MEETING OF THE
BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
August 4, 2014, 8:30 a.m.
MWDOC Conference Room 101

Teleconference Site:
20989 Park Lane
Rollins, MT 59931
(406) 844-2282

Members of the Public may attend and participate in the meeting at both locations.

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

Staff: R. Hunter, K. Seckel, R. Bell,
H. De La Torre, P. Meszaros, 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.

FULL BOARD TO CONVENE FOR ACTION ON THE FOLLOWING ITEM:

1. SOUTH COUNTY MET DIRECTOR NOMINATION/APPOINTMENT

BOARD ADJOURNS and PLANNING & OPERATIONS COMMITTEE RESUMES

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.)

2. REQUEST FOR PROPOSALS FOR THE OC RELIABILITY STUDY 2015

3. THE ORANGE COUNTY GARDEN FRIENDLY PROGRAM

4. DRAFT AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR OCEAN WATERS OF CALIFORNIA - DESALINATION FACILITY INTAKES AND BRINE DISCHARGES

5. 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

6. REVIEW OF ISSUES RELATED TO CONSTRUCTION PROGRAMS, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, DISTRICT FACILITIES, and MEMBER-AGENCY RELATIONS

ADJOURNMENT

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

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

Item No. 1

BOARD ACTION ITEM
August 4, 2014

TO: Board of Directors

FROM: President Larry Dick

SUBJECT: **SOUTH COUNTY MET DIRECTOR NOMINATION/APPOINTMENT**

RECOMMENDATION:

It is recommended that the Board ratify President Dick's appointment of an ad hoc Committee to review the nomination/appointment of the South County MET Director.

REPORT

Pursuant to the terms of the Settlement Agreement, the South County agencies have submitted candidate Larry McKenney for MWDOC MET Director. President Dick would like to appoint an ad hoc committee to review this appointment (also pursuant to the terms of the Agreement)

The MWDOC Administrative Code permits the President of the Board to appoint ad hoc committees, with ratification by the full Board.

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

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 2

INFORMATION ITEM
August 4, 2014

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

FROM: Robert Hunter
General Manager

Staff Contact: Karl Seckel/Richard Bell

SUBJECT: **Request for Proposals for the OC Water Reliability Study 2015**

COMMITTEE RECOMMENDATION

Staff recommends the Committee receives and files the report.

SUMMARY

Attached is the completed Request for Proposals sent out to a number of consultants. Staff has modified the schedule as follows to allow the consultants more time to develop their submittals:

- Consultant Proposals due by August 27
- Discussion at September 2 P&O Committee
- Award at September 3 or September 17 Board meeting

In addition, staff will have continuing discussions with our agencies on the Scope of Work and how best to approach the various analyses.

Budgeted (Y/N): Yes	Budgeted amount: $340,000	Core X	Choice __
Action item amount: Anticipated cost $150,000 to $200,000 for the work outlined above; there are other aspects of this work yet to be awarded.	Line item:		
Fiscal Impact (explain if unbudgeted): Actual proposals will be brought back at a later committee for award.			

Municipal Water District of Orange County

REQUEST FOR PROPOSALS

For

Professional Services

For

Orange County Water Reliability Investigation 2015

Proposals Due: 3:00 pm August 27, 2014

July 2014

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I. Introduction

The Municipal Water District of Orange County (MWDOC) and its member agencies invites your firm to submit a proposal for providing professional services for preparation of the Orange County Water Reliability Investigation 2015.

The selected Consultant shall have demonstrated capabilities and experience in the fields of water resources planning and analysis, water supply planning and analysis, water reliability analysis and planning, water demand forecasting, water use efficiency, climate change and carbon footprinting, preliminary engineering studies and project cost estimating, project benefit-cost analysis, hydrologic analysis, emergency supply planning, and other fields relevant to this work.

II. Background

MWDOC and its member agencies have been steadily working over the past decade on water supply and system reliability improvements. Since that time significant progress has been made in Orange County (OC) but further work remains.

System Reliability. Over the past several years, Metropolitan Water District of Southern California (MET) has made significant progress in implementing its "Infrastructure Reliability and Protection Plan" in OC with major structural improvements to the Diemer Water Treatment Plant to reduce potential damages from earthquakes. In addition, MET has made major improvements to its treated water distribution system in OC and plans on further improvements, with efforts currently beginning with lining of the the Second Lower Feeder to improve its structural integrity. After a lengthy evaluation process, MET is now recommending that local OC agencies develop 60 days of local emergency supplies to provide protection from the maximum considered earthquake risks to MET's OC facilities. MWDOC updated its 2004 South Orange County System Reliability Plan in 2013 and will prepare a similar study for North Orange County concurrent with this water reliability investigation.

Since the 2004 South Orange County System Reliability Plan, South OC agencies have constructed the Upper Chiquita Reservoir (Santa Margarita Water District lead agency), the Irvine Ranch Water District (IRWD)/South Orange County Regional Interconnection Project, and the Baker Aqueduct Water Treatment Plant which is now under construction with IRWD as the lead agency. In addition, groundwater desalters/treatment plants were constructed to utilize impaired groundwater from the Lower San Juan Basin and the Irvine Subbasin. These projects have all improved system reliability.

Supply Reliability. OC has been a leader in water stewardship with significant investment in water use efficiency programs, groundwater basin management, seawater intrusion control, brackish and colored groundwater treatment, coordinated reservoir operation for storm water conservation and environmental protection, and water recycling for both non-potable and indirect potable reuse.

In the main OC Groundwater Basin, the Orange County Water District (OCWD) constructed the Phase 1 Groundwater Replenishment System, is in the process of constructing Phase 2, and is now conducting studies for Phase 3 and Phase 4. IRWD and Mesa Consolidated Water District have constructed advanced membrane filtration plants to utilize impaired groundwater from the deep aquifer underlying the main OC Groundwater Basin. OCWD continues to make improvements to its facilities and programs for capture of Santa Ana River base flows and storm water, as well as continued improvements to its seawater intrusion

control barrier and actions to clean up groundwater contamination. OCWD is in the process of completing its Long Range Facilities Plan.

MWDOC recently completed its Water Use Efficiency (WUE) Master Plan and manages a regional WUE program that is now focused on outdoor water use efficiency improvements. IRWD is updating its water reliability study for its service area and Moulton Niguel Water District (MNWD) is also in the process of completing a water reliability study. MWDOC participates in both the north and south OC Integrated Regional Water Management Plans. MET is in the process of updating its water supply and demand projections and soon will be updating its Integrated Resources Plan.

IRWD constructed its Strand Ranch Groundwater Storage Bank in Kern County and SMWD has taken the CEQA lead on the Cadiz Groundwater Recovery and Storage Project. OC is currently considering the decision to implement two ocean desalination projects, the Poseidon Resources proposed 50 mgd project in Huntington Beach and the MWDOC/South Orange Coastal water agencies proposed 15 mgd Doheny Ocean Desalination Project in Dana Point.

A key decision point for the Poseidon Resources Huntington Beach Ocean Desalination Project is expected in early winter, with the expectation that the California Coastal Commission and Poseidon Resources will reach agreement on the intake system with the coastal development permit hearing likely in the spring of 2015 when the Commission meets in OC.

Imported Water Supply Reliability. Since 2000, the Colorado River has been in drought and recent USBR studies indicate that with projected population, economic growth and climate change, Colorado River supply shortages would increase in magnitude into the future without further action (ref: USBR, Colorado River Basin Water Supply and Demand Study, 2013). Cooperative efforts are underway but major challenges lie ahead. California's prior rights and the Law of the River require that shortages are first taken by Arizona and Nevada, but long-term predictions suggest a diminishing average supply which could impact California in the future. Substantial efforts in agricultural conservation with Imperial Irrigation District and Palo Verde Irrigation District, canal lining, and operational efficiency improvements have been made through agreements and investments by the U.S. Bureau of Reclamation, MET and the San Diego County Water Authority. Agreement for use of Intentionally Created Surplus (ICS) in Lake Mead has allowed MET conserved water to be stored in Lake Mead and used by MET when required up to the conveyance capacity limitations of the CRA.

The State Water Project has lost significant supply over the past several years due to the issuance of biological opinions (BioOps) for endangered species protections in the Delta. These were recently upheld by the Federal Court of Appeals. The Bay Delta Conservation Plan is in the process of being completed with adoption and a record of decision expected early next year. The BDCP would prevent further losses of supply due to additional listings and operational flexibility with a new north Delta diversion to reduce impacts on endangered species and may allow recovery of supplies lost due to the existing BioOps.

Furthermore, the ongoing severe drought has significantly impacted water exports and exacerbated groundwater overdraft, highlighting the value of water during droughts. In response to the drought, the Governor issued an Executive Order requiring 20% conservation and, the SWRCB on July 15, 2014 adopted emergency conservation regulations to implement the Executive Order. In addition, efforts are underway to change how California regulates and manages groundwater.

Another key consideration in this work will be an evaluation of drought and water supply programs that are best able to mitigate the impacts from extended drought. Recent paleoclimatology studies indicate

that the northern California Delta's 20th Century drought regime was more benign than in almost any comparable length of time during the past two millennia (Ingram and Malamud-Roam, 2013). Research has also found evidence of severe drought in the Sierra Nevada based on findings of 150-year tree ring stumps in lakes and rivers (Stine, 1994). Recent Sacramento River flow reconstructions using tree rings over the past 1200 years show periods of severe and long drought (Meko and Woodhouse, 2014). Developing a realistic perspective on the kinds of droughts that should be planned for requires a better understanding of droughts, demand response measures, and water development measures, such as larger surface reservoirs, groundwater storage banks, and additional local supply development, including drought-proof ocean desalination.

MWDOC's level of dependence on imported water supplies (currently about 43% and 60% under average and dry conditions, respectively) will need to be evaluated in cooperation with MET, including policy considerations related to cooperative local-regional partnerships in groundwater banks/conjunctive use storage programs, developing ocean desalination, and in the future development of surface water augmentation with recycled water or direct potable reuse. Increasing uncertainty with regard to future imported water supply suggests the possible need to reduce future dependency on imported water through increased water use efficiency programs and local resource development.

Key Investigation Objectives. The overall key objectives for this water reliability investigation are listed in the following table. A key overall goal of this work is to determine the desired mix of local and imported water supply for average and drought conditions that neither under or over invests in new supplies.

Key Investigation Objectives

Objective	Measure
Ensure supply reliability	• Assure sufficient supply • Improve drought supply protection from extended droughts with expanded water banks, local resource developments and WUE
Protect against system outages	• Provide system and local supply improvements that allow local supplies to be off the MET system for 60 days due to earthquake outage to MET facilities in Orange County • How to handle prolonged AMP shutdowns for repair of pre-stressed concrete cylinder pipe reaches • How to address SWP outages
Improve salinity of water supply	• Reduce overall supply TDS to improve GW basin salt balance, recycling, consumer acceptance and to reduce higher salinity consumer penalty costs on fixtures, appliances, hot water heaters, etc.
Benefit and protect OC economy and quality of life through affordable water supply improvements and arrangements	• Assure adequate water supply with goal of 100% reliability considering the economic value of water and affordability.
Practice sustainable water resource stewardship	• Control/manage system leaks and other losses • Advance water use efficiency programs

	• Expand water recycling • Implement conjunctive use storage for all of OC • Protect water quality • Protect and enhance the environment • Develop environmental protective ocean • desalination projects

It is the intent of this study to inform OC water agencies and decision makers on recommended water supply reliability needs and recommended project portfolios for OC. One early action objective is to inform decision makers on the timing and relative value of moving ahead with the Poseidon Resources project (which will require input in early winter 2015).

III. Scope of Services

The OC 2015 Water Reliability Investigation consists of nine major tasks as described below. A Project Work Group will be formed consisting of MWDOC, OCWD, and participating retail agencies. MWDOC will provide overall project management and coordination. It is noted that OC water agencies have completed many investigations and analyses which will form the basis of the underlying work.

The primary role of the Consultant is to bring this information together under one umbrella for policy review and decision-making. The budgeted Consultant hours should reflect this objective.

Task 1 Project Management

The Consultant shall provide a schedule, labor hours by task and task costs, to manage and conduct the project work. Project Management shall include, but not be limited to, project kick-off meeting, collection and review of existing information, monthly status meetings (include meeting agendas, presentations, and minutes), and support at workshops and project meetings. An Advisory Work Group of local agencies will be formed to advise MWDOC and the Consultant over the course of this work. MWDOC retains final decision authority over the work.

1.1 Existing Information – The Advisory Work Group agencies will be asked to provide related information on various OC water demand projections, projects and water supply issues, including local, regional and State water supply and delivery issues, in order to characterize the demands, supplies, projects, potential outages and other pertinent information necessary to perform the analysis. The consultant shall utilize the attached Appendix A and B information as a starting point in this work. Specific reports that will be made available include but are not limited to:

a) MWDOC WUE Master Plan (2013)
b) Water Alliance Model for estimating future WUE opportunities
c) MET estimates of passive conservation impacts on demands
d) MET Integrated Resources Plan
e) MET Water Surplus and Drought Management Plan (WSDM)
f) MWDOC South Orange County Reliability Study Update (2013)
g) OCWD Long Term Facilities Plan (2014)
h) IRWD and MNWD (still under preparation) Water Reliability Plans
i) OC Business Council Economic Value of Water Reliability (2003)
j) DWR Appendix 9.A. Economic Benefits of the BDCP and Take Alternatives
k) DWR – Delivery Capacity of the State Water Project

l) RECLAMATION's Climate Change Analysis for the Santa Ana River Watershed (Aug 2013)
m) RECLAMATION's Santa Ana River Watershed Basin Study(Sept 2013)
n) SAWPA's One Watershed, One Water Plan
o) Other

1.2 Project Meetings and Workshops – MWDOC and the Advisory Work Group will identify meetings and/or workshops to achieve the necessary input from the water community on water supply mix and reliability goals.

MWDOC and the Advisory Work Group will identify the stakeholders for each meeting or workshop. The Consultant shall provide support to MWDOC, OCWD and the Project Work Group for these meetings. For purposes of budgeting assume 10 meetings.

1.3 Draft and Final Reports – The consultant shall prepare a draft report for review and a final report.

Task 2 Review and Projection of Demands

The Consultant shall review historical demands and project future demands to 2035 as described below.

2.1 Historical Demands Analysis – Review historical demands back to 1990, including water conservation savings. Analyze OC demands post-2008 to determine the relative effect of various major factors (recession and economy, water rates and relative pricing, dry and warm weather, and conservation programs) that led to the decline and recent rebound in water demands.

a) Segregate out the impact from active and passive water use efficiency.
b) Estimate the appropriate factors for estimating the variability of future annual demands between wet and dry periods.

2.2 Projected Demand Analysis - Review demand projections summarized in Appendix A that include (a) the sum of the local agencies demands in OC and (b) those recently provided by MET that are based on their MWD Main Forecast Model (Draft, May 17, 2014).

Appendix B to this RFP provides a preliminary review of predicted climate change impacts on OC water supply and demand. This review was primarily based on the RECLAMATION's Santa Ana Watershed Basin Study (Technical Memorandum No. 1 Climate Change Analysis for the Santa Ana River Watershed, August 2013).

The consultant shall review and comment on the analysis of projected climate change impacts on demands, and use the results from this study in adjusting water demand projections to incorporate the effect of increasing temperature and other predicted changes, such as increasing severity and duration of heat waves, increasing summer humidity, changes in wind, etc.

Using regression or other statistical or modeling processes, develop a defensible high and low demand scenario (or projection with a plausible normalized band-width) for OC water demands from 2015 to 2035 in five-year increments, including an estimate of the potential active and passive conservation program measures water savings and climate change effect.

MWDOC and the Advisory Work Group will provide input and assistance regarding estimating active and passive conservation. MWDOC's WUE Master Plan is a source of information on active conservation opportunities. MWDOC also has access to the Water Alliance Model for estimating future water use efficiency opportunities. MET has also provided estimates of passive conservation impacts on demands.

Task 3 Review Existing OC Local Supplies

The Consultant shall review and update as appropriate existing supply estimates for average and dry year conditions as shown in Appendix A (data from MWDOC, OCWD and local agencies). The Consultant shall review and comment on those estimates for utilization in long range planning and refine, if necessary. Subtasks shall include:

3.1 SAR Watershed Supply Analysis – This task shall be conducted working with MWDOC and the Advisory Work Group with OCWD as the lead agency to develop an estimate of the future watershed supplies available for replenishing the OCWD groundwater basin. OCWD has conducted numerous studies and analyses on their supply sources which shall be utilized by the Consultant in carrying out this task. The analysis shall reflect OCWD's understanding of the historical and future base flow and storm water available to OCWD for recharge and the range of estimates between wet, average and dry periods (See Appendix A and B). OCWD shall be given a draft of the Consultant's report on this section for review prior to completion of the draft report. The projections should account for the following based on OCWD's operations and Long Range Facilities Plan:

a) Increased capture of Santa Ana River (SAR) flows at Prado due to planned improvements of the conservation pool and operating rules. The Consultant shall use the OCWD analysis of the potential gains from the final completion of the enlargement of Prado Dam and Reservoir and change in the conservation pool period of operation and water level.

b) Loss of SAR flows due to expanded upstream conservation and recycling. OCWD has made an evaluation of the potential SAR base flows which shall be used for this task.

c) Opportunities for purchase of Upper Watershed water for downstream use.

d) The 1969 judgment on SAR water rights.

e) Impacts due to Climate Change. As previously noted, the USBR and SAWPA completed a study of "Climate Change Analysis for the SAR Watershed" (See Appendix B).

f) OCWD operations and ability to capture and percolate the supplies.

g) The supply projection should also account for the potential for recovery of groundwater losses to LA County.

h) The Consultant shall review the historical operational storage range of the OCWD basin and shall work with OCWD to describe potential future operational strategies for groundwater basin storage utilization. A key aspect of this will be evaluating the availability and cost of supplies from MET over the long run for groundwater replenishment purposes to facilitate the groundwater basin operations. OCWD shall define their base anticipated operations and will develop alternatives based on the availability of imported water.

3.2 Non-OCWD Local Surface and Groundwater Supplies –The Consultant shall review the historical and projected non-OCWD local surface water and groundwater supplies shown in Appendix A, including Brea/LaHabra San Gabriel Basin supplies, and discuss any additional factors that should be taken into account with respect to long range planning.

3.3 Recycled Water – The Consultant shall review and comment on the historical and projected plans for recycled water supply in OC considering current and planned non-potable and indirect potable reuse projects and discuss any factors that should be taken into account, especially with regard to new potential IPR, SWA and DPR projects in OC. How would these efforts appropriately fit into OC's water future?

3.4 Regional Alliance Compliance Analysis with State 20 x 2020 and Future Goals – The consultant shall evaluate the compliance of the Orange County Regional Alliance in meeting the current 20 percent WUE goals by 2020 and shall also evaluate the potential State requirement for a 25 and 30 percent WUE levels by 2025 and 2030, respectively. This analysis shall determine additional WUE required to comply with potential new mandatory WUE requirements. Under this analysis, recycled water and WUE since 1990 are used in the analysis for the purpose of evaluating the efficient use and reuse of the developed supply.

Task 4 Estimate of Supplies Available from MET

The Consultant, with input from MWDOC and MET staff, shall complete an evaluation of current and projected supplies from MET. Consultant shall utilize statistical modeling including information from MET and DWR and recent paleoclimatology studies to quantify the variability of MET's supplies under plausible scenarios including estimates of future MET supplies available to OC.

Methodologies of apportioning MET supplies to OC shall include (1) Preferential Rights, (2) MET shortages (percent reduction) applied directly to import water to OC, (3) percentage of recent purchases from MET, and (4) others to be developed (including the current Water Shortage Allocation Plan and proposed modifications being discussed at this time). This important task is critical to understanding potential shortages and in decision-making to proceed with development of additional local or local/regional water supply projects. Plausible scenarios to be evaluated are:

4.1 Base Case – BDCP Implemented – Assume historical period of record hydrology and assume the BDCP is completed and operational by 2030, which would be the MET IRP base case.

4.2 BDCP is Not Implemented – This scenario is provided to show the importance of supply protection accorded by the BDCP. Use DWR projections and appropriate assumptions to evaluate the decline of supplies over time from the State Water Project due to current and future endangered species listings, climate change effects on water supply from the Sacramento River watershed, including sea level rise and repulsion of salinity intrusion, without make-up of these supplies, to demonstrate potential shortages that could occur into the future.

4.3 Extended Drought – This scenario would be applied to both 4.1 and 4.2 to examine the potential impact and storage/supply needs under longer duration droughts, including the setting out a basis for the severity of droughts – frequency, magnitude and duration. This work shall review paleoclimatology Sacramento River flow reconstructions, and other potential climate change impacts on MET's supplies (e.g. reduced snowpack and challenge of capturing and storing earlier runoff) to establish drought criteria.

4.4 Extended Outage of the SWP Due to Earthquake – This scenario would evaluate the impact on supplies from four potential major earthquake risks: (1) Delta, (2) San Andreas Fault that would knock out both the Colorado River Aqueduct and California Aqueduct (Porter Tunnel, Edmonston Pumping Plant over the Tehachapis and the East Branch Aqueduct), (3) San Andreas rupture of CRA only, and (4) San Andreas rupture of the SWP under case (2). Recovery times should be based on current MET or DWR estimates, if available or based on informed professional opinion.

4.5 Others as Suggested – The consultant shall suggest additional scenarios as appropriate.

Task 5 Develop a Supply Gap Analysis for Projected Demands and Local Supplies

Consultant shall develop a gap analysis comparing the projected demands to projected local and MET supplies under the local and imported supply scenarios for all of OC and subdivided by OCWD, South Orange County, Brea/La Habra, MWDOC and Total OC.

Task 6 Develop a Emergency System Gap Analysis (Amount and Days of Available Local Supply)

MWDOC will take the lead in completing an emergency system gap analysis by OCWD, Brea/La Habra and South Orange County subareas of Orange County assuming that earthquakes could result in outages to local facilities and assuming that delivery of MET water into OC may be unavailable for up to 60 days.

The Consultant shall assist and comment on the analysis. These three areas of OC rely on MET water for a different percentage of their supplies and hence would be impacted differentially by an outage of the MET supplies. MWDOC staff will provide a listing of the capabilities of local water production for each of the three areas. The maximum considered earthquake and potential larger earthquake scenarios on the major faults in OC will be described by MWDOC and used in this assessment.

The system reliability gap shall include the special situation of the future lining of the pre-stressed reaches of the southern Allen-McColloch Pipeline where shutdowns on the order of several of months may be needed on a recurring basis.

Task 7 Review Options for NEW Local Supplies and NEW System Capabilities/Supplies

The Consultant shall identify and help the Project Work Group and MWDOC Project Management staff to assess options for new local supplies and system improvements for, but not be limited to the following:

7.1 OCWD Basin Options (Working with OCWD)

a) Expansion of GWRS beyond 130,000 AF per year ("Phase 4")

b) Increased Storm Water Conservation at Prado (Under completed enlarged reservoir/dam)

c) Purchase upstream SAR water (groundwater, recycled or storm water)

d) Capture of basin outflow losses (LA County pumping and options for recovery to reduce losses)

7. 2 Ocean Desalination

a) Poseidon Resources Proposed Huntington Beach Project

b) Doheny Ocean Desalination Project

c) Camp Pendleton (Joint with SDCWA)

d) Other OC public developed project

7.3 Other Recycling Projects

a) Non-Potable Dual Distribution "Purple Pipe" Systems

b) Indirect Potable Reuse (San Juan Basin IPR, other)

c) Surface Water Augmentation (potentially in Irvine Lake)

d) Direct Potable Reuse (excluding "pipe-to-pipe")

e) Combined Ocean Desalination and Direct Potable Reuse

7.4 San Juan Basin Storm Water Conservation

7.5 Water Exchanges and Transfers

a) Strand Ranch

b) Cadiz

c) Other

7.6 Contract for a Higher Reliability from MET – This concept involves working with MET to secure additional supplies/transfers or dedicated storage in their system for drought or other reliability purposes, as contracted by their member agencies. These supplies would be paid for on a reimbursement basis and would be counted as "extraordinary water supplies" when needed by the MET member agencies contracting for these supplies.

7.7 Conjunctive Use Storage of Imported Water in OCWD Basin MET CUP Account for South Orange County for Emergency Supply – This option would evaluate concepts and arrangements for providing system reliability improvements for the South Orange County area from imported water stored within the OCWD basin. Opportunities for mutual benefits between the basin agencies and the SOC area would be key to the analysis.

7.8 Expansion of the Existing Emergency Services Concept from 2006 – The 2006 Emergency Supply Project (The Irvine Interconnection Project) that involved agreements between MWDOC, OCWD, IRWD and others would be examined for expansion opportunities. The provisions allowed imported water to be exchanged with groundwater via the IRWD system to provide up to 50 cfs of system supplies to South Orange County. To date, only 30 cfs of supplies have been implemented, leaving room for expansion under the existing agreement. In addition, per the terms of the IRWD Agreement, their system capacity to provide these supplies to others diminishes over time. An updated evaluation of their system capacity needs to be undertaken to evaluate the potential for extensions to this agreement for 2030 and beyond.

Task 8 Analysis of Policy Issues or Changes Needed for Implementation of NEW Projects

There are many policy issues that can influence the decision-making process for investments in future supplies for OC. The Consultant should develop recommendations on how to best address these policies for the benefit of OC and the region. These types of policies include:

8.1 MET Water Supply and Drought Management Plan (WSDM) – MET's method of allocating water during shortages is covered in its WSDM. The methodology is based on allocating MET's available water across the MET service area based on "the need for imported water". This can be viewed as a disincentive for certain types of projects when developed and paid for locally. With allocations, the local agency would receive a lower allocation from MET and hence a significant portion of the project reliability benefit is transferred to the region. This occurs whether or not MET has provided an incentive to the project and limits the ability of a local area to substantially change its reliability under this current policy.

8.2 Extraordinary Water Supplies – Unlike other local projects, local projects developed to provide NEW supplies ONLY in the event of an allocation scenario are not discounted as noted in (8.1) above. These types of supplies essentially provide a 1:1 benefit for the local agency making this investment. These include groundwater storage banks that would be dedicated during periods of shortage allocations, reducing their overall supply benefit (e.g., not being used to reduce risk of going into a shortage, but used only after a shortage is declared).

8.3 Regional vs Local Benefits – Various types of water supply projects carry with them different local and regional benefits. For example, an ocean desalination project provides a constant supply into the region under any type of hydrology. The water may not be needed to balance water supplies each and every year from a local basis, but operationally, it may offset the sale of MET water in average and wet years but may be critically important in dry years. How can these types of benefits be accounted for and valued in looking at the regional system? What is the value created by offsetting MET water, in certain amounts, and allowing MET to store that water for future use during dry periods when water has a much higher value, approximating the value of the cost of ocean desalination? One of the trade-offs is MET loses a sale of water during normal periods and their financial integrity is partially affected, but if they have storage capacity to allow storage of that water, it becomes higher valued for later use in a dry period – how should

this be accounted for in the regional system? If MET is restricted in its ability to export SWP during above normal and wet periods in order to increase outflows, will MET have sufficient wet period supplies to fill cyclical storage accounts?

8.4 MET as the Regional Supplier – MET as the regional provider, provides for water supply reliability in Southern California – if MET is reliable, we all are reliable (in the MET family) and the opposite is also true. How can decision-making be applied to avoid collective regional over or under investing? How should the MET Integrated Resources Plan coordinate these types of decisions while allowing flexibility for local control to adjust reliability while maintaining MET and local agency financial integrity?

8.5 Level and Extent of MET Storage for Managing Supplies – With increasing variability and uncertainty in supplies from both the CRA and SWP due to restrictive regulations that have decreased the developed supply, future major floods and earthquakes that could disrupt the imported water supply for long periods, combined with population and economic driven water demand growth and climate change impacts, the overall future variability and uncertainty in supplies for the region needs to be evaluated and the system and supply enhanced. MET's increased storage was planned to meet demands under a six year drought, but loss of SWP supply has likely reduced this capability. How much additional storage does the SWP and MET need to develop, both surface and groundwater, to meet future demands through 2035? Given the difficulty of dealing with a substantial outage of the SWP or Bay-Delta due to a major earthquake, should MET be pursuing additional surface and groundwater storage south of the Tehachapi Mountains? How would this storage provide benefits in conjunction with the Bay Delta Conservation Plan?

8.6 Incentives Provided by MET – MET's financial strength helps stabilize the State and Southern California. MET compensating agencies for developing more local supplies can cut into MET's sales base and financial integrity, driving up rates. What types of partnership or policy arrangements can be developed for the region to grow more reliable together? Where do we draw the line between the regional and local system, investments and responsibilities and who is best suited to address these issues?

MET's contribution of $250 per AF for local projects and ocean desalination has not been adjusted in many years, however, MET's rate increases over the past 10 years have incorporated funds to support local project development at or below the cost of MET water.

The rationale MET used in establishing the $250 per AF for groundwater desalters was based on a study of the costs/economics of groundwater desalters compared to MET's projected rates. Is this still the appropriate approach or is there a better way, such as MET/Member Agency partnerships in new southern California supply development? Valuing water produced that would be available for placing into long-term storage? What are possible next steps in evaluating or modifying the level of incentive provided by MET?

8.7 Extended Drought Planning Criteria – What is the appropriate extended drought sequence to hedge against? What is DWR and MET considering based on new reconstructions of Sacramento River flows and mega-droughts?

8.8 Water Supply and Storage Reserve – How large should a water supply and storage reserve or "contingency" be planned for regionally? What are the risks associated with such a reserve supply? The Consultant is encouraged to identify other or new policies that represent obstacles to supply development or that would further the development of local water supplies for benefit of the region.

8.9 Evaluation and Inclusion in Decision-Making – How can these policy issues be evaluated or included in the Task 9 decision-making process?

Task 9 Develop and Apply a Decision-Process Regarding Selection of Recommended Projects Including Ranking and Prioritization

Consultant shall develop and utilize a project evaluation process for decision-making to assist in the process of ranking and prioritizing projects for consideration for future implementation. Decision-making factors could include the following:

a) Project location
b) Conveyance and treatment options
c) Supply yield (average and dry year)
d) System yield (cfs)
e) Vulnerability to supply shortages from droughts
f) Vulnerability to disruption from earthquakes
g) Implementation issues (difficulty or ease including up-front planning through permitting funding, permitting, schedule, etc.)
h) Capital and O&M Costs and Unit Costs ($/AF)
i) Dependence on MET system (e.g. groundwater basin replenishment needs)
j) Institutional and regulatory issues
k) Other

Consultant should identify any events or triggers that should be carefully tracked to signal the need to initiate additional supply development. The policy issues identified in Section 8 shall also be included or accounted for in the decision-making process in an appropriate manner.

IV. Proposal Submittal

Proposals shall be submitted to the Municipal Water District of Orange County headquarters no later than 3:00 P.M. on Friday, August 27, 2014. Proposals should be addressed to:

Richard B. Bell, PE
Principal Engineer/Manager, Water Resources and Facility Planning
Municipal Water District of Orange County
18700 Ward Street, Fountain Valley, CA 92708

Proposals shall be submitted in electronic form plus one bound executed original and one reproducible copy. The electronic proposal file is to be emailed to Rbell@mwdoc.com. Additional information on firm experience and qualifications, including the Proposal, may be provided on a CD-R in the proposal. Additional information contained on the CD-R beyond the Proposal limitation in V.H. will be considered as background qualifications information, and will not be deemed part of the Proposal.

Proposals will become the property of MWDOC. Proposals will be held in confidence to the extent permitted by law. After award of a contract or after rejection of all proposals, the proposals will be public records subject to disclosure under California Public Records Act (Government Code Section 6250 et seq.).

V. Information to Be Submitted

The proposal must be clear and concise, and limited to 25 pages, well organized and demonstrate your firm's and team's qualifications and experience for conducting this work. The proposal must contain the following information as a minimum:

A. SCOPE: Detailed scope of work and methodology that comprehensively defines and describes the proposed approach to the conduct of the individual tasks. This scope of work will be used as a basis for any future contract amendment negotiations. The scope of work shall, at minimum, address the items shown in Section III "Scope of Services". The Consultant should be efficient in their conduct and approach to this project; if it makes sense to deviate from MWDOC's proposal the Consultant shall first discuss any changes with the Project Manager. The Consultant is encouraged to make recommendations that would enhance the overall project, suggest additions or deletions to the scope, or note any items that are missing from this scope that should be addressed to best achieve the primary objectives for this work. The scope of work shall specifically account for information to be developed and provided by MWDOC to reduce study costs.

B. TEAM: Descriptions of specific experience and capabilities of designated project manager and key team members that are directly relevant to the scope of work. Include a schedule showing team member task hours and the percentage of time each member will contribute to the project. Key personnel assigned to the project shall not be reassigned without prior MWDOC written approval.

C. REFERENCES: Description of the project team's past record of performance on similar projects for which your firm has provided services. Include a concise summary of such factors as control of costs, quality of work, and ability to meet schedules. Include five client references for similar work conducted by the Consultant team that may be contacted by MWDOC.

D. SCHEDULE: Assurance of the firm's ability to staff and complete all work, considering the firm's current and planned workload to meet the following schedule:

- Notice to Proceed to be issued in September 2014 after the selection committee decision is made and MWDOC Board approval, depending on the final scope, cost of this work and availability of funds.
- Progress Review Meetings - Monthly
- Complete Gap Analysis and start of Project Decsision Making Process
- Final Report - two months following receipt of comments on Draft Report (May/June 2015)

The schedule should also reflect coordination items, any critical path issues, and allowance for the MWDOC Work Group review and comment.

E. BUDGET: The Consultant shall provide in the proposal an analysis of the estimated hours that each project team member, including any sub-contractors and outside laboratories, will contribute for the individual tasks depicted in the scope of work. The Consultant shall also separately identify costs of all sub-contractors and other direct reimbursable costs to the project such as reproduction, mileage, etc. The consultant shall briefly explain why their task allocation of labor hours and costs provides the most effective use of budgeted funds to meet the objectives of this effort. If estimated costs exceed the budgeted funds, the consultant shall recommend areas where the scope of work can be reduced to keep the project within the budgeted funds.

F. CONFLICT OF INTEREST: Provide documentation that personal or organizational conflicts of interest prohibited by law do not exist.

G. CONTRACT: A sample copy of MWDOC's professional services agreement is attached (Appendix D). Please state in your proposal your willingness to accept the agreement terms and conditions. If you require any changes, please include in your proposal any proposed modifications to the standard terms and conditions. While MWDOC negotiates such changes with Consultants, MWDOC will consider your proposed modifications during Consultant selection and retains the right to reject any portion of your proposed modifications.

H. PROPOSAL LENGTH & SIZE: The letter of transmittal, executive summary, technical approach and labor hour/cost allocation Proposal shall be limited to 25 one-sided 8½ by 11 inch pages. Proposal supporting tables and figures specific to this project shall not exceed an additional 10 one-side 8½ by 11 inch pages. The project team organization chart, key team member resumes, representative project experience, and client references for the key team members, shall not exceed an additional 10 one-sided 8½ by 11 inch pages. The total proposal length shall not exceed 45 pages. To accommodate emailing the proposal to the PRP members, the overall proposal file size shall not exceed 5 MB.

VI. Consultant Procurement Schedule

The anticipated schedule for procurement of the consultant is shown below:

- Release of RFP — July 2014
- Proposal Due — August 27, 2014 by 3:00 pm
- Interviews (if needed) — TBD
- Award by MWDOC Board — TBD
- Kick Off Meeting — TBD

The agreement documents will be sent out within a day of the contract award for execution by the consultant and then by MWDOC. A notice to proceed will be issued at that time.

VII. Selection Process and Other Instructions/Limitations

A selection panel consisting of representatives from MWDOC and the member agency work group and Metropolitan Water District staff will review the Proposals and consider the following factors to select the most qualified firm/team:

- Completeness of proposal
- Understanding and approach to the work
- Quality of the task descriptions to undertake the scope of work
- Team and project manager experience in similar projects
- Professional qualifications of the team
- Firm resources and capabilities
- Quality of previous work performed as indicated by letter's of reference and references
- Demonstrated ability to manage and conduct the work within the proposed budget and schedule
- Cost of services and effort proposed to meet the objectives of this work

The Selection Panel will review all written proposals considering the above factors and may hold interviews with selected respondents. During the consultant selection process the Selection Panel may

contact either the recommended firm or a short list of firms to obtain additional information, and may contact recent clients. Interviews, if needed, will be scheduled to be held one week after receipt of the proposals.

Based upon this process the Selection Panel will recommend a firm to the MWDOC's Board of Directors for award of this work. The selected firm must be able to begin work immediately upon award and must be able to maintain the required level of effort to perform the work on-schedule.

This request does not commit MWDOC to retain any Consultants, to pay costs incurred in the preparation of proposals, or to proceed with the project. MWDOC reserves the right to reject any or all proposals and to negotiate with any qualified applicant.

Appendix A
OC Water Reliability Investigation 2014
Background Information on OC Water Supply and Demand

1. Demographics, Housing and Economics

A. Population Growth

Findings: Population projections by different agencies vary somewhat for Orange County, as shown in the following table. Near term population is projected at 2015 to range from 3,132,250 million to 3,154,580, a variation of 22,330. In 2035, the population projections showing a widening range from 3,311,810 to 3,539,900, a variation of 228,090.

Population Projection	2015	2035	Change
OC CDR OCP-2010 Modified	3,154,580	3,421,230	266,650
MET – SCAG 2012 (Draft 5/17/2014)	3,132,250	3,382,280	250,030
CalTrans 2013	3,151,350	3,539,900	388,550
CA Dept of Finance 2013	3,141,830	3,311,810	169,980

Conclusions: The increment in population growth over the period from 2015 to 2035 shows a range from a low of 169,980 to a high of 388,550, both the most recent projections that capture an improving economy. This represents a significant variation in projections. MET has relied on the census and 2011 projections which do not capture the improving economy and may underestimate the future population in Orange County. Water demands for the MET population projection and the higher population projection are assessed in the subsequent section on water demands.

Recommendations: Planning projections should consider a future band in the population projection rather than a single number.

B. Housing Projections

Findings: MET's projection of housing, based on SCAG 2012 Regional Transportation Plan, shows the an increase in occupied housing units from 2015 to 2035 at 97,495 units.

Occupied Housing Units	2015	2035	Change
Total	1,013,620	1,111,115	97,495
Single-Family	646,968	688,155	41,187
Multi-Family	366,652	422,960	56,308

This represents an average persons per dwelling unit at 2.56 based on MET's population projection and growth increment. Taking the average number of persons per multi-family at 2.0, the number of persons per single family unit would be 3.37.

Conclusions: There is a current trend in construction of multi-family rentals and condominium projects, as well as urban re-development as the entry level market is being geared to the younger population that has a higher unemployment rate and is carrying a large student loan

debt which constrains their ability to purchase larger, more expensive single family units. This trend is likely to continue and increase over the planning period as the projections indicate. The effect of increasing employment as discussed below may result in a growing demand for more local, affordable housing in OC which would result in a greater percentage of multi-family units.

Recommendations: The projected housing mix for the population projection band should be incorporated into the water demand projections. The average number of persons per dwelling unit should be verified.

C. Employment Projections

Findings: Orange County's total employment in 2015 is projected in the range of 1,511 million (CA DOT – 2013) to 1.546 million (CDR OCP – 2010 Modified). 2035 employment is projected at 1.779 million (SCAG and CDR OCP – 2010 Modified) to 1.824 million (CA DOT – 2013). MET projects 2035 employment at 1.747 million.

Employment Projection	2015	2035	Change
OC CDR OCP-2010 Modified	1,546,870	1,778,845	231,975
MET – SCAG 2012	1,545,340	1,747,110	201,770
CalTrans 2013	1,511,300	1,823,500	312,200

OC is a major regional employment center and has a net daily in-migration of workers. The following table shows the projected ratio of employment to total population for 2015 and 2035 by the three projections. In all cases, the employment to population ratio is projected to increase to around 52%.

Employment Projection	2015 Employment to Population Ratio	2035 Employment to Population Ratio
OC CDR OCP-2010 Modified	49.0%	52.0%
MET – SCAG 2012	49.3%	51.7%
CalTrans 2013	48.0%	51.5%

Conclusions: The increasing ratio of employment, approximately a 5% increase over 2015 levels, would indicate increasing net-daily in-migration of workers from other counties into OC. Office and daily use of water by workers is low and the effect overall would be about 1,000 afy.

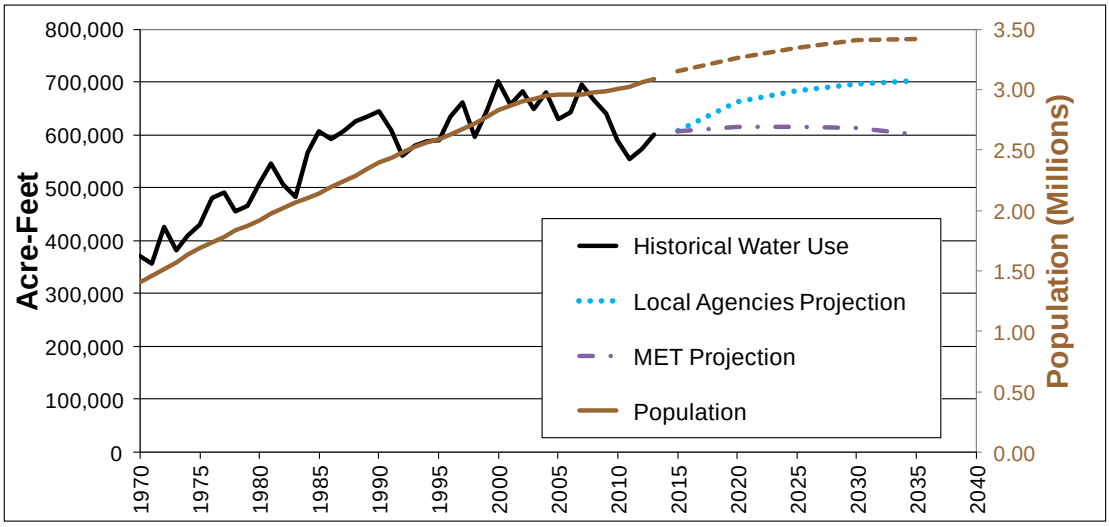
Recommendations: The increasing employment to population ratio indicating an increasing net daily influx of workers into OC demand effect of about 1,000 afy should be included in the projections.

2. Water Supply and Demand

A. Projected Water Demand (Consumptive Use)

Findings: Historical population and water demand growth in Orange County from 1970 to 1990 tracked population and then with the start of drought response passive and active conservation programs average demands relatively flattened until the housing bubble collapse and subsequent severe economic recession that started in 2008 when demands began to decrease

bottoming out in 2011. The following graph shows these trends in water demand and population growth and provides current projections to 2035.



Orange County Historical and Projected Population and Water Demands

Currently, there are two demand projections for OC, one recently prepared by MET and the other compiled by MWDOC based on the total of all retail water agencies projections. These projections are shown in the following table. The differences between the two is primarily the result of the assumptions in active and passive conservation achievements and in some cases also due to differeing estimates in population growth.

Average Demand Projection (Acre-Feet Per Year)	2015	2035	Change
Local Agencies Projections	608,590	702,820	94,230
OCWD GW Basin Area	438,730	509,320	70,590
Non-Basin Areas	169,860	193,500	23,640
MET Projection	587,900	604,870	16,970
OCWD GW Basin Area	423,290	435,510	12,220
Non-Basin Areas	164,610	169,360	4,750

Note: Basin/Non-Basin splits for MET projection assumed at splits based on local agencies projections.

MET has projected 2015 normal total consumptive water demand in Orange County at 587,900 afy. Local agencies projections for 2015 total 608,500 afy. In contrast, in 2013, a dry year with record statewide drought conditions and active calls for extraordinary conservation, the total demand was 606,000 afy.

- Based on MET's projections, 2013 average demands would have been approximately 580,000 afy, 4.5% less than what occurred during the dry year 2013.

- Historically, before the economic recession, dry year demands would typically increase above average demands by up to 8%.

- If the remainder of 2014 and 2015 continue to be dry, 2015 demand would be expected to increase by a minimum of 4.5% or 26,500 afy to 27,380 afy over the 2015 MET and Local Agencies projections, to 614,400 afy and 635,900 afy, respectively.

- At an 8% increase, the 2015 dry year demands would increase by 47,030 afy to 634,930 afy and by 48,680 afy to 655,180 afy for the MET and Local Agency projections.

The effect of voluntary calls for conservation or mandatory conservation requirements (see SWRCB July 15, 2014 Emergency Conservation Regulations) would reduce dry year demands to conserve water supplies. It is also important to note that total water demands in OC have rebounded in the last two years after a significant drop from the 2008 economic housing bubble collapse. The rebound is due to a combination of very dry conditions with a contribution from an improving economy, improving consumer confidence, an increase in population and employment growth, and a rebound in housing development.

OC's 2035 average total consumptive water demand is currently projected by MET at 604,870 afy and by local agencies at 702,820 afy. These two projections were slightly adjusted for the relative projected employment gains and provide a reasonable band for the low and high water demand projections. MET's demands assume continuing change outs to more efficient units and price-elasticity reductions than the local agency projections. If the higher population projection is realized, it would increase MET's projected water demands by about 4% above those shown with a similar effect on the local agency projection.

Current active conservation programs are expected to conservatively reduce this demand by an additional 10,000 afy. The effect of higher average temperatures and more frequent heat waves predicted by climate change models would lead to higher evapotranspiration rates which would increase demands by also about 10,000 afy, offsetting the gain in current active conservation programs. Projected dry year demands would likely range from 660,000 afy to 680,000 afy depending on drought conditions and the level of active calls for extraordinary conservation.

Additional outdoor water use efficiency programs under an accelerated turf removal program could save an additional 30,000 afy, assuming non-functional turf, at 25% of total turf, is removed and replaced with low water using plants. This would offset imported water purchases. Additional gains would be possible with further turf reduction. This potential savings is not included in the projected water demands.

Current State law requires water agencies to achieve conservation levels of 20 percent by 2020 from 1990 levels, which is met by both the efficient use and reuse of the developed supply. Current discussions indicate that new legislation requiring conservation targets of 25 percent by 2025 and possibly 30 percent by 2030 will be required. These analyses are not included in the two projected demand scenarios.

Conclusions:

- MET's 2035 demand projection, primarily by passive conservation and price-elasticity demand effect assumptions, shows an increase of only 16,970 afy, exclusive of current MWDOC active conservation programs which are projected to further reduce demands by an additional 10,000 afy. This would reduce the growth to only 6,970 afy.

- The Local Agency 2035 demand projection is projected to increase by 84,230 afy, with the an adjustment for MWDOC's current active conservation programs.

- CalTrans projects 2035 population growth will be 4.3% higher than MET's projection. If this projection were realized, it would increase the projections, assuming the weighted average per capita use of 140 gpcd for the marginal growth increment, by approximately 17,000 afy plus the higher relative employment gains would result in higher normal demands than projected by a total of about 18,000 afy.

- Removal of non-functional turf (estimated at 25% of total current turf area) can potentially reduce OC water demands by about 30,000 afy.

- A change from current water rate structures to allocation based rate structures would be expected to further decrease projected demands, but this cannot be determined at this time as each agency would make a determination of the water allocation based on a reference plant type(s).

Recommendations: A review of the MET and local agency demand projections should be made regarding assumptions and projected trends and forecasts in population and economic growth, relative employment, housing mix and persons per household.

In addition, the projection should evaluate water use efficiency programs, climate change effects from a warming atmosphere, and new WUE programs, including turf replacement to develop a reasonable high and low demand scenario and from new legislation that may require meeting a 25 percent conservation level by 2025 and 30 percent by 2030.

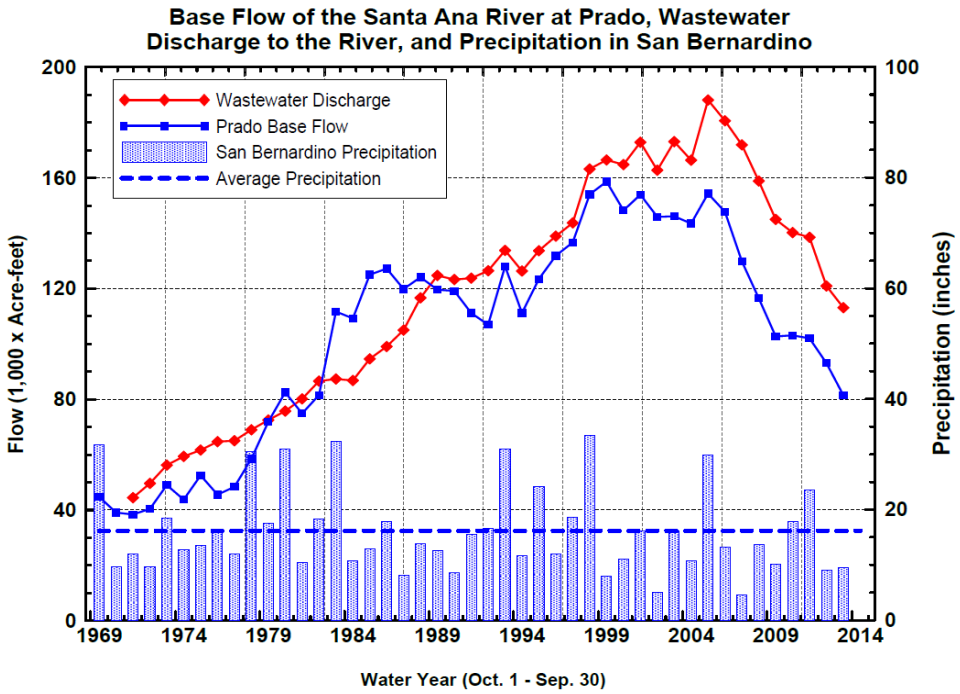
An estimate of the potential water use reduction from the use of allocation based rate structures should also be evaluated. The scenario projections should be made to form a band to constrain the reasonable range of outcomes based on the results of this evaluation.

B. OC Local Water Supply

Findings: The 2015 normal year OC local supply yield is estimated at 345,000 afy, 57% of average demand. The 2015 dry year OC local supply is estimated at 267,000 afy, 40% of dry year demand. From 2005, the Santa Ana River base flows decreased from 160,000 afy to 81,500 afy by the end of water year 2012/13 as shown below, primarily due to drought and reduced infiltration/inflow into sewer collection systems, price and economy induced conservation, and upstream recycling.

The 2035 local water supply is projected to increase with new recycling projects, increased Santa0 Ana River storm water capture, recovery of groundwater basin outflows, and ocean desalination projects. Implementation of groundwater storage banks (IRWD Strand Ranch, SMWD Cucamonga CWD and Cadiz Project) would provide water supply during drought shortages.

The planned expansion of the GWRS (Phase 2 is under construction and Phase 3 is in planning) will increase local indirect potable supply by 58,000 afy to a total of 130,000 afy. There is also a



potential Phase 4 project at 50,000 afy based on projected remaining wastewater flows that could be recycled (ref: OCSD). Studies are underway in SOC to determine the feasibility to augment San Juan Creek through an indirect potable reuse project. This work is not yet completed and no projection is included at this time. Expansion and extension of dual system, non-potable recycling projects is projected to increase supply by 22,000 afy by 2035.

Maintaining a 505' conservation pool year-round at Prado Basin is being proposed by OCWD. This would allow the additional conservation of stormwater on average of about 5,000 afy. This is considered a feasible change to the current operational plan when the enlarged Prado Dam flood control project becomes fully operational and is expected to be approved by the USACOE.

Capture of groundwater outflows to Los Angeles County is anticipated to recover about 10,000 afy on average. This may be accomplished through new wells and basin management measures such as increasing local basin production percentages for agencies located near the county line.

Ocean desalination offers a potential significant new potable supply source for OC and the MET region. The Poseidon Resources Huntington Beach project has been under development for several years and requires a California Coastal Commission permit and agreements by local agencies to purchase the water from the project. This project has a planned annual yield of 56,000 afy. At issue is the intake system and whether a subsurface intake system is feasible. A technical advisory panel is evaluating the feasibility of subsurface intakes in the Huntington Beach area. It is likely that consideration for approval of the project will be at the commission's spring 2015 meeting to be held in OC.

In south Orange County, the Doheny Ocean Desalination Project is now being pursued by South Coast Water District and Laguna Beach County Water District. It has the potential to produce up to 16,000 afy. A planned demonstration project of 5 mgd is being planned for implementation

Orange County Current and Projected Local Supply by Source (AFY)

Local Supply Source	Average Yield 2014/15	Dry Year Yield 2012/13	Average Yield 2035	Dry Year Yield 2035
Orange County Groundwater Basin				
Santa Ana River Baseflow	90,000	81,500	55,000	50,000
Santa Ana River Stormflow	53,000	18,380	53,000	17,500
Incidental Recharge	60,000	30,150	57,000	28,500
GWRS – Indirect Potable Reuse	72,000	72,630	130,000	130,000
GW Outflow Recovery	0	0	10,000	5,000
Subtotal	***275,000***	***202,660***	***305,000***	***231,000***
Other Local Groundwater				
Brea/La Habra	14,000	14,374	14,000	14,000
Aliso, Harding and Trabuco	500	356	450	300
Subtotal	***14,500***	***14,730***	***14,450***	***14,300***
Local Stream Systems				
Santiago Creek	3,000	1,860	2,850	1,770
San Juan Creek	9,000	7,510	8,400	7,130
San Mateo Creek	500	0	450	0
Subtotal	***12,500***	***9,370***	***11,700***	***8,900***
Recycled – Non Potable	**40,000**	**39,820**	**62,000**	**62,000**
Ocean Desalination	**0**	**0**	**72,000**	**72,000**
Total Local Supply	**342,000**	**266,580**	**465,150**	**388,200**
Total Demand – OC	**608,590**	**655,180**	**702,820**	**759,460**
Percent Local Supply	**56.2%**	**40.6%**	**66.2%**	**51.10%**
Total Demand – MET	**587,900**	**634,930**	**604,870**	**653,280**
Percent Local Supply	**58.2%**	**41.9%**	**76.9%**	**59.4%**

Notes: (1) Dry year demands estimated at 8% greater than average year demands.
(2) 5% climate change/warming impact on evapotranspiration and water supplies
(3) Turf Removal program not included in projected demand.

by 2019 with planned expansion to the full 15 mgd project capacity. These two projects could produce 72,000 afy. Additional projects may also be developed in the future.

The Santa Ana River base flows are projected to decrease with continuing upstream development of recycling and indoor conservation measures. The average or dependable SAR base flow is projected by OCWD to decrease to 55,000 afy with 34,000 afy set as the legal minimum flow by 2035. The dry year base flow is estimate based on historical dry year depletions at 50,000 afy. The average yield from San Juan Basin is assumed to remain at about 9,000 afy (middle and lower basin), not including climate change impacts.

In recent years, the OCWD Groundwater Basin has been drawn down and the overdraft could exceed 400,000 af by the fall of 2015 depending on whether the current drought continues and SAR base flows do not recover and further decline.

Predicted climate change impacts due to higher average and summer temperatures and corresponding higher ET rates and reduced snowpack and rainfall, are predicted to further decrease SAR flows by about 5% from current average levels based on a study conducted by USBR for the Santa Ana River watershed by 2035. This is estimated to reduce SAR, Santiago Creek and San Juan Creek natural supplies in total by about 5,000 afy in 2035. Climate change and increasing atmospheric warming beyond 2035 will continue to reduce local supplies.

During an extended drought, baseflows of the SAR would be expected to continue to decrease with increasing evapotranspiration and upstream depletions. The minimum baseflow of 34,000 afy should be used in evaluation of extended droughts. OCWD's evaluation of the main groundwater basin operable storage and basin production for the scenario's on extended drought should be utilized in this investigation.

OCWD manages the main Lower Santa Ana Groundwater Basin utilizing an annually set Basin Production Percentage and Basin Equity Assessment that makes additional groundwater production equal to the cost of imported water. OCWD operates and maintains a large forebay spreading operation to recharge the basin, sea water intrusion injection control barriers, and its Groundwater Replenishment System indirect potable reuse project. The basin has an approximate operable storage of 500,000 af. The basin is operated to minimize changes in the BPP allowing drawdown of the operable storage during periods of reduced local and imported supplies. OCWD's operational analysis for evaluation of the performance of the basin under 2015 and 2035 projections for a range of historical hydrologies and for extended periods of drought should be utilized in this investigation.

An analysis of local groundwater operable storage and management also includes the evaluation of the MET's imported supply and storage program capability to determine potential shortage levels and available supplies for groundwater replenishment as well as for direct deliveries.

Conclusions: The projected 2035 total OC average local supply is 468,150 afy, 77.7% of total demand (MET projection), and dry year supplies are projected at 388,200 afy, 59.4% of total demand. This case assumes both the Poseidon and Doheny ocean desalination projects are fully implemented. Without those projects, these projections would be reduced by 72,000 afy and local supplies in average and dry years would be 59.4% and 51.1% of total demand.

Recommendations: Current and projected supplies should be further evaluated and projected under a set of plausible supply development scenarios. Further work should document the projected SAR baseflows, stormwater capture, groundwater loss recovery, and climate change impacts over the planning period. A multi-year drought analysis is also necessary to evaluate the storage required to sustain supplies through 20th Century 6 year droughts and for longer, extended droughts.

C. Imported Water Requirements

Findings: The following table summarizes OC's existing and projected normal and dry year demands and supplies and shows the difference as a supply gap.

The supply gap would need to be made up from purchases of imported supplemental water from MET, development of additional new local water supplies, and/or from purchases of agricultural or other water for transfer and storage. Two cases are shown in the above tables: MET Projection and Local Agency Projection.

Conclusions: The 2015 supply gap under average demand conditions is 245,900 afy, 41.8% of total demand and 266,500 afy, 43.8% of the total demand, for the MET and Local Agency demand projections, respectively.

During dry years the 2015 supply gap would increase to 358,920 afy, 56.5% of total demand and 379,170 afy, 57.9% of total demand, for the MET and Local Agency demand projection, respectively. The supply gap during dry years would be satisfied in part from groundwater storage and imported water deliveries.

Imported water deliveries may be from purchases from MET or from OC owned storage/supply arrangements from sources outside of OC, such as IRWD's Strand Ranch Groundwater Bank, the Cadiz Water Project, or other supply source. Over an extended drought, groundwater production could decrease as the operable storage pool is drawdown resulting in an increasing demand for imported water or shortages which would require water allocations and mandatory cutbacks in demands.

The 2035 supply gap, under average supply conditions, without ocean desalination, without non-functional turf area removal program, and without GWRS Phase 4, is 211,720 afy, 35.0% of total demand and 309,670 afy, 44.1% of total demand, for MET and Local Agency demand projections, respectively. The 2035 supply gap, under average supply conditions, with ocean desalination and with turf removal, and without GWRS Phase 4, decreases to 109,720 afy, 19.1% of total demand and 207,670 afy, 30.9% of total demand, for the MET and Local Agency demand projection cases, respectively.

The 2035 supply gap, under dry year supply conditions, without ocean desalination, without non-functional turf area removal program, and without GWRS Phase 4, is 337,080 afy, 51.6%% of total demand and 443,260 afy, 58.4% of total demand, for MET and Local Agency demand projections, respectively. The 2035 supply gap, under dry year supply conditions, with ocean desalination, with non-functional turf area removal program, and without GWRS Phase 4, is 235,080 afy, 37.7% of total demand and 341,260 afy, 46.8% of total demand, for MET and Local Agency demand projections, respectively.

The 2035 supply gap, under dry year supply conditions, with ocean desalination, with non-functional turf area removal program, and with GWRS Phase 4, is 185,080 afy, 29.7% of total demand and 291,260 afy, 39.9% of total demand, for MET and Local Agency demand projections, respectively. The projections take into account the projected climate change effects of higher temperatures and evapotranspiration on water supply and demand.

Projected Imported Water Supply Requirement, MET Projection

MET Projection	2015		2035 No Desalination		2035 Desalination & Turf Removal		2035 Desalination, GWRS Ph 4 & Turf Removal	
Average Year	**AFY**	**%**	**AFY**	**%**	**AFY**	**%**	**AFY**	**%**
Demand	587,900	100%	604,870	100%	574,870	100%	574,870	100%
Local Supply	342,000	58.2%	393,150	65.0%	465,150	80.9%	515,150	89.6%
Supply Gap	245,900	41.8%	211,720	35.0%	109,720	19.1%	59,720	10.4%
Dry Year								
Demand	634,930	100%	653,280	100%	623,280	100%	623,280	100%
Local Supply	276,010	43.5%	316,200	48.4%	388,200	62.3%	438,200	70.3%
Supply Gap	358,920	56.5%	337,080	51.6%	235,080	37.7%	185,080	29.7%

Notes: (1) 2035 SAR baseflows: normal projected at 55,000 afy; dry at 35,000 afy (OCWD).
(2) Local supply excludes groundwater basin overdraft during dry years.
(3) Supplies are based on MWDOC and Local Agency projections.
(4) Dry years estimated at 8% over average demands.

Projected Imported Water Supply Requirement, Local Agency Projection

Local Agency Projection	2015		2035 No Desalination		2035 Desalination & Turf Removal		2035 Desalination, GWRS Ph 4 & Turf Removal	
Average Year	**AFY**	**%**	**AFY**	**%**	**AFY**	**%**	**AFY**	**%**
Demand	608,590	100%	702,820	100%	672,820	100%	672,820	100%
Local Supply	342,000	56.2%	393,150	55.9%	465,150	69.1%	515,150	76.6%
Supply Gap	266,500	43.8%	309,670	44.1%	207,670	30.9%	157,670	23.4%
Dry Year								
Demand	655,180	100%	759,460	100%	729,460	100%	729,460	100%
Local Supply	276,010	42.1%	316,200	41.6%	388,200	53.2%	438,200	60.1%
Supply Gap	379,170	57.9%	443,260	58.4%	341,260	46.8%	291,260	39.9%

Notes: (1) 2035 SAR baseflows: normal projected at 55,000 afy; dry (minimum) at 35,000 afy (OCWD).
(2) Local supply excludes groundwater basin overdraft during dry years.
(3) Supplies are based on MWDOC and Local Agency projections.
(4) Dry years estimated at 8% over average demands.

The following table summarizes the projected supply expressed as a percent of demand. This shows a modest improvement without desalination and non-functional area turf removal and a more significant gain with ocean desalination and turf removal to between 66.6% and 77.4% in average years. It decreases during dry years requiring use of dry year storage.

2015 and 2035 Projected Supply as Percent of Demand

	2015	2035 No Desalination	2035 With Desalination and Turf Removal
MET Demand			
Average Year	58.7%	65.5%	77.4%
Dry Year	43.5%	48.4%	59.4%
Local Agency Demand			
Average Year	56.7%	56.3%	66.6%
Dry Year	42.1%	41.6%	51.1%

Recommendations: An analysis using historical and extended severe drought is necessary to evaluate the management of the groundwater basin and to determine the level of shortages that can be accommodated over historical and extended severe drought. A review of the basin operations and strategies for defining the level of imported supplies needed to support basin operations should be evaluated. This analysis will need to be made considering MET's overall supply and storage availability during historical and extended droughts. The extended severe drought for planning purposes will need to be developed considering paleoclimate reconstructions and climate change factors. The level of supply gap and imported water supply requirement will need to be evaluated to determine appropriate policy.

D. Imported Water Supply

Findings: MET's current average supply from the Colorado River Aqueduct, including various conservation arrangements in 2014 is approximately 995,000 afy. The capacity under 8 pump sustained flow is approximately 1,250,000 afy. MET can store conserved water (e.g. Palo Verde fallowing program) in Lake Mead under the ICS program (Intentionally created storage) and during dry years on the SWP; during high demand years when supplies are short MET can pull water from its ICS account to supplement its CRA supply.

In recent years, MET's supply from the SWP has been dramatically reduced due to the endangered species rulings which have greatly restricted export pumping. Fishery agencies biological opinions (BioOps) under Section 7 consultation for Delta Smelt, Longfin Smelt and Chinook Salmon were recently upheld by the federal Court of Appeals, overturning the Wanger Decision that had only partially upheld the BioOps. Prior to these regulatory requirements, the average supply available to the SWP was 3.20 mafy out of a total CVP/SWP allowable average (median of period of record 1928-2012) export of 5.70 mafy. The BioOps and subsequent recent Court of Appeals ruling (not yet finalized) appear to have reduced the SWP/CVP average yield to 4.20 mafy or lower. The ruling on fixed incidental take limits no matter the population size, rather than the "proportionality" argument advanced by the SWP and CVP could have significant

impacts and are not yet known and require sound science to better evaluate this question. How this is resolved could further reduce the combined average projects yield.

Assuming a 4.20 mafy average combined SWP/CVP yield level, the SWP would receive approximately 2.36 mafy and MET's Table A allocation would be approximately 1.15 mafy. The BDCP estimates that without the BDCP or if the BDCP record of decision and implementation are delayed, and additional endangered species listings and new biological opinions are made, this could further reduce the overall average combined yield of the SWP/CVP to as low as 3.40 mafy, which would further reduce the average supply from the SWP to as low as 1.91 mafy. MET's share of the average yield would be about 0.95 mafy under this adverse scenario.

The BDCP is anticipated to restore some of the reduced flows by the operational flexibility that would be provided by a new north Delta diversion as this would reduce the incidental take of Delta Smelt, but could cause some additional incidental take of salmon. However, at this time it is unclear what the average yield would be from the SWP with the BDCP in place. The goal of the BDCP is restore the operable export yield between 4.6 and 5.7 mafy, with the SWP share being 56.1%, 2.58 mafy to 3.20 mafy. It is possible that the result may be no further improvement in yield but only firming up the yield and protecting the yield from further endangered species listing reductions.

The CRA average supply in 2014 is approximately 995,000 afy (CRA 4th priority at 550,000 afy, IID conservation by MET and SDCWA at 355,000 afy, PVID land fallowing at 100,000 afy, and miscellaneous at 20,000 afy) and during drought years using ICS storage in Lake Mead and additional fallowing, MET can bring in about 1,250,000 afy. The long-term goal of MET is to firm up this supply to the 1,250,000 afy aqueduct capacity level. MET's current CRA/SWP average supply is about 2,145,000 afy. With further endangered species listing in the Delta, MET's near-term average supply could decrease to 1,945,000 afy.

MET's total average demands are currently estimated at 1,883,100 afy and are projected to slightly decrease by 2035 to 1,880,750 afy as the result of continuing investments in local supply development that are projected by MET to offset the additional demand of 323,077 afy, after conservation savings, from the projected increase in population of 2,688,000 by 2035. Should additional endangered species listings occur before the BDCP is adopted and implemented, further cutbacks in exports could bring MET's average supply to below projected demands. This would require further local supply development to handle average supply conditions. During droughts the SWP supply would be further reduced and storage and possibly some agricultural transfers would be required to meet demands to avoid a shortage condition.

Another key benefit of the BDCP tunnels would be to protect exports from a massive Delta levee failure from a major earthquake. A major earthquake is projected to cause substantial levee failure and inundation of the central and south Delta area with seawater. It is estimated that restoration of exports could take as long as 3 years. Over the long-term, the new north Delta intake would protect the project from major earthquakes and would also help to protect the project from the direct impact of higher salinity due to sea water level rise and intrusion, but it can also be anticipated that additional water will have to be released to help repulse seawater and maintain water quality objectives. At some point water quality objectives would have to be relaxed or physical measures implemented to protect the Delta from seawater intrusion.

A large earthquake on the San Andreas fault in southern California could rupture both the Colorado River Aqueduct and State Water Project facilities. Recent studies by MET indicate that the 6 foot vertical allowance in the CRA in the vicinity of the San Andreas fault would protect the aqueduct from uplift by that amount. Repairing the canal sections would require about six months assuming that the general area is not uplifted above the canal. Potential damages to the San Jacinto Tunnel from a major earthquake, an unlined tunnel, are unknown.

The San Andreas Fault crosses the SWP aqueduct tunnel at a significant depth upstream of the East Branch and could cause the tunnel to be displaced 25 feet or more horizontally and up to several feet vertically. The nearby Edmonton PS would likely suffer significant damage as it was designed using 1960 seismic design criteria, which would not meet today's more stringent design criteria (we are unaware of any major seismic retrofits to the pumping station). Further, the fault parallels the East Branch system for several miles and could cause substantial damage to the aqueduct and pump stations.

The recovery time for restoration of SWP service could be one to two years or even longer, as repair of major damages to the tunnel, penstocks, and pumping stations would require significant time. Utilizing southern California storage, MET could meet demands for about 1 year with the CRA returned to service within 6 months. A better assessment of the damage potential to the SWP and the recovery time should be made by MET with DWR and the southern area contractors. If the recovery period lasts longer than one year, MET supplies would need to be cutback by about 50% when reservoir storage is depleted. This scenario would cause significant shortages to OC on the order of 10% to 18% under normal demands and higher during dry years.

Conclusions: Based on current information, MET's projected imported water supply and imported water demand is summarized below. The consultant shall review this analysis and provide appropriate updates and conclusions.

- MET's imported supply capability over the past several years has been adversely impacted by endangered species rulings and imposed pumping restrictions on Delta exports which have been upheld in a recent ruling by the Federal Court of Appeals.

- Without the BDCP or if it is significantly delayed, additional endangered species listings could cause MET's SWP average supply to drop to potentially as low as 950,000 afy based on MET's BDCP information documents. The BDCP successful implementation is critical to the future reliable supply from the State Water Project.

- MET's 2035 projections of demands on MET are predicated on population growth projections from the regional planning agencies (SCAG 2012 Regional Transportation Plan and SANDAG Series 12 Forecast) and local supply development of an additional 325,440 afy above 2015 average supply levels and an additional conservation level of 207,680 afy (passive and active programs), as shown by MET in their May 17, 2014 draft supply demand analysis. The local supply growth includes increases in groundwater production and recovery, surface water capture, recycling, and seawater desalination (Carlsbad Project).

- Over the planning period to 2035, and as governed under the Law of the River, and without a severe depletion of main stem reservoir storage from a prolonged drought that would trigger shortages on MET, and without additional agricultural conservation investments, MET's CRA supply would be about 995,000 afy.

- Total imported average supply from the SWP and CRA would be approximately 1,945,000 afy, about 64,250 afy above the 2035 projected average demand on MET of 1,880,750 afy.

During dry periods MET relies on their large cyclical storage accounts. The storage at any time is dependent on past hydrology and available water placed into storage accounts.

MET faces significant supply challenges from its State Water Project supplies due to the continuing uncertainties in future exports from the Bay-Delta. Future projections of increasing aridity in the Colorado River Basin will also increase pressure on the use of available water supplies in the basin. In addition, the projected 2035 demand on MET is based on the development of 325,440 afy of local supply and conservation of 207,680 afy as estimated by MET in their May 17, 2014 draft water supply and demand update.

Recommendations: The current situation poses questions relative to water supply reliability to MET's region and Orange County. Development of additional local supply from ocean desalination and agricultural transfers to aid in maintaining an appropriate supply buffer and reserve storage should be considered as a supplement to MET's core supplies. MWDOC should work with MET to evaluate a partnership approach in developing ocean desalination and regional/local agricultural transfer conjunctive use storage programs.

Ocean desalination could add to the overall supply to help maintain an adequate supply buffer to insure that MET has adequate water for storage programs. MET could also consider increasing its support for ocean desalination based on the net benefits that would be derived by the region. MET may also consider entering into a regional/local partnership in development of ocean desalination projects to help to move these projects forward as they are relatively costly and time consuming to plan and permit. An approach and policy development section should be considered with MET.

The consultant should suggest possible new policy refinements that could include: (1) the WSDM allocation program, (2) increasing the local resource projects subsidy, (3) a new business model where MET partners with local agencies in the larger, higher cost indirect and direct potable reuse projects and ocean desalination projects or where MET takes the primary responsibility for developing these projects with member agencies, (4) MET works with member agencies to secure agricultural transfers for joint conjunctive use storage programs, and (5) other arrangements.

Appendix B
Climate Change Impacts on OC Water Supply and Demand

Overview Outline of Main Assessment Areas

- Define Goals and Objectives
- Projection of Orange County Water Supply and Demand
- Identification of Climate Change Drivers on Supply and Demand
- Assessment of Impact on Demand
- Assessment of Impact on Water Supply
- Assessment of Impact from Sea Level Rise
- Regional Impacts on Imported Water Supply Availability to Orange County

Introduction

Climate change represents a change from historical temperature and precipitation patterns over our recent development period, often taken as the last 150 years. Significant climate change can occur from natural variations in climate forcing mechanisms, such as global oceanic currents and distribution of heat, solar output, and the amount of solar radiation reaching earth either due to orbital cycles and/or changes in the atmosphere. Changes in atmospheric composition can occur from volcanic activity (short term effects) and from increasing greenhouse gas (GHG) emissions, which leads to increased concentrations of gas, aerosols and fine particulates. These emissions combine to change the atmosphere's radiative balance, which leads to increasing heating or cooling. Additionally, both natural and anthropogenic causes are influencing factors.

The major purpose of this Appendix is to examine how natural climatic variations and global warming from anthropogenic causes (land use, agricultural and forest changes and burning of fossil fuels) may potentially impact future water supplies and demands in Orange County (OC) for use in this 2015 Water Resources Investigation. This Appendix shows estimate effects for 2035, 2050 and 2070.

The Intergovernmental Panel on Climate Change (IPCC) is the international body for assessing the science related to climate change. It was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. The Fifth Assessment Report (AR5) was released in October 2013 entitled "Climate Change 2013, Physical Science Basis". This report was prepared by 259 scientists from 39 countries. The report states the following: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased".

With increasing scientific evidence there has been an overwhelming acceptance of climate change by the scientific community throughout the world. According to NASA, over ninety-seven percent of climate scientists now agree that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position.

Recent policy in the United States and California now require assessment of climate change in planning future water resources and management activities. As a consequence of the above, the following scoping document has been prepared to address potential climate change effects on Orange County's future water supply, water demand and water management.

Define Goals and Objectives

The key overriding goal is to gain an understanding of the magnitude of the potential impact of a warming climate and and the effects from natural variability on OC's future water supply and demand, to describe the time frames, adaptive management, and to inform decision makers of the potential impacts. Specific objectives would be to describe the various factors that can impact water supplies and demands and current projected climate change scenarios based on a range of emission scenarios being evaluated by the IPCC. Other objectives would be to look at historical changes, the state of the climate science and models, and to describe recent studies that have been done in other areas to estimate climate change impacts on southern California water supply and demand.

California law requires inclusion of Climate Change assessment in Integrated Regional Water Management (IRWM) Plans and consideration of Climate Change in Urban Water Management Plans. In addition, under the California Water Code, environmental documentation must include a climate change assessment for project impacts and adaption in CEQA documentation.

Specifically, planning should consider the following climate change effects:

- Water Demand — Hotter days and nights, as well as a longer irrigation season, will increase evapotranspiration, plant-water demands, and other water usage.

- Water Supply and Quality — Reduced snowpack, shifting spring runoff to earlier in the year, reduced number of storms, shifting storm tracks, reduced precipitation, increasing water temperature and reduced dissolved oxygen levels, and increasing algal blooms in reservoirs are predicted - each has the potential to impact water supply and water quality.

- Sea Level Rise — Melting ice caps and thermal expansion of the ocean will steadily cause sea levels to rise, resulting in increased sea water intrusion potential impact on inland groundwater basins, seawater intrusion into river systems requiring greater releases of freshwater to repulse seawater, and reduction in flood control system capacities with increased flooding risks.

- Greater Extremes — More extreme climate events are expected to become more frequent as climate change brings increased climate variability, resulting in more extreme droughts, wildfires, and floods.

In addition, California requires that IRWM Plans must address both adaptation to the effects of climate change and mitigation of GHG emissions. The IRWM Plans must include the following items:

- A discussion of the potential effect of climate change on the IRWM region, including an evaluation of the IRWM region's vulnerabilities to the effects of climate change.

- A discussion of potential adaptation responses to climate vulnerabilities. The evaluation of vulnerabilities must, at a minimum, be equivalent to the vulnerability assessment contained in the Climate Change Handbook for Regional Water Planning

- A process that considers GHG emission reduction when choosing between project alternatives.

- The IRWM Plan must include a list of prioritized vulnerabilities based on the vulnerability assessment and the IRWM's decision making process.

- The IRWM Plan must contain a plan, program, or methodology for further data gathering and analysis of the prioritized vulnerabilities.

Projection of Orange County Water Demand

OC water demands since 1970 are shown in Figure 1. Total demands have ranged from about 370,000 acre-feet per year (AFY) to about 700,000 AFY. Demands have varied due to population and economic growth, water use efficiency programs, changes in relative median family income, climate variability (rainfall, temperature, humidity, cloud cover, and wind), and the general economy.

Following the economic repression brought on from the housing bubble and financial system collapse in 2008, water demands subsequently decreased by 20% in Orange County. However, over the past two years demands have slowly increased due to both a slowly improving economy and from increasing landscape water demands resulting from current drought conditions.

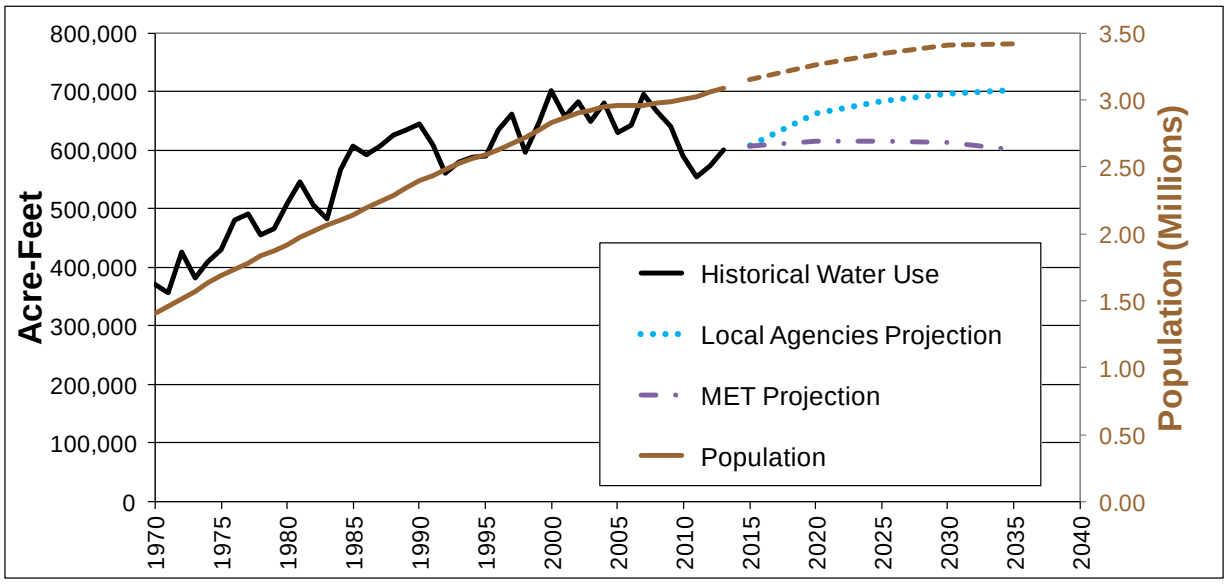


Figure 1. Orange County Historical and Projected Population and Water Demand

Figure 1 shows historical and projections of population and total water demand. It can be seen that prior to 1990 water demands tracked fairly well with population growth with annual variations primarily due to climatic and recession effects. Then, after major water conservation programs commenced in

1990, demands began to decline with increasing water use efficiency measures while tracking a slowing population growth, until after the housing bubble and financial system collapse in 2008. Demands then fell rapidly for three years due to the recession and wet and cooler weather, before rebounding slightly over the past two years primarily due to an improving economy, increasing home construction, and dry weather. A major issue is whether demands will rebound to pre-2008 trends or whether they will be permanently reduced due to the public's embrace of more efficient outdoor landscapes and water agencies promotion of water use efficiency and increasing use of budget-based water rates.

The 2015 OC Water Resources Investigation should note the potential impacts on water supplies and demands in the 2035 time frame from climate change. This effort will need to describe the relationship between population, the economy and income, and water rates on future water demand as well as climate change and natural variability and changes in the landscape palette to more drought tolerant, locally climate appropriate (California Friendly®) landscaping plants. General trends and extended, more severe droughts will need to be described.

Identification of Climate Change Drivers on Supply and Demand

There are two major climate change drivers that will impact water supply and demand in OC: (1) increasing air temperature and (2) shifts in the jet stream and atmospheric circulation patterns that drive precipitation. The following information summarized statewide and regional projections. This work should be further described for evaluation of future local climate change impacts specific to OC.

Increasing air temperature will mostly result in increased landscape evapotranspiration and water application needs. Changes in relative humidity and wind will also have effects on evapotranspiration rates, but these are not currently considered as large an impact as the predicted increase in air temperature. Shown below is the current projected change in global mean air temperatures to 2100 developed by the IPCC. The high emission scenario, RCP 8.5 shows an increase by 4.0 °C (7.2°F) by 2100 and for no change in emissions a 1.0°C (1.8°F) increase.

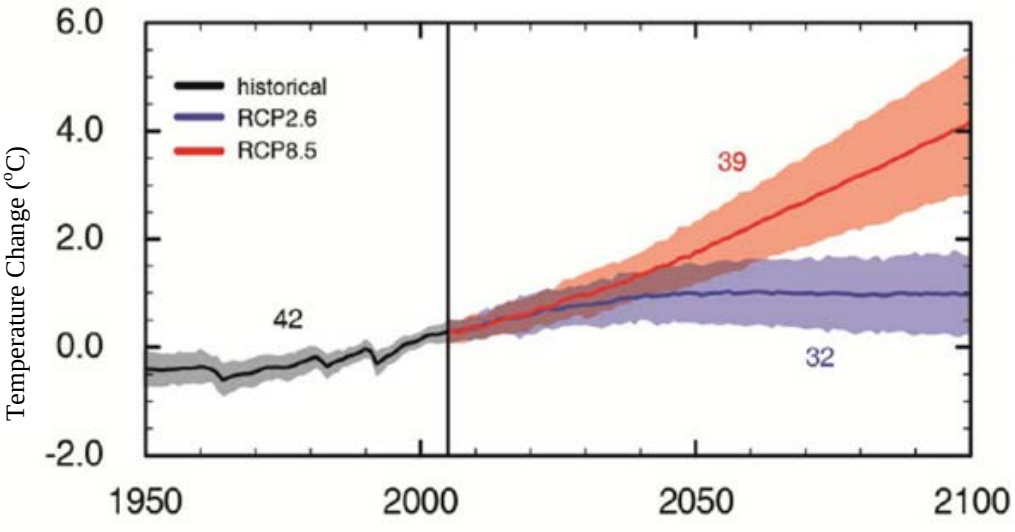


Figure 2. Historical and Projected Global Mean Air Temperature
Source: IPCC 2013 AR5 Report

The U.S. Bureau of Reclamation released a study in August 2013 entitled "Climate Change Analysis for the Santa Ana River Watershed". That study evaluated climate change drivers and estimated a projected range of impacts on water supply in the basin and regional water demand. According to this study, over the past 100 years the Santa Ana River Watershed has slowly warmed by 0.9°C (1.7°F), similar to increases observed throughout the State.

Based on global models conducted prior to the recent IPCC 2013 report, estimates were made for various scenarios. The low emission projection scenario predicted the mean temperature of the earth would increase by 1.8°C (3.2 °F) by 2100. Alternatively, the high emission projection scenario predicted an increase of 3.6°C (6.5° F) by 2100.

Climate models downscaled to the Santa Ana River Watershed for a mid-level emission scenario, indicate an increase in annual mean temperature of 1.7°C (3.1°F) and 2.3°C (4.1°F) by 2050 and 2070, respectively. The USBR study also projects that mean annual precipitation will decrease by 5.4% and 8.1% by 2050 and 2070, respectively. Combined, the Santa Ana River flows are estimated to decrease by 10.1% and 14.6% by 2050 and 2070. It is also predicted that the hot days and heat waves, defined as days over 35°C (95°F) will increase in OC from an average annual of 4 days to 12 and 16 days by 2050 and 2070, respectively.

In reviewing the new IPCC 2013 AR5 report, future scenarios are now referred to in terms of "representative concentration pathways" or RCPs. The four RCPs used are 2.6, 4.5, 6.0 and 8.5. By 2100, the projected mean increase in temperature will range from an RCP of 2.6 with a 1°C (1.8°F) increase to an RCP of 8.5 with a 3.7°C (6.7°F) increase. The low range scenario shows a lower temperature increase and the high end is slightly higher than the prior high emission scenario.

Assessment of Impact on Demand

To estimate changes in potential water use by landscape material, it is important to understand the current outdoor water use under a range of climatic conditions as well as the future outdoor water use in terms of expected variation to landscaped area, plant material, and climatic conditions. Estimating irrigation water demand is done by both determining the theoretical irrigation requirements from landscape evapotranspiration ETL and by applying an irrigation efficiency factor. Evapotranspiration is a combination of evaporation of water from soil and plant surfaces and transpiration, or water lost by the plant through openings in its leaves. ETL considers both the water needs of the varying plant material along with their corresponding proportion to the overall landscape area. In order to more accurately estimate future outdoor water use it is necessary to calculate ETL for future climate conditions over a 12 month period over the climatic zones in OC.

To estimate future changes in climate to OC, global climate model output is used for downscaling. Predicted climate values for a range of scenarios for daily minimum, maximum, and average temperatures along with precipitation and other climatic variables should be presented.

Reference evapotranspiration (ETO), is affected by air temperature, wind speed, humidity, solar radiation, and cloud cover. Landscape evapotranspiration (ETL) is then derived from ETO based on the factors stated above. In practice, based on the typical local landscape material the actual ETL values tend to be less than the theoretical ETO values.

There are empirical methods to estimate ETO, such as Hargreaves (v. 1985), and the adjusted Thornthwaite (1). More detailed methods such as the Blaney-Criddle, Priestley-Taylor or the Penman-Monteith equations are available, but they require greater levels of data input.

Studies indicate that by 2100 landscape demands could increase by 18% or more in California. Studies by the California Department of Water Resources staff, using California Irrigation Management Information System (CIMIS) data for lawn irrigation, have estimated that increasing temperatures will increase evapotranspiration rates by about 14% by 2070. This is a very rough estimate but should suffice for this Water Resources Investigation as climate changes over the next 20 years will be relatively small.

To gain a rough magnitude of the potential climate change impact on 2035 water demands in OC, it is first important to understand the current magnitude of outdoor demands. A preliminary review was made to estimate total outdoor water demand in OC in 2013, using total water demands less wastewater flows, excluding groundwater desalter brine flows and urban runoff diversions and Santa Ana River Interceptor line inflows from the Upper Santa Ana River Watershed. Total outdoor water demand in OC during calendar year 2013 was found to be 328,800 AF. To gain a rough magnitude of the potential impact on water demand due to a warming atmosphere, using the DWR preliminary estimate and assuming no change in plant mix over the next 50 plus years and only the increase in predicted temperature, ETO would increase by roughly 46,000 AFY by 2070. Assuming a linear relationship, 2035 ETO would increase by 5.1% or 16,500 AFY.

This study will need to recognize the change in average ETO due to increasing air temperature over a range of climate change scenarios for OC. The general effect from additional and more severe heat waves, longer irrigation season, warmer nights, and changes in wind and humidity should also be noted.

The study should also note that changes from the existing plant mix to a future plant mix that incorporates an increasing percentage of drought tolerant, California Friendly plants will reduce ETL. Variations in ETL by plant mix should also be noted in the study and the general effect described.

For extended, more severe droughts, an evaluation of historical droughts should be reviewed and a planning level drought criterion selected for this study. This will require review of paleoclimate tree ring and other climate proxy data to ascertain the magnitude, duration and frequency of droughts longer than current planning level that are based on the 1928 to 1934 and 1987 to 1991 droughts.

Assessment of Impact on Water Supply

The potential impact of climate change on surface water supply can be roughly estimated using various published studies. Changes in global air circulation and storm tracks, precipitation intensity and frequency, as well as increasing air temperature effects on upper Santa Ana River mountain snowpack are projected to reduce Santa Ana River flows and surface water supplies in OC. The USBR study predicts runoff reduction of 10% and 14.6% due to climate change by 2050 and 2070. Assuming a linear relationship and interpolating, 2035 would roughly see a runoff reduction of 6.5% from current levels. This would also likely reduce the number of storms and potential recoverable supply from storm water.

[1] The original Thornthwaite (1948) approach is well known for under-predicting results for arid climates. The adjusted Thornthwaite (Willmott et al., 1985) approach results in a slight over-prediction, but is considered statistically equivalent to that obtained with the more detailed Penman–Monteith FAO-56 parameterization scheme.

Storm water capture from the Santa Ana River since 1990 has averaged 52,892 AFY, ranging from a minimum of 5,784 AFY to a maximum of 118,495 AFY. To get a rough handle on the potential impact of climate change on future storm water capture, it is assumed that the reduced stormwater capture would be proportional to reduced water supply. On this basis, the reduction in Santa Ana River storm water capture supply could be about 3,500 AFY, 5,300 AFY to 7,700 AFY by 2035, 2050 and 2070, respectively. The average annual yield from Santiago Creek and San Juan Creek is approximately 20,000 AFY (8,000 AFY from Irvine Lake and 12,000 AFY from San Juan Basin).

Climate change impacts on these local supplies could subsequently amount to annual average reductions in yield from 1,250 AFY, 2,000 AFY and 3,000 AFY by 2035, 2050 and 2070, respectively. Additionally, the total potential reduction in surface water supplies due to climate change could potentially be on the order of approximately 7,300 AFY and 10,700 AFY by 2050 and 2070, respectively. For the purposes of this study, the effect can be assumed to be linear and thus interpolated for 2035.

Groundwater recharge from precipitation and lateral inflow would also likely be reduced by a similar proportion to surface water reductions. OCWD has estimated that incidental recharge to the basin has averaged about 60,000 AFY. Using the same reductions in precipitation, the incidental recharge could be potentially reduced by 6,000 AFY to 8,400 AFY by 2050 and 2070, respectively.

In sum, the total potential reduction in local water supply from climate change is roughly on the order of 8,500 AFY, 13,000 AFY and 19,000 AFY by 2035, 2050 and 2070 respectively. These levels are significant and this study will need to note the potential impact on water supplies in OC due to climate change. As in the demand analysis, natural variability will need to be analyzed for extended droughts.

Assessment of Impact from Sea Level Rise in Orange County

The objective of this assessment is to evaluate the potential impact of Sea Level Rise on water supply in OC. The record of increasing global temperatures over the past century have been accompanied by rising sea levels due to thermal expansion of the ocean from adsorption of atmospheric heat and from glacial and ice cap melting. Figure 3 shows sea level rise since the last glacial maximum.

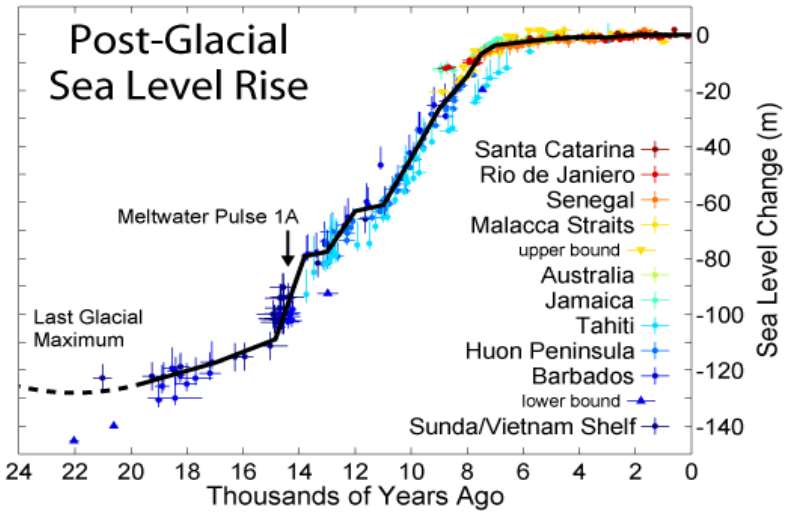


Figure 3. Historical Sea Level Rise

Sea level rise has been ongoing since the last glacial maximum that occurred about 20,000 years ago when sea level stand was about 360 feet (ft) lower than today. Models are predicting that sea level rise will continue and its rate is dependent on the rate of increasing air and ocean water temperature.

Sea level rise will gradually cause beach retreat, coastal flooding, intrusion of saline water into river systems and into coastal groundwater basins. At some point, higher sea levels will require (1) coastal flood control channels be raised to maintain flood protection, (2) increasing release of freshwater to repulse seawater intrusion into river systems such as the Bay-Delta, and (3) changes in sea water intrusion control for coastal groundwater basins.

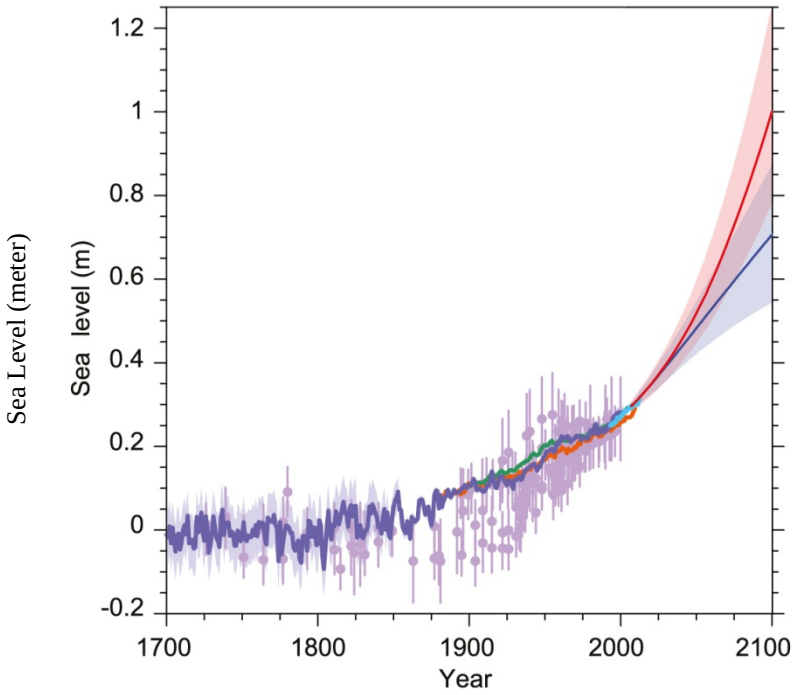


Figure 4. Projected Mean Global Sea Level
Source: IPCC 2013 AR5

Figure 4 shows the IPCC 2013 AR5 range in projected mean global sea levels for different emission scenarios. For San Francisco between 2046 and 2065, mean Sea Level Rise is projected to rise by 0.23 meter (m) (0.75 ft) with a range between 0.15 m (0.5 ft) and 0.35 m (1.15 ft). Between 2081 and 2100 the mean projection is 0.52 m (1.71 ft) with a range between 0.30 m (0.98 ft) and 0.78 m (2.56 ft). At some point in time, the use of injection barriers will no longer be feasible as the required injection elevations will continue to rise, which will cause shallow groundwater and potentially artesian conditions in coastal areas with increasing liquefaction potential.

Seawater intrusion control also will, at some point in time, have to transition from injection barriers to pumping extraction troughs. OCWD conducted a study on Sea Level Rise and seawater intrusion control for the USBR Santa Ana River Watershed study in 2013. They looked at a sea level rise of 0.91 m (3 ft) and concluded that changes would likely be required for their control system at this level. A 0.91 m (3 ft) Sea Level Rise is at the higher end of the 2100 range projection in Figure 4. Consequently, no impact on water supply in OC seawater intrusion control barriers should occur through the planning analysis period of this study due to Sea Level Rise.

Regional Impacts on Imported Water Supply Availability to Orange County

OC receives imported water from the Metropolitan Water District of Southern California (MET). These imported water supplies come from the Colorado River Basin (Basin) through the Colorado River Aqueduct and the Feather River watershed in the Northern Sierra mountains through the State Water Project (SWP). Both supplies are predicted to incur increasing shortages due to the effects of climate change. The objective of this assessment is to review and assess the potential impact on these imported water supplies for OC.

The Basin is projected to become warmer and drier due to an enlargement of the Hadley Cell, part of the global circulation system, which is predicted to expand northward leading to drier conditions in the Basin. In addition, paleoclimate reconstructions have shown that much drier and longer droughts have occurred in the Basin over the past 1,000 years and that these could re-occur.

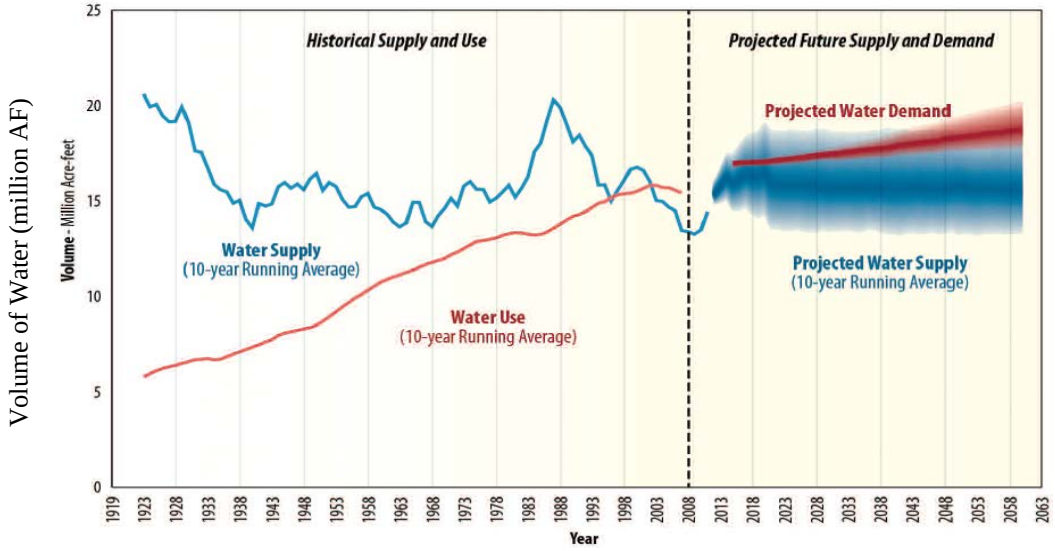


Figure 4. Historical and Projected Colorado River Supply and Demand
Source: US Bureau of Reclamation, Water Supply and Demand Study, 2013

A recent study conducted by the USBR and the seven Basin States on future supply and demand found that increasing demands will exceed projections of decreasing supplies and that the Basin is susceptible to long, severe droughts. Efforts are underway on evaluating the best course of action to address this future imbalance and extended drought. This may at some point cause a reduction in MWD's Colorado River supplies, but MWD is well protected as Arizona and Nevada under current law are required to take the first shortage before California.

Projections of impacts of climate change on the SWP supply are less clear, as the northern Sierras are in a transition zone of future changes. Climate models indicate that the northwest will become wetter and the southwest will become drier. Predictions for the northern Sierras range from drier to wetter conditions, so the future effect of climate change on the SWP supply is uncertain. What is highly likely is the effect of a warming atmosphere on the extent of the future snowpack. Studies show that the snowpack will shrink with increasing rainfall. This will impact seasonal storage and could impact water supply be increasing losses to the ocean.

The impact of Sea Level Rise will be more significant as movement of saline water further into the Bay-Delta will require increasing releases of freshwater to repulse the seawater intrusion. This will result in a gradual reduction in supply without changes in the regulatory control points.

Perhaps of greater issue is the potential for extended droughts. Recent tree ring reconstructions of the Sacramento River (2) flows back to 900 AD have been made for DWR (See Figure 5). These studies show that much longer and more severe droughts have occurred in the past. Climatologists indicate they could occur in the future. Extended droughts will require greater amounts of storage and new alternative supplies that are not tied into the hydrologic system.

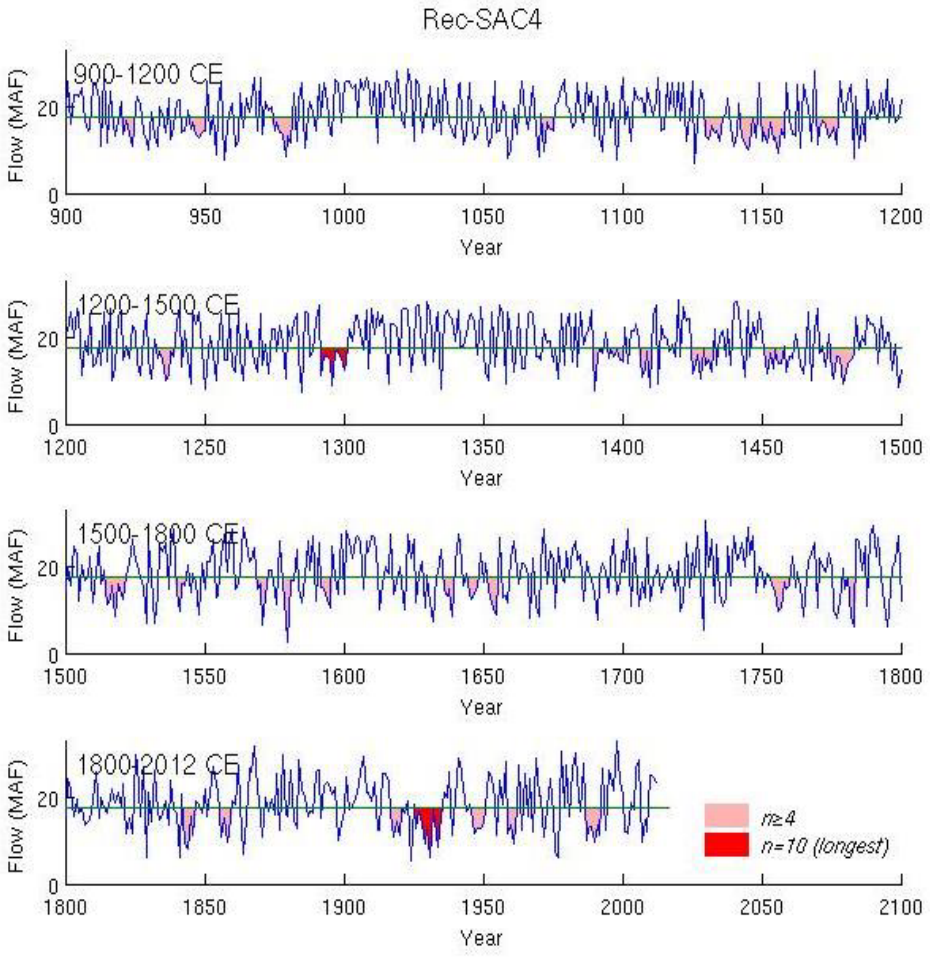


Figure 5. Reconstructed Flows of Sacramento River[2]
From "Klamath/San Joaquin/Sacramento Hydroclimatic Reconstructions from Tree Rings", Draft Report (Meko, Woodhouse, and Touchan, 2014)].

This work indicates that the most severe periods of extended drought occurred in the 1100s (20 – 50 year sustained dry periods), 1570 to early 1580s (up to decades-long periods), and 1920s -1930s (up to

[2] The Sacramento River includes the Feather River as a tributary.

20-year periods). Paleoclimate data and the derived reconstructed streamflows shows a broader range of hydrologic variability than what has occurred in the historical period of record. A repeat of the "Dustbowl Drought" of the 1920s and 1930s (the most severe historical event in terms of duration) with today's urban and agricultural development would as DWR has indicated "…would challenge California's infrastructure and institutional framework for water management". That challenge would pale in comparison to the time of the Medieval Climate Anomaly, when sustained severe drought gripped much of the western United States.

In addition to climate change impacts on hydrology, climate change will impact endangered species and regulatory protections through release of cold water and curtailment of exports during critical periods will likely increase as the result of both a warming atmosphere and a warming streamflow. This part of the study should note the impact of climate change on SWP imported water, without the BDCP, with the BDCP with additional outflows, and future climate change impacts on hydrology and endangered fish protections, as well as natural variability and extended drought based on published information. In addition, a review of the published climate change impacts on the Colorado River supply should be noted.

Appendix C

STANDARD AGREEMENT FOR CONSULTANT SERVICES
EPA GRANT PROJECT

This **AGREEMENT** for consulting services, which includes all exhibits and attachments hereto, "**AGREEMENT**" is made on the last day executed below by and between **MUNICIPAL WATER DISTRICT OF ORANGE COUNTY**, hereinafter referred to as "**DISTRICT**," and, _____ hereinafter referred to as "**CONSULTANT"** for _____ hereinafter referred to as **"SERVICES**."[3] **DISTRICT** and **CONSULTANT** are also referred to collectively herein as the **"PARTIES"** and individually as **"PARTY."** The **PARTIES** agree as follows:

I PURPOSE AND SCOPE OF WORK

A. Consulting Work

DISTRICT hereby contracts with **CONSULTANT** to provide general or special **SERVICES** as more specifically set forth in **Exhibit "B"** attached hereto and incorporated herein. Tasks other than those specifically described therein shall not be performed without prior written approval of **District's** General Manager.

B. Independent Contractor

CONSULTANT is retained as an independent contractor for the sole purpose of rendering professional and/or special **SERVICES** described herein and is not an agent or employee of **DISTRICT**. **CONSULTANT** shall be solely responsible for the payment of all federal, state and local income tax, social security tax, Workers' Compensation insurance, state disability insurance, and any other taxes or insurance **CONSULTANT,** as an independent contractor, is responsible for paying under federal, state or local law. **CONSULTANT** is thus not eligible to receive workers' compensation, medical, indemnity or retirement benefits, including but not limited to enrollment in CalPERS. Unless, expressly provided herein, **CONSULTANT** is not eligible to receive overtime, vacation or sick pay. **CONSULTANT** shall not represent or otherwise hold out itself or any of its directors, officers, partners, employees, or agents to be an agent or employee of **DISTRICT**. **CONSULTANT** shall have the sole and absolute discretion in determining the methods, details and means of performing the **SERVICES** required by **DISTRICT**. **CONSULTANT** shall furnish, at his/her own expense, all labor, materials, equipment and transportation necessary for the successful completion of the **SERVICES** to be performed under this **AGREEMENT. DISTRICT** shall not have any right to direct the methods, details and means of the **SERVICES;** however, **CONSULTANT** must receive prior written approval from **DISTRICT** before using any sub-consultants for **SERVICES** under this **AGREEMENT**.

C. Changes in Scope of Work

If **DISTRICT** requires changes in the tasks or scope of work shown in **Exhibit "B"** or additional work not specified therein, **DISTRICT** shall prepare a written change order. If **CONSULTANT** believes work or materials are required outside the tasks or scope of work

[3] Pursuant to Section 8002 of the District's Administrative Code, the District's "Ethics Policy" set forth at sections 7100-7111 of the Administrative Code is attached hereto as Exhibit "A" and incorporated herein by this reference.

described in **Exhibit "B,"** it shall submit a written request for a change order to the **DISTRICT**. A change order must be approved and signed by the **PARTIES** before **CONSULTANT** performs any work outside the scope of work shown in **Exhibit "B." DISTRICT** shall have no responsibility to compensate **CONSULTANT** for such work without an approved and signed change order. Change orders shall specify the change in the budgeted amount for **SERVICES.**

II TERM

This **AGREEMENT** shall commence upon the date of its execution and shall extend thereafter for the period specified in **Exhibit "B"** or, if no time is specified, until terminated on thirty (30) days notice as provided herein.

III BUDGET, FEES, COSTS, BILLING, PAYMENT AND RECORDS

A. Budgeted Amount for SERVICES

CONSULTANT is expected to complete all **SERVICES** within the Budgeted Amount set forth on **Exhibit "B."** The total compensation for the **SERVICES** to be performed under this **AGREEMENT** shall not exceed the Budgeted Amount unless modified as provided herein. Upon invoicing the **DISTRICT** 80% of the Budgeted Amount, **CONSULTANT** shall prepare and provide to **DISTRICT** a "cost to complete" estimate for the remaining **SERVICES**. The **PARTIES** shall work together to complete the project within the agreed-upon Budgeted Amount, but the obligation to complete the **SERVICES** within the Budgeted Amount lies with the **CONSULTANT**.

B. Fees

Fees shall be billed per the terms and conditions and at the rates set forth on **Exhibit "B"** for the term of the **AGREEMENT.** Should the term of the **AGREEMENT** extend beyond the period for which the rates are effective, the rates specified in **Exhibit "B"** shall continue to apply unless and until modified by consent of the **PARTIES**.

C. Notification Clause

Formal notices, demands and communications to be given hereunder by either **PARTY** shall be made in writing and may be effected by personal delivery or by registered or certified mail, postage prepaid, return receipt requested and shall be deemed communicated as of the date of mailing. If the name or address of the person to whom notices, demands or communication shall be given changes, written notice of such change shall be given, in accordance with this section, within five(5) working days.

Notices shall be made as follows:

Municipal Water District of O.C.	Company
Name:	Contact Name:
Title:	Title:
18700 Ward Street, P.O.Box 20895	Address:
Fountain Valley, CA 92708	City, State, Zip:

D. **Billing and Payment**

Consultant's fees shall be billed by the 10th day of the month and paid by **DISTRICT** on or before the 10th of the following month. Invoices shall reference the Purchase Order number from the **DISTRICT**.

DISTRICT shall review and approve all invoices prior to payment. **CONSULTANT** agrees to submit additional supporting documentation to support the invoice if requested by **DISTRICT**. If **DISTRICT** does not approve an invoice, **DISTRICT** shall send a notice to **CONSULTANT** setting forth the reason(s) the invoice was not approved. **CONSULTANT** may re-invoice **DISTRICT** to cure the defects identified in the **DISTRICT** notice. The revised invoice will be treated as a new submittal. If **DISTRICT** contests all or any portion of an invoice, **DISTRICT** and **CONSULTANT** shall use their best efforts to resolve the contested portion of the invoice.

E. **Billing Records**

CONSULTANT shall keep records of all **SERVICES** and costs billed pursuant to this **AGREEMENT** for at least a period of seven (7) years and shall make them available for review and audit if requested by **DISTRICT**.

IV DOCUMENTS

All **MATERIALS** as defined in Paragraph XI below, related to **SERVICES** performed under this **AGREEMENT** shall be furnished to **DISTRICT** upon completion or termination of this **AGREEMENT**, or upon request by **DISTRICT**, and are the property of **DISTRICT**.

V TERMINATION

Each **PARTY** may terminate this **AGREEMENT** at any time upon thirty (30) days written notice to the other **PARTY**, except as provided otherwise in **Exhibit "C."** In the event of termination: (1) all work product prepared by or in custody of **CONSULTANT** shall be promptly delivered to **DISTRICT**; (2) **DISTRICT** shall pay **CONSULTANT** all payments due under this **AGREEMENT** at the effective date of termination; (3) **CONSULTANT** shall promptly submit a final invoice to the **DISTRICT**, which shall include any and all non-cancelable obligations owed by **CONSULTANT** at the time of termination, (4) neither **PARTY** waives any claim of any nature whatsoever against the other for any breach of this **AGREEMENT**; (5) **DISTRICT** may withhold 125 percent of the estimated value of any disputed amount pending resolution of the dispute, consistent with the provisions of section III D above, and; (6) **DISTRICT** and **CONSULTANT** agree to exert their best efforts to expeditiously resolve any dispute between the **PARTIES**.

VI INSURANCE REQUIREMENTS

CONSULTANT shall obtain prior to commencing work and maintain in force and effect throughout the term of this **AGREEMENT**, all insurance set forth below.

A. **Workers' Compensation Insurance**

By his/her signature hereunder, **CONSULTANT** certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance

with the provisions of that code, and that **CONSULTANT** will comply with such provisions before commencing the performance of the **SERVICES** under this **AGREEMENT**.

CONSULTANT and sub-consultant will keep workers' compensation insurance for their employees in effect during all work covered by this **AGREEMENT**. An ACORD certificate of insurance or other certificate of insurance satisfactory to **DISTRICT**, evidencing such coverage must be provided (1) by **CONSULTANT** and (2) by sub-consultant's upon request by **DISTRICT**.

B. **Professional Liability Insurance**

CONSULTANT shall file with **DISTRICT**, before beginning professional **SERVICES**, an ACORD certificate of insurance, or any other certificate of insurance satisfactory to **DISTRICT**, evidencing professional liability coverage of not less than $1,000,000 per claim and $1,000,000 aggregate, requiring 30 days notice of cancellation (10 days for non-payment of premium) to **DISTRICT**.

Such coverage shall be placed with a carrier with an A.M. Best rating of no less than A: VII, or equivalent. The retroactive date (if any) of such insurance coverage shall be no later than the effective date of this **AGREEMENT**. In the event that the **CONSULTANT** employs sub-consultants as part of the **SERVICES** covered by this **AGREEMENT**, **CONSULTANT** shall be responsible for requiring and confirming that each sub-consultant meets the minimum insurance requirements specified herein.

C. **Other Insurance**

CONSULTANT will file with **DISTRICT**, before beginning professional **SERVICES**, ACORD certificates of insurance, or other certificates of insurance satisfactory to **DISTRICT**, evidencing general liability coverage of not less than $1,000,000 per occurrence for bodily injury, personal injury and property damage; automobile liability (owned, scheduled, non-owned or hired) of at least $1,000,000 for bodily injury and property damage each accident limit; workers' compensation (statutory limits) and employer's liability ($1,000,000) (if applicable); requiring 30 days (10 days for non payment of premium) notice of cancellation to **DISTRICT**. For the coverage required under this paragraph, the insurer(s) shall waive all rights of subrogation against **DISTRICT**, and its directors, officers, agents, employees, attorneys, consultants or volunteers. **Consultant's** insurance coverage shall be primary insurance as respects **DISTRICT**, its directors, officers, agents, employees, attorneys, consultants and volunteers for all liability arising out of the activities performed by or on behalf of the **CONSULTANT**. Any insurance pool coverage, or self-insurance maintained by **DISTRICT**, and its directors, officers, agents, employees, attorneys, consultants or volunteers shall be excess of the **Consultant's** insurance and shall not contribute to it.

The general liability coverage shall give **DISTRICT**, its directors, officers, agents, employees, attorneys, consultants and authorized volunteers additional insured status using ISO endorsement CG2010, CG2033, or equivalent. Coverage shall be placed with a carrier with an A.M. Best rating of no less than A: VII, or equivalents. In the event that the **CONSULTANT** employs sub-consultant as part of the work covered by the **AGREEMENT**, it shall be the **CONSULTANT's** responsibility to require and confirm that each sub-consultant meets the minimum insurance requirements specified herein.

D. **Expiration of Coverage**

If any of the required coverages expire during the term of the **AGREEMENT**, **CONSULTANT** shall deliver the renewal certificate(s) including the general liability additional insured endorsement to **DISTRICT** at least ten (10) days prior to the expiration date.

VII INDEMNIFICATION

To the fullest extent permitted by applicable law, **CONSULTANT** shall indemnify, defend and hold harmless **DISTRICT**, its officers, Directors and employees and authorized volunteers, and each of them from and against:

a. When the law establishes a professional standard of care for the **CONSULTANT's** services, all claims and demands of all persons that arise out of, pertain to, or relate to the **CONSULTANT's** negligence, recklessness or willful misconduct in the performance (or actual or alleged non-performance) of the work under this agreement. **CONSULTANT** shall defend itself against any and all liabilities, claims, losses, damages, and costs arising out of or alleged to arise out of **CONSULTANT's** performance or non-performance of the work hereunder, and shall not tender such claims to **DISTRICT** nor its directors, officers, employees, or authorized volunteers, for defense or indemnity.

b. Any and all actions, proceedings, damages, costs, expenses, penalties or liabilities, in law or equity, of every kind or nature whatsoever, arising out of, resulting from, or on account of the violation of any governmental law or regulation, compliance with which is the responsibility of **CONSULTANT**.

c. Any and all losses, expenses, damages (including damages to the work itself), attorney's fees and other costs, including all costs of defense, which any of them may incur with respect to the failure, neglect, or refusal of **CONSULTANT** to faithfully perform the work and all of the **CONSULTANT's** obligations under the agreement. Such costs, expenses, and damages shall include all costs, including attorneys' fees, incurred by the indemnified parties in any lawsuit to which they are a party.

CONSULTANT shall defend, at **CONSULTANT's** own cost, expense and risk, any and all such aforesaid suits, actions, or other legal proceedings of every kind that may be brought or instituted against **DISTRICT** or its directors, officers, employees, or authorized volunteers with legal counsel reasonably acceptable to **DISTRICT**.

CONSULTANT shall pay and satisfy any judgment, award or decree that may be rendered against **DISTRICT** or its directors, officers, employees, or authorized volunteers, in any and all such suits, actions, or other legal proceedings.

CONSULTANT shall reimburse **DISTRICT** or its directors, officers, employees, or authorized volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing indemnity herein provided.

CONSULTANT's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by **DISTRICT**, or its directors, officers, employees, or authorized volunteers.

VIII FINANCIAL DISCLOSURE AND CONFLICTS OF INTEREST

Although **CONSULTANT** is retained as an independent contractor, **CONSULTANT** may still be required, under the California Political Reform Act and **DISTRICT's** Administrative Code, to file annual disclosure reports. **CONSULTANT** agrees to file such financial disclosure reports upon request by **DISTRICT**. Further, **CONSULTANT** shall file the annual summary of gifts required by Section 7105 of the **DISTRICT's** Ethics Policy, attached hereto as **Exhibit "A."**

Failure to file financial disclosure reports upon request and failure to file the required gift summary are grounds for termination of this **AGREEMENT.** Any action by **CONSULTANT** that is inconsistent with **DISTRICT's** Ethic's Policy current at the time of the action is grounds for termination of this **AGREEMENT**. The Ethics Policy as of the date of this **AGREEMENT** is attached hereto as **Exhibit "A."**

IX PERMITS AND LICENSES

CONSULTANT shall procure and maintain all permits, licenses and other government-required certification necessary for the performance of its **SERVICES**, all at the sole cost of **CONSULTANT**. None of the items referenced in this section shall be reimbursable to **CONSULTANT** under the **AGREEMENT**. **CONSULTANT** shall comply with any and all applicable local, state, and federal regulations and statutes including Cal/OSHA requirements.

X LABOR AND MATERIALS

CONSULTANT shall furnish, at its own expense, all labor, materials, equipment, tools, transportation and other items or services necessary for the successful completion of the **SERVICES** to be performed under this **AGREEMENT**. **CONSULTANT** shall give its full attention and supervision to the fulfillment of the provisions of this **AGREEMENT** by its employees and sub-consultant and shall be responsible for the timely performance of the **SERVICES** required by this **AGREEMENT**. All compensation for **CONSULTANT's SERVICES** under this **AGREEMENT** shall be pursuant to **Exhibit "B"** to the **AGREEMENT**.

Only those **SERVICES,** materials, administrative, overhead and travel expenses specifically listed in **Exhibit "B"** will be charged and paid. No other costs will be paid. **CONSULTANT** agrees not to invoice **DISTRICT** for any administrative expenses, overhead or travel time in connection with the **SERVICES, unless agreed upon and listed in Exhibit "B"**.

XI CONFIDENTIALITY AND RESTRICTIONS ON DISCLOSURE

A. Confidential Nature of Materials

CONSULTANT understands that all documents, records, reports, data, or other materials (collectively **"MATERIALS"**) provided by **DISTRICT** to **CONSULTANT** pursuant to the **AGREEMENT**, including but not limited to draft reports, final report(s) and all data, information, documents, graphic displays and other items that are not proprietary to **CONSULTANT** and that are utilized or produced by **CONSULTANT** pursuant to the **AGREEMENT** are to be considered confidential for all purposes.

B. No Disclosure of Confidential Materials

CONSULTANT shall be responsible for protecting the confidentiality and maintaining the security of **DISTRICT MATERIALS** and records in its possession. All **MATERIALS** shall be deemed confidential and shall remain the property of **DISTRICT**. **CONSULTANT** understands the sensitive nature of the above and agrees that neither its officers, partners, employees, agents or sub-consultants will release, disseminate, or otherwise publish said reports or other such data, information, documents, graphic displays, or other materials except as provided herein or as authorized, in writing, by **DISTRICT's** representative. **CONSULTANT** agrees not to make use of such **MATERIALS** for any purpose not related to the performance of the **SERVICES** under the **AGREEMENT**. **CONSULTANT** shall not make written or oral disclosures thereof, other than as necessary for its performance of the **SERVICES** hereunder, without the prior written approval of **DISTRICT**. Disclosure of confidential **MATERIALS** shall not be made to any individual, agency, or organization except as provided for in the **AGREEMENT** or as provided for by law.

C. **Protections to Ensure Control Over Materials**

All confidential **MATERIALS** saved or stored by **CONSULTANT** in an electronic form shall be protected by adequate security measures to ensure that such confidential **MATERIALS** are safe from theft, loss, destruction, erasure, alteration, and any unauthorized viewing, duplication, or use. Such security measures shall include, but not be limited to, the use of current virus protection software, firewalls, data backup, passwords, and internet controls.

The provisions of this section survive the termination or completion of the **AGREEMENT**.

XII OWNERSHIP OF DOCUMENTS AND DISPLAYS

All original written or recorded data, documents, graphic displays, reports or other **MATERIALS** which contain information relating to **CONSULTANT's** performance hereunder and which are originated and prepared for **DISTRICT** pursuant to the **AGREEMENT** are instruments of service and shall become the property of **DISTRICT** upon completion or termination of the Project. **CONSULTANT** hereby assigns all of its right, title and interest therein to **DISTRICT**, including but not limited to any copyright interest. In addition, **DISTRICT** reserves the right to use, duplicate and disclose in whole, or in part, in any manner and for any purpose whatsoever all such data, documents, graphic displays, reports or other **MATERIALS** delivered to **DISTRICT** pursuant to this **AGREEMENT** and to authorize others to do so.

To the extent that **CONSULTANT** utilizes any of its property (including, without limitation, any hardware or software of **CONSULTANT** or any proprietary or confidential information of **CONSULTANT** or any trade secrets of **CONSULTANT**) in performing **SERVICES** hereunder, such property shall remain the property of **CONSULTANT**, and **DISTRICT** shall acquire no right or interest in such property.

XIII EQUAL OPPORTUNITY

DISTRICT is committed to a policy of equal opportunity for all and to providing a work environment that is free of unlawful discrimination and harassment. In keeping with this commitment, **DISTRICT** maintains a policy prohibiting unlawful discrimination and harassment in any form based on race, religious creed, color, national origin, ancestry, physical or mental

disability, medical condition, pregnancy or childbirth, marital status, gender, sex, sexual orientation, veteran status or age by officials, employees and non-employees (vendors, contractors, etc.).

This policy applies to all employees, consultants and contractors of the **DISTRICT** whom the **DISTRICT** knows or has reason to know are violating this policy. Appropriate corrective action will be taken against all offenders, up to and including immediate discharge or termination of this **AGREEMENT**. During, and in conjunction with, the performance of this **AGREEMENT**, **CONSULTANT** shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, marital status or national origin.

XIV INTEGRATION OF ALL OTHER AGREEMENTS

This **AGREEMENT**, including any Exhibits and Addenda, contains the entire understanding of the **PARTIES**, and there are no further or other agreements or understandings, written or oral, in effect between the **PARTIES** hereto relating to the subject matter hereof. Any prior understanding or agreement of the **PARTIES** shall not be binding unless expressly set forth herein and, except to the extent expressly provided for herein, no changes of this **AGREEMENT** may be made without the written consent of both **PARTIES**.

XV ATTORNEYS' FEES

In any action at law or in equity to enforce any of the provisions or rights under this **AGREEMENT**, the prevailing **PARTY** shall be entitled to recover from the unsuccessful **PARTY** all costs, expenses and reasonable attorney's fees incurred therein by the prevailing **PARTY** (including, without limitations, such costs, expense and fees on any appeals), and if such prevailing **PARTY** shall recover judgment in any such action or proceeding, such costs, expenses, including those of expert witnesses and attorneys' fees, shall be included as part of this judgment.

XVI JURISDICTION AND VENUE SELECTION

In all matters concerning the validity, interpretation, performance, or effect of this **AGREEMENT**, the laws of the State of California shall govern and be applicable. The **PARTIES** hereby agree and consent to the exclusive jurisdiction of the courts of the State of California and that venue of any action brought hereunder shall be in Orange County, California.

XVII COMPLIANCE WITH FEDERAL REQUIREMENTS

CONSULTANT acknowledges that some portion of the funding from this **AGREEMENT** and/or the project to which the **CONSULTANT's** services will contribute has been provided by one or more federal agencies. **CONSULTANT**, by execution of this **AGREEMENT**, declares that all relevant times it will be and/or act in compliance with requirements imposed on such federally assisted projects, as stated in **Exhibit "C"** hereto.

IN WITNESS WHEREOF, the **PARTIES** have hereunto affixed their names as of the day and year thereinafter, which shall be and is the effective date of this **AGREEMENT**.

APPROVED BY:	**CONSULTANT ACCEPTANCE:**
_____	_____
_____	_____
Date	Date
Kevin Hunt, General Manager Municipal Water District of Orange County 18700 Ward Street, P.O.Box 20895 Fountain Valley, CA 92708 (714) 963-3058	Name: Address: Phone: Tax I.D. #

Internal Use Only:

Program No. _____

Line Item: _____

Funding Year: _____

Contract Amt.: _____

Purchase Order # _____

ETHICS POLICY	§7100-§7111

§7100 PURPOSE

The policy of MWDOC is to maintain the highest standards of ethics from its Board members, officers and employees (all shall be referred to as employees for the purposes of this section). The proper operation of MWDOC requires decisions and policy to be made in the proper manner, that public office not be used for personal gain, and that all individuals associated with MWDOC remain impartial and responsible toward the public. Accordingly, all employees are expected to abide by the highest ethical standards and integrity when dealing on behalf of MWDOC with fellow Board members or employees, vendors, contractors, customers, and other members of the public.

§7101 RESPONSIBILITIES OF BOARD MEMBERS

Board members are obliged to uphold the Constitution of the United States and the Constitution of the State of California and shall comply with all applicable laws regulating Board member conduct, including conflicts of interest and financial disclosure laws. No Board member or officer shall grant any special consideration, treatment, or advantage to any person or group beyond that which is available to every other person or group in the same circumstances.

§7102 PROPER USE OF MWDOC PROPERTY AND RESOURCES

Except as specifically authorized, no employee shall use or remove or permit the use or removal of MWDOC property, including MWDOC vehicles, equipment, telephones, office supplies, and materials for personal convenience or profit. No employee shall require another MWDOC employee to perform services for the personal convenience or profit of another employee. Each employee must protect and properly use any MWDOC asset within his/her control, including information recorded on paper or in electronic form. Employees shall safeguard MWDOC property, equipment, monies, and assets against unauthorized use or removal, as well as from loss due to criminal act or breach of trust.

Employees are responsible for maintaining written records, including expense reports, in sufficient detail to reflect accurately and completely all transactions and expenditures made on MWDOC's behalf. Creating a document with misleading for false information is prohibited.

Motion - 1/17/96;

§7103 CONFLICT OF INTEREST

All MWDOC Directors, officers, and employees at every level shall comply with the requirements of Section 1090 of the California Government Code which prohibits such persons from being financially interested in any contract made by them in their official capacity, or by any body or board of which they are members, or from being a purchaser at any sale or a vendor at any purchase made by them in their official capacity.

All Directors and employees designated under MWDOC's Conflict of Interest Code ("designated employees") and employees required to report under Chapter 7, Article 2 of the Political Reform

Act (Government Code Section 7300 et seq.) shall promptly and fully comply with all requirements thereof.
MWDOC employees who are not designated employees under MWDOC's Conflict of Interest Code shall refrain from participating in, making a recommendation, or otherwise attempting to influence MWDOC's selection of a contractor, consultant, product, or source of supply if the non-designated employee, or an immediate family member, has a direct or indirect financial interest in the outcome of the selection process. No employee shall use his/her position with MWDOC in any manner for the purpose of obtaining personal favors, advantages or benefits for him/herself or an immediate family member from a person or entity doing business or seeking to do business with MWDOC. Such favors, advantages, or benefits would include, but are not limited to: 1) offers of employment; 2) free or discounted goods or services; or 3) gifts.

§7104 GIFTS

No employee shall accept, directly or indirectly, any compensation, reward or gift from any source except from MWDOC, for any action related to the conduct of MWDOC business, except as set forth below:

1. Acceptance of food and refreshments of nominal value on infrequent occasions in the ordinary course of a breakfast, luncheon or dinner meeting or other meeting or on an inspection tour where the arrangements are consistent with the transaction of official business.*

2. Acceptance of transportation, lodging, meals or refreshments, in connection with attendance at widely attended gatherings sponsored by industrial, technical or professional organizations; or in connection with attendance at public ceremonies or similar activities financed by nongovernmental sources where the employee's participation on behalf of MWDOC is the result of an invitation addressed to him or her in his/her official capacity, and the transportation, lodging, meals or refreshment accepted is related to, and is in keeping with, his/her official participation.*

3. Acceptance of unsolicited advertising or promotional materials such as pens, pencils, note pads, calendars, or other items of nominal value.*

4. Acceptance of plaques and commemorative mementoes, of nominal value, or of value only to the recipient, such as service pins, recognition awards, retirement mementoes.

5. Acceptance of incidental transportation from a private organization provided it is furnished in connection with an employee's official duties and is of the type customarily provided by the private organization.

* Nothing herein shall be deemed to relieve any Director or designated employee from reporting the value of such meals, transportation, lodging or gifts and abstaining from participation in any decision of MWDOC which could foreseeably have a material financial effect on the donor when the value of such gifts reaches the limits set forth in MWDOC's Conflict of Interest Code and the Political Reform Act.

In no event shall any employee accept gifts from any single source, the cumulative value of which exceeds the applicable gift limit under California law.

A gift or gratuity, the receipt of which is prohibited under this section, shall be returned to the donor. If return is not possible, the gift or gratuity shall be turned over to a public or charitable

institution without being claimed as a charitable deduction and a report of such action and the reasons why return was not feasible shall be made on MWDOC records. When possible, the donor also shall be informed of this action.

Motion - 1/17/96;

§7105 PERSONS OR COMPANIES REPORTING GIFTS

All persons and companies doing business with MWDOC, with the exception of public agencies, shall submit a summary, by January 31 of each calendar year, of all gifts claimed for internal vendor audits (including meals) made to, or on behalf of, employees or Directors of MWDOC, or their immediate family members, that have occurred in the normal course of business during the previous calendar year. Failure to provide this information to MWDOC may result in the termination of MWDOC business with that person or company.

Motion - 7/21/93; Motion - 8/18/93;

§7106 USE OF CONFIDENTIAL INFORMATION

Confidential information (i.e., information which is exempt from disclosure under the California Public Records Act) shall not be released to unauthorized persons unless the disclosure is approved by the Board, President of the Board, or General Manager. Employees are prohibited from using any confidential information for personal advantage or profit.

§7107 POLITICAL ACTIVITIES

Employees are free to endorse, advocate, contribute to, or otherwise support any political party, candidate, or cause they may choose; however, employees are prohibited from soliciting political funds or contributions at MWDOC facilities. In any personal political activity an employee may be involved in, it shall be made clear that the employee is acting personally and not for MWDOC.

§7108 IMPROPER ACTIVITIES

Employees shall not interfere with the proper performance of the official duties of others, but are strongly encouraged to fulfill their own moral obligations to the public, MWDOC, and its member agencies by disclosing, to the extent not expressly prohibited by law, improper activities within their knowledge. No employee shall directly or indirectly use or attempt to use the authority or influence of his/her position for the purpose of intimidating, threatening, coercing, commanding, or influencing any person with the intent of interfering with that person's duty to disclose improper activity.

§7109 VIOLATION OF POLICY – STAFF AND STAFF OFFICERS

If an employee is reported to have violated MWDOC's Ethics Policy, the matter shall be referred to the General Manager for investigation and consideration of any appropriate action warranted which may include employment action such as demotion, reduction in salary, or termination. If a Board appointed officer (Secretary, Treasurer or General Manager) is reported to have violated MWDOC's Ethics Policy, the matter shall be referred to the Executive Committee for investigation and consideration of any appropriate action.

Motion - 1/17/96;

§7110 VIOLATION OF POLICY -- DIRECTORS

A perceived violation of this policy by a Director should be referred to the President of the Board or the full Board of Directors for investigation, and consideration of any appropriate action warranted. A violation of this policy may be addressed by the use of such remedies as are available by law to MWDOC, including, but not limited to: (a) adoption of a resolution expressing disapproval of the conduct of the Director who has violated this policy, (b) injunctive relief, or (c) referral of the violation to MWDOC Legal Counsel and/or the Grand Jury.

§7111 PERIODIC REVIEW OF CONFLICT OF INTEREST AND ADMINISTRATIVE GUIDELINES

During the first quarter of the year immediately following an election (every two years), the Board shall meet to review and/or receive a presentation that addresses principles relating to reporting guidelines on compensation, conflict of interest issues, and standards for rules of conduct.

Please note If using Consultant's proposal as Exhibit "B" to supplement or the standard Exhibit "B" Form below, BOTH Parties must verify that all sections of this form are FULLY ADDRESSED and the appropriate Exhibit is attached and labeled accordingly.

EXHIBIT "B"

SCOPE OF WORK, TERMS OF AGREEMENT AND TERMS AND CONDITIONS FOR BILLING

Company:
Name:
Address:
Phone:
Tax I.D. #

1. Term – Commencement (Insert Date) _____Termination (Insert Date) _____

2. Fees/Rates to be billed - $_____

3. Budgeted Amount – Compensation is to be on a "time and material" basis, not to exceed $_____. **CONSULTANT** shall send **DISTRICT** an invoice no later than the tenth (10^{th}) day of each month. **DISTRICT** shall pay said invoice by the (10^{th}) day of the following month.

   Upon invoicing **DISTRICT** 80% of the contract amount, **CONSULTANT** shall prepare and provide to **DISTRICT** a "cost to complete" estimate for the remaining work.

4. Scope of Work/Services – (Insert description) _____

5. Consultant Representative: _____

EXHIBIT "C"
REQUIREMENTS SPECIFIC TO
EPA GRANT PROJECTS

1. **TERMINATION**

A. Termination for Convenience - **DISTRICT** may terminate this Agreement for any reason, upon a determination that doing so is in the interest of **DISTRICT**, by giving **CONSULTANT** at least thirty (30) days prior written notice of such termination. Such termination shall not relieve **DISTRICT** from responsibility for payment for services rendered by **CONSULTANT** after the notice of termination.

B. Termination for Cause - DISTRICT may terminate the agreement for cause, effective immediately upon written notice of such termination to **CONSULTANT**, based upon the occurrence of any of the following events:

(1) Material breach of the Agreement by **CONSULTANT**
(2) Cessation of **CONSULTANT** to be licensed, as required by law
(3) Failure of **CONSULTANT** to substantially comply with any applicably federal, state or local laws or regulations
(4) The voluntary or involuntary filing of any petition under any law for the relief of debtors with respect to **CONSULTANT**
(5) Conviction of **CONSULTANT** of any crime other than minor traffic offenses

C. Compensation Upon Termination - If the services of **CONSULTANT** are terminated, in whole or in part, **CONSULTANT** shall be compensated as provided herein for all services within the scope of work set for the in Exhibit "A" to the Agreement and all approved change order work performed prior to the date of such termination.

2. Breach By Contractor - Withholding Payment - In the event **DISTRICT** has reasonable grounds for believing **CONSULTANT** will be unable to materially perform the services under this Agreement or unable to complete the services within the not to exceed amount described in this Agreement, or if the **DISTRICT** becomes aware of a potential claim against **CONSULTANT** or **DISTRICT** arising out of **CONSULTANT'S** negligence, intentional act or breach of any provision of this Agreement, including a potential claim against **CONSULTANT** by **DISTRICT**, then **DISTRICT** may withhold payment of any amount payable to **CONSULTANT** that **DISTRICT** determines is related to such inability to complete the services, negligence, intentional act, or breach.

3. Equal Opportunity - CONSULTANT must comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR Part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

4. Copyrights - Pursuant to 40 CFR §31.34, the EPA reserves a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, for Federal Government purposes: (a) The copyright in any work developed pursuant to, or in the course of the services provided under, the Agreement, and (b) any rights of copyright to which CONTRACTOR purchases ownership pursuant to, or in the course of the services provided under, the Agreement.

5. Record Maintenance - CONSULTANT must allow **DISTRICT**, EPA, the Comptroller General of the United States, or any of their duly authorized representatives, access to any books, documents, papers and records of the **CONSULTANT** directly pertinent to the Agreement for the purpose of making audits, examinations, excerpts and transcriptions. **CONSULTANT** must retain all Agreement-related records for three years after the **CONSULTANT** receives final payment.

6. No Award to Excluded Parties - CONSULTANT may not award any subcontract for services to be provided under the Agreement to persons (individuals or organization) listed on the Federal Excluded Parties List System (EPLS), which is available at http://www.epls.gov/

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 3

INFORMATION ITEM
August 7, 2014

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

FROM: **Robert Hunter, General Manager**

Staff Contact: Joe Berg, Water Use Efficiency Programs Manager

SUBJECT: **The Orange County Garden Friendly Program**

STAFF RECOMMENDATION

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

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

In spring of 2014, staff piloted the Orange County Garden Friendly (OCGF) Program to promote the use of climate appropriate plants and water efficient irrigation equipment to consumers visiting local garden centers. This effort was modeled after a similar program in the Inland Empire known as the Inland Empire Garden Friendly Program, led by the Inland Empire Utilities Agency. Inland Empire focused exclusively on water efficient plant material at Home Depot stores, but have now expanded to other garden centers in their service area. Their emphasis is climate appropriate landscape design and what plants to plant and where. This Program is now being implemented in many parts of Southern California and in three other states. A common logo is used to establish branding of the Program.

ORANGE COUNTY GARDEN FRIENDLY

The pilot OCGF Program was expanded beyond plant materials to include irrigation equipment such as Smart Timers, drip irrigation, and sprinkler nozzles, along with available rebates. The OCGF Program was implemented in partnership with retail agencies, the

Budgeted (Y/N): Yes	Budgeted amount: Staff time.	Core __	Choice _X_
Action item amount: $ N/A	Line item: N/A		
Fiscal Impact (explain if unbudgeted): This effort was funded utilizing budgeted staff time; no direct financial expenditures were incurred.			

Orange County Stormwater Program, and UC Cooperative Extension with the goals of educating consumers and garden center employees, promoting our rebate programs, reducing irrigation runoff, and improving outdoor water use efficiency.

Each partner participated in planning and staffing three seven-hour (8 am – 3 pm), Saturday events. The pilot events were held at three Home Depot stores representing north, central, and southern Orange County locations. At the events, residents were able to purchase OCGF labeled plants, learn about and purchase water efficient irrigation devices, apply for rebates, and consult with gardening experts. The table below provides statistics for these events, followed by some lessons learned which will be used to enhance future events.

OCGF Pilot Program Statistics

Event	Event Date	Booth Visitors	Smart Timers Purchased	Associated Smart Timer Rebates	Water Savings (gal/day)
Huntington Beach	April 29	328	12	11	588
Laguna Niguel	May 3	193	21	7	1,029
Brea	May 17	210	35	88	4,312
Total		**731**	**68**	**106**	**5,929**

Lessons Learned

- The level of awareness of water agency incentive programs, climate appropriate plant material, and irrigation equipment by home center staff was significantly improved.
- The Brea Home Depot has maintained an in-store, rebate-eligible Smart Timer display, as well as the distribution of rebate program literature. This resulted in additional timer sales following the event.
- Consumers have technical questions regarding irrigation practices and retrofits. This requires staff with technical knowledge to staff the events.
- Having staff from MWDOC, the retail agency, and Orange County Stormwater was beneficial.
- Interaction and education with hosting sites prior to the event allowed for better event organization, setup, and rebate-eligible product availability.
- The prime time for consumer interaction was from 8 am to noon.
- Providing a youth and adult hands-on activity increased interaction time with consumers.

Overall, the pilot OCGF effort was well received by the public and our hosting sites. Water agencies and city stormwater representatives promoted our incentive programs and educated, on average, 250 people per event, which resulted in a measurable increase in participation and water savings. This was accomplished with no out-of-pocket expense except staff time to plan and implement the events.

DETAILED REPORT

The Orange County Garden Friendly Steering Committee plans to move forward with the FY 14-15 OCGF Program, expanding it to six events in the upcoming fall and spring

seasons. These events will be offered from 8 am to noon. The six events include the following[1]:

- Events in partnership with The Home Depot
  - Lake Forest, 20021 Lake Forest Dr. – 10/4/14 with El Toro Water District
  - Cypress, 5800 Lincoln Ave. – 3/7/15
  - Mission Viejo, 27952 Hillcrest – 4/11/15 with Santa Margarita Water District
- Events in partnership with special partners
  - Tree of Life Nursery, 33201 Ortega Hwy, San Juan Capistrano – 10/18/14 with the Cities of San Clemente and San Juan Capistrano
  - Green Thumb, 23782 Bridger Rd, Lake Forest– 5/2/14
  - UCCE Agriculture and Natural Resources Urban Landscape and Garden Education Expo[2], 7601 Irvine Blvd., Irvine - 9/27/14

Additional organizations and garden centers which may be invited to host an OCGF event or have expressed specific interest in participating in this Program include: Mesa Water District, Rogers Gardens, the Ecology Center, OC Coastkeeper, and Surfrider Foundation.

A critical component of the OCGF Program is the involvement of the local city and water agency staff in the planning, execution, and public outreach for each event. City and water district staff is asked to participate in a handful of coordination conference calls, assist with applications for any necessary permits, and staff the event. Cities and water agencies will also provide OCGF event promotion to their customers via water bills, newsletter articles, California Friendly classes, and websites.

The OCGF Steering Committee is developing an informal memorandum of understanding between each hosting organization (i.e., Home Depot, Tree of Life Nursery, Green Thumb, etc.), to include the following requirements:

- Promote the event prior to the event date to increase participation
- Adhere the OCGF Program label to appropriate plants and irrigation devices
- Maintain OCGF Program displays and rebate information beyond the date of the event
- Following the event, collect product sales metrics and report back to the Steering Committee.

Finally, the OCGF Steering Committee is broadening the Program messages for use outside of event environments. Examples may include the development of a semi-permanent display for use in home improvement stores and additions to the OCGF website (i.e., www. http://www.overwateringisout.org/oc-garden-friendly/.com). Additional direct outreach will also be conducted with landscapers, homeowners associations, and other entities involved in lawn care.

Staff will provide ongoing reporting to the Board via the Water Use Efficiency Department Activities Log contained in the Planning and Operations Committee meeting packet.

[1] All dates are tentative and subject to approval by all affected organizations.
[2] This UCCE Annual Event is on September 27, 2014 and is a confirmed date.


SMART PLANT
Outdoor
$5.98
Sun
Sol
6


SMART PLANT
Outdoor
$14.98
Sun
Sol
6


RAIN BIRD


It's Your Garden.
Grow It Right!
Choose the right plant for the right place
Water the right amount at the right time
Spruce Up Your Sprinkler System
Inspect
Select
PLEASE RETURN CARTS TO THIS AREA
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 4

INFORMATION ITEM
August 4, 2014

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

FROM: Robert Hunter
General Manager

Staff Contact: Karl Seckel/Richard Bell

SUBJECT: **Draft Amendment to the Water Quality Control Plan for Ocean Waters of California - Desalination Facility Intakes and Brine Discharges**

COMMITTEE RECOMMENDATION

Staff recommends the Committee receives and files the report.

SUMMARY

The SWRCB has been developing its Ocean Desalination and Brine Disposal Policy and Amendment to the Water Quality Control Plan for Ocean Waters of California ("Ocean Plan") over the past three years. On July 3, 2014 SWRCB staff released their Draft Staff Report, Draft Substitute Environmental Documentation report, and proposed Draft Amendment to the Ocean Plan. A public workshop and public hearing are scheduled for August 6 and 19 in Sacramento. Richard Bell will be attending.

Staff has been working with CalDesal, several coastal agencies developing ocean desalination projects, and with Poseidon Resources. The proposed regulations provide some flexibility, are well written and clear, but require improvement in several areas to make the regulations more workable and to clean up areas where oversights or inconsistencies exist, and where interpretation could lead to unintended constraints. Following are our main comments where the regulations need to be revised.

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

1. **The term "Feasible" is not defined in the water code or proposed regulations; the SWRCB staff indicates this would allow greater flexibility in use of the term; we disagree.**

   It is our opinion, that a reasonable definition of feasible is warranted. It should be noted that in the recent Court of Appeals Decision in *Surfrider Foundation v. Cal. Regional Water Quality Control Board* upheld the use of the definition of "feasible" under CEQA. Under CEQA, "feasible" means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors". The Coastal Act relies on the same definition. For consistency, the SWRCB should consider this same definition.

2. **Need for Ocean Desalination and consistency with regional planning documents.**

   Page 4. 2.b.(1) – This section (under determination of the best site available), brings into the Ocean Plan the determination whether the proposed ocean desalination facility is needed and whether the proposed project is consistent with an integrated regional water management plan or an urban water management plan and County or City general plans regarding growth.

   This determination is beyond the scope of the statutory requirement under Section 13142.5 and is not part of the determination of the best available site. We don't see a need for this in the Ocean Plan. Water supply agencies are responsible for determining the need for local resource developments, not the SWRCB or RWQCB's. Local resource development plans, including ocean desalination, are typically included in their water supply agency plans. In the event that the SWRCB will not remove this provision, the provision should be expanded to also include water agency Water Master Plans, Water Resource Plans, and Water Reliability Plans.

3. **Regional Boards shall require subsurface intakes unless it determines that subsurface intakes are infeasible. This provision could be onerous, depending on the definition of feasibility.**

   The intake option should be a site specific, project-by-project determination. One size does not fit all. This standard could result in excessive costs and delays in permitting projects. It is the responsibility of the Project Proponent to make a determination of the best project intake system, based on cost, capacity, and other factors. This requirement could create an unreasonable burden and potentially increased costs to water agencies and to the public.

   The reason and justification given for this approach is that subsurface intakes do not cause impingement and entrainment impacts and thus would fully achieve the statutory requirement to minimize the intake and mortality of marine organisms. However, the statutory requirement **does not require zero impact**, but requires that

impacts be minimized. Subsurface intakes may impact coastal environments during construction and maintenance activities. The water agency should determine the best intake method for each project considering all factors.

In the case of the Doheny Ocean Desalination Project, we have found that a subsurface slant well intake is feasible, provides adequate capacity for local agencies, causes no impact to marine organisms, can provide seawater intrusion control benefit, is less costly than an open intake system, coastal impacts can be mitigated to a less than significant level, and that the project can participate in assistance in restoration of the seasonal coastal lagoon and efforts to help in the recovery of southern steelhead trout.

4. **Brine Discharges shall be sited to "maximize their distance from Marine Life Reserves" and salinity shall not exceed natural background levels in MLR's.**

   Page 4. 2.b.(6) – This section requires that brine discharges shall be sited **to maximize** their distance from an Marine Protected Area (MPA) or a State Water Quality Protection Area (SWQPA) such that there are **no impacts** to these areas and that the salinity does not exceed the natural background salinity. "Maximizing" the distance from an MPA or SWQPA is limitless, sets no feasible boundary, is a subjective consideration, and could lead to excessive costs to public agencies without any added protective benefit to marine organisms. Determination of a reasonable or sufficient distance to be protective of the MPA and SWQPA should be determined by the Regional Board with dispersion modeling information provided by the project proponent and taking into consideration that a 2 part per thousand parts (ppt) standard is fully protective for the most sensitive marine organisms. Determining a natural background salinity could be impossible from a compliance standpoint due to the impacts of the brine discharge and natural salinity variations. Siting the discharge edge of the Brine Mixing Zone (BMZ) at a reasonable distance from the MPA or SWQPA would achieve the protective objective of this section.

5. **Subsurface Intakes can be determined to be infeasible by the Regional Board.**

   Section 2d(1)(a)(i): The Regional Board can determine that subsurface intakes are infeasible based on their analysis of specified criteria, including "presence of sensitive habitats, presence of sensitive species, energy use, impact to freshwater aquifers, local water supply, and existing water users..." This section should allow for mitigation of impacts and not be solely used by the Regional Board to determine that a subsurface intake is infeasible due to a finding of the **presence** of any of these criteria.

6. **Potential for recycling could prohibit co-disposal of brine with municipal wastewater.**

   Section 2d(2)(a) states that the preferred technology for minimizing mortality of marine life resulting from brine disposal is to "…commingle brine with

wastewater…**unless the wastewater is of suitable quality and quantity to support domestic or irrigation uses**". This clause in effect could be used to prohibit co-disposal of brine with municipal wastewater if the Regional Board determines that the wastewater could potentially be used in the future for recycling.

The Regional Board would likely condition the permit to require the agency to use an alternate method for brine disposal should a recycling project(s) reduces the amount of wastewater below levels necessary for dilution of the brine. This clause should be deleted or revised. Water supply agencies are responsible for development of water supply and reliability projects, not the SWRCB or its Regional Boards.

7. Intake Marine Life Mortality Report and 3 year Entrainment Study is onerous.

Page 37 Section 2e(1)(a): Entrainment Study requires at least a 36 consecutive month period of ocean sampling. This would delay the Poseidon Project from two to three years in order to comply with this requirement as only one year was used in procuring their existing NPDES permit, which is up for renewal in a couple of years. This requirement should be reduced to 1 year of ocean sampling for the permit application and allow additional post-permit issuance sampling to refine the predicted entrainment impact and mitigation determinations.

8. Requirement for mitigating entrainment impacts in the Brine Mixing Zone (BMZ).

Existing wastewater agencies are not required to mitigate for the very small entrainment losses that might occur from wastewater disposal within the zone of initial dilution. The SWRCB Expert Panel indicated that the mortality from shearing losses is likely quite small from high pressure jets. The monitoring costs would far exceed the value and cost of any mitigation and this can be better handled as a small adjustment to the mitigation acreage.

9. Definition of BMZ prohibits acute toxicity in the BMZ which is non-attainable and would inadvertently prohibit brine disposal.

As defined, it is impossible to prevent acute toxicity in the Brine Mixing Zone (BMZ) due to brine disposal. When brine firsts enters the ocean from the diffuser it is acutely toxic prior to being adequately diluted. A reasonable zone within the BMZ should be exempt from the acute toxicity rule. One approach is to make this definition consistent with current municipal wastewater discharge acute toxicity requirements in the Zone of Initial Dilution which prohibits acute toxicity beyond 10% of the distance from the edge of the discharge structure to the edge of the chronic brine mixing zone, if this is an adequate distance. Otherwise, this provision would in effect prohibit brine disposal. This is obviously not the intent of the SWRCB and this provision needs to be revised to make disposal through multi-port high pressure jets workable.

10. Mitigation requirements as proposed are excessive.

The mitigation for entrained organisms using the Area Production Foregone method as proposed would require meeting a 90 percent confidence level where prior mitigation requirements have required a 50 percent confidence level. Based on data shown in the appendix, the 90 percent confidence level would increase the required land area for mitigation by a factor of 4 fold or higher. In addition, using the two mesh sizes, the standard 335 micron size and a new requirement for a finer 200 micron mesh, would result in a greater number of entrained larvae and eggs, increasing the required mitigation level. Coastal wetland areas are limited and increasing the area requirement by a factor of 4 or more is unreasonable, especially if the approach is to use individual species. Use of mean species would be more representative of the total effect and would be a more reasonable approach if the benefits to be derived by the higher confidence levels and smaller mesh size are significant. If not, the amendment should rely on the prior standardized approach.

Status of Ongoing MWDOC Reliability and Engineering and Planning Projects

July 30, 2014

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 late 2016	MWDOC has been asked to help secure MET's concurrence on the quality of water being introduced into the South County Pipeline. Staff is awaiting a draft of an amendment from MET staff and legal counsel.
Doheny Desalination Project	MWDOC			Rob Hunter has met with a number of the Doheny Desal agencies and a group meeting is in the process of being set to discuss progress on the Foundational Action efforts and to discuss options for moving forward.
Poseidon Resources Ocean Desalination Project in Huntington Beach				Karl Seckel participated in several meetings with OCWD's Financial Consultant, Clean Energy Capital. MWDOC is assisting in the efforts in developing information on MET's future water rates and in helping to evaluate the reliability benefits of the project. The work is scheduled to be completed in September.
OC-88 Metering Issue on the South County Pipeline				MWDOC staff worked with MET to complete the analysis of the refund for the OC-88 metering problem on an agency by agency basis and will be holding a meeting with the South County Pipeline participants on July 31.

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Orange County Water Reliability Study				MWDOC completed the Request for Proposals and send it out to several consultants. Our hope was to take it to the MWDOC Board in August, however, there was not sufficient time for the consultants to prepare solid proposals. Submittals from consultants are due on August 27; we will discuss the award of the contract at the September 2 P&O Committee. MWDOC is scheduling a meeting of the Study Workgroup to get input on the Scope of Work.
Other Meetings/Work				
				MWDOC and EOCWD had previously requested MET to proceed with installation of a transfer switch at service connection OC-70 to allow a trailer mounted generator to power the pumps at the service connection in the event of a power outage of the local power grid. MET has completed the installation and the transfer switch is ready to be used, if and when needed. This was a high priority for EOCWD.
				Richard Bell has been participating in discussions with Cal Desal regarding the recently released Ocean Plan Amendments. He will be attending the August 6 workshop with the State Water Resources Control Board. The SWRCB is hoping to complete the new regulations by the end of the year. Richard has continued to monitor the Poseidon Project meetings with the Coastal Commission on the use of a subsurface intake system. This work is also expected prior to the end of the year.

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				MWDOC issued its Comment letter on the BDCP including the comments on the Implementation Agreement. We will now await the analysis of the input received and the next steps in the process which should be the official response to comments.
				Karl Seckel provided a BDCP presentation to the San Juan Capistrano Utilities Commission. They had quite a few questions on the BDCP plan and ocean desalination issues.

Status of Ongoing WEROC Projects
July 2014

Description	*Comments*
General Activities	Louay Toma participated in the California Emergency Services Association (CESA) Disaster Finance Webinar to learn more about the disaster declaration and reimbursement process. Kelly Hubbard, Karl Seckel and Cathy Harris conducted the interview process for the WEROC Coordinator position. An offer has been made and hopefully the finalist will start by August 18th. Kelly provided the Riverside Water Utility Task Force a presentation on Water Utility Preparedness and Response.
Member Agency Coordination	Louay and Kelly facilitated a meeting between the City of Laguna Beach, Laguna Beach County Water District and South Coast Water District to collaborate how messages will be sent to Laguna Beach residents utilizing the reverse notification system, AlertOC. The purpose of the meeting was to make sure the city understood where the service boundaries of each utility was, what messaging would be used, protocols for courtesy notifications to each agency, etc. The meeting was a great introduction between the coordination agencies and started a dialog on joint communications and protocols. Kelly provided a short presentation to the Santa Margarita Water District Board for a Special Workshop on Emergency Preparedness and Response. Larry Patterson, SMWD Safety Officer, provided a presentation on what SMWD's emergency preparedness and response efforts are. Kelly then provided a presentation on WEROC, coordination during response and upcoming planning and training efforts. Kelly is participating in a small work group for Metropolitan to work on developing the MARS Radio & Member Agency Coordination Standard Operating Procedures (SOP). The MARS Radio Guide has not been updated in over a decade and does not reflect the current radio system. Additionally, there is no guidance for member agencies on how MET expects member agencies

Description	*Comments*
	to coordinate with them during disaster response. A couple lessons from the La Habra Earthquake and other recent events are being utilized to develop this document. The goal is to have a draft ready to test for the MET exercise in November, so that the document can be "field tested" and revised before formally presented to their Management and Board for final approval. Kelly participated in the June MET Exercise Design meeting to assist in the development of a disaster exercise that will be coordinated between MET, the three MET cities, WEROC and its member agencies. The group approved the exercise objectives and expected outcomes. The exercise will be based on an El Nino type event. MET has recruited the National Weather Services (NWS) to write the scenario for the exercise. The exercise date was just set as November 5th, so Kelly will start working with the WEROC Member Agencies to develop their participation in the exercise. This will be an extensive work effort in a very short time frame.
Coordination with the County of Orange	Louay attended the County-wide AlertOC Collaboration meeting. The meeting is used to discuss system updates, operating issues and planning. Kelly is working with the Operational Area staff to allow next year's Alert OC Annual Test to be conducted by the water utilities. Both Kelly and Louay attended July's Orange County Emergency Managers Organization (OCEMO) held in Huntington Beach. Kelly also met with representatives from the Operational Area and the Orange County Fire Authority (OCFA) to discuss water dip locations for fire response and any particular concerns related to the drought.
Coordination with Outside Agencies	*Ongoing (last month's report as reference): Kelly was asked to join the California Office of Emergency Services Southern Region Drought Conference Calls as the Region 1 Mutual Aid Coordinator for the California Water and Wastewater Agency Response Network (CalWARN). This is a weekly conference call to provide an update to the Southern Region and the State Operations Center (SOC) on drought impacts, activities and needs.* Currently, the group is discussing what costs should be reported to the state as drought response costs. As a declared disaster the state would like agencies to track their disaster related costs, but this is an atypical

Description	*Comments*
	event and everyone is unsure how to apply the Stafford Act requirements. The Stafford Act is the federal regulation that defines emergency response and recovery processes, including eligibility for federal fiscal assistance to local governments and individuals for response and recovery efforts. Once the group develops some examples of costs and actions being taken for the State Office of Emergency Services to review and provide comment on, Kelly will share the information with the WEROC member agencies. Kelly attended the CESA State Board Meeting as one of the Southern Region Directors in San Luis Obispo. The group was provided an opportunity to hear and provide input into the State Office of Emergency Services' new training and credentialing program proposal. This program will set new best practices for emergency management within California. Kelly had the opportunity to participate in the County of San Luis Obispo's Drought Tabletop Exercise. San Luis Obispo has been significantly impacted with the drought and has been working on short term and long term solutions for several communities who will run out of water in the next couple of months. Kelly provided insight on the mutual aid systems available for water systems, as well as some standard concepts of response coordination for water utilities. An After-Action Report should be available soon and will be shared with OC agencies. Kelly participated in the Cal WARN State Steering Committee Conference Call. The group is working on enhancing coordination for the water utilities with the State Office of Emergency Services at the regional level and a follow-up Fuel Planning Seminar for the Fall AWWA conference. Kelly attended the Mutual Aid Regional Advisory Committee (MARAC) meeting in Rancho Cucamonga. Presentations were provided on the increase in crude oil deliveries via train in California, as well as the regulations related to Non-Profits assisting with emergency response. The most valuable aspect of these meetings is the ongoing discussions between attendees on response and coordination.

Description	*Comments*
WEROC Emergency Operations Center (EOC) Readiness	Kelly has been working with ATT to get U-Verse internet installed at the EOCs for several months now. This has been a tedious process, as ATT had to evaluate their ability to install the support network offsite to reach both EOC facilities. Since both facilities are in unique locations there were many obstacles and delays. ATT was successful in establishing a connection at the NEOC, but was unable to support the infrastructure for the SEOC at this time. The NEOC is now on U-Verse internet service which provides us a significant increase in speed and actually results in a cost savings. The SEOC will stay with its current internet service. ATT is in the process of phasing out their traditional internet service and moving all customers to U-Verse, so this service will be evaluated again in one year. Louay successfully participated in the scheduled OA Radio test this month. Louay and Kelly missed the scheduled MARS radio test due to schedule conflicts, however conducted a check-in at a later time to ensure the radio is in working order. The WEROC radio test was successful this month. We did have a few less agencies participating, but many of those reported schedule conflicts due to short staffing with vacations this month.

Status of Water Use Efficiency Projects

August 2014

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	September 2015	For June 2014, 82 smart timers were installed in the residential sector and 40 in the commercial sector. For program water savings and implementation information, see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	June 2015	For June 2014, 771 residential and 50 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	September 2014	In June 2014, a total of 12,386 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$mart Residential Indoor Rebate Program	MWDSC	On-going	June 2015	In June 2014, 468 high efficiency clothes washers and 651 high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
SoCal Water$mart Commercial Rebate Program	MWDSC	On-going	On-going	In June 2014, 1 ice making machine and 1 cooling tower conductivity controller were installed through this program.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
SoCal Water$mart Commercial Rebate Program (cont.)				For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Industrial Process Water Use Reduction Program	MWDOC	84%	December 2014	Survey scheduling is ongoing. A total of 40 Focused Surveys and 19 Comprehensive Surveys have been completed or are in progress. To date, 12 companies have signed Incentive Agreements. Updated discharger lists have been obtained, and outreach is continuing to sites with feasible water savings potential. Fabrica Fine Carpets has signed an Implementation Agreement for a water reuse project. Additionally, UCI Medical Center in Orange is in the process of signing an Implementation Agreement for water reduction devices.
MWDOC Conservation Meeting	MWDOC	On-going	Monthly	No meeting was held in July due to the holiday. The next meeting will be on August 7, 2014 at the City of San Clemente.
Metropolitan Conservation Meeting	MWDSC	On-going	Monthly	This month's meeting was held on July 17, 2014. The next meeting will be August 21, 2014 at Metropolitan.
Water Smart Hotel Program	MWDOC	75%	June 2015	MWDOC was awarded a Bureau of Reclamation grant, to be matched with Metropolitan funds, to conduct up to 30 commercial and landscape audits of hotels. Enhanced financial incentives will be provided to augment the current SoCal Water$mart rebates. No surveys were scheduled in July. Staff is currently reviewing reports for the Best Western Anaheim and the Best Plus Pavilions.
Turf Removal Program	MWDOC	On-going	Ongoing	In June 2014, 70 rebates were paid, representing 87,190 square feet of turf removed in Orange County. To date, the Turf Removal Program has removed approximately 1,624,279 square feet of turf.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Turf Removal Program (cont.)				For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
California Sprinkler Adjustment Notification System	MWDOC	95%	September 2014	MWDOC was awarded a grant from the Bureau of Reclamation to develop 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. Pilot implementation is scheduled to conclude in August 2014, with broad implementation to begin throughout Orange County in September 2014.
Public Spaces Program	MWDOC	10%	December 2015	Through the Integrated Regional Watershed Management (IRWM) process, MWDOC is implementing a Proposition 84 grant to target the installation of comprehensive landscape improvements for publicly owned landscape properties throughout the South Orange County IRWM Plan area. The program encourages the removal of non-functional turfgrass, the upgrade of antiquated irrigation timers, and the conversion of high-precipitation-rate fixed spray irrigation to low-precipitation-rate rotating nozzles and/or drip irrigation. To date, 10 cities, water districts, or other special districts (i.e., school districts) have applied for funding through this program, and 4 project proposals have been received.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Home Certification Program	MWDOC	3%	July 2015	This program will provide single-family sites with indoor and outdoor audits to identify areas for water savings improvements and opportunities. The program will also provide rebates for the installation of residential water efficiency devices, including smart timers and high efficiency rotating nozzles. In June 2014, MWDOC received ten (10) applications for the Home Certification Program. Five surveys were conducted, and survey results are pending.
Landscape Irrigation Survey Program	MWDSC	Ongoing	June 2016	Through this program, Metropolitan offers, at no cost, the services of a certified landscape irrigation auditor who will survey and provide written recommendations for qualifying non-residential properties within Metropolitan's service area. Eligible landscapes include commercial and industrial sites, homeowner association common areas, and institutional sites such as schools, parks, and government facilities. To date, 107 sites in the MWDOC service area have contacted Metropolitan to request surveys.
Spray to Drip Conversion Pilot Program	MWDOC	15%	October 2014	This is a pilot program designed to test the efficacy of replacing conventional spray heads in shrub beds with low-volume, low-precipitation drip technology. Through a rebate program format, residential sites will be encouraged to convert their existing spray nozzles to drip. To date, 30 applications have been received, and the conversions are currently underway.
Commercial, Industrial, and Institutional Performance-Based Water Use Efficiency Program	MWDOC	2%	December 2015	This program will provide enhanced rebate incentives to commercial, industrial, and institutional sites and large-landscape properties (landscapes $\geq$ 1 acre). The program is scheduled to launch during the second Quarter of 2014.

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Landscape Training and Outreach	MWDOC	5%	Ongoing	The Orange County Garden Friendly (OCGF) Pilot Program promotes the use of climate appropriate plants and water efficient irrigation practices, with the overall goals of reducing water runoff and improving outdoor water use efficiency. The OCGF Pilot Program is a collaborative effort of the Orange County Stormwater Program (OCSP) and the University of California Cooperative Extension (UCCE). Each partner plays a role in planning and implementing the Program. After the completion of the Pilot Program, the steering committee met to review the Program's successes and lessons learned. An information item will be presented to the MWDOC P&O Committee in August. The OCGF program is set to continue with three events during Fall 2014 and three more events in Spring 2015.

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	June-14	468	1.08	5,696	89.30	96,727	2,672	15,101
Smart Timer Program - Irrigation Timers	2004	June-14	122	2.52	1,031	178.13	11,232	3,783	19,702
Rotating Nozzles Rebate Program	2007	June-14	821	0.27	61,355	188.09	372,402	1,996	7,866
SoCal Water$mart Commercial Plumbing Fixture Rebate Program	2002	June-14	2	0.07	1,532	38.39	45,360	3,414	26,990
Water Smart Landscape Program [1]	1997	June-14	12,386	883.86	12,386	10,524.86	12,386	10,378	57,826
Industrial Process Water Use Reduction Program	2006	June-14	0	0.00	1	0.00	11	252	941
Turf Removal Program[3]	2010	June-14	87,190	1.02	547,093	77	1,624,279	227	475
High Efficiency Toilet (HET) Program	2005	June-14	651	2.31	3,607	153.43	32,180	1,189	7,157
Home Water Certification Program	2013	June-14	5	0.010	58	0.453	58	1.364	1.364
Synthetic Turf Rebate Program	2007		0	0	0	0	685,438	96	469
Ultra-Low-Flush-Toilet Programs [2]	1992		0	0	0	0	363,926	13,452	150,509
Home Water Surveys [2]	1995		0	0	0	0	11,867	160	1,708
Showerhead Replacements [2]	1991		0	0	0	0	270,604	1,667	19,083
Total Water Savings All Programs			**891**		**632,759**	**11,249**	**3,526,470**	**39,287**	**307,827**

(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 01/02	FY 02/03	FY03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14	Total	Current FY Water Savings Ac/Ft (Cumulative)	Cumulative Water Savings across all Fiscal Years
Brea	17	107	178	132	143	132	175	156	42	186	144	93	115	1,620	1.75	252.05
Buena Park	9	45	88	81	84	85	114	146	59	230	145	105	106	1,297	1.86	183.49
East Orange CWD RZ	3	8	20	20	11	18	22	17	3	23	10	10	8	173	0.15	28.43
El Toro WD	21	88	108	103	83	91	113	130	32	162	112	134	121	1,298	1.96	187.33
Fountain Valley	36	127	209	196	178	205	219	243	72	289	158	115	102	2,149	1.58	345.68
Garden Grove	39	173	278	243	243	238	304	332	101	481	236	190	162	3,020	2.61	468.15
Golden State WC	37	195	339	374	342	339	401	447	168	583	485	265	283	4,258	4.32	649.41
Huntington Beach	114	486	857	738	680	761	750	751	211	963	582	334	295	7,522	4.47	1,236.40
Irvine Ranch WD	159	626	1,087	1,093	1,445	1,972	2,052	1,844	1,394	2,621	2,170	1,763	1,664	19,890	26.77	2,881.62
La Habra	8	40	86	81	66	96	136	83	22	179	128	82	114	1,121	1.74	160.84
La Palma	3	5	13	21	18	33	35	51	25	76	46	34	25	385	0.44	54.13
Laguna Beach CWD	17	88	119	84	68	57	77	77	27	96	57	38	37	842	0.49	135.83
Mesa Water District	24	117	228	240	212	239	249	246	73	232	176	114	86	2,236	1.30	374.06
Moulton Niguel WD	158	630	841	640	570	652	716	742	250	1,127	679	442	421	7,868	6.67	1,218.19
Newport Beach	17	144	343	277	243	245	270	259	57	197	142	116	92	2,402	1.47	410.20
Orange	58	247	304	358	330	366	365	403	111	349	262	218	163	3,534	2.57	582.21
Orange Park Acres	-	-	-	-	-	4	8	-	-	-	-	-	-	12	0.00	2.43
San Juan Capistrano	16	95	120	107	102	109	103	127	43	190	110	76	73	1,271	1.08	196.57
San Clemente	32	182	235	170	136	204	261	278	63	333	206	140	94	2,334	1.51	362.02
Santa Margarita WD	140	510	743	573	592	654	683	740	257	1,105	679	553	662	7,891	9.98	1,174.76
Seal Beach	13	28	57	39	46	47	46	57	7	81	51	31	29	532	0.51	82.16
Serrano WD	9	16	54	39	39	30	31	23	7	21	20	13	10	312	0.21	54.47
South Coast WD	35	138	165	97	103	107	130	148	43	183	112	89	79	1,429	1.40	218.79
Trabuco Canyon WD	10	63	76	58	44	69	60	62	28	82	62	30	45	689	0.76	107.22
Tustin	21	89	152	138	127	152	146	144	45	174	97	78	59	1,422	0.90	233.57
Westminster	37	159	235	196	186	213	171	233	74	329	208	121	82	2,244	1.15	355.91
Yorba Linda	36	214	342	355	333	288	350	367	117	394	273	181	167	3,417	2.47	557.40
MWDOC Totals	1,069	4,620	7,277	6,453	6,424	7,406	7,987	8,106	3,331	10,686	7,350	5,365	5,094	81,168	80.09	12,513.32
Anaheim	917	677	904	1,364	701	854	847	781	860	910	477	331	285	9,908	4.23	1,685.44
Fullerton	40	196	369	289	263	269	334	330	69	397	270	200	186	3,212	3.01	494.80
Santa Ana	15	69	188	269	244	236	235	257	87	355	190	163	131	2,439	1.98	407.53
Non-MWDOC Totals	972	942	1,461	1,922	1,208	1,359	1,416	1,368	1,016	1,662	937	694	602	15,559	9.21	2,587.76
Orange County Totals	2,041	5,562	8,738	8,375	7,632	8,765	9,403	9,474	4,347	12,348	8,287	6,059	5,696	96,727	89.30	15,101.08

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		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm.	
Brea	3	9	0	0	2	0	8	0	9	8	4	0	37	66	293.68
Buena Park	3	1	0	0	0	0	4	19	3	0	0	0	10	20	44.07
East Orange CWD RZ	0	0	0	0	1	0	5	0	2	0	0	0	11	0	2.35
El Toro WD	0	25	2	18	5	5	26	2	7	2	11	0	65	321	1,524.86
Fountain Valley	1	0	0	6	2	2	8	2	3	2	4	0	38	17	74.40
Garden Grove	2	1	6	0	5	4	7	0	5	2	9	0	50	13	62.41
Golden State WC	1	2	9	22	7	4	13	3	9	49	9	25	95	127	320.53
Huntington Beach	13	1	6	27	6	36	15	4	18	33	20	35	123	160	433.68
Irvine Ranch WD	29	56	14	145	28	153	267	71	414	135	71	59	1,119	1,349	5,580.51
La Habra	0	0	0	21	0	0	3	0	4	7	2	0	17	29	89.27
La Palma	0	0	0	0	0	0	1	0	1	0	2	0	4	0	0.32
Laguna Beach CWD	2	0	2	14	4	1	109	2	76	2	71	0	298	19	96.50
Mesa Water District	6	7	13	7	7	22	21	0	10	2	15	2	116	73	338.20
Moulton Niguel WD	21	23	17	162	36	60	179	31	51	74	40	45	469	477	1,519.45
Newport Beach	10	27	7	58	6	0	275	12	242	26	168	75	969	345	1,371.55
Orange	5	2	2	13	5	8	25	0	20	24	13	9	147	111	461.40
San Juan Capistrano	10	0	7	49	13	1	103	2	14	18	6	11	174	90	283.85
San Clemente	81	20	13	209	46	11	212	17	26	7	28	2	960	334	1,478.48
Santa Margarita WD	25	44	10	152	61	53	262	7	53	171	64	93	586	694	2,138.22
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Seal Beach	0	0	0	1	0	0	0	3	1	0	1	36	2	40	33.79
Serrano WD	0	0	11	0	4	0	3	0	1	0	0	0	19	0	3.78
South Coast WD	11	6	3	10	13	3	78	10	13	16	8	4	158	128	533.94
Trabuco Canyon WD	1	0	2	0	2	10	12	0	6	0	2	0	68	103	548.16
Tustin	7	9	10	14	10	0	11	0	8	4	9	1	59	35	138.18
Westminster	3	0	3	0	1	1	2	0	1	1	2	0	28	14	85.22
Yorba Linda	8	5	5	21	25	0	22	0	20	0	12	5	173	83	394.48
MWDOC Totals	242	238	142	949	289	374	1,671	185	1,017	583	571	402	5,795	4,648	17,851.29
Anaheim	9	59	5	46	12	11	23	60	19	10	9	26	120	361	1,376.36
Fullerton	2	2	2	39	9	33	22	51	9	29	8	0	74	154	384.88
Santa Ana	2	4	1	8	8	0	6	5	8	19	7	8	36	44	89.63
Non-MWDOC Totals	13	65	8	93	29	44	51	116	36	58	24	34	230	559	1,850.87
Orange County Totals	255	303	150	1,042	318	418	1,722	301	1,053	641	595	436	6,025	5,207	19,702

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

Agency	FY 09/10			FY 10/11			FY 11/12			FY 12/13			FY 13/14			Total Program			Cumulative Water Savings across all Fiscal Years
	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	
	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	
Brea	8	100	0	32	0	0	130	0	0	65	120	0	84	0	0	341	220	0	6.57
Buena Park	0	0	2,535	29	0	0	32	0	0	65	0	0	53	0	0	216	75	2,535	447.88
East Orange	0	0	0	0	0	0	340	0	0	55	0	0	30	0	0	530	0	0	7.16
El Toro	145	2,874	890	174	0	0	357	76	0	23	6,281	0	56	3,288	0	843	12,809	890	296.93
Fountain Valley	21	0	0	83	0	0	108	0	0	35	0	0	0	0	0	381	0	0	6.74
Garden Grove	151	45	0	38	0	0	119	0	0	95	0	0	80	0	0	680	151	0	14.48
Golden State	280	29	0	303	943	0	294	0	0	257	2,595	0	192	0	0	1,570	3,567	0	59.70
Huntington Beach	39	3,420	305	203	625	0	458	0	0	270	0	0	120	0	0	1,505	4,909	2,681	719.35
Irvine Ranch	1,034	54,441	1,479	2,411	2,861	0	1,715	4,255	0	25,018	1,014	0	11,010	4,257	0	43,392	79,371	2,004	2304.58
La Habra	0	273	0	0	0	0	33	90	0	0	0	0	15	0	0	72	898	900	213.71
La Palma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0.24
Laguna Beach	191	0	0	156	0	0	763	0	0	3,596	0	0	2,948	878	0	7,870	925	0	66.29
Mesa Water District	195	83	0	118	0	0	297	277	0	270	0	0	361	0	0	1,522	385	343	110.07
Moulton Niguel	234	0	959	1,578	0	0	1,225	0	0	512	1,385	0	361	227	0	4,633	8,615	2,945	834.02
Newport Beach	92	4,781	0	337	1,208	0	640	3,273	0	25,365	50	0	19,349	6,835	0	45,870	16,886	0	499.17
Orange	129	0	0	135	30	0	343	0	0	264	0	0	245	120	0	2,235	313	0	44.29
San Clemente	729	1,299	0	2,612	851	0	4,266	117	1,343	631	172	0	415	5,074	0	9,237	7,538	1,343	332.96
San Juan Capistrano	656	5,709	0	1,452	0	0	949	0	0	684	30	0	370	0	0	4,615	7,399	0	221.23
Santa Margarita	1,731	937	611	3,959	3,566	0	4,817	0	0	983	0	0	389	0	0	13,123	4,571	611	379.94
Seal Beach	0	291	0	0	0	0	0	0	0	0	0	0	0	0	0	115	291	0	8.58
Serrano	1,498	0	0	364	0	0	58	0	0	190	0	0	105	0	0	2,333	0	0	41.61
South Coast	0	0	0	318	1,772	0	688	359	0	435	0	0	70	0	0	1,700	2,264	0	58.30
Trabuco Canyon	1,357	791	0	0	0	0	379	0	0	34	0	0	0	0	0	1,900	791	0	51.40
Tustin	314	0	0	512	0	0	476	1,013	0	378	0	0	329	0	0	2,581	1,013	0	50.48
Westminster	80	0	0	0	0	0	26	0	0	15	0	0	0	0	0	232	0	0	4.69
Yorba Linda	371	3,256	0	529	0	0	559	0	0	730	0	0	40	990	0	3,232	4,359	500	231.65
MWDOC Totals	9,255	78,329	6,779	15,343	11,856	0	19,072	9,460	1,343	59,970	11,647	0	36,622	21,669	0	150,738	157,350	14,752	7012.02
Anaheim	273	164	105	372	382	0	742	38,554	0	459	813	0	338	0	0	2,581	39,913	105	531.84
Fullerton	48	0	1,484	416	0	0	409	0	0	119	0	0	107	0	0	1,640	64	1,484	288.49
Santa Ana	48	572	0	53	0	0	22	65	0	99	0	0	86	2,533	0	549	3,226	0	33.25
Non-MWDOC Totals	369	736	1,589	841	382	0	1,173	38,619	0	677	813	0	531	2,533	0	4,770	43,203	1,589	853.58
Orange County Totals	9,624	79,065	8,368	16,184	12,238	0	20,245	48,079	1,343	60,647	12,460	0	37,153	24,202	0	155,508	200,553	16,341	7865.60

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

Agency	FY 01/02	FY 02/03	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	Totals	Cumulative Water Savings across all Fiscal Years
Brea	0	51	0	22	52	2	27	113	24	4	1	234	0	**530**	**263**
Buena Park	10	83	28	55	64	65	153	432	122	379	290	5	23	**1,709**	**692**
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
El Toro WD	23	23	73	42	5	2	0	92	143	1	137	0	212	**753**	**393**
Fountain Valley	1	94	2	59	35	63	17	35	0	2	314	0	0	**622**	**409**
Garden Grove	21	199	51	297	34	136	5	298	130	22	0	4	1	**1,198**	**1,058**
Golden State WC	11	197	34	232	80	531	46	414	55	68	135	0	1	**1,804**	**1,367**
Huntington Beach	5	191	73	185	82	209	48	104	126	96	156	104	144	**1,523**	**1,076**
Irvine Ranch WD	306	1,085	87	325	1,044	429	121	789	2,708	1,002	646	1,090	451	**10,083**	**4,500**
La Habra	10	37	52	45	60	16	191	75	53	4	0	0	0	**543**	**385**
La Palma	0	0	0	0	5	0	0	140	21	0	0	0	0	**166**	**56**
Laguna Beach CWD	2	30	2	18	9	12	20	137	189	0	0	0	27	**446**	**219**
Mesa Water District	424	155	22	130	241	141	141	543	219	669	41	6	0	**2,732**	**1,438**
Moulton Niguel WD	31	74	65	172	3	0	9	69	151	6	0	0	0	**580**	**595**
Newport Beach	4	230	9	77	24	94	98	27	245	425	35	0	0	**1,268**	**873**
Orange	84	144	22	553	127	88	18	374	67	1	73	1	271	**1,823**	**1,250**
San Juan Capistrano	0	34	21	181	0	6	2	1	1	0	0	0	14	**260**	**306**
San Clemente	0	36	5	95	40	173	2	18	43	0	19	0	0	**431**	**287**
Santa Margarita WD	0	16	3	56	0	0	6	23	11	0	0	0	0	**115**	**149**
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Seal Beach	3	34	44	40	61	45	1	2	124	0	0	0	0	**354**	**309**
Serrano WD	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
South Coast WD	0	31	8	54	8	4	9	114	56	422	84	148	0	**938**	**304**
Trabuco Canyon WD	0	1	0	6	0	0	0	4	0	0	0	0	0	**11**	**11**
Tustin	9	114	16	82	14	7	115	145	25	230	0	0	0	**757**	**574**
Westminster	16	109	32	153	57	104	40	161	16	63	35	1	28	**815**	**731**
Yorba Linda	0	36	12	42	4	118	10	24	8	30	0	1	0	**285**	**402**
MWDOC Totals	**960**	**3,004**	**661**	**2,921**	**2,049**	**2,245**	**1,079**	**4,134**	**4,537**	**3,424**	**1,966**	**1,594**	**1,172**	**29,746**	**17,646**
Anaheim	1,042	400	947	362	1,113	780	766	3,298	582	64	48	165	342	**9,909**	**4,849**
Fullerton	28	41	138	270	91	96	133	579	29	4	0	94	0	**1,503**	**1,141**
Santa Ana	115	153	589	227	624	373	493	815	728	39	12	16	18	**4,202**	**3,354**
Non-MWDOC Totals	**1,185**	**594**	**1,674**	**859**	**1,828**	**1,249**	**1,392**	**4,692**	**1,339**	**107**	**60**	**275**	**360**	**15,614**	**9,344**
Orange County Totals	**2,145**	**3,598**	**2,335**	**3,780**	**3,877**	**3,494**	**2,471**	**8,826**	**5,876**	**3,531**	**2,026**	**1,869**	**1,532**	**45,360**	**26,990**

[1] Retrofit devices include ULF Toilets and Urinals, High Efficiency Toilets and Urinals, 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, and Water Pressurized Brooms.

Water Smart Landscape Program

Total Number of Meters in Program by Agency

Agency	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12/13	FY 13/14	Overall Water Savings To Date (AF)
Brea	0	0	0	0	0	0	0	22	22	22	39.25
Buena Park	0	0	0	0	0	17	103	101	101	101	347.38
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	0.00
El Toro WD	88	109	227	352	384	371	820	810	812	812	3,929.83
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	0	0	14	34	32	34	32	32	32	164.06
Huntington Beach	0	0	0	0	0	31	33	31	31	31	113.03
Irvine Ranch WD	277	638	646	708	1,008	6,297	6,347	6,368	6,795	6,797	30,586.88
Laguna Beach CWD	0	0	0	0	57	141	143	141	124	124	591.50
La Habra	0	0	0	0	23	22	24	22	22	22	111.61
La Palma	0	0	0	0	0	0	0	0	0	0	0.00
Mesa Water District	191	170	138	165	286	285	288	450	504	511	2,358.35
Moulton Niguel WD	80	57	113	180	473	571	595	643	640	675	3,349.32
Newport Beach	32	27	23	58	142	171	191	226	262	300	1,158.66
Orange	0	0	0	0	0	0	0	0	0	0	0.00
San Clemente	191	165	204	227	233	247	271	269	269	299	1,937.90
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0.00
Santa Margarita WD	547	619	618	945	1,571	1,666	1,746	1,962	1,956	2,274	11,540.01
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	0	0	62	117	108	110	118	118	118	655.79
Trabuco Canyon WD	0	0	0	12	49	48	62	60	60	60	282.01
Tustin	0	0	0	0	0	0	0	0	0	0	0.00
Westminster	0	0	0	10	18	18	20	18	18	18	95.91
Yorba Linda WD	0	0	0	0	0	0	0	0	0	0	0.00
MWDOC Totals	**1,406**	**1,785**	**1,969**	**2,733**	**4,395**	**10,025**	**10,787**	**11,273**	**11,766**	**12,196**	**57,261.5**
Anaheim	0	0	0	0	0	142	146	144	190	190	564.59
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**	**0**	**0**	**142**	**146**	**144**	**190**	**190**	**564.59**
Orange Co. Totals	**1,406**	**1,785**	**1,969**	**2,733**	**4,395**	**10,167**	**10,933**	**11,417**	**11,956**	**12,386**	**57,826.09**

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	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
Buena Park	0	1	0	0	0	0	0	1	54	297
East Orange	0	0	0	0	0	0	0	0	0	0
El Toro	0	0	0	0	0	0	0	0	0	0
Fountain Valley	0	0	0	0	0	0	0	0	0	0
Garden Grove	0	0	0	0	0	0	0	0	0	0
Golden State	1	0	0	0	0	0	0	1	3	18
Huntington Beach	0	0	0	0	0	2	0	2	54	106
Irvine Ranch	0	0	2	1	1	1	1	6	98	244
La Habra	0	0	0	0	0	0	0	0	0	0
La Palma	0	0	0	0	0	0	0	0	0	0
Laguna Beach	0	0	0	0	0	0	0	0	0	0
Mesa Water District	0	0	0	0	0	0	0	0	0	0
Moulton Niguel	0	0	0	0	0	0	0	0	0	0
Newport Beach	0	0	0	0	0	0	0	0	0	0
Orange	1	0	0	0	0	0	0	1	43	276
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0
San Clemente	0	0	0	0	0	0	0	0	0	0
Santa Margarita	0	0	0	0	0	0	0	0	0	0
Seal Beach	0	0	0	0	0	0	0	0	0	0
Serrano	0	0	0	0	0	0	0	0	0	0
South Coast	0	0	0	0	0	0	0	0	0	0
Trabuco Canyon	0	0	0	0	0	0	0	0	0	0
Tustin	0	0	0	0	0	0	0	0	0	0
Westminster	0	0	0	0	0	0	0	0	0	0
Yorba Linda	0	0	0	0	0	0	0	0	0	0
MWDOC Totals	2	1	2	1	1	3	1	11	252	941

[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.

TURF REMOVAL BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 10/11		FY 11/12		FY 12/13		FY 13/14		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	0	0	3,397	9,466	7,605	0	0	0	11,002	9,466	7.53
Buena Park	0	0	0	0	0	0	0	0	0	0	-
East Orange	0	0	0	0	0	0	1,964	0	1,964	0	0.27
El Toro	0	0	4,723	0	4,680	72,718	4,582	0	13,985	72,718	24.30
Fountain Valley	0	0	1,300	0	682	7,524	4,252	0	6,234	7,524	3.44
Garden Grove	0	46,177	14,013	0	4,534	0	8,274	0	26,821	46,177	34.17
Golden State	0	0	42,593	30,973	31,813	3,200	32,725	8,424	107,131	42,597	46.46
Huntington Beach	801	3,651	27,630	48,838	9,219	12,437	20,642	0	58,292	64,926	43.56
Irvine Ranch	5,423	12,794	6,450	1,666	32,884	32,384	36,584	76,400	81,341	123,244	47.70
La Habra	0	7,775	0	8,262	0	0	0	0	0	16,037	7.82
La Palma	0	0	0	0	0	0	0	0	0	0	-
Laguna Beach	978	0	2,533	0	2,664	1,712	4,586	226	10,761	1,938	3.51
Mesa Water District	0	0	6,777	0	10,667	0	22,246	0	39,690	0	8.95
Moulton Niguel	956	16,139	4,483	26,927	11,538	84,123	14,739	40,741	31,716	167,930	57.32
Newport Beach	0	0	3,454	0	3,548	2,346	894	0	7,896	2,346	3.23
Orange	0	0	12,971	0	15,951	8,723	11,244	0	40,166	8,723	13.93
San Clemente	0	0	21,502	0	16,062	13,165	18,471	13,908	56,035	27,073	21.75
San Juan Capistrano	0	0	22,656	103,692	29,544	27,156	12,106	0	64,306	130,848	70.64
Santa Margarita	4,483	5,561	1,964	11,400	10,151	11,600	17,778	48,180	34,376	76,741	26.56
Seal Beach	0	0	0	0	3,611	0	0	0	3,611	0	1.01
Serrano	0	0	0	0	0	0	2,971	0	2,971	0	0.42
South Coast	0	16,324	6,806	0	9,429	4,395	15,162	116,719	31,397	137,438	34.33
Trabuco Canyon	0	0	272	0	1,542	22,440	2,651	0	4,465	22,440	7.20
Tustin	0	0	0	0	9,980	0	1,410	0	11,390	0	2.99
Westminster	0	0	0	0	0	0	0	0	0	0	-
Yorba Linda	11,349	0	0	0	0	0	0	0	11,349	0	6.36
MWDOC Totals	23,990	108,421	183,524	241,224	216,104	303,923	233,281	304,598	656,899	958,166	473.44
Anaheim	0	0	0	0	0	0	0	0	0	0	-
Fullerton	0	0	0	0	0	0	0	9,214	0	9,214	1.29
Santa Ana	0	0	0	0	0	0	0	0	0	0	-
Non-MWDOC Totals	0	0	0	0	0	0	0	9,214	0	9,214	1.29
Orange County Totals	23,990	108,421	183,524	241,224	216,104	303,923	233,281	313,812	656,899	967,380	474.73

[1]Installed device numbers are listed as square feet

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	Total	Cumulative Water Savings across all Fiscal Years
Brea	0	2	7	43	48	8	0	0	38	146	**26.94**
Buena Park	0	1	2	124	176	7	0	0	96	406	**75.33**
East Orange CWD RZ	0	0	10	12	1	0	0	0	13	36	**6.81**
El Toro WD	0	392	18	75	38	18	0	133	218	892	**189.73**
Fountain Valley	0	69	21	262	54	17	0	0	41	464	**112.78**
Garden Grove	0	14	39	443	181	24	0	0	63	764	**174.79**
Golden State WC	2	16	36	444	716	37	80	2	142	1,475	**305.40**
Huntington Beach	2	13	59	607	159	76	0	0	163	1,079	**231.48**
Irvine Ranch WD	29	1,055	826	5,088	2,114	325	0	1,449	810	11,696	**2,578.61**
Laguna Beach CWD	0	2	17	91	28	11	0	0	45	194	**38.73**
La Habra	0	3	18	296	34	20	0	0	37	408	**94.18**
La Palma	0	1	10	36	26	13	0	0	21	107	**21.15**
Mesa Water District	0	247	19	736	131	7	0	0	174	1,314	**314.17**
Moulton Niguel WD	0	20	104	447	188	46	0	0	400	1,205	**216.80**
Newport Beach	0	5	19	163	54	13	0	0	49	303	**64.77**
Orange	1	20	62	423	79	40	0	1	142	768	**163.43**
San Juan Capistrano	0	10	7	76	39	11	0	0	35	178	**36.56**
San Clemente	0	7	22	202	66	21	0	0	72	390	**81.20**
Santa Margarita WD	0	5	14	304	151	44	0	0	528	1,046	**145.59**
Seal Beach	0	678	8	21	12	1	0	2	17	739	**242.20**
Serrano WD	0	0	1	13	5	0	0	0	2	21	**5.53**
South Coast WD	2	2	29	102	41	12	23	64	102	377	**59.63**
Trabuco Canyon WD	2	0	4	23	23	0	0	0	10	62	**12.38**
Tustin	0	186	28	387	479	17	0	0	64	1,161	**278.04**
Westminster	0	17	25	541	167	23	0	0	35	808	**192.32**
Yorba Linda WD	0	14	89	323	96	18	0	0	40	580	**138.96**
MWDOC Totals	38	2,779	1,494	11,282	5,106	809	103	1,651	3,357	26,619	**5,807.53**
Anaheim	0	255	78	2,771	619	114	0	0	156	3,993	**975.41**
Fullerton	0	4	28	286	60	23	0	0	61	462	**102.01**
Santa Ana	0	11	25	925	89	23	0	0	33	1,106	**271.65**
Non-MWDOC Totals	0	270	131	3,982	768	160	0	0	250	5,561	**1,349.08**
Orange County Totals	38	3,049	1,625	15,264	5,874	969	103	1,651	3,607	32,180	**7,156.61**

HOME WATER SURVEYS PERFORMED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 13/14		FY 14/15		Total		Cumulative
	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Water Savings
Brea	1	0	0	0	1	0	0.02
Buena Park	0	0	0	0	0	0	0.00
East Orange	15	0	0	0	15	0	0.35
El Toro	0	0	0	0	0	0	0.00
Fountain Valley	2	0	0	0	2	0	0.05
Garden Grove	0	0	0	0	0	0	0.00
Golden State	0	0	0	0	0	0	0.00
Huntington Beach	1	0	0	0	1	0	0.02
Irvine Ranch	0	0	0	0	0	0	0.00
La Habra	0	0	0	0	0	0	0.00
La Palma	0	0	0	0	0	0	0.00
Laguna Beach	4	0	0	0	4	0	0.09
Mesa	0	0	0	0	0	0	0.00
Moulton Niguel	4	0	0	0	4	0	0.09
Newport Beach	1	0	0	0	1	0	0.02
Orange	0	0	0	0	0	0	0.00
San Clemente	14	0	0	0	14	0	0.33
San Juan Capistrano	2	0	0	0	2	0	0.05
Santa Margarita	10	0	0	0	10	0	0.24
Serrano	0	0	0	0	0	0	0.00
South Coast	4	0	0	0	4	0	0.09
Trabuco Canyon	0	0	0	0	0	0	0.00
Tustin	0	0	0	0	0	0	0.00
Westminster	0	0	0	0	0	0	0.00
Yorba Linda	0	0	0	0	0	0	0.00
MWDOC Totals	58	0	0	0	58	0	1.36
Anaheim	0	0	0	0	0	0	0.00
Fullerton	0	0	0	0	0	0	0.00
Santa Ana	0	0	0	0	0	0	0.00
Non-MWDOC Totals	0	0	0	0	0	0	0.00
Orange County Totals	58	0	0	0	58	0	1.364

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 District	4,114	0	3,005	78,118	4,106	0	2,198	0	13,423	78,118	63.46
Moulton Niguel	14,151	0	25,635	2,420	7,432	0	0	0	47,218	2,420	35.69
Newport Beach	2,530	0	6,628	0	270	0	0	0	9,428	0	6.92
Orange	4,169	0	7,191	0	635	0	0	0	11,995	0	8.89
San Clemente	9,328	0	11,250	455	2,514	1,285	500	0	23,592	1,740	18.37
San Juan Capistrano	0	0	7,297	639	2,730	0	4,607	0	14,634	639	9.02
Santa Margarita	12,922	0	26,069	0	21,875	0	7,926	0	68,792	0	44.68
Seal Beach	0	0	817	0	0	0	0	0	817	0	0.57
Serrano	7,347	0	1,145	0	0	0	0	0	8,492	0	6.97
South Coast	2,311	0	6,316	0	17,200	0	1,044	0	26,871	0	16.43
Trabuco Canyon	1,202	0	9,827	0	0	0	0	0	11,029	0	7.89
Tustin	6,123	0	4,717	0	2,190	0	0	0	13,030	0	9.67
Westminster	2,748	16,566	8,215	0	890	0	0	0	11,853	16,566	22.47
Yorba Linda	11,792	0	12,683	0	4,341	5,835	0	0	28,816	5,835	24.48
MWDOC Totals	132,820	18,033	181,848	89,642	97,806	8,624	20,184	0	432,658	116,299	384.83
Anaheim	4,535	0	7,735	20,093	13,555	65,300	4,122	0	29,947	85,393	69.18
Fullerton	4,865	876	5,727	0	6,223	0	105	0	16,920	876	12.36
Santa Ana	0	0	2,820	0	525	0	0	0	3,345	0	2.27
Non-MWDOC Totals	9,400	876	16,282	20,093	20,303	65,300	4,227	0	50,212	86,269	83.81
Orange County Totals	142,220	18,909	198,130	109,735	118,109	73,924	24,411	0	482,870	202,568	468.63

[1]Installed device numbers are calculated in square feet

ULF TOILETS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	Previous Years	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	Total	Cumulative Water Savings across all Fiscal Years
Brea	378	189	299	299	122	144	867	585	341	401	26	48	17	4	0	**3,720**	**1,569.44**
Buena Park	361	147	331	802	520	469	524	1,229	2,325	1,522	50	40	18	9	0	**8,347**	**3,221.94**
East Orange CWD RZ	2	0	33	63	15	17	15	50	41	44	19	18	13	2	0	**332**	**127.24**
El Toro WD	1,169	511	678	889	711	171	310	564	472	324	176	205	61	40	0	**6,281**	**2,883.15**
Fountain Valley	638	454	635	858	1,289	2,355	1,697	1,406	1,400	802	176	111	58	32	0	**11,911**	**4,988.63**
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**	**11,284.48**
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**	**10,916.54**
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**	**12,886.15**
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**	**10,965.00**
Laguna Beach CWD	283	93	118	74	149	306	220	85	271	118	32	26	29	6	0	**1,810**	**785.75**
La Habra	594	146	254	775	703	105	582	645	1,697	1,225	12	31	6	7	0	**6,782**	**2,733.13**
La Palma	65	180	222	125	44	132	518	173	343	193	31	27	20	17	0	**2,090**	**858.31**
Mesa Water District	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**	**7,114.85**
Moulton Niguel WD	744	309	761	698	523	475	716	891	728	684	410	381	187	100	0	**7,607**	**3,119.21**
Newport Beach	369	293	390	571	912	1,223	438	463	396	1,883	153	76	36	16	0	**7,219**	**2,927.69**
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**	**6,798.18**
San Juan Capistrano	1,234	284	193	168	323	1,319	347	152	201	151	85	125	42	39	0	**4,663**	**2,170.00**
San Clemente	225	113	191	65	158	198	667	483	201	547	91	66	37	34	0	**3,076**	**1,212.77**
Santa Margarita WD	577	324	553	843	345	456	1,258	790	664	260	179	143	101	29	0	**6,522**	**2,785.02**
Seal Beach	74	66	312	609	47	155	132	81	134	729	29	10	6	12	0	**2,396**	**994.45**
Serrano WD	81	56	68	41	19	52	95	73	123	98	20	15	14	2	0	**757**	**313.59**
South Coast WD	110	176	177	114	182	181	133	358	191	469	88	72	32	22	0	**2,305**	**913.71**
Trabuco Canyon WD	10	78	42	42	25	21	40	181	102	30	17	20	12	14	0	**634**	**252.02**
Tustin	968	668	557	824	429	1,292	1,508	1,206	1,096	827	69	89	26	12	0	**9,571**	**4,106.91**
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**	**6,544.89**
Yorba Linda WD	257	309	417	457	404	1,400	759	1,690	1,155	627	158	136	81	41	0	**7,891**	**3,148.16**
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**	**105,621.20**
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**	**16,914.77**
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**	**6,894.71**
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**	**21,078.27**
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**	**44,887.75**
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**	**150,508.96**