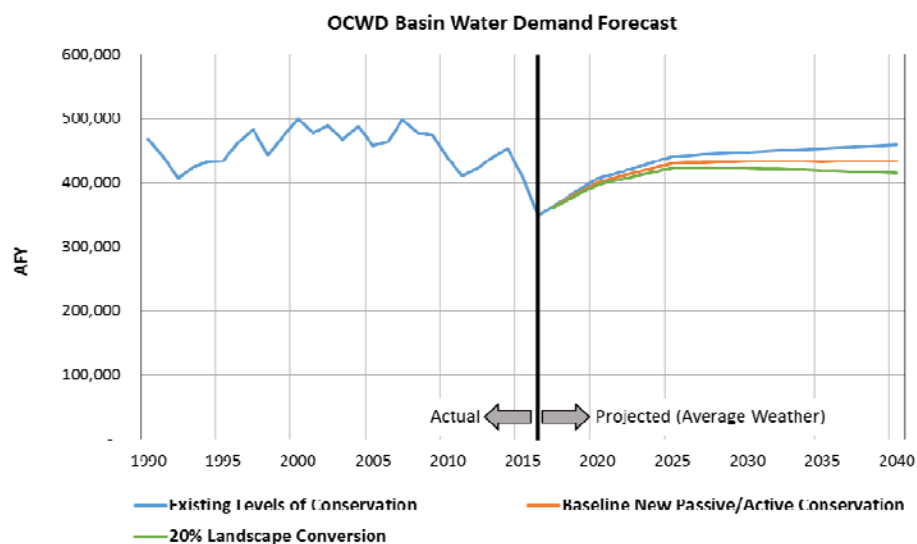
Water Demand Forecast



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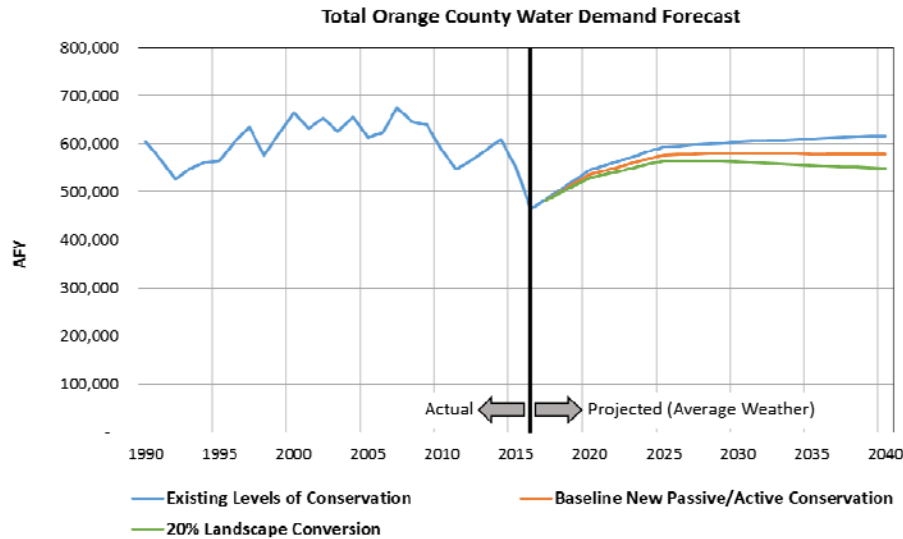
Water Demand Forecast



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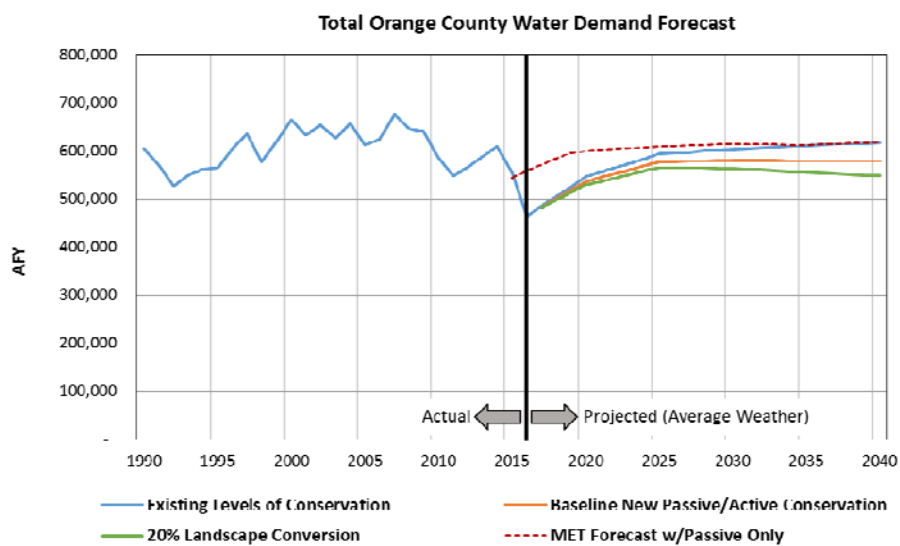
Water Demand Forecast



25



Water Demand Forecast: Comparison to MET







26




Proposed Schedule for Phase 1

MWDOC Agency Manager/Reliability Workgroup Meetings:

-  Oct 1 – Revised Supply Gap Analysis
-  Oct 15 – Supply and System Gap Comparison
-  Nov 5 – Summary of Future Options, and Workplan for Phase 2
-  Ready for overview/briefings (outreach)

Joint MWDOC/OCWD Board Workshop

-  TBS – Presentation of Supply & System Gap, Summary of Future Options, and Workplan for Phase 2



27



28

Status of Ongoing MWDOC Reliability and Engineering and Planning Projects

September 28, 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			Groundwater modeling efforts under the Doheny Desal Foundational Action Program and under the San Juan Basin Foundational Action Program are beginning to roll out. With the results starting to develop, MWDOC is now working with NWRI, South Coast and SJBA to convene a Science Advisory Panel to review and comment on both the work being done by SJBA as well as the work being done by South Coast Water District and Laguna Beach County Water District. The panel is expected to convene in November or December and complete their report by the end of the year. In discussions with NWRI and the agencies, it was noted that two panels may be used for this effort.
Poseidon Resources Ocean Desalination Project in Huntington Beach				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 groundwater basin, for direct delivery to other agencies or some combination thereof. OCWD called a meeting with MWDOC and

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				the South County Agencies to discuss potential delivery amounts from the Poseidon Project.
Orange County Water Reliability Study				At the September meeting of the Workgroup, the topic centered on OC Water Demands. A detailed report is included in the P&O Packet. Meetings are coming up on Oct 1, Oct 15 and Nov 5 to try to close out the Phase 1 Project.
California WaterFix & EcoRestore				MWDOC has begun its review of the Recirculated EIR/EIS for the California Fix (previously called the BDCP) and will be providing comments by the close of comments, October 30, 2015. A shorter comment letter is being circulated to our agencies and a discussion is planned for MWDOC's PAL meeting on Oct 19 at 8:30.
Other Meetings/Work				
				Harvey De La Torre and Arcadis met regarding development of MWDOC's UWMP and to discuss how the meetings with our agencies are proceeding. Kevin Hostert has been attending the meetings between our agencies and Arcadis. So far, all is proceeding well. We are awaiting input from MET regarding their UWMP. 24 other agencies are participating in the contract with Arcadis.
				Karl Seckel attended the Santiago Aqueduct Commission which

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				has jurisdiction over the Baker Pipeline O&M. The main topic of discussion was the Commission's response to the Grand Jury on Joint Powers Authorities, which is the type of entity the Commission is.
				Karl Seckel attended the San Juan Basin Authority meeting in September. The SJBA is proceeding with a Governance Study that is starting with an inventory of agreements and responsibilities. The other major topics of discussion were the basin conditions, continued minor pumping by the City of San Juan Capistrano and work on the Foundational Action Plan activities.
				<p>Karl Seckel and Harvey attended and participated in discussions regarding MET's Integrated Resources Plan for 2015. This was the last of the Technical Meetings. MET plans on wrapping the items up and proceeding on with the Policy Issues which will likely include:</p> <ul style="list-style-type: none"> • Work with the MET Board on establishing IRP Targets in the various areas. <ul style="list-style-type: none"> ○ Develop NEW 2015 IRP Targets • Tackle the policy issues associated with the IRP, which include: <ul style="list-style-type: none"> ○ Water for replenishment of groundwater basins ○ Water Supply Allocation Plan <ul style="list-style-type: none"> ▪ Basic methodology ▪ Credits for local projects ▪ Water for groundwater replenishment

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				<ul style="list-style-type: none"> ○ MET participation in local projects <ul style="list-style-type: none"> ▪ Equity participation in regional projects (Regional IPR Project) ▪ Continuation of LRP subsidy ▪ Reliability in SWP Only portion of MET system ○ Target & Funding for FUTURE WUE measures ○ Other
				<p>Rob, Karl and Harvey participated in discussions with OCWD and the Three Cities regarding the allocation process for water under MET's Water Supply Allocation Plan.</p>
				<p>Karl Seckel met with representatives from the Global Environmental Legacy Foundation, an organization that provides solutions for an increasingly polluted planet. They are committed to cleaning up pollution in our urban environment providing a safer, healthier place to live. They have a number of interesting treatment systems they are working on and wanted to introduce themselves and tour GWRs.</p>
				<p>Karl Seckel is working with Dan Ferons at SMWD and Glen Boyd at MET to determine the terms and conditions for moving the Cadiz water into the Colorado River Aqueduct. MET just responded with a series of comments on the first submittal by SMWD. We anticipate a meeting in the near future to discuss the MET comments.</p>

**Status of Ongoing WEROC Projects
September 2015**

Description	Comments
General Activities	<p>On 9/2/2015, Brandon attended the California Emergency Services Association (CESA) Southern Chapter Annual Meeting and Fall Program in Norwalk. The Fall Program included presentations from the State Water Resources Control Board Division of Drinking Water, the National Weather Service and Santa Barbara County Office of Emergency Management. The presentations focused on the extreme drought conditions, future actions and coordination.</p> <p>Brandon attended the NIMS All-Hazards Logistics Section Chief Course at the Operational Area EOC from 9/14/15-9/18/15. The course provided emergency managers with a robust understanding of the duties, responsibilities, and capabilities of an effective Logistics Section Chief on an All-Hazards Incident Management Team.</p> <p>Kelly Hubbard presented at WACO on September 4th with representatives of the FBI and Infragard on water security.</p> <p>Brandon and Kelly attended the 2015 CESA Annual Training and Conference in South Lake Tahoe from September 28 to October 1. Brandon attended a pre-conference training on Hazard Mitigation Planning. The OC Multi-Jurisdictional Multi-Hazard Mitigation Plan is scheduled to be updated starting in 2016. Kelly attended the California Office of Emergency Services (OES) Train-the-Trainer session. OES is proposing a new credentialing program for emergency managers that will involve an extensive amount of training for EOC staff. As a trainer for the state, Kelly will be able to provide this training to WEROC Member Agencies at a reduced cost and locally. Brandon and Kelly attended the keynote an breakout sessions on various topics of emergency management.</p> <p>Karl Seckel, Rob Hunter and Kelly Hubbard met with Dr. Lucy Jones of the United States Geological Survey (USGS) on September 23rd. Dr. Jones focus for enhancing community earthquake resilience is to focus on policies that can support better building standards and</p>

Description	Comments
	<p>concepts to enhance water infrastructure reliability. The meeting was a first opportunity to develop ideas on how MWDOC could support Dr. Jones' efforts, as well as how she could support MWDOC's planning efforts. For example, Dr. Jones agreed to review and coordinate regarding issues raised in the MWDOC Water Reliability Study Seismic Evaluation Plan.</p>
<p>Coordination with Member Agencies</p>	<p>Kelly attended and provided input into an Orange County Water District Emergency Response Team (ERT) training and tabletop. The Emergency Response Teams are individuals at OCWD who have been identified for taking a lead in responding to incidents on the OCWD property, including concepts such as evacuation, first aid, etc.</p>
<p>Coordination with the County of Orange</p>	<p>Brandon and Kelly attended the Orange County Emergency Management Organization (OCEMO) on 9/3/15 at the Orange County Transportation Authority (OCTA) building in Santa Ana. Curt Burlingame presented on OCTA resources and the challenges of emergency transportation coordination. On August 31, 2015, Governor Brown signed executive order B34-15 to bolster California's preparedness and response to cyber-attacks. The order directs CalOES to establish the California Cybersecurity Integration Center (Cal-CSIC), which will be responsible for strengthening the state's cybersecurity. Under the order, Cal-CSIC will also establish a multi-agency Cyber Incident Response Team to serve as the state's primary unit to lead cyber threat detection, reporting, and response in coordination with public and private entities across the state.</p> <p>Kelly attended the OCEMO Exercise Design meeting. The committee developed a plan for exercise training and exercises for 2015 for county-wide training. Many of the county-wide exercises often involve the same agencies every year. The group discussed ways in which to bring more agencies into a more active role in emergency disaster exercises. Several efforts will be developed over the next couple of months. WEROC is participating in this effort for the same reason - to bring more of the water utilities into the disaster exercises.</p> <p>Kelly attended the Operational Area Winter Weather Workshop, an annual workshop to prepare</p>

Description	Comments
	<p>the all coordinating partners for potential winter weather related events that may occur. Presentations were provided by the National Weather Service, Army Corp of Engineers, Orange County Public Works, Orange County Water District and Orange County Sanitation District. Many of the WEROC Member Agencies attended and good contacts were made for response this winter.</p>
<p>Coordination with Outside Agencies</p>	<p>Within Kelly's role as the Region 1 California Water/Wastewater Agency Response Network (CalWARN) mutual aid coordinator, she was coordinating potential resources for water utilities impacted by the Valley Fire in Lake County. On September 17th an Emergency Management Mutual Aid (EMMA) request was issued by the Lake County Operational Area EOC for three water related positions: Infrastructure Coordinator, Incident Management Team (IMT) Water Liaison, and a Field Water Utility Damage Assessment position. Kelly was asked to fulfill the role of the IMT Water Liaison, as one of the few individuals in the state with her expertise and experience. Kelly responded to Lake County for 3 days. In her role she was a liaison between the Operational Area EOC, the Fire Incident Commander, the local State Water Resource Control Board Division of Drinking Water (DDW) representative, and to the water utilities in the field. She was able to tour the fire area that was no longer actively burning to assist in the damage assessment process and to provide the local water utilities with information about the FEMA documentation process. She also worked with the Operational Area EOC to provide situational awareness, important safety information on infrastructure for areas that were being repopulated, and worked with the Public Information Officers to get critical water quality information out to the public. She worked directly with the Fire Incident Management Team to identify concerns with utilities in the field, to address their needs operationally and to facilitate the repopulation of communities. Throughout this process Kelly worked with the DDW District Engineer to help coordinate concepts of disaster coordination, FEMA recovery processes and to help DDW to continue the coordination Kelly was providing once she left. This opportunity provided lessons that will be brought back to Orange County for disaster planning with the water utilities, in particular concepts related to repopulation of evacuated areas and concepts that should be incorporated into water distribution planning. The Valley Fire in Lake County started on September 12th and as of September 29th was 97% contained with just over 76,000 acres</p>

Description	Comments
	<p>burned. Over 2,000 structures were destroyed in this fire, including many water utility treatment facilities, pump stations, wells, administrative offices and other critical water and wastewater infrastructure. There were 16 water utilities within the fire burn area. Many of those utilities lost treatment, pressure and many of the homes that they served. Mutual aid was brought in following Kelly's departure to assist the utilities with restoring pressure and treatment. Kelly has ideas developing on training that can facilitate future recovery efforts.</p>
<p>WEROC Emergency Operations Center (EOC) Readiness</p>	<p>Brandon participated in the Operational Area Radio Test on 9/8/2015 from the South EOC. The radios were serviced in August by Eagle Communications and the OA radio test was the first time the radios had been used following the assessment.</p> <p>The WEROC EOC Volunteer Forms Binder has been updated at all three EOC facilities. The binders are 100% up to date and in compliance with Disaster Services workers records retention.</p> <p>WEROC purchased a sign for the outside gate of the South EOC to assist visitors in finding the WEROC SEOC. El Toro Water District is installing the sign on the gate for WEROC.</p> <p><i>UPDATE Radio Assessment:</i> The finalization of the WEROC Radio Assessment is largely dependent on the coordination and availability of Member Agencies. Scheduling has been a struggle due to summer vacations and the impacts of staff availability due to drought response. A summary of the assessment will be provided to the Board when available.</p>

Status of Water Use Efficiency Projects

September 2015

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	September 2017	For August 2015, 96 residential and 38 commercial smart timers were installed in Orange County. For program water savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	For August 2015, 1,397 residential and 1,592 commercial 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 July 2015, a total of 12,625 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 August 2015, 618 high efficiency clothes washers and 1,735 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 August 2015, 1 high efficiency toilet and 15 multi-family high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDSC Water Use Efficiency Program Savings and Implementation Report.
Industrial Process Water Use Reduction Program	MWDSC	December 2015	95%	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.
MWDSC Conservation Meeting	MWDSC	Monthly	On-going	This month's meeting was held on September 3, 2015 at MWDSC. The next meeting will be on October 22, 2015 at a location to be determined.
Metropolitan Conservation Meeting	MWDSC	Monthly	On-going	This month's meeting was held on September 17, 2015. The next meeting will be October 15, 2015 at Metropolitan.
Water Smart Hotel Program	MWDSC	June 2015	85%	MWDSC 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	<p>In September 2015, 271 rebates were paid, representing 1,075,071 square feet of turf removed in Orange County. To date, the Turf Removal Program has removed approximately 9,466,850 square feet of turf.</p> <p>For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.</p>
California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator	MWDOC	30%	December 2015	<p>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.</p> <p>EcoLandscape California (ELC) was selected and approved by the Board to develop the Base Irrigation Schedule Calculator and instructional videos. The agreement with ELC was executed in late August. Development of the calculator began in September and is expected to be beta tested in November 2015.</p>
Public Spaces Program	MWDOC	30%	December 2015	<p>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.</p> <p>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.</p>

Home Certification Program	MWDOC	28%	July 2015	<p>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.</p> <p>In August 2015, 13 residential surveys were conducted, and survey results are pending.</p>
Landscape Irrigation Survey Program	MWDSC	Ongoing	June 2016	<p>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.</p> <p>To date, 146 sites in the MWDOC service area have contacted Metropolitan to request surveys.</p>
Spray to Drip Conversion Pilot Program	MWDOC	35%	April 2016	<p>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.</p> <p>To date, 196 residential applications and 54 commercial applications have received a Notice to Proceed. Of these, 108 residential sites and 28 commercial sites have been completed.</p>
CII Performance-Based Water Use Efficiency Program	MWDOC	2%	December 2017	<p>This program will provide enhanced rebate incentives to commercial, industrial, and institutional sites and large-landscape properties (landscapes ≥ 1 acre).</p> <p>The program launched during the first Quarter of 2015.</p>
Landscape Training and Outreach	MWDOC & County Stormwater	Ongoing	Ongoing	<p>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</p>

<p>Landscape Training and Outreach (cont.)</p>			<p>California Cooperative Extension (UCCE). Each partner plays a role in planning and implementing the Program.</p> <p>Upcoming OCGF events include 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.</p>
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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	August-15	618	1.78	1,142	4.79	104,509	3,605	20,672
Smart Timer Program - Irrigation Timers	2004	August-15	134	2.48	315	9.22	13,382	4,648	28,926
Rotating Nozzles Rebate Program	2007	August-15	2,989	11.95	11,291	78.34	472,161	2,395	9,693
SoCal WaterSmart Commercial Plumbing Fixture Rebate Program	2002	August-15	16	0.03	855	5.19	49,021	3,518	34,052
Water Smart Landscape Program [1]	1997	July-15	12,625	900.91	12,625	900.91	12,625	10,578	69,384
Industrial Process Water Use Reduction Program	2006	August-15	1	11.26	1	11.26	14	357	1,317
Turf Removal Program ^[3]	2010	September-15	1,075,071	12.54	1,949,177	34	9,466,850	1,326	2,853
High Efficiency Toilet (HET) Program	2005	August-15	1,735	6.15	3,601	25.53	49,902	1,845	11,251
Home Water Certification Program	2013	August-15	13	0.025	23	0.110	282	6,633	14,560
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				947	1,979,030	1,070	11,500,581	43,652	361,984

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	FY 13/14	FY 14/15	FY 15/16	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	17	1,751	0.08	346.01	906
Buena Park	85	114	146	59	230	145	105	106	91	14	1,402	0.06	262.79	725
East Orange CWD RZ	18	22	17	3	23	10	10	8	8	2	183	0.01	38.14	95
El Toro WD	91	113	130	32	162	112	134	121	111	17	1,426	0.07	267.06	738
Fountain Valley	205	219	243	72	289	158	115	102	110	15	2,274	0.06	466.79	1,177
Garden Grove	238	304	332	101	481	236	190	162	165	31	3,216	0.14	641.55	1,664
Golden State WC	339	401	447	168	583	485	265	283	359	63	4,680	0.26	907.85	2,422
Huntington Beach	761	750	751	211	963	582	334	295	319	46	7,887	0.20	1,647.82	4,081
Invine Ranch WD	1,972	2,052	1,844	1,394	2,621	2,170	1,763	1,664	1,882	314	22,086	1.25	4,148.60	11,428
La Habra	96	136	83	22	179	128	82	114	87	9	1,217	0.04	229.73	630
La Palma	33	35	51	25	76	46	34	25	34	5	424	0.02	78.74	219
Laguna Beach CWD	57	77	77	27	96	57	38	37	39	10	891	0.05	180.58	461
Mesa Water	239	249	246	73	232	176	114	86	89	19	2,344	0.07	498.40	1,213
Moulton Niguel WD	652	716	742	250	1,127	679	442	421	790	166	8,824	0.70	1,685.85	4,566
Newport Beach	245	270	259	57	197	142	116	92	95	21	2,518	0.09	540.39	1,303
Orange	366	365	403	111	349	262	218	163	160	35	3,729	0.15	781.07	1,929
Orange Park Acres	4	8	-	-	-	-	-	-	-	-	12	0.00	3.09	6
San Juan Capistrano	109	103	127	43	190	110	76	73	92	27	1,390	0.12	270.84	719
San Clemente	204	261	278	63	333	206	140	94	141	20	2,495	0.09	493.92	1,291
Santa Margarita WD	654	683	740	257	1,105	679	553	662	792	122	8,805	0.53	1,657.29	4,556
Seal Beach	47	46	57	7	81	51	31	29	38	8	578	0.04	113.01	299
Serrano WD	30	31	23	7	21	20	13	10	26	3	341	0.01	71.83	176
South Coast WD	107	130	148	43	183	112	89	79	68	12	1,509	0.05	296.94	781
Trabuco Canyon WD	69	60	62	28	82	62	30	45	47	10	746	0.05	146.22	386
Tustin	152	146	144	45	174	97	78	59	80	16	1,518	0.07	313.83	785
Westminster	213	171	233	74	329	208	121	82	109	15	2,368	0.06	480.21	1,225
Yorba Linda	288	350	367	117	394	273	181	167	156	32	3,605	0.13	748.99	1,865
MWDOC Totals	7,406	7,987	8,106	3,331	10,686	7,350	5,365	5,094	6,002	1,049	88,219	4.40	17,317.54	17,044
Anaheim	854	847	781	860	910	477	331	285	295	44	10,247	0.17	2,140.84	5,302
Fullerton	269	334	330	69	397	270	200	186	211	31	3,454	0.14	644.27	1,787
Santa Ana	236	235	257	87	355	190	163	131	132	18	2,589	0.08	569.01	1,340
Non-MWDOC Totals	1,359	1,416	1,368	1,016	1,662	937	694	602	638	93	16,290	0.39	3,354.12	3,147
Orange County Totals	8,765	9,403	9,474	4,347	12,348	8,287	6,059	5,696	6,640	1,142	104,509	4.79	20,671.65	20,191

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	0	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	0	6	2	8	2	3	2	4	0	7	10	0	0	45	27	114.90
Garden Grove	2	1	6	0	5	4	7	0	5	2	9	0	10	14	2	3	62	30	106.41
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	50	43	71	79	170.92
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	3	0	136	101	486.58
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	45	24	1,025	378	1,956.78
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	1	2	181	111	448.59
San Clemente	81	20	13	209	46	11	212	17	26	7	28	2	28	24	14	1	1,002	359	2,052.93
Santa Margarita WD	25	44	10	152	61	53	262	7	53	171	64	93	53	321	5	0	644	1,015	3,563.83
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	1	23	1	1.73
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	0	0	23	0	5.91
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	7	0	84	49	211.57
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	12	1	217	86	529.05
MWDOC Totals	242	238	142	949	289	374	1,671	185	1,017	583	571	402	648	1,026	213	76	6,656	5,750	26,145.27

Anaheim	9	59	5	46	12	11	23	60	19	10	9	26	7	52	4	6	131	419	1,948.29
Fullerton	2	2	2	39	9	33	22	51	9	29	8	0	40	26	4	6	118	186	641.94
Santa Ana	2	4	1	8	8	0	6	5	8	19	7	8	9	27	5	1	50	72	190.27
Non-MWDOC Totals	13	65	8	93	29	44	51	116	36	58	24	34	56	105	13	13	299	677	2,780.50

Orange County Totals	255	303	150	1,042	318	418	1,722	301	1,053	641	595	436	704	1,131	226	89	6,955	6,427	28,926
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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
	Res	Comm.	Large	Res	Comm.	Large	Res	Comm.	Large	Res	Comm.	Large	Res	Comm.	Large	Res	Comm.	Large	Res	Comm.	Large	
Brea	32	0	0	130	0	0	65	120	0	84	0	0	157	45	0	842	0	498	1,107	0	13.71	
Buena Park	29	0	0	32	0	0	65	0	0	53	0	0	248	75	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	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	61	4,457	0	2,645	45,980	890	635.68
Fountain Valley	83	0	0	108	0	0	35	0	0	0	0	0	107	0	0	18	0	506	0	0	7.95	
Garden Grove	38	0	0	119	0	0	95	0	0	80	0	0	88	50	0	27	0	795	201	0	17.09	
Golden State	303	943	0	294	0	0	257	2,595	0	192	0	0	583	1,741	0	65	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	27	1,030	0	2,330	7,358	2,681	744.42
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	112	1,110	0	44,925	81,113	2,004	2,656.14
La Habra	0	0	0	33	90	0	0	0	0	15	0	0	109	338	0	21	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	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	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	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	245	0	6,474	13,202	2,945	904.31	
Newport Beach	337	1,208	0	640	3,273	0	25,365	50	0	19,349	6,835	0	460	3,857	0	97	0	46,427	20,743	0	946.70	
Orange	135	30	0	343	0	0	264	0	0	245	120	0	304	668	0	132	0	2,671	981	0	57.62	
San Clemente	2,612	851	0	4,266	117	1,343	631	172	0	415	5,074	0	326	0	0	44	0	9,607	7,538	1,343	386.06	
San Juan Capistrano	1,452	0	0	949	0	0	684	30	0	370	0	0	495	737	0	0	0	5,110	8,136	0	239.75	
Santa Margarita	3,959	3,566	0	4,817	0	0	983	0	0	389	0	0	1,207	1,513	0	170	0	14,500	6,084	611	413.34	
Seal Beach	0	0	0	0	0	0	0	0	0	0	0	0	40	5,261	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	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	26	179	0	6,719	16,160	0	212.77
Trabuco Canyon	0	0	0	379	0	0	34	0	0	0	0	0	56	0	0	77	0	2,033	791	0	52.43	
Tustin	512	0	0	476	1,013	0	378	0	0	329	0	0	408	0	0	27	45	0	3,016	1,058	0	59.68
Westminster	0	0	0	26	0	0	15	0	0	0	0	0	54	0	0	0	0	286	0	0	5.25	
Yorba Linda	529	0	0	559	0	0	730	0	0	40	990	0	921	0	0	420	0	4,573	4,359	500	254.77	
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	1,734	7,663	0	172,290	230,263	14,752	8,768.67

Anaheim	372	382	0	742	38,554	0	459	813	0	338	0	0	498	712	0	112	1,570	0	3,191	42,195	105	561.12
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	324	1,570	0	6,586	46,681	1,589	924.76

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	2,058	9,233	0	178,876	276,944	16,341	9,693.43
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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	59.66
Buena Park	0	0	0	17	103	101	101	101	101	101	441.07
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	4,683.10
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	193.74
Huntington Beach	0	0	0	31	33	31	31	31	31	31	141.79
Irvine Ranch WD	646	708	1,008	6,297	6,347	6,368	6,795	6,797	6,769	6,769	36,853.66
Laguna Beach CWD	0	0	57	141	143	141	124	124	124	124	706.53
La Habra	0	0	23	22	24	22	22	22	22	22	132.01
La Palma	0	0	0	0	0	0	0	0	0	0	0.00
Mesa Water	138	165	266	265	288	450	504	511	514	514	2,833.39
Moulton Niguel WD	113	180	473	571	595	643	640	675	673	673	3,974.93
Newport Beach	23	58	142	171	191	226	262	300	300	300	1,436.96
Orange	0	0	0	0	0	0	0	0	0	0	0.00
San Clemente	204	227	233	247	271	269	269	299	407	407	2,274.08
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	13,667.31
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	794.80
Trabuco Canyon WD	0	12	49	48	62	60	60	60	60	60	337.67
Tustin	0	0	0	0	0	0	0	0	0	0	0.00
Westminster	0	10	18	18	20	18	18	18	18	18	112.60
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	12,435	68,643.3
Anaheim	0	0	0	142	146	144	190	190	190	190	740.85
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	740.85
Orange Co. Totals	1,969	2,733	4,395	10,167	10,933	11,417	11,956	12,386	12,625	12,625	69,384.16

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	360
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	224
Irvine Ranch	0	0	2	1	1	1	1	0	0	6	98	358
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	16
Orange	1	0	0	0	0	0	0	0	0	1	43	327
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	1306
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	11
OC Totals	2	1	2	1	1	3	1	2	1	14	357	1317

[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	38	330	53.41
Buena Park	0	1	2	124	176	7	0	0	96	153	40	599	124.61
East Orange CWD RZ	0	0	10	12	1	0	0	0	13	26	6	68	12.34
El Toro WD	0	392	18	75	38	18	0	133	218	869	71	1,832	342.64
Fountain Valley	0	69	21	262	54	17	0	0	41	132	62	658	166.15
Garden Grove	0	14	39	443	181	24	0	0	63	350	131	1,245	275.19
Golden State WC	2	16	36	444	716	37	80	2	142	794	172	2,441	505.86
Huntington Beach	2	13	59	607	159	76	0	0	163	1,190	213	2,482	433.68
Irvine Ranch WD	29	1,055	826	5,088	2,114	325	0	1,449	810	1,777	594	14,067	3,750.69
Laguna Beach CWD	0	2	17	91	28	11	0	0	45	112	16	322	65.46
La Habra	0	3	18	296	34	20	0	0	37	94	27	529	138.06
La Palma	0	1	10	36	26	13	0	0	21	59	17	183	36.00
Mesa Water	0	247	19	736	131	7	0	0	174	162	72	1,548	442.87
Moulton Niguel WD	0	20	104	447	188	46	0	0	400	2,497	690	4,392	561.27
Newport Beach	0	5	19	163	54	13	0	0	49	168	60	531	107.42
Orange	1	20	62	423	79	40	0	1	142	978	168	1,914	319.19
San Juan Capistrano	0	10	7	76	39	11	0	0	35	140	81	399	67.07
San Clemente	0	7	22	202	66	21	0	0	72	225	86	701	137.21
Santa Margarita WD	0	5	14	304	151	44	0	0	528	997	346	2,389	334.22
Seal Beach	0	678	8	21	12	1	0	2	17	50	16	805	310.04
Serrano WD	2	0	1	13	5	0	0	0	2	40	13	76	11.45
South Coast WD	2	2	29	102	41	12	23	64	102	398	54	829	127.89
Trabuco Canyon WD	0	0	4	23	23	0	0	0	10	108	52	220	28.90
Tustin	0	186	28	387	479	17	0	0	64	132	62	1,355	390.73
Westminster	0	17	25	541	167	23	0	0	35	161	41	1,010	276.55
Yorba Linda WD	0	14	89	323	96	18	0	0	40	280	128	988	217.60
MWDOC Totals	38	2,779	1,494	11,282	5,106	809	103	1,651	3,357	12,038	3,256	41,913	9,236.51

Anaheim	0	255	78	2,771	619	114	0	0	156	1,188	160	5,341	1,423.22
Fullerton	0	4	28	286	60	23	0	0	61	293	95	850	170.32
Santa Ana	0	11	25	925	89	23	0	0	33	602	90	1,798	420.87
Non-MWDOC Totals	0	270	131	3,982	768	160	0	0	250	2,083	345	7,989	2,014.41

Orange County Totals	38	3,049	1,625	15,264	5,874	969	103	1,651	3,607	14,121	3,601	49,902	11,250.92
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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	9,406	0	98,086	40,083	45.70
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	3,981	0	24,257	0	6.51
El Toro	4,723	0	4,680	72,718	4,582	0	27,046	221,612	6,435	71,999	47,466	366,329	129.18
Fountain Valley	1,300	0	682	7,524	4,252	0	45,583	5,279	4,532	0	56,349	12,803	22.17
Garden Grove	14,013	0	4,534	0	8,274	0	67,701	22,000	10,551	0	105,073	68,177	81.20
Golden State	42,593	30,973	31,813	3,200	32,725	8,424	164,507	190,738	25,927	0	297,565	233,335	191.48
Huntington Beach	27,630	48,838	9,219	12,437	20,642	0	165,600	58,942	24,414	7,042	248,306	130,910	145.34
Irvine Ranch	6,450	1,666	32,884	32,384	36,584	76,400	234,905	317,999	28,605	612,581	344,851	1,053,824	349.56
La Habra	0	8,262	0	0	0	0	14,014	1,818	4,347	2,936	18,361	20,791	17.77
La Palma	0	0	0	0	0	0	4,884	0	0	57,400	4,884	57,400	9.40
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	11,861	0	183,226	33,620	68.00
Moulton Niguel	4,483	26,927	11,538	84,123	14,739	40,741	314,250	1,612,845	62,050	19,558	408,016	1,800,333	664.22
Newport Beach	3,454	0	3,548	2,346	894	0	33,995	65,277	1,064	50,794	42,955	118,417	41.15
Orange	12,971	0	15,951	8,723	11,244	0	120,093	281,402	17,010	0	177,269	290,125	142.42
San Clemente	21,502	0	16,062	13,165	18,471	13,908	90,349	1,137	14,520	392,742	160,904	420,952	127.65
San Juan Capistrano	22,656	103,692	29,544	27,156	12,106	0	101,195	32,366	11,917	19,598	177,418	182,812	167.09
Santa Margarita	1,964	11,400	10,151	11,600	17,778	48,180	211,198	514,198	78,463	175,095	324,037	766,034	296.28
Seal Beach	0	0	3,611	0	0	0	15,178	504	1,124	0	19,913	504	6.57
Serrano	0	0	0	0	2,971	0	41,247	0	24,057	0	68,275	0	16.16
South Coast	6,806	0	9,429	4,395	15,162	116,719	84,282	191,853	29,777	0	145,456	329,291	163.09
Trabuco Canyon	272	0	1,542	22,440	2,651	0	14,771	0	4,138	50,000	23,374	72,440	26.45
Tustin	0	0	9,980	0	1,410	0	71,285	14,137	8,698	0	91,373	14,137	31.32
Westminster	0	0	0	0	0	0	14,040	34,631	10,283	0	24,323	34,631	15.07
Yorba Linda	0	0	0	0	0	0	112,136	12,702	33,165	54,587	156,650	67,289	56.77
MWDOC Totals	183,524	241,224	216,104	303,923	238,978	304,598	2,195,544	3,692,153	434,845	1,514,332	3,292,985	6,164,651	2,849.44

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La Habra	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	434,845	1,514,332	3,292,985	6,173,865	2,853
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[1] Installed device numbers are listed as square feet

HOME WATER SURVEYS PERFORMED BY AGENCY

through MWDOT and Local Agency Conservation Programs

Agency	FY 13/14		FY 14/15		FY 15/16		Total		Cumulative Water Savings
	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	
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	0	0	6	0	0.28
Golden State	0	0	0	0	0	0	0	0	0.00
Huntington Beach	2	0	5	0	0	0	7	0	0.38
Irvine Ranch	1	0	3	0	2	0	6	0	0.26
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	0	0	12	0	0.66
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	0	0	20	0	0.99
San Clemente	15	0	13	0	0	0	28	0	1.67
San Juan Capistrano	4	0	13	0	1	0	18	0	0.92
Santa Margarita	15	0	40	1	10	0	65	1	3.18
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	0	0	10	0	0.61
Trabuco Canyon	0	0	4	0	0	0	4	0	0.19
Tustin	0	0	10	0	0	0	10	0	0.47
Westminster	0	0	0	0	0	0	0	0	0.00
Yorba Linda	0	0	13	0	5	0	18	0	0.73
MWDOT Totals	78	0	164	1	22	0	264	1	13.74

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-MWDOT Totals	0	0	17	0	1	0	18	0	0.82
Orange County Totals	78	0	181	1	23	0	282	1	14.560

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
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[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	988	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
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