Municipal Water District of Orange County

2020 Water Shortage Contingency Plan

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Acronyms and Abbreviations

%	Percent
Act	Urban Water Management Planning Act
AF	Acre-Feet
AFY	Acre-Feet per Year
Annual Assessment	Annual Water Supply and Demand Assessment
BPP	Basin Production Percentage
cfs	cubic feet per second
CRA	Colorado River Aqueduct
CVP	Central Valley Project
CWC	California Water Code
DDW	Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DRA	Drought Risk Assessment
DVL	Diamond Valley Lake
DWR	California Department of Water Resources
EBSD	Emerald Bay Services District
EOCWD	East Orange County Water District
EOC	Emergency Operation Center
EOP	Emergency Operations Plan
ERP	Emergency Response Plan
ETWD	El Toro Water District
FVCSP	MWDOC Crossings Specific Plan
FY	Fiscal Year
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GSP	Groundwater Sustainability Plan
GSWC	Golden State Water Company
HMP	Hazard Mitigation Plan
IRP	Integrated Water Resource Plan
IRWD	Irvine Ranch Water District
LBCWD	Laguna Beach County Water District
M&I	Municipal and industrial
MAF	Million Acre-Feet
MCL	Maximum Contaminant Level
Mesa Water	Mesa Water District
MET	Metropolitan Water District of Southern California
Metropolitan Act	Metropolitan Water District Act
MGD	Million Gallons per Day
MNWD	Moulton Niguel Water District

MWDOC	Municipal Water District of Orange County
OC	Orange County
OC San	Orange County Sanitation District
OCWD	Orange County Water District
SCAB	South Coast Air Basin
SCWD	South Coast Water District
Serrano	Serrano Water District
SMWD	Santa Margarita Water District
sf	Square Foot
Supplier	Urban Water Supplier
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TCWD	Trabuco Canyon Water District
UWMP	Urban Water Management Plan
WEROC	Water Emergency Response Organization of Orange County
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDM	Water Surplus and Drought Management Plan
WUE	Water Use Efficiency
YLWD	Yorba Linda Water District

1 Introduction and WSCP Overview

The Water Shortage Contingency Plan is a strategic planning document designed to prepare for and respond to water shortages. This Water Shortage Contingency Plan (WSCP) complies with California Water Code (CWC) Section 10632, which requires that every urban water supplier shall prepare and adopt a WSCP as part of its Urban Water Management Plan (UWMP). This level of detailed planning and preparation is intended to help maintain reliable supplies and reduce the impacts of supply interruptions.

The WSCP is MWDOC's operating manual that is used to prevent catastrophic service disruptions through proactive, rather than reactive, management. A water shortage, when water supply available is insufficient to meet the normally expected customer water use at a given point in time, may occur due to a number of reasons, such as population and land use growth, climate change, drought, and catastrophic events. This Plan provides a structured guide for MWDOC to deal with water shortages, incorporating prescriptive information and standardized action levels, along with implementation actions in the event of a catastrophic supply interruption. This way, if and when shortage conditions arise, MWDOC's governing body, its staff, and retail agencies can easily identify and efficiently implement pre-determined steps to manage a water shortage. A well-structured WSCP allows real-time water supply availability assessment and structured steps designed to respond to actual conditions, to allow for efficient management of any shortage with predictability and accountability.

The WSCP also describes MWDOC's procedures for conducting an Annual Water Supply and Demand Assessment (Annual Assessment) that is required by CWC Section 10632.1 and is to be submitted to the California Department of Water Resources (DWR) on or before July 1 of each year, or within 14 days of receiving final allocations from the State Water Project (SWP), whichever is later. MWDOC's 2020 WSCP is included as an appendix to its 2020 UWMP which will be submitted to DWR by July 1, 2021. However, this WSCP is created separately from MWDOC's 2020 UWMP and can be amended, as needed, without amending the UWMP. Furthermore, the CWC does not prohibit an urban water supplier from taking actions not specified in its WSCP, if needed, without having to formally amend its UWMP or WSCP.

1.1 Water Shortage Contingency Plan Requirements and Organization

The WSCP provides the steps and water shortage response actions to be taken in times of water shortage conditions. WSCP has prescriptive elements, such as: an analysis of water supply reliability; the water shortage response actions for each of the six standard water shortage levels that correspond to water shortage percentages ranging from 10% to greater than 50%; an estimate of potential to close supply gap for each measure; protocols and procedures to communicate identified actions for any current or predicted water shortage conditions; procedures for an annual water supply and demand assessment; reevaluation and improvement procedures for evaluating the WSCP.

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

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

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

Section 3 Water Shortage Contingency Plan

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

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

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

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

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

Section 3.6 Compliance and Enforcement is not required by wholesale water providers.

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

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

Section 3.9 Monitoring and Reporting is not required by wholesale water providers.

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

Section 3.11 Special Water Feature Distinction

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

1.2 Integration with Other Planning Efforts

As a retail water supplier in Orange County (OC), MWDOC considered other key entities in the development of this WSCP, including the Metropolitan Water District of Southern California (MET) (regional wholesaler for Southern California and the direct supplier of imported water to MWDOC), and OCWD (OC Groundwater Basin manager and provider of recycled water in North OC). As a wholesale water provider, MWDOC also worked with its retail agencies to align WSCP strategies to ensure robust water shortage planning and response across the District. The DWR Submittal tables for MWDOC's WSCP can be found in Appendix A.

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

- **MWDOC's 2020 UWMP** provides the basis for the projections of the imported supply availability over the next 25 years for MWDOC's service area.

- **MWDOC's Orange County Reliability Study** provides the basis for water demand projections for MWDOC's member agencies as well as Anaheim, Fullerton, and Santa Ana.
- **MET's 2020 Integrated Water Resources Plan (IRP)** is a long-term planning document to ensure water supply availability in Southern California and provides a basis for water supply reliability in Orange County.
- **MET's 2020 UWMP** was developed as a part of the 2020 IRP planning process and was used by MWDOC as another basis for the projections of supply capability of the imported water received from MET.
- **OCWD's 2021 Water Reliability Plan** provides the latest information on groundwater management and supply projection for the OC Groundwater Basin, the primary source of groundwater for a significant number of water suppliers in OC.
- **OCWD's 2018-19 Engineer's Report** provides information on the groundwater conditions and basin utilization of the OC Groundwater Basin.
- **OCWD's 2017 Basin 8-1 Alternative Plan i**s an alternative to the Groundwater Sustainability Plan (GSP) for the OC Groundwater Basin and provides significant information related to sustainable management of the basin in the past and hydrogeology of the basin, including groundwater quality and basin characteristics.
- **2020 Local Hazard Mitigation Plan** provides the basis for the seismic risk analysis of the water system facilities.
- **Orange County Local Agency Formation Commission's 2020 Municipal Service Review for MWDOC Report** provides a comprehensive service review of the municipal services provided by MWDOC.
- **Water Master Plan and Sewer Master Plan** of MWDOC provide information on water infrastructure planning projects and plans to address any required water system improvements.
- **Groundwater Management Plans** provide the groundwater sustainability goals for the basins in the MWDOC's service area and the programs, actions, and strategies activities that support those goals.

2 Background Information

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

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

Lying in the South Coast Air Basin (SCAB), its climate is characterized by southern California's "Mediterranean" climate with mild winters, warm summers, and moderate rainfall. In terms of land use, MWDOC's service area in the North OC is almost built out with predominantly residential units with pockets dedicated to commercial, institutional, governmental uses and open space and parks and the existing vacant lots in South OC are gradually transitioning to residential and commercial mixed-use areas. The current population of 2,342,740 is projected to increase by 8% over the next 25 years.

MWDOC is governed by an elected seven-member Board of Directors, with each board member representing a specific area of the County and elected to a four-year term by voters who reside within that part of the MWDOC service area. Each director is a member of at least one of the following standing committees: Planning and Operations; Administration and Finance; and Executive.

2.1 MWDOC Service Area

MWDOC serves more than 2.34 million residents in a 600-square-mile service area (Figure 2-1). Although MWDOC does not have its own water facilities and does not have jurisdiction over local supplies, it works to ensure the delivery of reliable water supplies to the region.

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

- City of Brea
- City of Buena Park
- City of Fountain Valley
- City of Garden Grove
- City of Huntington Beach
- City of La Habra
- City of La Palma
- City of Newport Beach
- City of Orange
- East Orange County Water District (EOCWD)
- El Toro Water District (ETWD)
- Emerald Bay Services District (EBSD)
- Irvine Ranch Water District (IRWD)
- Golden State Water Company (GSWC)
- Laguna Beach County Water District (LBCWD)
- Mesa Water District (Mesa Water)
- Moulton Niguel Water District (MNWD)
- Orange County Water District (OCWD)

- City of San Clemente
- City of San Juan Capistrano
- City of Seal Beach
- City of Tustin
- City of Westminster
- Santa Margarita Water District (SMWD)
- Serrano Water District (Serrano)
- South Coast Water District (SCWD)
- Trabuco Canyon Water District (TCWD)
- Yorba Linda Water District (YLWD)

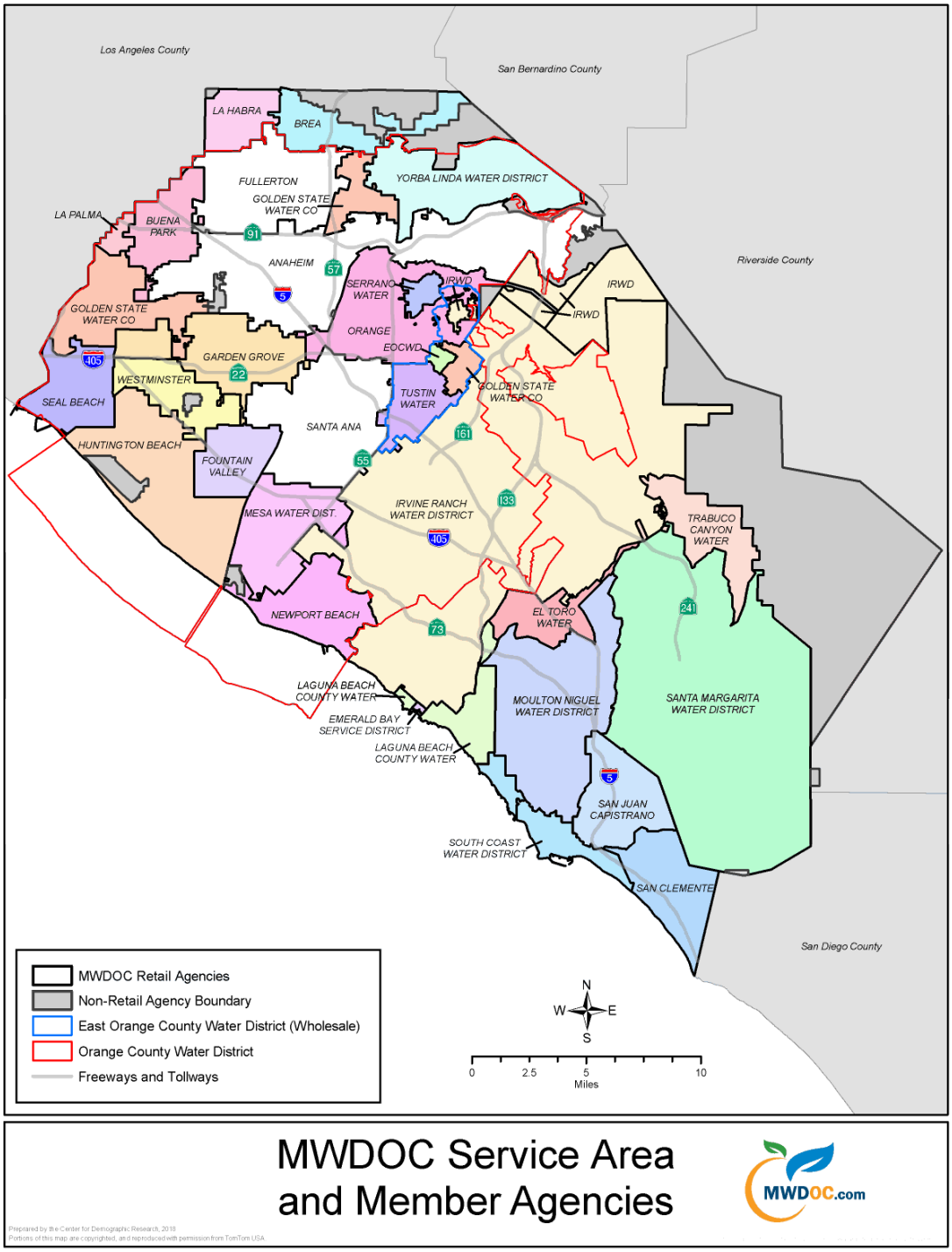

Figure 2-1: MWDOC Service Area

2.2 Relationship to MET

MWDOC became a member agency of MET in 1951 to bring supplemental imported water supplies to parts of Orange County. MET is the largest water wholesaler for domestic and municipal uses in California, serving approximately 19 million customers. MET wholesales imported water supplies to 26 member cities and water districts in six southern California counties. Its service area covers the southern California coastal plain, extending approximately 200 miles along the Pacific Ocean from the City of Oxnard in the north to the international boundary with Mexico in the south. This encompasses 5,200 square miles and includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. The regional locations of MET's member agencies are shown in Figure 2-2. Approximately 85% of the population from the aforementioned counties reside within MET's boundaries.

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

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

In Orange County, MWDOC and the cities of Anaheim, Fullerton, and Santa Ana are MET member agencies that purchase imported water directly from MET. Furthermore, MWDOC purchases both treated potable and untreated water from MET to supplement its retail agencies' local supplies.

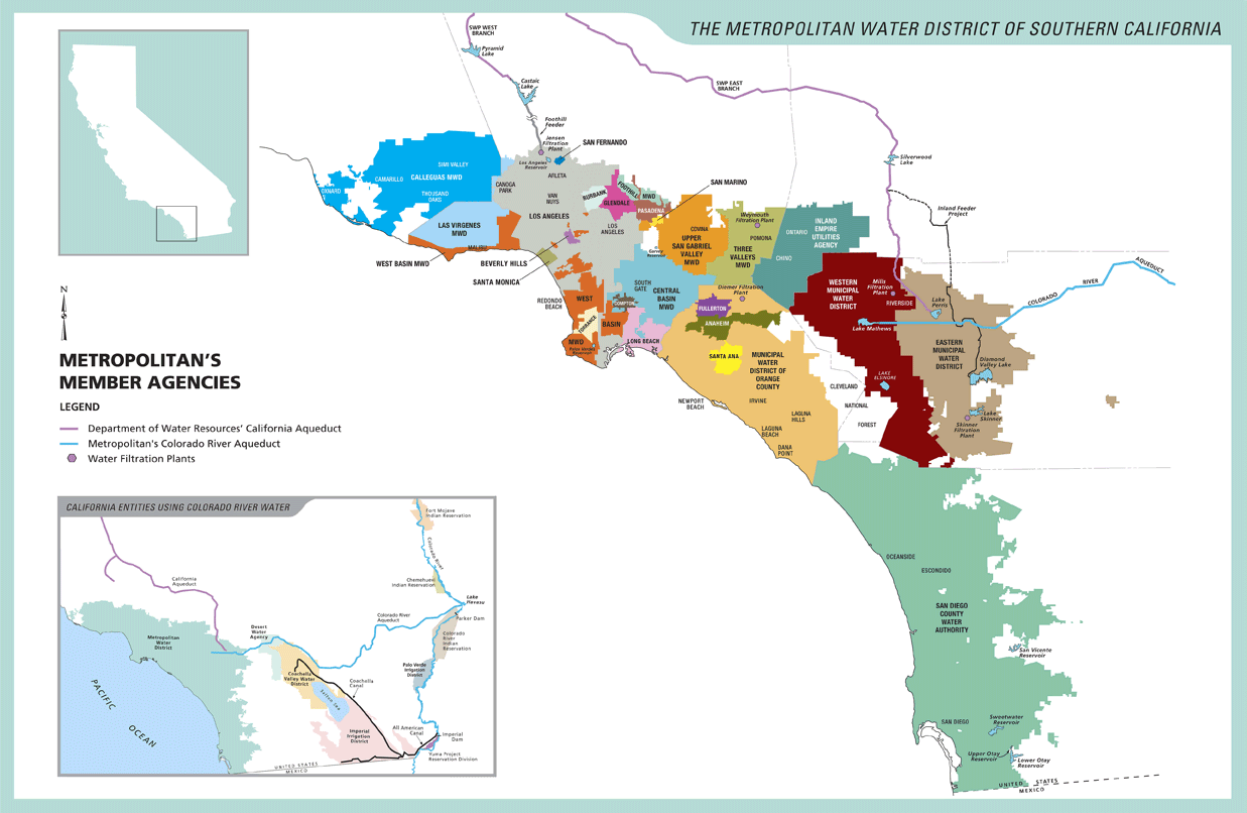

Figure 2-2: Regional Location of MET's Member Agencies

2.3 Relationship with MET Water Shortage Planning

The WSCP is designed to be consistent with MET's Water Shortage and Demand Management (WSDM) Plan, MET's Water Supply Allocation Plan (MET WSAP), MWDOC's Water Supply Allocation Plan (WSAP), and other emergency planning efforts as described below. MET and MWDOC's WSAPs are integral to the WSCP's shortage response strategy. In the event that MET determines that supply augmentation (including dedicated drought storage supply) and demand reduction measures would not be sufficient to meet a projected supply needs, MET will determine shortage conditions exist and assign a water shortage level needed to meet MWDOC service area reduced demands. In turn, MWDOC will need to further assess the shortage conditions within their service area to meet Retailer agencies' demands and as required activate MWDOC's WSAP. If applicable, MWDOC will also need to need invoke water shortage level conditions appropriate to meet projected Retailer demands as described further in Section 2.3.3 below.

2.3.1 MET Water Surplus and Drought Management Plan

MET evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage annually. Each stage is associated with specific resource management actions to avoid extreme shortages to the extent possible and minimize adverse impacts to retail

customers should an extreme shortage occur. The sequencing outlined in the WSDM Plan reflects anticipated responses towards MET's existing and expected resource mix.

Surplus stages occur when net annual deliveries can be made to water storage programs. Under the WSDM Plan, there are four surplus management stages that provides a framework for actions to take for surplus supplies. Deliveries in Diamond Valley Lake (DVL) and in SWP terminal reservoirs continue through each surplus stage provided there is available storage capacity. Withdrawals from DVL for regulatory purposes or to meet seasonal demands may occur in any stage.

The WSDM Plan distinguishes between shortages, severe shortages, and extreme shortages. The differences between each term are listed below.

- Shortage: MET can meet full-service demands and partially meet or fully meet interruptible demands using stored water or water transfers, as necessary.
- Severe Shortage: MET can meet full-service demands only by using stored water, transfers, and possibly calling for extraordinary conservation.
- Extreme Shortage: MET must allocate available supply to full-service customers.

There are six shortage management stages to guide resource management activities. These stages are defined by shortfalls in imported supply and water balances in MET's storage programs. When MET must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Figure 2-3 gives a summary of actions under each surplus and shortage stages when an allocation plan is necessary to enforce mandatory cutbacks. The goal of the WSDM plan is to avoid Stage 6, an extreme shortage (MET, 1999).

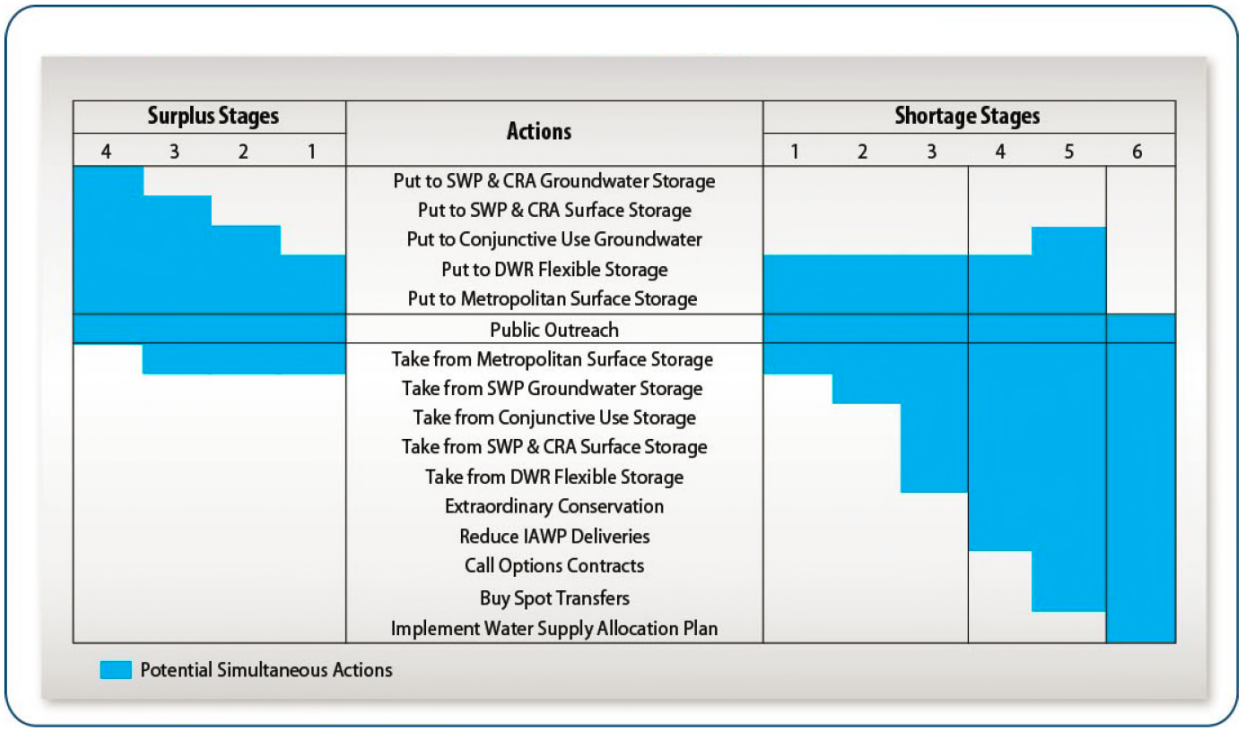

Figure 2-3: Resource Stages, Anticipated Actions, and Supply Declarations

MET's Board of Directors adopted a Water Supply Condition Framework in June 2008 in order to communicate the urgency of the region's water supply situation and the need for further water conservation practices. The framework has four conditions, each calling increasing levels of conservation. Descriptions for each of the four conditions are listed below:

- Baseline Water Use Efficiency: Ongoing conservation, outreach, and recycling programs to achieve permanent reductions in water use and build storage reserves.
- Condition 1 Water Supply Watch: Local agency voluntary dry-year conservation measures and use of regional storage reserves.
- Condition 2 Water Supply Alert: Regional call for cities, counties, member agencies, and retail water agencies to implement extraordinary conservation through drought ordinances and other measures to mitigate use of storage reserves.
- Condition 3 Water Supply Allocation: Implement MET's WSAP.

As noted in Condition 3, should supplies become limited to the point where imported water demands cannot be met, MET will allocate water through the WSAP (MET, 2021a2021).

2.3.2 MET Water Supply Allocation Plan

MET's imported supplies have been impacted by a number of water supply challenges as noted earlier. In case of extreme water shortage within the MET service area is the implementation of its WSAP.

MET's Board of Directors adopted the WSAP in February 2008 to fairly distribute a limited amount of water supply and applies it through a detailed methodology to reflect a range of local conditions and needs of the region's retail water consumers.

The WSAP includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering an allocation. MET's WSAP is the foundation for the urban water shortage contingency analysis required under CWC Section 10632 and is part of MET's 2015 UWMP.

MET's WSAP was developed in consideration of the principles and guidelines in MET's 1999 WSDM Plan with the core objective of creating an equitable "needs-based allocation". The WSAP's formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of MET supplies of up to 50%. The formula takes into account a number of factors, such as the impact on retail customers, growth in population, changes in supply conditions, investments in local resources, demand hardening aspects of water conservation savings, recycled water, extraordinary storage and transfer actions, and groundwater imported water needs.

The formula is calculated in three steps: 1) based period calculations, 2) allocation year calculations, and 3) supply allocation calculations. The first two steps involve standard computations, while the third step contains specific methodology developed for the WSAP.

Step 1: Base Period Calculations – The first step in calculating a member agency's water supply allocation is to estimate their water supply and demand using a historical based period with established water supply and delivery data. The base period for each of the different categories of supply and demand is calculated using data from the two most recent non-shortage years.

Step 2: Allocation Year Calculations – The next step in calculating the member agency's water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population growth and changes in local supplies.

Step 3: Supply Allocation Calculations – The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2.

In order to implement the WSAP, MET's Board of Directors makes a determination on the level of the regional shortage, based on specific criteria, typically in April. The criteria used by MET includes, current levels of storage, estimated water supplies conditions, and projected imported water demands. The allocations, if deemed necessary, go into effect in July of the same year and remain in effect for a 12-month period. The schedule is made at the discretion of the Board of Directors.

Although MET's 2020 UWMP forecasts that MET will be able to meet projected imported demands throughout the projected period from 2025 to 2045, uncertainty in supply conditions can result in MET needing to implement its WSAP to preserve dry-year storage and curtail demands (MET, 2021b2021).

2.3.3 MWDOC Water Supply Allocation Plan

To prepare for the potential allocation of imported water supplies from MET, MWDOC worked collaboratively with its 28 retail agencies to develop its own WSAP that was adopted in January 2009 and amended in 2015. The MWDOC WSAP outlines how MWDOC will determine and implement each of its retail agencies' allocation during a time of shortage.

The MWDOC WSAP uses a similar method and approach, when reasonable, as that of the MET's WSAP. However, MWDOC's plan remains flexible to use an alternative approach when MET's method produces a significant unintended result for the member agencies. The MWDOC WSAP model follows five basic steps to determine a retail agency's imported supply allocation.

Step 1: Determine Baseline Information – The first step in calculating a water supply allocation is to estimate water supply and demand using a historical based period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the last two non-shortage years.

Step 2: Establish Allocation Year Information – In this step, the model adjusts for each retail agency's water need in the allocation year. This is done by adjusting the base period estimates for increased retail water demand based on population growth and changes in local supplies.

Step 3: Calculate Initial Minimum Allocation Based on MET's Declared Shortage Level – This step sets the initial water supply allocation for each retail agency. After a regional shortage level is established, MWDOC will calculate the initial allocation as a percentage of adjusted Base Period Imported water needs within the model for each retail agency.

Step 4: Apply Allocation Adjustments and Credits in the Areas of Retail Impacts and Conservation– In this step, the model assigns additional water to address disparate impacts at the retail level caused by an across-the-board cut of imported supplies. It also applies a conservation credit given to those agencies that have achieved additional water savings at the retail level as a result of successful implementation of water conservation devices, programs and rate structures.

Step 5: Sum Total Allocations and Determine Retail Reliability – This is the final step in calculating a retail agency's total allocation for imported supplies. The model sums an agency's total imported allocation with all of the adjustments and credits and then calculates each agency's retail reliability compared to its Allocation Year Retail Demand.

The MWDOC WSAP includes additional measures for plan implementation, including the following:

- **Appeal Process** – An appeals process to provide retail agencies the opportunity to request a change to their allocation based on new or corrected information. MWDOC anticipates that under most circumstances, a retail agency's appeal will be the basis for an appeal to MET by MWDOC.
- **Melded Allocation Surcharge Structure** – At the end of the allocation year, MWDOC would only charge an allocation surcharge to each retail agency that exceeded their allocation if MWDOC exceeds its total allocation and is required to pay a surcharge to MET. MET enforces allocations to retail agencies through an allocation surcharge to a retail agency that exceeds its total annual allocation at the end of the 12-month allocation period. MWDOC's surcharge would be assessed according to the retail agency's prorated share (AF over usage) of MWDOC amount with MET. Surcharge funds collected by MET will be invested in its Water Management Fund, which is used to in part to fund expenditures in dry-year conservation and local resource development.
- **Tracking and Reporting Water Usage** – MWDOC will provide each retail agency with water use monthly reports that will compare each retail agency's current cumulative retail usage to their

allocation baseline. MWDOC will also provide quarterly reports on its cumulative retail usage versus its allocation baseline.

- **Timeline and Option to Revisit the Plan** – The allocation period will cover 12 consecutive months and the Regional Shortage Level will be set for the entire allocation period. MWDOC only anticipates calling for allocation when MET declares a shortage; and no later than 30 days from MET's declaration will MWDOC announce allocation to its retail agencies.

3 Water Shortage Contingency Planning

MWDOC's WSCP is a detailed guide of how MWDOC intends to act in the case of an actual water shortage condition. The WSCP anticipates a water supply shortage and provides pre-planned guidance for managing and mitigating a shortage. Regardless of the reason for the shortage, the WSCP is based on adequate details of demand reduction and supply augmentation measures that are structured to match varying degrees of shortage will ensure the relevant stakeholders understand what to expect during a water shortage situation.

3.1 Water Supply Reliability Analysis

Per CWC Section 10632 (a)(1), the WSCP shall provide an analysis of water supply reliability conducted pursuant to CWC Section 10635, and the key issues that may create a shortage condition when looking at MWDOC's water asset portfolio.

Understanding water supply reliability, factors that could contribute to water supply constraints, availability of alternative supplies, and what effect these have on meeting customer demands provides MWDOC with a solid basis on which to develop appropriate and feasible response actions in the event of a water shortage. In the 2020 UWMP, MWDOC conducted a Water Reliability Assessment to compare the total water supply sources available to the water supplier with long-term projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years.

MWDOC also conducted a Drought Risk Assessment (DRA) to evaluate a drought period that lasts five consecutive water years starting from the year following when the assessment is conducted. An analysis of both assessments determined that MWDOC is capable of meeting all of its member agencies' demands from 2021 through 2045 for a normal year, a single dry year, and a drought lasting five consecutive dry years with significant supplemental dedicated drought supplies from MET and ongoing conservation program efforts from its member agencies. MET's projections take into account the imported demands from Orange County and as so, MET's water reliability assessments determine that demands within MWDOC can be met, and the development of numerous local sources further augments the reliability of the imported water system. As a result, there is no projected shortage condition due to drought that will trigger agency demand reductions until MET notifies MWDOC of its implementation of its WSAP. More information is available in MWDOC's 2020 UWMP Section 6 and 7.

3.2 Annual Water Supply and Demand Assessment Procedures

Per CWC Section 10632.1, MWDOC will conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and by July 1st of each year, beginning in 2022, submit an annual water shortage assessment with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan.

MWDOC must include in its WSCP the procedures used for conducting an Annual Assessment. The Annual Assessment is a determination of the near-term outlook for supplies and demands and how a perceived shortage may relate to WSCP shortage stage response actions in the current calendar year. This determination is based on information available to MWDOC at the time of the analysis. Starting in 2022, the Annual Assessment will be due by July 1 of every year.

This section documents the decision-making process required for formal approval of MWDOC's Annual Assessment determination of water supply reliability each year and the key data inputs and the methodologies used to evaluate the water system reliability for the coming year, while considering that the year to follow would be considered dry.

3.2.1 Decision-Making Process

The following decision-making process describes the functional steps that MWDOC will take to formally approve the Annual Assessment determination of water supply reliability each year.

3.2.1.1 MWDOC Steps to Approve the Annual Assessment Determination

The MWDOC Annual Assessment will be predicated on MET's WSDM supply demand tracking, which is reported monthly to their Board of Directors. MET WSDM planning involves the examination of developing demand and supply conditions for the calendar year, as well as considerations of potential actions consistent with the WSDM Plan. Additionally, MWDOC staff simultaneously provides water supplies and demand reports to its Board of Directors to inform them of emerging demand and supply conditions. These monthly analyses provide key information for MWDOC and MET to manage resources to meet a range of estimated demands and adjust to changing conditions throughout the year.

For many of MWDOC's member agencies, their primary source of water is produced locally from groundwater basins, recycle water projects, surface reservoirs, and groundwater recovery projects. Their remaining source to meet retail demands comes from the purchase of imported water from MWDOC. However, some member agencies, particularly in South Orange County, rely heavily on imported water due to limited local supplies. As described below, MWDOC surveys each member agency to project near term and long-term consumptive and replenishment imported water demands.

Annually, MWDOC surveys its member agencies for anticipated water demands and supplies for the upcoming year. MWDOC utilizes this information to plan for the anticipated imported water supplies for the MWDOC service area. This information is then shared and coordinated with MET and is incorporated into their analysis of their service area's annual imported water needs. Based on the year's supply conditions and WSDM actions, MET will present a completed Annual Assessment for its member agencies' review from which they will then seek Board approval in April of each year. Additionally, MET expects that any triggers or specific shortage response actions that result from the Annual Assessment would be approved by their Board at that time. Based upon MET's Assessment and taking into consideration information provided to MWDOC through the annual survey, MWDOC will provide each member agency an anticipated estimate of imported supplies by member agency to be incorporated into each agency's annual supply and demand assessment. MWDOC will then adopt its completed Annual Assessment prior to the July 1 deadline, so MWDOC's member agencies will be able to submit their annual assessment by the July 1 DWR deadline. Figure 3-1 provides a breakdown of the decision-making process.

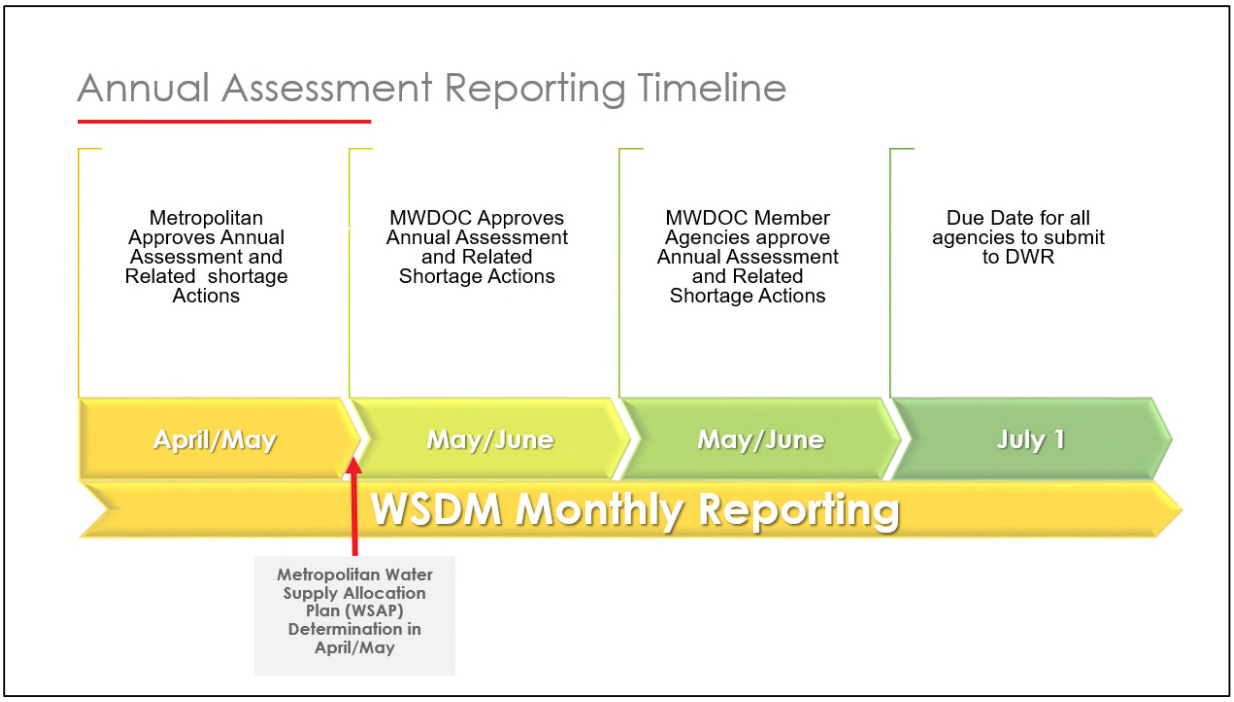

Figure 3-1: Sample Annual Assessment Reporting Timeline

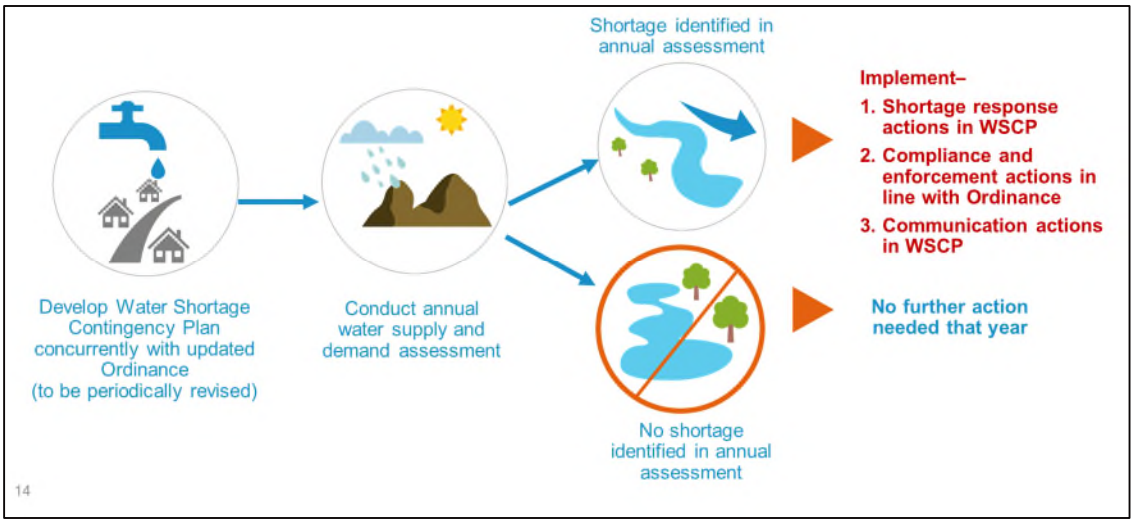

Figure 3-2: Water Shortage Contingency Plan Actions

3.2.2 Data and Methodologies

The following paragraphs document the key data inputs and methodologies that are used to evaluate MWDOC's water system reliability for the coming year, while considering that the year to follow would be considered dry.

3.2.2.1 Assessment Methodology

MWDOC will evaluate water supply reliability for the current year and one dry year for the purpose of the Annual Assessment. The Annual Assessment determination will be based on considerations of unconstrained water demand, local water supplies, MET imported water supplies, planned water use, and infrastructure considerations. The balance between projected in-service area supplies, coupled with MET imported supplies, and anticipated unconstrained demand will be used to determine what, if any, shortage stage is expected under the WSCP framework. The WSCP's standard shortage stages are defined in terms of shortage percentages. Shortage percentages will be calculated by dividing the difference between water supplies and unconstrained demand by total unconstrained demand. This calculation will be performed separately for anticipated current year conditions and for assumed dry year conditions.

3.2.2.2 Locally Applicable Evaluation Criteria

The information and analyses that comprise the Annual Assessment are based on ongoing planning processes that include the monthly WSDM supply-demand reporting. The Annual Assessment represents a mid-year evaluation at a given point in time; even after formal approval and submittal of the Annual Assessment determination by July 1, MWDOC will continue to monitor emerging supply and demand conditions and take appropriate actions consistent with the flexibility and adaptiveness inherent to the Water Shortage Contingency Plan. Some conditions that affect MWDOC's wholesale supply and demand, such as groundwater replenishment, surface water and local supply production, can differ significantly from earlier projections throughout the year.

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

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

3.2.2.3 Water Supply

MWDOC is the regional wholesaler of imported water that provides treated and untreated water purchased from MET for Municipal and Industrial (M&I) (direct) and non-M&I (indirect) uses within its service area. Imported water represents 35% of total water supply in MWDOC's service area. As detailed in MWDOC's 2020 UWMP, water supplies within MWDOC's service area are from local and imported sources. Local supplies developed by other entities and retail agencies include groundwater, recycled water, and surface water, accounting for 65% of the service area's water supplies. In North Orange County, imported water from MWDOC is supplemental, as agencies can pump a significant amount of their water demand from the OC Basin as set by the BPP; however, member agencies in South Orange County rely more heavily on imported water due to limited local resources.

3.2.2.4 Unconstrained Customer Demand

The WSCP and Annual Assessment define unconstrained demand as expected water use prior to any projected shortage response actions that may be taken under the WSCP. Unconstrained demand is distinguished from observed demand, which may be constrained by preceding, ongoing, or future actions, such as emergency supply allocations during a multi-year drought. WSCP shortage response actions to constrain demand are inherently extraordinary; routine activities such as ongoing conservation programs and regular operational adjustments are not considered as constraints on demands.

MWDOC's DRA reveals that its supply capabilities are expected to balance anticipated total water use and supply, assuming a five-year consecutive drought with a six percent increase in potable water demand above a normal year from 2021 through 2045. MWDOC purchases a fixed amount of untreated imported water from MET for use in groundwater recharge for the OC Basin and surface storage in Irvine Lake, which accounts for its non-potable demand that does not experience a six percent increase in demand, as these volumes are not affected by changes in hydrological conditions. MWDOC purchases a fixed amount of untreated imported water from MET for use in groundwater recharge for the OC Basin and surface storage in Irvine Lake, which accounts for its non-potable demand that does not experience a six percent increase in demand, as these volumes are not directly affected by changes in hydrological conditions.

3.2.2.5 Planned Water Use for Current Year Considering Dry Subsequent Year

CWC Section 10632(a)(2)(B)(ii) requires the Annual Assessment to determine "current year available supply, considering hydrological and regulatory conditions in the current year and one dry year."

The Annual Assessment will include two separate estimates of MWDOC's annual water supply and unconstrained demand using: 1) current year conditions, and 2) assumed dry year conditions. Accordingly, the Annual Assessment's shortage analysis will present separate sets of findings for the current year and dry year scenarios. The CWC does not specify the characteristics of a dry year, allowing discretion to the Supplier. MWDOC will use its discretion to refine and update its assumptions for a dry year scenario in each Annual Assessment as information becomes available and in accordance with best management practices.

In MWDOC's 2020 UWMP, the "single dry year" is characterized to resemble conditions as a year in which conditions reflect the lowest water supply available to the Supplier. Supply and demand analyses for the single-dry year case was based on conditions affecting the SWP as this supply availability fluctuates the most among MET's, and therefore MWDOC's, sources of supply. Fiscal Year 2013-14 was the single driest year for SWP supplies with an allocation of 5% to M&I uses. Unique to this year, the 5% SWP allocation was later reduced to 0%, before ending up at its final allocation of 5%, highlight the stressed water supplies for the year. Furthermore, on January 17, 2014 Governor Brown declared the drought State of Emergency, citing 2014 as the driest year in California history. Additionally, within MWDOC's service area, precipitation for FY 2013-14 was the second lowest on record, with 4.37 inches of rain, significantly impacting water demands.

3.2.2.6 Infrastructure Considerations

With the sale of the Allen-McColloch Pipeline to MET in 1995, MWDOC no longer owns or operates a distribution system. However, as the regional wholesale agency, MWDOC closely coordinates with MET and its member agencies on any planned infrastructure work that may impact water supply availability. The Annual Assessment will include consideration of any infrastructure issues that may pertain to near-term water supply reliability,

including repairs, construction, and environmental mitigation measures that may temporarily constrain capabilities, as well as any new projects that may add to system capacity. Throughout each year, MET regularly carries out preventive and corrective maintenance of its facilities within the MWDOC service area that may require shutdowns. MET plans and performs shutdowns to inspect and repair pipelines and facilities and support capital improvement projects. These shutdowns involve a high level of planning and coordination between MWDOC, MWDOC's Member Agencies, and MET. These shutdowns are scheduled to ensure that major portions of the distribution system are not out of service at the same time. Operational flexibility within MET's system and the cooperation of member agencies allow shutdowns to be successfully completed while continuing to meet all system demands.

Table 3-1: Water Shortage Contingency Plan Levels

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

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

3.3 Six Standard Water Shortage Levels

Per CWC Section 10632 (a)(3)(A), MWDOC must include the six standard water shortage levels that represent shortages from the normal reliability as determined in the Annual Assessment. The shortage levels have been standardized to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. This is an outgrowth of the severe statewide drought of 2012-2016, and the widely recognized public communication and state policy uncertainty associated with the many different local definitions of water shortage Levels.

The six standard water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10%, 20%, 30%, 40%, 50%, and greater than 50% shortage compared to the normal reliability condition) and align with the response actions MWDOC would implement to meet the severity of the impending shortages.

3.4 Shortage Response Actions

CWC Section 10632 (a)(4) requires the WSCP to specify shortage response actions that align with the defined shortage levels. MWDOC has defined specific shortage response actions that align with the defined shortage levels in DWR Tables 8-2 and 8-3 (Appendix A). These shortage response actions were developed with consideration to the system infrastructure and operations changes, supply augmentation responses, customer-class or water use-specific demand reduction initiatives, and increasingly stringent water use prohibitions.

3.4.1 Demand Reduction

The demand reduction measures that would be implemented to address shortage levels are described in DWR Table 8-2 (Appendix A). This table indicates which actions align with specific defined shortage levels and estimates the extent to which that action will reduce the gap between supplies and demands to demonstrate to the that choose suite of shortage response actions can be expected to deliver the expected outcomes necessary to meet the requirements of a given shortage level. This table also identifies the enforcement action, if any, associated with each demand reduction measure.

MWDOC's demand reduction actions correspond to shortage Levels 0 through 6, with coordination with the Water Emergency Response Organization of Orange County (WEROC) anticipated to begin at Level 4 or greater. At Level 0, MWDOC has ongoing long-term conservation savings measures including providing rebates for landscape irrigation efficiency, plumbing fixtures and devices, and turf replacement and providing programmatic support to retail agencies to reduce system water loss. For Shortage Levels 1 through 6, MWDOC will continuously expand public awareness campaigns to encourage consumers to reduce their water usage and implement voluntary demand reduction and its WSAP to further reduce the imported water shortage gap at each level, reaching up to greater than 50% of the shortage gap at Level 6.

3.4.2 Supply Augmentation

Supply Augmentation actions represent short-term management objectives triggered by the MET's WSDM Plan and do not overlap with the long-term new water supply development or supply reliability enhancement projects. Supply Augmentation is made available to MWDOC through MET. MWDOC relies on MET's reliability portfolio of water supply programs including existing water transfers, storage, and exchange agreements to supplement gaps in the supply/demand balance. MET has developed significant storage capacity (over 5 MAF) in reservoirs and

groundwater banking programs both within and outside of the Southern California region. Additionally, MET can pursue additional water transfer and exchange programs with other water agencies to help mitigate supply/demand imbalances and provide additional dry-year supply sources.

MWDOC will work in close coordination with MET on their supply augmentation projects during normal conditions and shortage Levels 1 through 6 to ensure reliability of imported water for the service area. MWDOC's supply augmentation actions are described in DWR Table 8-3 (Appendix A).

3.4.3 Operational Changes

During shortage conditions, water operations in Orange County may be affected depending on the specific condition or situation. As noted in section 3.2.2.6, MWDOC does not own any infrastructure, nor does it direct the operations of infrastructure in Orange County. MWDOC will coordinate and facilitate operational changes that may result from shortage conditions or arise from an emergency situation.

3.4.4 Additional Mandatory Restrictions

CWC Section 10632(a)(4)(D) calls for "additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions" to be included among the WSCP's shortage response actions. These prohibitions are in addition to the proposed State Board regulation in California Code of Regulations, title 23, division 3, a new chapter 3.5 on Conservation and the Prevention of Waste and Unreasonable Use; and within chapter 3.5, a new article 2 pertaining to Wasteful and Unreasonable Uses. Mandatory prohibitions include:

- Hosing off sidewalks, driveways, and other hardscapes;
- Washing automobiles with hoses not equipped with a shut-off nozzle;
- Using non-recirculated water in a fountain of other decorative water feature;
- Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation;
- Irrigating ornamental turf on public street medians.

MWDOC currently does not have any additional restrictions above the Statewide Mandatory prohibitions. However, State law gives substantial discretion to wholesale and retail water agencies to promulgate regulations and restrictions to conserve and allocate water in the event of a water shortage.

3.4.5 Emergency Response Plan (Hazard Mitigation Plan)

A catastrophic water shortage would be addressed according to the appropriate water shortage level and response actions. It is likely that a catastrophic shortage would immediately trigger Shortage Level 6 and response actions have been put in place to mitigate a catastrophic shortage. In addition, there are several Plans that address catastrophic failures and align with the WSCP, including MET's WSDM and WSAP and MWDOC's Hazard Mitigation Plan (HMP) and Emergency Response Plan (ERP).

3.4.5.1 MET's Water Surplus and Drought Management and Water Supply Allocation Plans

MET has comprehensive plans for stages of actions it would undertake to address a catastrophic interruption in water supplies through its WSDM and WSAP. MET also developed an Emergency Storage Requirement to

mitigate against potential interruption in water supplies resulting from catastrophic occurrences within the southern California region, including seismic events along the San Andreas Fault. In addition, MET is working with the state to implement a comprehensive improvement plan to address catastrophic occurrences outside of the southern California region, such as a maximum probable seismic event in the Sacramento-San Joaquin River Delta (Delta) that would cause levee failure and disruption of SWP deliveries.

3.4.5.2 Water Emergency Response of Orange County

In 1983, the Orange County water community identified a need to develop a plan on how agencies would respond effectively to disasters impacting the regional water distribution system. The collective efforts of these agencies resulted in the formation of WEROC to coordinate emergency response on behalf of all Orange County water and wastewater agencies, develop an emergency plan to respond to disasters, and conduct disaster training exercises for the Orange County water community. WEROC was established with the creation of an indemnification agreement between its member agencies to protect each other against civil liabilities and to facilitate the exchange of resources. WEROC is unique in its ability to provide a single point of contact for representation of all water and wastewater utilities in Orange County during a disaster. This representation is to the county, state, and federal disaster coordination agencies. Within the Orange County Operational Area, WEROC is the recognized contact for emergency response for the water community, including MWDOC.

3.4.5.3 MWDOC's Emergency Response Plan

MWDOC will follow its ERP in the event of a catastrophic supply interruption. The objectives of MWDOC's ERP are listed below:

- Protect public health by maintaining water quality standards.
- Maintain, restore, or establish water services to meet requirements of emergency services and the essential needs of the community.
- Assess damage and initiate repairs within the service area and report damage to the WEROC.
- Request and coordinate mutual aid resources through WEROC.

MWDOC is responsible for managing the response effort within the service area in the event of an emergency. In order to avoid duplicating requests and efforts, MWDOC can use the California Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). SEMS and NIMS implement an organized system of information flow to ensure a timely and coordinated effort in response to any sort of disaster.

MWDOC's emergency plan is activated once the Emergency Operations Center (EOC) is notified by telephone, oral delivered message, or radio. MWDOC's plan may be activated automatically under rare circumstances where communication is not possible such as during a significant earthquake or state of war emergency.

MWDOC may initiate a mutual aid request in the event that MWDOC is unable to provide the level of emergency response support required by the situation. MWDOC is a part of several mutual assistance programs such as WEROC and Water Agency Response Network (WARN).

MWDOC may find it necessary to release information to the public in order to safeguard public health and safety. MWDOC personnel and supervisors shall discuss any water quality issues as soon as possible to determine if a maximum contaminant level (MCL) has been exceeded or other water system violation has occurred.

MWDOC distributes to all news media the necessary public notification to the affected service area. If the affected area is deemed to be small (10 percent or less than the total service area), the use of sound trucks and/or informational flyer distribution is considered an appropriate means of public notification. There are three unsafe water notices that can be issued to MWDOC. They are listed below.

- Boil Water Notice: The water supply is contaminated with microbes that can be rendered safe by boiling or disinfecting the affected water. This is the most commonly used notice.
- Do Not Drink Notice: The water supply contains an acute contaminant that cannot be rendered safe by boiling or disinfecting the affected water.
- Do Not Use Notice: The water supply contains a contaminant that is unknown or exposure to the water supply can impact the health of the consumer.

3.4.6 Seismic Risk Assessment and Mitigation Plan

Per CWC Section 10632.5, Suppliers are required to assess seismic risk to water supplies as part of their WSCP. The plan also must include the mitigation plan for the seismic risk(s). Given the great distances that imported supplies travel to reach Orange County, the region is vulnerable to interruptions along hundreds of miles aqueducts, pipelines and other facilities associated with delivering the supplies to the region. Additionally, the infrastructure in place to deliver supplies are susceptible to damage from earthquakes and other disasters.

MWDOC's HMP evaluates hazards applicable to all jurisdictions in its entire planning area, prioritized based on probability, location, maximum probable extent, and secondary impacts. Earthquake fault rupture and seismic hazards, including ground shaking and liquefaction, are among the highest ranked hazards to the region as a whole because of its long history of earthquakes, with some resulting in considerable damage. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to infrastructure, fires, damages and outages of water and wastewater facilities, and other threats to life and property.

Nearly all of Orange County is at risk of moderate to extreme ground shaking, and the areas most susceptible to damage include Yorba Linda Water District and the Cities of La Habra and Buena Park. Liquefaction is also possible throughout much of Orange County, with the most extensive liquefaction zones occurring in coastal areas including the Cities of Huntington Beach and Newport Beach. Based on the amount of seismic activity that occurs within the region, there is no doubt that communities within MWDOC's service area will continue to experience future earthquake events, and it is a reasonable assumption that a major event will occur within a 30-year timeframe.

It was determined that the overarching mitigation goals were the same for all of MWDOC's member agencies, and thus, one set of goals were identified for MWDOC's HMP, which include:

Goal 1: Minimize vulnerabilities of critical infrastructure to minimize damages and loss of life and injury to human life caused by hazards.

Goal 2: Minimize security risks to water and wastewater infrastructure.

Goal 3: Minimize interruption to water and wastewater utilities.

Goal 4: Improve public outreach, awareness, education, and preparedness for hazards in order to increase community resilience.

Goal 5: Eliminate or minimize wastewater spills and overflows.

Goal 6: Protect water quality and supply, critical aquatic resources, and habitat to ensure a safe water supply.

Goal 7: Strengthen Emergency Response Services to ensure preparedness, response, and recovery during any major or multi-hazard event.

The process used by the Planning Team to identify hazard mitigation actions for MWDOC's HMP include the below. The mitigation actions identify the hazard, proposed mitigation action, location/facility, local planning mechanism, risk, cost, timeframe, possible funding sources, status, and status rationale, as applicable.

- Review of the Risk Assessment presented in Section 3 of the HMP (Appendix D).
- Review of the Capabilities Assessment presented for each member agency in the Jurisdictional Annexes.
- Team discussion of new concerns and issues that need to be addressed to reduce hazards to critical water and wastewater infrastructure.

For detailed hazard identification and prioritization and mitigation strategies of MWDOC and its member agencies, refer to MWDOC's HMP (Appendix D).

3.4.7 Shortage Response Action Effectiveness

For each specific Shortage Response Action identified in the plan, the WSCP also estimates the extent to which that action will reduce the gap between supplies and demands identified in DWR Table 8-2 (Appendix A). To the extent feasible, MWDOC has estimated percentage savings for the chosen suite of shortage response actions, which can be anticipated to deliver the expected outcomes necessary to meet the requirements of a given shortage level.

3.5 Communication Protocols

Timely and effective communication is a key element of the WSCP implementation. Per CWC Section 10632 (a)(5), MWDOC has established communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments regarding any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1; any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1; and any other relevant communications.

This section includes specific communications protocols that would be triggered to address each shortage level and response actions implemented. This element is focused on communicating the water shortage contingency planning actions that can be derived from the results of the Annual Assessment, and it would likely trigger based upon the decision-making process in Section 3.2 and/or emergency communications protocols to address earthquakes, fires, infrastructure failures, civil unrest, and other catastrophic events.

Strategic communication is an ongoing activity where the purpose, audience, message, tools, and channels may change at any given moment. In the context of water shortage response, the purpose may be an emergency water shortage situation, such as may result from an earthquake, or a longer-term, non-emergency, shortage condition, such as may result from a drought. In an emergency, MWDOC will activate the communication protocol detailed in the WEROC Emergency Operations Plan. In a non-emergency water shortage situation, MWDOC will implement the procedures identified in the Strategic Communications Program and Plan.

3.5.1 WEROC Emergency Operations Plan

This Plan defines the actions to be taken by WEROC EOC staff to reduce the loss of water and wastewater infrastructure; to respond effectively to a disaster; and to coordinate recovery operations in the aftermath of any emergency involving extensive damage to Orange County water and wastewater utilities. The EOC Plan includes activation notification protocol that will be used to contact partner agencies to inform them of the situation, activation status of the EOC, known damage or impacts, or resource needs. The EOC Plan is a standalone document that is reviewed annually and approved by the Board every three years.

The WEROC EOC is responsible for assessing the overall condition and status of the Orange County regional water distribution and wastewater collection systems including MET facilities that serve Orange County. The EOC can be activated during an emergency situation that can result from both natural and man-made causes, and can be activated through automatic, manual, or standby for activation. The WEROC EOC activation decision steps include the following:

- **Categorize incident:** Using information gathered from one or more sources, the WEROC primary contact will categorize the incident as a natural disaster, manmade disaster, terrorist threat, or terrorist physical attack.
- **Initial determination of situation:** WEROC and MWDOC management will make an initial determination of the situation based on scope and severity of incident, damage to affected agencies, and potential impacts.
- **WEROC activation level:** WEROC and MWDOC management will determine the appropriate level of WEROC activation.
- **Groups that will be notified:** When the EOC is activated, at a minimum, WEROC EOC staff, affected water utilities, MET's EOC at Eagle Rock, the Operational Area EOC, the Division of Drinking Water, health care agency, and California Department of Public Health should be notified.

For full details on the WEROC EOC procedures, refer to the WEROC Emergency Operations Plan (EOP) (Appendix C).

3.5.2 Strategic Communications Program and Plan

Strategic Communications Program and Plan serves as a blueprint, establishing a baseline understanding for how MWDOC's programs will provide information and value to its various stakeholders, partners, and employees during normal and shortage conditions. The MWDOC Public Affairs Department (Department), tasked to elevate public awareness, garner support, and establish confidence in the District's initiatives, attends the monthly general manager meetings where supply conditions are shared and is therefore kept up-to-date on shortage actions. The Department is tasked with providing transparent, reliable, and accurate information to the public, our partners, and our member agencies. With 28 member agencies in the District's service area, MWDOC utilizes various communications tools and channels to reach and unify such a vast and diverse group of stakeholders and audiences. Upon declaration of a shortage condition, the Department will collaborate agencies and internal staff to implement the communication protocols defined in the Strategic Communications Program and Plan.

The MWDOC Strategic Communications Program and Plan aligns the District's identified goals and objectives with the respective audiences, and outlines the appropriate communications tools and channels used to connect them all together, defines an implementation plan, and then monitors the program for effectiveness.

3.5.2.1 Goals & Objectives

The Board of Directors, executive management, and the District's Mission Statement have defined MWDOC'S three primary goals and associated objectives in the Strategic Communications Program and Plan. Water shortage communication will follow the protocols designed to communicate Goal #2, Objective 2.2:

- **Goal #2:** Examine, develop, and implement sound policies and programs that support Orange County water investments, and provide recognized value to the region.
- **Objective 2.2:** Be the trusted, leading voice for the region on water reliability, water policy, efficient water use, water education, and emergency preparedness and response.

3.5.2.2 Target Audiences

The ability to understand MWDOC's identified audience groups will make it possible to logically align messaging with the appropriate communications tools and channels to reach the District's during a water shortage. The Department has identified several key audience groups for communication purposes as defined in the Strategic Communications Program and Plan.

3.5.2.3 Communications Tools and Channels

During a normal and water shortage condition, MWDOC will utilize a defined set of communication tools and channels based to reach the relevant audiences as defined in the Strategic Communications Program and Plan.

3.5.2.4 Implementation, Assignments, and Schedules

Public sector organizations shoulder a unique responsibility to be transparent, accountable, and have a positive impact on the community. A carefully developed and executed communications plan can establish trust and credibility for our stakeholders, partners, audience members, and employees during a water shortage.

To effectively communicate water shortage, water shortage communication will include basic strategic targets such as goals, intended audiences, messages, and tools. To ensure the benefit or value received is worth the time, money, talent, and effort expended by the District and its staff, the water shortage communication planning should start with the question "Why are we doing this?" This is an important question during water shortage as it likely the situation will change and evolve, sometimes rapidly. Once defined, all strategic water shortage targets will be followed by an *implementation plan* which identifies tactics and logistics, and eventually, active monitoring, evaluation, and amending.

Assignments are essential to maintaining productivity and accountability as well as collectively accomplishing the goals of a project. The MWDOC Public Affairs Department has developed a Programs and Responsibility flowchart which breaks down the Department's primary roles and assignments by team member (See Strategic Communications Program and Plan). Additionally, the MWDOC Public Affairs Department has developed a series of logistical checklists to efficiently plan, implement, and control the flow of information during water shortage, and will continue to do so as the situation evolves. Furthermore, the Department uses robust program management software tools such as Asana and CoSchedule to stay in touch with impending deadlines and to keep everything, including assignments and checklists, organized and in one place.

3.5.2.5 Monitor, Evaluate, and Amend

The effectiveness of the MWDOC Strategic Communications Program and Plan depends on a large variety of factors including technological advancements or changes, the rise and fall of audience engagement, current news or media concentration, political changes in leadership and focus, and even the weather. The Strategic Communications Program and Plan identifies Key Performance Indicators (KPI), metrics and measurements that the MWDOC Public Affairs Department currently uses to track program effectiveness. Program and activity evaluation is constant, and through this evaluation process the District's messaging and activities are shaped and refined.

3.5.2.6 Water Shortage Communication

The type and degree of communication varies with each shortage level, thus predefined and actionable communication protocols improve MWDOC's ability to message necessary events. These communication protocols and procedures are summarized in Table 3-2.

Table 3-2: Communication Procedures

Communications Procedures Matrix				
Level 0 Permanent Water Waste Prohibitions	**Level 1 Up to 10% Voluntary Conservation**	**Level 2 Up to 20% Mandatory Conservation**	**Levels 3-4 Up to 30% or 40% Mandatory Conservation**	**Levels 5-6 Up to 50% or >50% Mandatory Conservation**
Standard outreach efforts in effect (media relations, social media, websites, etc.)	Update message platform to reflect conditions and needed actions from public	Update campaign and messages to generate immediate actions/behaviors by public	Update campaign and messages to raise awareness for more severe water-saving actions/behaviors by public	Update campaign and messages to reflect extreme or emergency condition and likely need to focus water use on health/safety needs
Promote ongoing WUE programs/tools/ partnerships designed to achieve long-term water management goals	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)	Announce status change to key stakeholders, general public (News release, social media, etc.)

Communications Procedures Matrix				
Standard coordination with member agencies	Include increased conservation messages on MWDOC.com and in standard outreach efforts; provide regular condition updates to stakeholders/media	Supplement Level 1 activities with additional tactics (mass media ads, partnerships, events,, etc.) as needed; provide regular condition updates to stakeholders/media	Supplement Level 2 outreach with additional tactics (supplemental ads, etc.) as needed; provide regular updates to stakeholders/media on conditions	Supplement Level 3-4outreach with additional tactics as needed; provide regular condition updates to stakeholders/media on conditions
As-needed Board reports on public communication andwater-use efficiency outreach activities	Enhance promotion ofongoing WUE programs/tools; deploy targeted advertising	Conduct issue briefings with electedofficials, other key civic and business leaders	Conduct specialized outreach to reduce discretionary outdooruse while minimizing landscape damage	Suspend promotion oflong-term WUE programs/ tools to focus on imminent needs
	Increase coordinationwith member agencies	Continue promotion ofongoing WUE programs/tools	Promote available water assistance resources for vulnerable populations; specialized outreach to impacted industries	Continue enhanced coordination with member agencies asneeded (daily or weekly briefings or email updates, etc.)
		Enhance coordination with member agenciesas needed	Continue enhanced coordination with member agencies asneeded	Analyze water use andother data to determine any appropriate supplemental actions
	Analyze water use andother data to determine any appropriate supplemental actions	Analyze water use andother data to determine any appropriate supplemental actions	Analyze water use andother data to determine any appropriate supplemental actions	

3.6 Compliance and Enforcement

Per the CWC Section 10632 (a)(6), wholesale water providers are subject to these requirements.

3.7 Legal Authorities

Per CWC Section 10632 (a)(7)(A), MWDOC has provided a description of the legal authorities that empower MWDOC to implement and enforce its shortage response in [WSCP Ordinance] (Appendix X). Per CWC Section 10632 (a)(7)(A), MWDOC has provided a description of the legal authorities that empower MWDOC to implement and enforce its shortage response in Appendix X.

Per CWC Section 10632 (a)(7) (B), MWDOC shall declare a water shortage emergency condition to prevail within the area served by such wholesaler whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

Per CWC Section 10632 (a)(7)(C), MWDOC shall coordinate with any agency or county within which it provides water supply services for the possible proclamation of a local emergency under California Government Code, California Emergency Services Act (Article 2, Section 8558). Table 3-3 identifies the contacts for all cities or counties for which the Supplier provides service in the WSCP, along with developed coordination protocols, can facilitate compliance with this section of the CWC in the event of a local emergency as defined in subpart (c) of Government Code Section 8558.

Table 3-3: Agency Contacts and Coordination Protocols

Contact	Agency	Coordination Protocols
Assistant General Manager, Water Services	Anaheim Public Utilities	Notification, Coordination, and provide supportive actions
Public Works Director	City of Brea	Notification, Coordination, and provide supportive actions
Director of Public Works/City Engineer	City of Buena Park	Notification, Coordination, and provide supportive actions
Director of Public Works/City Engineer	City of Fountain Valley	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Fullerton	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Garden Grove	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Huntington Beach	Notification, Coordination, and provide supportive actions

Contact	Agency	Coordination Protocols
Director of Public Works	City of La Habra	Notification, Coordination, and provide supportive actions
Public Works & Community Services Director	City of La Palma	Notification, Coordination, and provide supportive actions
Utilities Director	City of Newport Beach	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Orange	Notification, Coordination, and provide supportive actions
Public Works Director	City of San Clemente	Notification, Coordination, and provide supportive actions
Director of Public Works	City of San Juan Capistrano	Notification, Coordination, and provide supportive actions
Acting Public Works Director	City of Santa Ana	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Seal Beach	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Tustin	Notification, Coordination, and provide supportive actions
Director of Public Works	City of Westminster	Notification, Coordination, and provide supportive actions
General Manager	East Orange County Water District	Notification, Coordination, and provide supportive actions
General Manager	El Toro Water District	Notification, Coordination, and provide supportive actions
General Manager	Emerald Bay Service District	Notification, Coordination, and provide supportive actions

Contact	Agency	Coordination Protocols
General Manager, Orange County	Golden State Water Company	Notification, Coordination, and provide supportive actions
General Manager	Irvine Ranch Water District	Notification, Coordination, and provide supportive actions
General Manager	Laguna Beach County Water District	Notification, Coordination, and provide supportive actions
General Manager	Mesa Water	Notification, Coordination, and provide supportive actions
General Manager	Moulton Niguel Water District	Notification, Coordination, and provide supportive actions
General Manager	Orange County Water District	Notification, Coordination, and provide supportive actions
General Manager	Santa Margarita Water District	Notification, Coordination, and provide supportive actions
General Manager	Serrano Water District	Notification, Coordination, and provide supportive actions
General Manager	South Coast Water District	Notification, Coordination, and provide supportive actions
General Manager	Trabuco Canyon Water District	Notification, Coordination, and provide supportive actions
General Manager	Yorba Linda Water District	Notification, Coordination, and provide supportive actions
Public Works Director	Orange County	Notification
Public Works Director	City of Aliso Viejo	Notification
Director of Public Services	City of Costa Mesa	Notification
Public Works Director	City of Cypress	Notification
Public Works Director	City of Dana Point	Notification

Contact	Agency	Coordination Protocols
Public Works Director	City of Irvine	Notification
Public Works Director	City of Laguna Beach	Notification
Public Works Director	City of Laguna Hills	Notification
Public Works Director	City of Laguna Niguel	Notification
City Engineer	City of Laguna Woods	Notification
Public Works Director	City of Lake Forest	Notification
City Engineer	City of Los Alamitos	Notification
Public Works Director	City of Mission Viejo	Notification
Public Works Director	City of Placentia	Notification
Public Works Director	City of Rancho Santa Margarita	Notification
Public Works Director	City of Stanton	Notification
Public Works Director	City of Villa Park	Notification
Public Works Director	City of Yorba Linda	Notification

3.8 Financial Consequences of WSCP

Per CWC Section 10632(a)(8), Suppliers must include a description of the overall anticipated financial consequences to the Supplier of implementing the WSCP. This description must include potential reductions in revenue and increased expenses associated with implementation of the shortage response actions. This should be coupled with an identification of the anticipated mitigation actions needed to address these financial impacts.

MWDOC's rates and fees fall into three general categories: (1) the pass through of costs from MET for imported water rates and charges; (2) specific charges for MWDOC services contracted by our Member Agencies (Choice Budget); and (3) charges for MWDOC services that apply to all our Member Agencies (Core Budget). Below is a more detail description on each category:

1. The pass-through rates and charges from Metropolitan are billed on a monthly basis to our Member Agencies with the majority of the cost allocation based on their volumetric purchases. MWDOC does not collect any revenue from these charges.
2. The Choice Budget fees are primarily associated with the water education school program and the water use efficiency program, including conservation rebates. MWDOC Member Agencies elect to subscribe to specific programs and can opt-out of program participation. These fees are assessed to recover the entire cost of these "choice" programs. Any additional revenue collected is either reimbursed to the participating agencies at the end of the year or credited the following year. No additional revenue is collected for MWDOC.

3. MWDOC's Core Budget includes all other programs and functions provided to our Member Agencies. Among them are: Water Reliability Planning, Metropolitan Activities, Government Affairs, Public Affairs, Water Use Efficiency, Emergency Response, Board Functions, Finance, Information Technology, and Administration.

MWDOC's Core budget is funded through a fixed charge assessed on each agency's retail meter and a fixed groundwater service charge, which are both collected at the beginning of each fiscal year. Because MWDOC's rate structure is completely fixed and does not fluctuate with volumetric sales, the implementation of the WSCP will not impact MWDOC's revenues. There may be an increase in MWDOC's expenditures as it relates to additional public and media outreach. However, as experienced in the last drought of 2014-2015, MWDOC coordinated such outreach efforts with its member agencies and most costs were shared among the participating agencies. Therefore, any additional expenditures are not anticipated to be significant and can be recovered by MWDOC reserves.

MWDOC's choice budget would also not be adversely impacted by implementation of the WSCP. Although we anticipate during a shortage there will be an increase in funding to support the implementation of Member Agency WSCPs, as described above programs, MWDOC's Choice Budget are selected by our member agencies to participate and pay their share according to the service received.

Lastly, the pass through rates and charges from MET do not have a financial impact on MWDOC and will not be adversely impacted by the implementation of the WSCPs.

3.9 Monitoring and Reporting

Per CWC Section 10632(a)(9), water provider wholesalers are not subject to this requirement.

3.10 WSCP Refinement Procedures

Per CWC Section 10632 (a)(10), MWDOC must provide reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

MWDOC's WSCP is prepared and implemented as an adaptive management plan. MWDOC will use the monitoring and reporting process defined in section 3.9 to refine the WSCP. In addition, if certain procedural refinements or new actions are identified by MWDOC staff, or suggested by customers or other interested parties, MWDOC will evaluate their effectiveness, incorporate them into the WSCP, and implement them quickly at the appropriate water shortage level.

It is envisioned that the WSCP will be periodically re-evaluated to ensure that its shortage risk tolerance is adequate, and the shortage response actions are effective and up to date based on lessons learned from implementing the WSCP. The WSCP will be revised and updated during the UWMP update cycle to incorporate updated and new information. For example, new supply augmentation actions will be added, and actions that are no longer applicable for reasons such as program expiration will be removed. However, if revisions to the WSCP are warranted before the UWMP is updated, the WSCP will be updated outside of the UWMP update cycle. In the course of preparing the Annual Assessment each year, MWDOC staff will routinely consider the

functionality the overall WSCP and will prepare recommendations for MWDOC Board of Directors if changes are found to be needed.

3.11 Special Water Feature Distinction

As a wholesaler, CWC Section 10632 (b) is not applicable to MWDOC.

3.12 Plan Adoption, Submittal, and Availability

Per CWC Section 10632 (a)(c), MWDOC provided notice of the availability of the draft 2020 UWMP and draft 2020 WSCP and notice of the public hearing to consider adoption of the WSCP. The public review drafts of the 2020 UWMP and the 2020 WSCP were posted prominently on MWDOC's website, in advance of the public hearing on May 19, 2021. Copies of the draft WSCP were also made available for public inspection at MWDOC Clerk's and Utilities Department offices and public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix F.

MWDOC held the public hearing for the draft 2020 UWMP and draft WSCP on May 19, 2021 at the Board meeting. MWDOC Board reviewed and approved the 2020 UWMP and the WSCP at its May 19, 2021 meeting. See Appendix G for the resolution approving the WSCP.

By July 1, 2021, MWDOC's adopted 2020 UWMP and WSCP was filed with DWR, California State Library, and the County of Orange. MWDOC will make the WSCP available for public review on its website no later than 30days after filing with DWR.

Based on DWR's review of the WSCP, MWDOC will make any amendments in its adopted WSCP, as required and directed by DWR.

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

4 References

Metropolitan Water District of Southern California (MET). (2021a, February). *Water Shortage Contingency Plan.* http://www.mwdh2o.com/PDF_About_Your_Water/Draft_Metropolitan_WSCP_February_2021.pdf

Metropolitan Water District of Southern California (MET). (2021b, June). *2020 Urban Water Management Plan.*

Metropolitan Water District of Southern California (MET). (1999, August). *Water Surplus and Drought Management Plan*. http://www.mwdh2o.com/PDF_About_Your_Water/2.4_Water_Supply_Drought_Management_Plan.pdf

Appendix A

DWR Submittal Tables

DWR Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** **(*Narrative description)***
0	0% (Normal)	A Level 0 Water Supply Shortage –Condition exists when MWDOC notifies its water users that no supply reductions are anticipated in this year. MWDOC proceeds with planned water efficiency best practices to support consumer demand reduction in line with state mandated requirements and local MWDOC goals for water supply reliability.
1	Up to 10%	A Level 1 Water Supply Shortage – Condition exists when no supply reductions are anticipated, a consumer imported demand reduction of up to 10% is recommended to make more efficient use of water and respond to existing water conditions. Upon the declaration of a Water Aware condition, MWDOC shall implement the mandatory Level 1 conservation measures identified in this WSCP. The type of event that may prompt MWDOC to declare a Level 1 Water Supply Shortage may include, among other factors, a finding that its wholesale water provider (MET) calls for extraordinary water conservation efforts.
2	Up to 20%	A Level 2 Water Supply Shortage – Condition exists when MWDOC notifies its member agencies that due to drought or other supply reductions, a consumer imported demand reduction of up to 20% is necessary to make more efficient use of water and respond to existing water conditions. Upon declaration of a Level 2 Water Supply Shortage condition, MWDOC shall implement the mandatory Level 2 conservation measures identified in this WSCP.
3	Up to 30%	A Level 3 Water Supply Shortage – Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 30% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
4	Up to 40%	A Level 4 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 40% consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.
5	Up to 50%	A Level 5 Water Supply Shortage - Condition exists when MWDOC declares a water shortage emergency condition pursuant to California Water Code section 350 and notifies its member agencies that up to 50% or more consumer imported demand reduction is required to ensure sufficient supplies for human consumption, sanitation and fire protection. MWDOC must declare a Water Supply Shortage Emergency in the manner and on the grounds provided in California Water Code section 350.

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

DWR Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
0	Provide Rebates for Landscape Irrigation Efficiency	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agencies and their customers through Landscape Irrigation Efficency rebates.	No
0	Provide Rebates on Plumbing Fixtures and Devices	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agencies and their customers through water saving device rebates.	No
0	Provide Rebates for Turf Replacement	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of support to retail agecies and their customers through MWDOC's Turf Removal Program.	No
0	Reduce System Water Loss	On-going Long Term-Conservation Savings Measure. Not applicable to Water Shortage Contingency Plan quantifiable savings.	Base level of programatic support to retail agencies through MWDOC's Water Loss Program.	No
1	Expand Public Information Campaign	0 to 5% of total imported water use met by voluntary Demand Reduction	Expand Public Awareness to encourage residents and industries to reduce their usage of water.	No
1	Other	0 to 10% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
1	Other	0 to 10% of total imported base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
2	Expand Public Information Campaign	0 to 20% of total imported water use met by voluntary Demand Reduction	Increase Public Awareness efforts to encourage residents and industries to reduce their usage of water.	No
2	Other	0 to 20% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Recommended Demand Reduction	No
2	Other	0 to 20% of total imported base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
3	Expand Public Information Campaign	0 to 30% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of	No
3	Other	0 to 30% of total imported water use met by voluntary Demand Reduction	Work with retail agencies to review and update as needed water waste prohibitions and ordinances to discourage unnecessary water usage.	No
3	Other	0 to 30% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
3	Other	0 to 30% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
4	Expand Public Information Campaign	0 to 40% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.	No
4	Other	0 to 40% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
4	Other	0 to 40% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes

DWR Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
5	Expand Public Information Campaign	0 to 50% of total imported water use met by voluntary Demand Reduction	Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.	No
5	Other	0 to 50% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
5	Other	0 to 50% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
6	Other	0 to 50% of total imported water use met by voluntary Demand Reduction	Implement Voluntary Demand Reduction	No
6	Other	>50% of total base demand met by WSAP supply allocation	Implement Water Supply Allocation Plan	Yes
NOTES: Coordination with WEROC is anticipated to begin at Level 4 or greater. In the event of a short or long-term emergency MWDOC will utilize the WEROC Emergency Operations Plan and follow the detailed steps and process as specified.				

DWR Submittal Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
0 through 6	Other Actions (describe)	TBD	MWDOC will work in close coordination with MET on their supply augmentation projects during this time to ensure reliability for the service area.
NOTES:			

Appendix B

MWDOC Water Supply Allocation Plan

Municipal Water District of Orange County

Water Supply Allocation Plan

DRAFT
Revised 2016

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FIGURES

Section 1: Introduction

The Municipal Water District of Orange County (MWDOC) is dedicated to ensuring water reliability for the communities we serve. Hundreds of thousands of Orange County residents have taken advantage of our water conservation rebates to install water saving toilets, clothes washers, and other water saving devices. We continue to partner with our client agencies to develop new local supplies such as recycled water, brackish water desalting, ocean water desalination, and the Groundwater Replenishment System.

However, a combination of water supply challenges have brought about the possibility that MWDOC may not have access to the imported supplies necessary to meet the demands of its client agencies in the coming years. The following factors have dramatically impacted water supply conditions not only in Orange County, but all of Southern California:

- In CY 2013 many areas of California experienced the driest year on record. California received record low snowpack in FY 2014-15. On January 17, 2014, Governor Brown proclaimed a statewide drought emergency. On May 5, 2015, the State Water Resources Control Board adopted an emergency conservation regulations in accordance with the Governor's directive. The provisions of the emergency regulations went into effect on May 18, 2015. On February 2, 2016, the SWRCB will consider a resolution to extend the existing May 2015 Emergency Regulation as directed in the November 2015 executive order.

- The Colorado River is recovering from a long-term drought. Reservoirs along the river are less than half full. In the summer of 2015, Lake Mead water levels reached record lows. Supplies from this source have been reduced since 2003 and will continue to be limited.

To meet the imported water demands of its member agencies, the Metropolitan Water District of Southern California (MET) is quickly withdrawing supplies from surface and groundwater storage. Over the past three years, MET has drawn down 67% of its available reserves.

The recent dry conditions and the uncertainty about future supplies from the State Water Project have raised the possibility that MET will not have access to the supplies necessary to meet the imported water demands of its member agencies. As a result, MET has developed a Water Supply Allocation Plan that allocates wholesale imported water supplies among its 26 member agencies throughout Southern California.

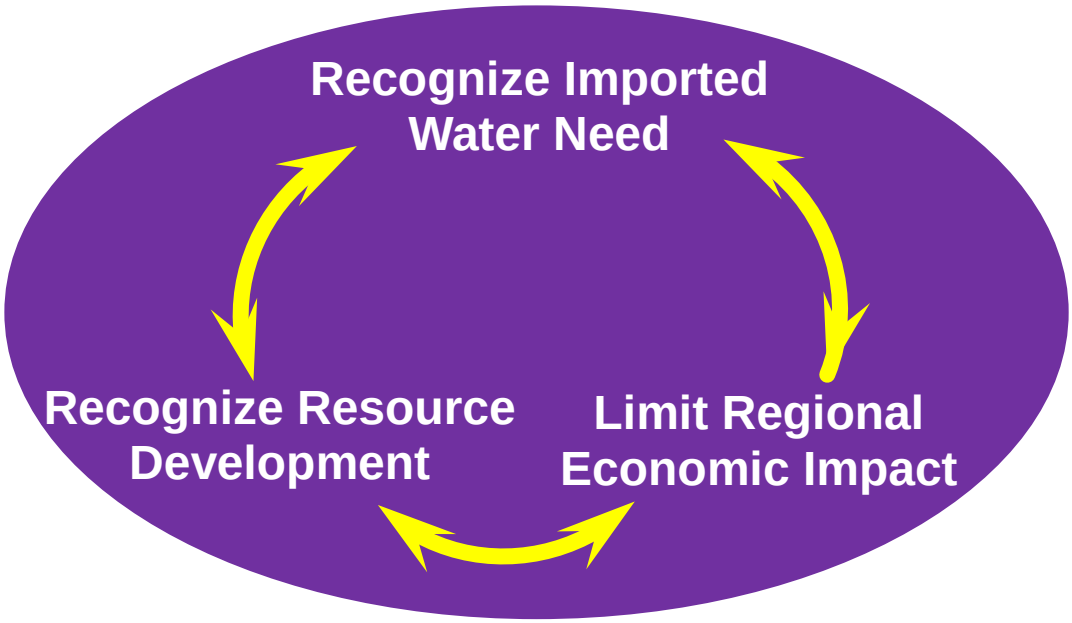
To prepare for the possibility of an allocation of imported water supplies from MET, MWDOC has worked in collaboration with its 28 client agencies to develop this Water Supply Allocation Plan to allocate imported water supplies at the retail level. This document lays out the essential components of how MWDOC plans to determine and implement each agency’s allocation during a time of shortage.

Section 2: Metropolitan Water District's Water Supply Allocation Plan

In February 2008, MET approved a Water Supply Allocation Plan (WSAP) designed to allocate imported water to all of its member agencies during a shortage. In June 2014 MET convened a member agency working group to revisit the WSAP. The purpose of the working group was to collaborate with member agencies to identify potential revisions to the WSAP in preparation for mandatory supply allocations in 2015. There were eight working group meetings and three discussions at the monthly Member Agency Managers' Meetings. The WSAP follows the principles and considerations identified in MET's Water Surplus and Drought Management Plan, which calls upon the allocation of water in a fair and equitable manner to all of MET's member agencies. To the extent possible, this means developing a plan that minimizes regional hardship during times of shortage.

The MET WSAP seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level. To achieve this, it takes into account:

- The impact to retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation
- Investments in local resources
- Investments in MET's facilities



The WSAP states that MET staff will go before the Board with a recommendation in April, from which the Board of Directors will make a determination on the level of the Regional Shortage. If the Board determines allocations are necessary, they will go into effect in July and remain for a twelve-month period. *Note: This schedule is at the discretion of the MET Board, and is subject to change.*

The recommendation to declare a regional shortage will be based upon water supply availability from the State Water Project, the Colorado River Aqueduct, and the amount of surface and groundwater storage remaining in MET's reserves. It will also take into account the implementation of MET's water management actions i.e. Five Year Water Supply Plan, extraordinary conservation efforts, the acceleration of local resource projects, and the purchases of water transfers.

A full copy of MET's Water Supply Allocation Plan as revised in December 2014 is available in Appendix B.

Section 3: Development Process

In preparation for possible allocation of imported water supplies from MET, MWDOC's Board first adopted the following policy principles to help guide staff and the client agency technical workgroup to develop a plan that is fair and equitable for everyone within its service area:

- **Seek best allocation available from MET**
- **Develop MWDOC Plan in collaboration with client agencies**
- **When reasonable, use similar method/approach as MET**
- **When MET's method would produce significant unintended result, use an alternative approach**
- **Develop accurate data on local supply, conservation, recycling, rate structures, growth and other relevant adjustment factors**
- **Seek opportunities within MWDOC service area to provide mutually beneficial shortage mitigation**

Client Agency Input

Between the months of September and January of 2014-15, MWDOC staff worked cooperatively with the client agencies through a series of technical workgroups to develop a formula and implementation plan to allocate imported supplies in the event that MET declares a regional shortage. These workgroups provided an arena for in-depth discussion of the objectives, mechanics, and policy aspects of the different parts of the Plan. MWDOC staff also met individually with a number of client agencies for detailed discussions on elements of the Plan. The discussions, suggestions, and comments expressed by the client agencies during this process played a key part in the development of this Plan.

The following MWDOC client agencies participated in the Technical Workgroup:

- **City of Buena Park**
- **City of Fountain Valley**
- **City of Garden Grove**
- **City of Huntington Beach**
- **City of Newport Beach**
- **City of Orange**
- **City of San Clemente**
- **City of San Juan Capistrano**
- **City of Tustin**
- **City of Westminster**
- **East Orange County Water District**
- **El Toro Water District**
- **Golden State Water Co.**
- **Irvine Ranch Water District**
- **Laguna Beach County Water District**

- **Mesa Water District**
- **Moulton Niguel Water District**
- **Orange County Water District**
- **Serrano Water District**
- **Santa Margarita Water District**
- **South Coast Water District**
- **Trabuco Canyon Water District**
- **Yorba Linda Water District**

In addition to the workshops, individual meetings were held between MWDOC staff and the following MWDOC client agencies to address more specific and agency-related questions.

These individual meetings provided MWDOC staff with a great deal of insight on exactly how a retail agency would implement allocations at the customer level. Such information was extremely valuable in our regional discussion at MET and in the development of this Plan.

Board of Directors Input

Throughout the Plan's development process, the MWDOC Board of Directors was provided with regular progress reports on the status of the Plan and the technical workgroup discussions. During the months the Plan was being developed, the Board Planning and Operations Committee was kept apprised of key issues regarding MET's and MWDOC's allocation plan. Moreover, the Committee played an integral part in the development of key implementation issues such as the appeal process and the surcharge rate structure.

Section 4: Water Supply Allocation Formula

The MWDOC Water Supply Allocation Model follows five (5) basic steps to determine an agency's imported supply allocation:

- Step 1: Determine Baseline Information
- Step 2: Establish Allocation Year Information
- Step 3: Assess the Shortage Reduction Stage (Based on MET's Declared Shortage Level)
- Step 4: Apply Allocation Adjustments and Credits in the areas of retail impacts, conservation, groundwater recharge.
- Step 5: Sum total allocations and determine retail reliability

A description of how the calculation is used in each step is described below:

Step 1 – Determine Baseline Information

In order to determine a client agency's retail demands and imported supply needs in the allocation year, the model needs to establish a historical base period for water supply and delivery data. The base period for each of the different categories of demands and supplies is calculated using data from fiscal years (July through June) ending 2013 and 2014.

The following is a description of the base period calculations:

Base Period Local Supplies: Local supplies for the base period are calculated using a two-year average (from fiscal years ending 2013 and 2014) of groundwater production, groundwater recovery, surface water production, and other non-imported supplies.

Base Period Wholesale ("Imported") Firm Demands: Firm demands on MWDOC for the base period are calculated using a two-year average (from fiscal years ending 2013 and 2014) of full-service, and surface storage operating agreement demands.

Base Period In-lieu Deliveries: Base period in-lieu deliveries to client agencies are calculated using a two year average (from fiscal years ending 2013 and 2014) of In-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs. In-lieu deliveries are not calculated as imported supplies from MET. They are calculated as local supplies to account for the corresponding reduction in base year local production that was required to take In-lieu deliveries.

Base Period Retail Demands: Total retail municipal and industrial demands for the base period are calculated by adding the Base Period Local Supplies, Base Period Wholesale Imported Firm Demands, and Base Period In-Lieu Deliveries.

Step 2 – Establish Allocation Year Information

In this step, the model adjusts for each member agency's water need in the allocation year. To do so, it adjusts the base period estimates for population growth and changes in local supplies.

The following is a description of how the allocation year information is established:

Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for growth. The method in which MWDOC determines each client agency's growth is through population increases for the fiscal years ending 2013 to 2014[1]. Based on the data received from California State University of Fullerton, Center for Demographic Research, MWDOC prorates each agency's population increase share to MWDOC's growth adjustment received from MET[2], as shown in Appendix C.

Growth Adjustment: The growth adjustment is calculated by taking the average percent of growth from fiscal years ending 2013 and 2014, as generated by the Center for Demographic Research at California State University, Fullerton.

Allocation Year Local Supplies: Allocation year local supplies include groundwater production, groundwater recovery, surface water production, and other imported supplies not from MET. In-lieu deliveries are considered as local supplies to account for the corresponding reduction in base year local production that was required to take in-lieu deliveries. Allocation year local supplies reflect a more accurate estimate of actual supplies in the allocation year, and in turn more accurately estimates an agency's demand for imported supplies.

Extraordinary Increased Production Adjustment: This adjustment accounts for extraordinary increases in local supplies above the base period. Extraordinary increases in production include such efforts as purchasing water transfers. In order not to discourage such extraordinary efforts, a percentage of the yield from these supplies is added back to Allocation Year Local Supplies in shortage levels as shown below. This has the effect of "setting aside" the majority of the yield for the agency who procured the supply. The percentage of the extraordinary increases in local supply corresponds according to the regional shortage level, as shown in Table 4.1.

[1] Although many options were discussed in the technical workgroup sessions, this option was chosen to best reflect the increase in water demand due to population growth as intended by MET's allocation formula for each client agency in the MWDOC service area.

[2] MET's growth adjustment is calculated by using the average of the last two year County-wide population growth rates, which include not only MWDOC's service area but also the cities of Fullerton, Anaheim, and Santa Ana.

Table 4.1
Extraordinary Increased Production Adjustment

Regional Shortage Level	Regional Shortage Percentage	Extraordinary Increase Percentage
1	5%	5%
2	10%	10%
3	15%	15%
4	20%	20%
5	25%	25%
6	30%	30%
7	35%	35%
8	40%	40%
9	45%	45%
10	50%	50%

Step 3 – Calculate Initial Minimum Allocation Based on Declared Shortage Level

This step sets the initial allocation. After a regional shortage level is established, MWDOC will calculate the initial allocation as a percentage of adjusted Demand for Firm MET Supplies within the model for each client agency.

Regional Shortage Levels: The model allocates shortages of supplies over ten levels: from 5 to 50 percent, in 5 percent increments.

Initial (Wholesale Minimum) Allocation: The Wholesale Minimum Allocation is established to ensure a minimum level of imported supplies. The Wholesale Minimum Allocation ensures that client agencies will not experience shortages on the wholesale level that are greater than one-and-a-half times the percentage shortage of MET's regional water supplies. As illustrated in Table 4.2, the Wholesale Minimum Allocation percentage is equal to 100 minus one-and-a-half times the shortage level. The allocation is based on each agency's demand of firm MET water.

Table 4.2
Wholesale ("Imported")
Supply Minimum Allocation

Regional Shortage Level		Wholesale Minimum Allocation
1		92.5%
2		85.0%
3		77.5%
4		70.0%
5		62.5%
6		55.0%
7		47.5%
8		40.0%
9		32.5%
10		25.0%

Step 4 – Assign Allocation Adjustments and Conservation Credit

In this step, the model assigns additional water to address disparate impacts at the retail level caused by an across-the-board cut of imported supplies. It also applies a conservation credit given to those agencies that have achieved additional water savings at the retail level as a result of successful implementation of water conservation devices, programs and rate structures.

Retail Impact Adjustment: The Retail Impact Adjustment is the factor used to address major differences in retail level shortages associated with across-the-board cuts. The purpose of this adjustment is to ensure that agencies with a high level of dependence on MET do not experience highly disparate shortages compared to other agencies when faced with a reduction in imported supplies. The Retail Impact Adjustment is calculated as the difference between the Regional Shortage Percentage and the Wholesale Imported Minimum Allocation. The amount of the adjustment each client agency receives is prorated on a linear scale, based on its dependence on imported water at the retail level. The prorated amount of allocation is referred to as the Retail Impact Adjustment Allocation. Table 4.3 below illustrates the maximum adjustment an agency may receive according to the regional shortage level.

Table 4.3
Retail Impact Adjustment

Regional Shortage Level	Regional Shortage Percentage	Retail Impact Adjustment Maximum
1	5%	2.5%
2	10%	5.0%
3	15%	7.5%
4	20%	10.0%
5	25%	12.5%
6	30%	15.0%
7	35%	17.5%
8	40%	20.0%
9	45%	22.5%
10	50%	25.0%

Unfortunately, the Retail Impact Adjustment MWDOC receives from MET may be less than the aggregate retail impact adjustment for its client agencies. To mitigate this difference, MWDOC decreases each client agency's retail impact adjustment according to their prorated share.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit addresses the increased difficulty in achieving additional water savings at the retail level that comes as a result of successful implementation of water conserving devices and conservation savings programs. To estimate conservation savings, each member agency has a historical baseline Gallons Per Person Per Day (GPCD) calculated by the maximum usage from fiscal year ending 2004 to fiscal year ending 2014. Reductions from the baseline GPCD to the Allocation Year are used to calculate the equivalent conservation savings in acre-feet. The Conservation Demand Hardening Credit is based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board during implementation of the WSAP. The credit will also be adjusted for:

- The overall percentage reduction in retail water demand
- The member agency's dependence on Metropolitan

The credit is calculated using the following formula:

Conservation Demand Harding Credit = Conservation Savings x (10% + Regional Shortage Level Percentage) x (1 +((Baseline GPCD – Allocation Year GPCD)/Baseline GCPD))x Dependence on MWD Percentage.

Minimum Per-Capita Water Use Credit: This adjustment creates a minimum daily gallons per capita (GPCD) water use threshold. Member agencies' retail-level water use is

compared to a total water use of 100 GPCD. Agencies that fall below this threshold receive additional allocation to bring them up to the minimum GPCD water use level[3].

Step 5 – Sum Total Allocations and Calculate Retail Reliability

This is the final step in calculating an agency's total allocation for imported supplies. The model sums an agency's total imported allocation with all of the adjustments and credits and then calculates each agency's retail reliability compared to its Allocation Year Retail Demand.

Final Metropolitan Allocation: The final allocation of imported supplies to an agency for its retail demand is the sum of the Wholesale Imported Minimum Allocation, their Retail Impact Adjustment, their Conservation Demand Hardening Credit, and Per-Capita Adjustment Allocation (if applicable).

Total Metropolitan Supply Allocations: In addition to the WSAP Allocation described above, agencies may also receive separate allocations of supplies for seawater barrier and groundwater replenishment demands. Allocations of supplies to meet seawater barrier demands are to be determined by the MET Board of Directors independently, but in conjunction with the WSAP. Separating the seawater barrier allocation from the WSAP allocation allows the MET Board to consider actual barrier requirements in the Allocation Year and address the demand hardening issues associated with cutting seawater barrier deliveries. According to the principles outlined for allocating seawater barrier demands, allocations should be no deeper than the WSAP Wholesale Minimum Percentage implemented at that time. The WSAP also provides a limited allocation for drought-impacted groundwater basins based on the following framework:

1. Metropolitan staff will hold a consultation with the requesting member agency and the appropriate groundwater basin manager to document whether the basin is in one of the following conditions:

> a. Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
> b. Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries.

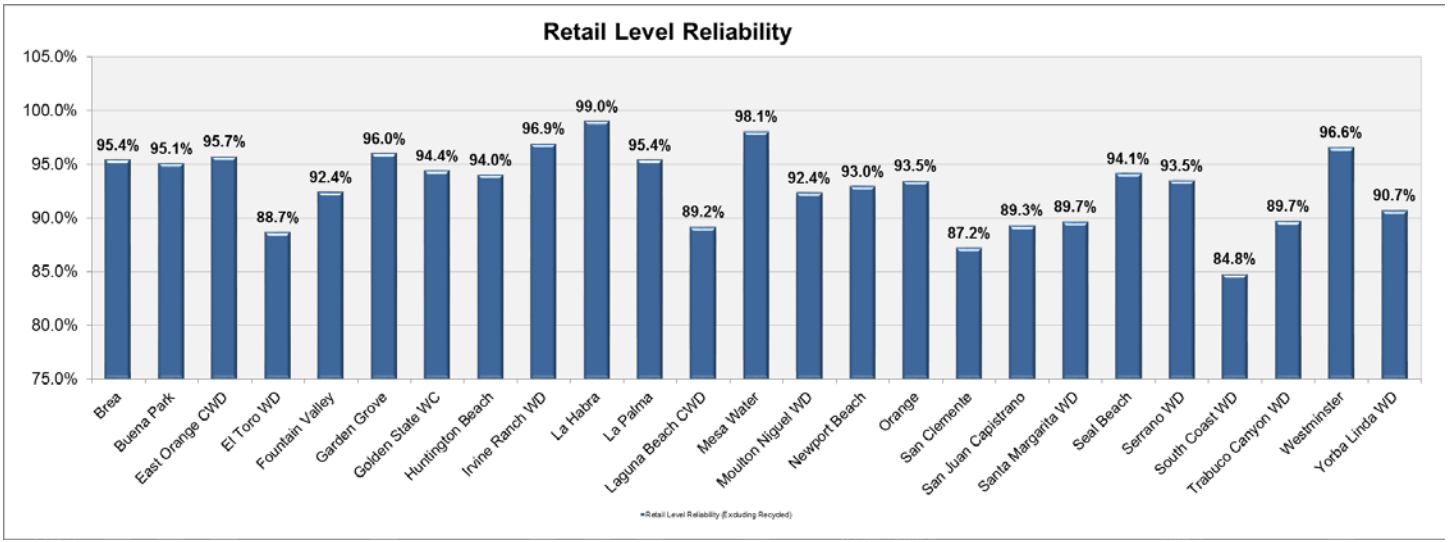
2. An allocation is provided based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level.

Agency's Retail Reliability: This calculates an agency's total MET allocation versus their allocation year retail demands to determine their overall reliability percentage (supplies

3 Per capita water used based on Total Retail-Level Use and population data received from California State University of Fullerton, Center for Demographic Research

as a percentage of retail demand) under a regional shortage level. This percentage excludes recycled water supplies from an agency's total water supply. Figure 4.1 illustrates the MWDOC client agencies' reliability percentages under a stage 3 regional shortage level (15%).

Figure 4.1
MWDOC's Water Supply Allocation Plan
Stage 3 with a Regional Shortage of 15%*



Source: MWDOC Allocation Model Version 3.1 and assumes a BPP of 75%.
[*] These are estimated reliability percentages for MWDOC client agencies under a regional shortage stage 3 (15%) based on initial local supply data received from the client agencies and OCWD's projected BPP for 2015/16.

Section 5: Plan Implementation

This section covers implementation issues which include: the appeal process, penalties rate structure and billing, tracking and reporting water usage, timeline and option to revisit the plan.

Allocation Appeals Process

The purpose of the appeals process is to provide client agencies the opportunity to request a change to their allocation based on new or corrected information. The grounds for appeal can include but are not limited to:

- Adjusting errors in historical data used in the Base period calculations
- Adjusting for unforeseen losses or gains in local supplies
- Adjusting for extraordinary increases in local supplies
- Adjusting for population growth rates
- Adjusting for credits with the Conservation base data, including Conservation Rate Structure

MWDOC anticipates that under most circumstances, a client agency's appeal will be the basis for an appeal to MET by MWDOC. MWDOC staff will work with client agencies to ensure that such an appeal is a complete and accurate reflection of the client agency's allocation and is properly reviewed by MET. To accomplish this, MWDOC will require the following information from the client agency submitting an appeal:

- Written letter (in the form of a letter or e-mail) from the client agency requesting an appeal
- Brief description of the type of appeal e.g. incorrect base data, loss/gain in local supply, extraordinary increase in local supply, adjustment in agency's conservation base data, or other
- Rationale for the appeal
- Quantity in acre-feet in question
- Verifiable documentation that supports the rationale i.e. billing statements, invoices for conservation device installations, Groundwater reports

To provide clarity of the process and ensure your appeal is properly handled, the following steps will occur:

Step 1 – Submit Appeal – Client agency will submit the necessary information, described above, to MWDOC.

Step 2 – Notification of Response and Appeal Meeting – Once MWDOC staff receives the appeal information, MWDOC will send a response and schedule a meeting with MWDOC staff and the client agency, within two weeks of receiving the information, to discuss the appeal in further detail.

Step 3 – Submittal to MET & MWDOC Board Notification – Using the information received from the client agency, MWDOC will prepare and submit the appeal to MET no later than one month of receiving the information. In addition, MWDOC staff will notify its Board of the submittal to MET.

Step 4 – MET Appeal Process - MWDOC will follow the terms of MET's appeal process, as described in Appendix B. Client agencies will also be invited, as deemed appropriate, by MWDOC to attend any meetings with MET on their appeal.

Step 5 –Client Agency Notification of MET's Decision – Once MET has made a determination of the appeal, MWDOC staff will notify the client agency of the decision and determine if additional actions are needed i.e. Appeal to MET Board.

In the event that MET denies the appeal, MWDOC staff will continue to work with the appealing agency to resolve their issue(s). Any action that will result in adjustments to client agency's allocation will be submitted to the Board for review and approval.

Allocation Surcharge Rates & Billing

MET's Surcharge Rates

MET will enforce its allocations through a tiered surcharge rate structure. MET will assess surcharge rates to a member agency that exceeds its total annual allocation at the end of the twelve-month allocation period, according to the rate structure below:

Table 5.1: Metropolitan Water District
Allocation Surcharge Rate Structure
(FY2015/16 Rates)*

Water Use up to:	(1) **Base Rate**	(2) **Surcharge Rate****	(1)+(2) = **Total Rate**
100% Allocation	Tier 1 ($942/AF)	-	**$942/AF**
100% < = 115%	Tier 1 ($942/AF)	Tier 1 + (1,480/AF)***	**$2,422/AF**
Use > 115%	Tier 1 ($942/AF)	Tier 1 + (2,960/AF)***	**$3,902/AF**

[*] The base rate shall be the applicable water rate for the water being purchased (Model shows CY 2016 rate).
[**] If MWDOC exceeds its allocation limit but is within its equivalent preferential right amount, MET will decrease the surcharge rate by one level.
[***] Surcharge rate is applied to water use in excess of an agency's WSAP allocation.

These surcharge rates will be assessed according to MET water rates in effect at the time of billing. Any surcharge funds collected by MET will be invested back to the MET member agency through conservation and local resource development.

MWDOC Surcharge Rates

As a water wholesaler, MWDOC has the opportunity to assess penalties in many different ways. A number of options were discussed and analyzed with the client

agencies and Board Committee members. The key components that helped guide development of a surcharge structure included:

- A financial incentive to discourage water usage above a client agency's allocation
- A surcharge rate structure that is administratively easy to understand and implement
- Surcharge rates that are fair and appropriate during a shortage

From these components and input received from both the MWDOC Board and the client agencies, a melded surcharge rate structure was recommended. This was mainly due to its "region-wide" style approach and similar structure to other MWDOC rates and charges.

MWDOC Surcharge Rate Structure – At the end of the allocation year, MWDOC would charge a surcharge to each client agency that exceeded their allocation. This surcharge would be assessed according to the client agency's prorated share (acre-feet over usage) of MWDOC surcharge amount with MET. Below is an example of how this surcharge rate structure would apply:

Under the melded surcharge rate structure, client agencies will only be assessed penalties if MWDOC exceeds its total allocation and is required to pay a surcharge to MET.

MWDOC Billing

During the allocation period, MWDOC billing will remain the same. Only at the end of the twelve-month allocation period will MWDOC calculate each member agency's total potable water use based on the local supply certification and MWDOC allocation model and determine which agencies exceeded their annual allocation. From those agencies that exceeded their allocation, MWDOC will assess surcharge rates according to the melded surcharge rate structure on their next water invoice.

Understanding that the penalties can be significant to a retail agency, MET and MWDOC will allow payment of these penalties to be spread over three monthly billing periods. Therefore, a third of the penalties will be applied each month to the agency's water invoice over a three-month period

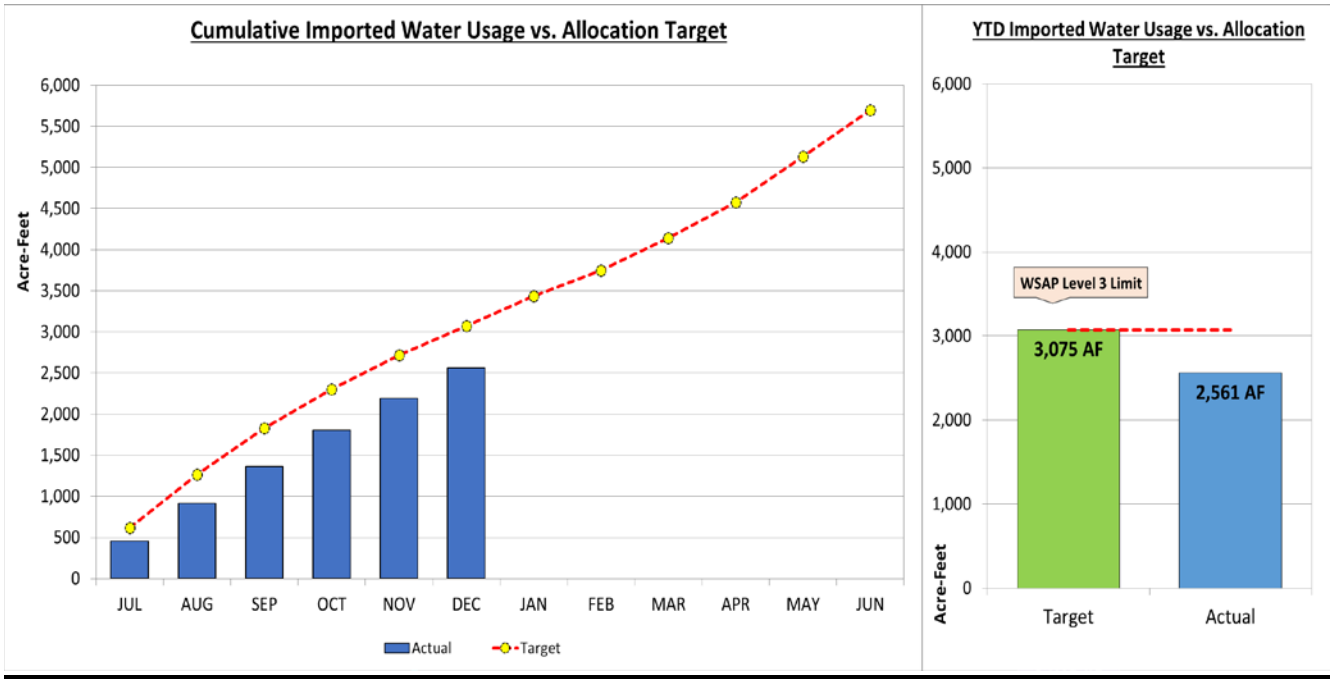
Tracking and Reporting

In preparing for allocations, it is important to track the amount of water the region and each client agency is using monthly. This data is important to help MWDOC and client agencies project their annual usage, evaluate their current demands, and avoid any over usage that will result in allocation penalties. MWDOC will provide water use monthly reports upon request or when necessary that will compare each client agency's current cumulative imported usage to their allocation target (Based off historical monthly percentages of imported usage). In addition, MWDOC will provide quarterly reports on its cumulative retail usage compared to its allocation baseline.

To develop these reports, MWDOC will need to work closely with each client agency to get their local supply data on a monthly basis. This data will not only be used by MWDOC to track monthly usage, but also by MET to assess MWDOC's total projected water demands.

Below in Figure 5.2 is an example of the type of monthly report MWDOC will provide to each client agency during the allocation period.

Figure 5.2
Example of a Client Agency's Monthly Usage Report



Key Dates for Implementation

If a regional shortage is declared, the allocation period will cover twelve consecutive months, e.g. July 1st of a given year through June 30. Barring unforeseen large-scale circumstances, the Regional Shortage Level will be set for the entire allocation period, which will provide the client agencies an established water supply shortage allocation amount. Figure 5.3 Illustrates the Metropolitan timeline for allocations during a two year period.

Figure 5.3: Metropolitan Water District
Adopted Allocation Timeline

Year	Month	Year 1 Board Allocation Decision	Year 1 Allocation Year	Year 2 Board Allocation Decision	Year 2 Allocation Year
YEAR 1	January				
	February				
	March				
	April	**Declaration**			
	May		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use		
	June				
	July				
	August				
	September				
	October				
	November				
	December				
YEAR 2	January				
	February				
	March				
	April			**Declaration**	
	May				
	June				
	July				
	August		**Assess Penalties**		**Effective Period** Continuous Tracking of Member Agency Local Supply and Imported Water Use
	September				
	October				
	November				
	December				
YEAR 3	January				
	February				
	March				
	April				
	May				
	June				

It is important to note that MWDOC does not anticipate calling for allocation unless the MET Board declares a shortage through it WSAP; and no later than 30 days from MET's declaration will MWDOC announce allocation to its client agencies.

Revisiting the Plan

Calculating the amount of imported water each client agency receives during a water shortage is not an easy task. The key objective in developing this allocation plan is to ensure that a proper and fair distribution of water is given to each client agency. However, due to the complexity of this issue and the potential for unforeseen circumstances that may occur during an allocation year, MWDOC offers the opportunity to review and refine components of this plan where deemed necessary.

The MWDOC staff and client agencies have the opportunity to revisit the plan and offer any recommendations to the MWDOC Board that will improve the method, calculation, and approach of this plan.

MET has a similar process which will allow opportunity to review their plan when deemed necessary.

Appendix A

List of Acronyms:

AF- Acre-feet
M&I- Municipal and Industrial
MET-Metropolitan Water District of Southern California
SWRCB-State Water Resources Control Board
WSAP-Water Supply Allocation Plan

Definitions:

Extraordinary Increases in Production: water production efforts that increase local supplies during an allocation year such as purchasing water transfers.

Groundwater Recovery: The extraction and treatment of groundwater making it usable for a variety of applications by removing high levels of chemicals and/or salts.

In-lieu deliveries: MET-supplied water bought to replace water that would otherwise be pumped from the groundwater basin.

Overproducing groundwater yield: Withdrawal (removal) of groundwater over a period of time that exceeds the recharge rate of the supply aquifer. Also referred to as overdraft or mining the aquifer.

Seawater Barrier: The injection of water into wells along the coast to protect the groundwater basin from seawater intrusion. The injected water acts like a wall, blocking seawater that would otherwise migrate into groundwater basins as a result of pumping inland.

Appendix B

Metropolitan's Draft Water Supply Allocation Plan

MET Final Water Supply Allocation Pl

Appendix C
MWDOC Growth Adjustment Table per Client Agency

Population of MWDOC Retail Water Agencies

Water Agency	Jan-13	Jan-14	Avg of 2013 & 2014
Brea	41,129	42,181	**41,655**
Buena Park	82,053	82,364	**82,209**
East Orange CWD Retail Zone	3,233	3,247	**3,240**
El Toro WD	48,453	48,628	**48,541**
Fountain Valley	57,129	57,590	**57,360**
Garden Grove	175,096	175,873	**175,485**
Golden State Water Company	167,779	168,561	**168,170**
Huntington Beach	193,873	196,041	**194,957**
Irvine Ranch WD	357,781	369,724	**363,753**
La Habra	60,989	61,455	**61,222**
La Palma	15,890	15,946	**15,918**
Laguna Beach CWD includ. Emerald Bay Service District	20,130	20,204	**20,167**
Mesa Water	105,779	106,152	**105,966**
Moulton Niguel WD	168,301	169,405	**168,853**
Newport Beach	65,404	65,551	**65,478**
Orange	137,814	138,182	**137,998**
San Clemente	50,757	50,960	**50,859**
San Juan Capistrano	37,943	38,491	**38,217**
Santa Margarita WD	152,245	153,358	**152,802**
Seal Beach	23,543	23,618	**23,581**
Serrano WD	6,408	6,437	**6,423**
South Coast WD	34,672	34,816	**34,744**
Trabuco Canyon WD	12,588	12,640	**12,614**
Tustin	67,445	67,700	**67,573**
Westminster	92,939	93,322	**93,131**
Yorba Linda WD	73,378	73,990	**73,684**
Total of MWDOC Agencies	**2,252,751**	**2,276,436**	**2,264,594**

Source: Center for Demographic Research, CSU Fullerton, December 2014. CDR's estimates were based on the 2010 Census. Water agency counts were made for the actual area served, which may be different than the political boundary. Numbers are tied to the State Dept. of Finance numbers for total population of Orange County.

Water Agency	Growth % from 2012 to 2013	Growth % from 2013 to 2014	Avg Growth % 2013 to 2014
Brea	1.13%	2.56%	1.84%
Buena Park	0.62%	0.38%	0.50%
East Orange CWD Retail Zone	0.56%	0.43%	0.50%
El Toro WD	0.56%	0.36%	0.46%
Fountain Valley	0.71%	0.81%	0.76%
Garden Grove	0.19%	0.44%	0.32%
Golden State Water Company	0.87%	0.47%	0.67%
Huntington Beach	0.61%	1.12%	0.87%
Irvine Ranch WD	2.68%	3.34%	3.01%
La Habra	0.53%	0.76%	0.65%
La Palma	0.75%	0.35%	0.55%
Laguna Beach CWD includ. Emerald Bay Service District	0.60%	0.37%	0.48%
Mesa Water	0.58%	0.35%	0.47%
Moulton Niguel WD	0.78%	0.66%	0.72%
Newport Beach	0.51%	0.22%	0.37%
Orange	0.59%	0.27%	0.43%
San Clemente	0.55%	0.40%	0.48%
San Juan Capistrano	0.89%	1.44%	1.17%
Santa Margarita WD	0.55%	0.73%	0.64%
Seal Beach	0.59%	0.32%	0.45%
Serrano WD	0.60%	0.45%	0.52%
South Coast WD	0.61%	0.42%	0.51%
Trabuco Canyon WD	0.55%	0.41%	0.48%
Tustin	0.63%	0.38%	0.50%
Westminster	0.64%	0.41%	0.53%
Yorba Linda WD	1.11%	0.83%	0.97%
Total of MWDOC Agencies	**0.95%**	**1.05%**	1.00%

Appendix D

MWDOC Conservation Hardening Credit Table per Client Agency

Member Agency	GPCD Baseline	GPCD for 2014	Change in GPCD	AF Savings
Brea	288.58	246.61	**41.97**	**1,983**
Buena Park	199.59	165.57	**34.02**	**3,138**
East Orange CWD includ. Tustin	196.19	170.20	**25.99**	**2,065**
El Toro WD	214.96	185.54	**29.42**	**1,748**
Fountain Valley	192.48	184.64	**7.84**	**506**
Garden Grove	166.11	133.16	**32.95**	**6,491**
Golden State Water Company	175.11	146.27	**28.84**	**5,445**
Huntington Beach	163.73	141.79	**21.94**	**4,818**
Irvine Ranch WD	304.13	244.30	**59.83**	**24,778**
La Habra	160.60	150.19	**10.41**	**717**
La Palma	154.88	123.75	**31.13**	**556**
Laguna Beach CWD includ. EBSD	203.74	173.46	**30.28**	**685**
Mesa WD	191.25	166.35	**24.90**	**2,961**
Moulton Niguel WD	236.66	194.91	**41.75**	**7,922**
Newport Beach	258.85	239.36	**19.49**	**1,431**
Orange	231.08	210.84	**20.24**	**3,134**
San Clemente	198.09	178.51	**19.58**	**1,118**
San Juan Capistrano	236.93	206.65	**30.28**	**1,306**
Santa Margarita WD	235.06	201.77	**33.29**	**5,719**
Seal Beach	157.34	147.07	**10.27**	**272**
Serrano WD	485.61	468.88	**16.73**	**121**
South Coast WD	205.86	196.91	**8.95**	**349**
Trabuco Canyon WD	314.13	270.88	**43.25**	**612**
Tustin	191.31	164.21	**27.10**	**2,055**
Westminster	145.76	120.75	**25.01**	**2,614**
Yorba Linda WD	299.73	272.75	**26.98**	**2,236**

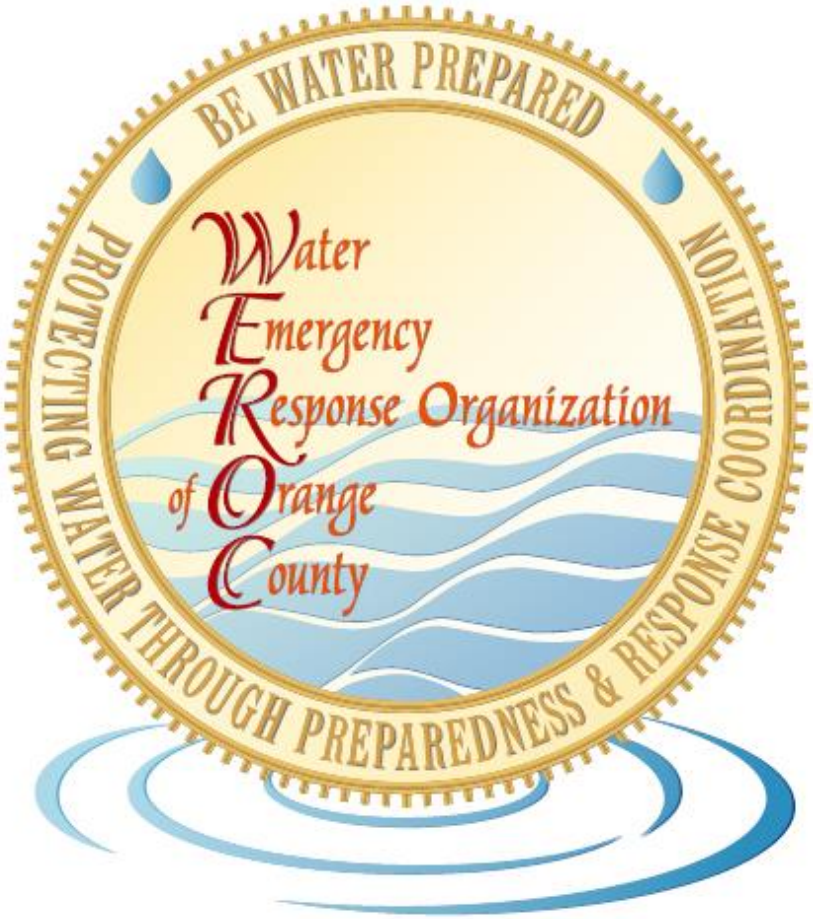
[*] The "GPCD Baseline" is the highest Ten-year average from 2004 to present, and includes Recycled water in order to normalize the conservation savings

Source: MWDOC 20% by 2020 OC Regional Alliance Model updated in 2014

WSAP GPCD.pdf

Appendix C

WEROC 2018 Emergency Operations Plan



WEROC EMERGENCY OPERATIONS PLAN

(EOP)

Revised March 2018

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QUICK REFERENCE

How To Use This Document?
Personnel who are assigned a responsibility in this plan should have a working knowledge of the functions and actions described throughout. All WEROC Emergency Operations Center (EOC) staff should refer to this document before and throughout a response for guidance in WEROC EOC activation, response, and deactivation procedures. When WEROC EOC staff arrive to the WEROC EOC during an emergency, locate your specific position guide or the WEROC Emergency Operations Plan (EOP). If WEROC EOC staff are at home/work/car, they should refer to the WEROC Auto-Pack or Safety Center mobile application for information on activation, reporting, response, and functional duties and responsibilities.

What To Do With This Document?
The WEROC Emergency Manager will provide a current copy of the EOP to WEROC EOC staff. All WEROC EOC staff are responsible for familiarizing themselves with the contents of this EOP. During an emergency, EOC staff should know where the EOP is located and how to use it. It is important to familiarize staff with the EOP's location and contents through review and exercises.

What is an EOC?
An Emergency Operations Center, or EOC, is a central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation. The WEROC EOC is responsible for assessing the overall condition and status of the Orange County regional water distribution and wastewater collection systems including MET facilities serving Orange County. Additionally, the WEROC EOC collects and analyzes damage assessments, obtains resource requests, and procures resources that are needed by member agencies to respond and recover from the event.

When will I need to report to the WEROC EOC?
The EOC can be activated during an emergency situation that can result from both natural and man-made causes. Types of emergencies include earthquake, fire, flood, water contamination, power outages and dam failure. Not every incident affecting water utilities will activate the EOC. The magnitude and scale of an incident can vary widely and many can be handled within the parameters of an agency's usual policies and procedures. It is when an agency's daily operating procedures or resources are not sufficient to cope with an emergency that the WEROC EOC may be activated. For specific criteria on when to report to the EOC, see EOC Activation.

- *Automatic Activation*: Significant events (i.e. earthquake), will most likely result in an Automatic Activation.
- *Manual Activation:* Notification is provided by a member agency, the OA, MET, the Media, the DDW (potable water), or the Regional Water Quality Control Board (Wastewater) of an event. These events may result in manual activation in which staff are notified to respond to the EOC.
- *Standby for Activation:* Advanced notification of an event or possible need, such as a winter storm or an emergency replacement of a waterline. WEROC EOC will monitor the situation, and if deemed necessary, WEROC will notify EOC staff to respond to the EOC.

How Do I Respond To An Emergency?

- Be prepared - have a personal emergency plan and an emergency kit ready and accessible.
- Make sure your family is safe.
- Determine whether the emergency requires you to respond to the EOC (automatic or by notification) See EOC Activation.
- Once you determine that activation is required, reference the WEROC Auto-Pack, Safety Center mobile Application for EOC maps and start-up actions upon arrival to the designated EOC.

For more specific instructions refer to the EOC Activation Section (Page 24).

Do I Have To Report For Duty?

As public employees, MWDOC staff are, by law, Disaster Service Workers (DSW). If a "Local Emergency" is declared during normal work hours, staff will be expected to remain at work to respond to the emergency needs of our water utilities. If a "Local Emergency" is declared outside of normal work hours, employees may be called back to work.

Some WEROC EOC Staff have opted to sign a volunteer agreement with WEROC to volunteer their time to the WEROC EOC during emergencies. These individuals may be composed of member agency staff, private partners, and non-governmental organizations. Volunteer EOC Staff are expected to check in with their agency first for approval to respond to WEROC, and have agreed to respond as long as their own agency is not impacted.

If WEROC EOC staff are unable to report to their assigned location as a result of the event, they should immediately contact the WEROC primary contact or alternate to update them on their status and to receive further instructions. For more information on notification and reporting policies refer to EOC Activation section of the plan.

Whether reporting directly to WEROC or to another agency's EOC or location, WEROC EOC staff need to check-in with the WEROC Emergency Manager or alternate during an emergency to notify WEROC of their status.

Where Do I Go To Report For Duty?

WEROC maintains two functional EOC's; the South EOC (SEOC) and alternate (MWDOC Administration building). When the EOC is activated, WEROC EOC staff are to report to the WEROC SEOC unless informed otherwise. The location will be determined based on the condition and function of each building. Maps and addresses to the EOC's are located in **Attachment I**.

What Hours Will I Be Working?

During emergencies, shifts may be extended to 13 hours. Depending on the event, length of shifts may vary. Shift schedules will be developed by the EOC Director for events requiring an extended period of response. Employees will be discouraged from working shifts longer than 13 hours without an appropriate rest period as it leads to fatigue and other safety concerns.

ACRONYMS

CAL EPA	California Environmental Protection Agency
CPRI	Critical Priority Risk Index
CPUC	California Public Utilities Commission
DDW	Division of Drinking Water
DPH	Department of Public Health
DSW	Disaster Service Worker
DWR	Department of Water Resources
EAS	Emergency Alert System
EOC	Emergency Operations Centers
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency (Federal)
ESF	Emergency Support Functions
FEMA	Federal Emergency Management Agency (Federal)
IAP	Incident Action Plan
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IDE	Initial Damage Estimates
JIC	Joint Information Center
JIS	Joint Information System
MA	Member Agency
MET	Metropolitan Water District of Southern California
MMAA	Master Mutual Aid Agreement
MWDOC	Municipal Water District of Orange County
NEOC	WEROC North Emergency Operations Center
NGO	Non-Governmental Organization
NIMS	National Incident Management System (Federal)
NOAA	National Oceanic and Atmospheric Administration
OA	Operational Area
OCHCA	Orange County Health Care Agency
OCEMO	Orange County Emergency Management Organization
OES	Office of Emergency Services
PDA	Preliminary Damage Assessment
PIO	Public Information Officer
REOC	Regional Emergency Operations Center (Cal OES)
RWQCB	Regional Water Quality Control Boards
SEMS	Standardized Emergency Management System
SEOC	WEROC South Emergency Operations Center
SOC	State Operations Center (Cal OES)
SONGS	San Onofre Nuclear Generating Station
SOP	Standard Operating Procedures
SWRCB	State Water Resource Control Board
UC	Unified Command
WEROC	Water Emergency Response Organization of Orange County

FORWARD

The Water Emergency Response Organization of Orange County (WEROC) Emergency Operations Plan (EOP) is designed to be flexible enough to be used in all emergencies and will facilitate response and short-term activities. The goals of this plan are to outline a strategy to prepare for, respond to, and recover from an emergency or disaster that affects the Orange County water and wastewater agencies and the population served by them. As part of this strategy, this plan will:

- Establish activation protocols of the WEROC Emergency Operation Centers (EOC)
- Identify authorities and assign responsibilities for planning and response activities
- Identify the scope of hazards which will guide the specific response activities
- Outline response actions that will be taken by WEROC EOC staff
- Identify other agencies and organizations with which planning and emergency response activities should be coordinated
- Identify the role of the WEROC EOC in coordinating response efforts during an emergency impacting Orange County water and wastewater agencies
- Outline the process of assisting with the dissemination of emergency information and instructions to the public
- Describe the resources available to support EOC operations
- Provide the basis for ongoing training of EOC and member agency staff

During a major emergency or disaster, the enclosed procedures and EOC position binders at each EOC provide guidance for each function to be performed.

RESOLUTION NO. 2067

A RESOLUTION OF THE MUNICIPAL WATER DISTRICT OF ORANGE COUNTY ADOPTING THE REVISED WEROC EMERGENCY OPERATIONS PLAN

WHEREAS, The Municipal Water District of Orange County (MWDOC) established the goal of developing and maintaining an emergency plan; and

WHEREAS, The California Code of Regulation Section 2401 has since established the Standardized Emergency Management System (SEMS), and the President of the United States in Homeland Security Directive (HSPD)-5, directed the Secretary of the Department of Homeland Security to develop and administer a National Incident Management System (NIMS), both of which standardize response to emergencies involving multiple jurisdictions or agencies; and

WHEREAS, Government Code Section 8607 required all political subdivisions to be in compliance with SEMS by December 1, 1996, to be eligible for reimbursement of emergency response personnel costs and now pursuant to the President's Executive Order, Homeland Security Directive (HSPD)-5, local governments are required to establish the NIMS as the standard for incident management by September 30, 2007; and

WHEREAS, with this revised emergency plan MWDOC continues to conform to State SEMS and Federal NIMS guidelines for emergency plan compliance; and

WHEREAS, MWDOC has determined that it is in the District's best interest and benefit to maintain a current emergency plan that meets emergency management best practices.

NOW, THEREFORE, BE IT RESOLVED the Board of Directors of Municipal Water District of Orange County hereby adopts the WEROC Emergency Operations Plan, dated March 2018.

Said resolution supersedes Resolution ___ and was adopted on _____, by the following roll call:

AYES:	Directors
NOES	None
ABSENT:	Directors
ABSTAIN:	None

I hereby certify the foregoing is a true and correct copy of Resolution No. ____ adopted by the Board of Directors of Municipal Water District of Orange County, at its meeting held on _____.

_____
Maribeth Goldsby, Board Secretary
Municipal Water District of Orange County

PLAN APPROVAL AND IMPLEMENTATION

The Municipal Water District of Orange County Board of Directors will review and approve the plan as the administrative agency of the WEROC Program.

PLAN MODIFICATION

The EOP is a living document, subject to revision based on agency reorganization, new laws, experience with exercises, and actual disasters. The EOP will be reviewed annually to ensure that plan elements are valid and current. The EOP will be modified as required based on deficiencies identified during drills, exercises or actual occurrences. Changes in agency structure and emergency response procedures will also be considered in the EOP revisions. All WEROC water utilities are invited to review the plan and provide comments.

WEROC is responsible for making revisions to the EOP that will enhance the conduct of response and recovery operations.

Revisions to the plan will be presented to the MWDOC Board every three years for approval.

INTRODUCTION

PURPOSE

This Plan determines the actions to be taken by WEROC EOC staff to reduce the loss of water and wastewater infrastructure; to respond effectively to a disaster; and to coordinate recovery operations in the aftermath of any emergency involving extensive damage to Orange County water and wastewater utilities.

PLAN ORGANIZATION

The plan is organized into three elements, as well as companion documents which are incorporated into the EOP:

- **Basic Plan.** The Basic Plan contains information on the overall organizational and operational concepts relative to response and recovery.
- **Appendices.** The Appendices provide supplemental reference information.
- **Hazard Specific Annexes.** Hazard Specific Annexes provide specific information and procedures for responding to hazards that may affect Orange County water utilities.

SCOPE

The EOP has been designed to serve the growing needs of water and wastewater utilities. It is important that the EOP be flexible enough to use in all emergencies. This plan not only meets that need but will also improve the effectiveness and efficiency of the response and short-term recovery activities. It is intended as an overview of emergency management for the WEROC organization and is not a detailed operational document. WEROC water and wastewater utilities will be referred to as "Member Agencies" from here on out.

Intended Audience
The intended audience of this EOP is the staff that supports the WEROC EOCs, the WEROC OA EOC Liaison position, as well as any other position in which a person is serving on behalf of the WEROC organization. This plan is also a reference for the managers, staff and elected officials of the member agencies, the OA, and other coordinating partners. An EOP Distribution List is available as **Attachment D**.

SITUATION OVERVIEW

This section describes the county and a number of potential hazards that could affect the county water infrastructure within Orange County upon their occurrence, which would warrant the activation of this plan.

<u>Community Profile, Geography, and Nature Features</u>
From a regional perspective, Orange County, like the rest of Southern California, is heavily dependent upon imported water supplies. Approximately fifty (50%) percent of the total water consumed within Orange County comes from distant sources outside the County. This imported

water is conveyed via the Colorado River and State Water Project aqueducts which travel 242 and 444 miles, respectively, to reach urban Southern California.

The other 50% of water consumption is mostly supplied by groundwater pumped from the vast underground aquifer located below north and central Orange County. The groundwater supply resources in Orange County result from the existence of the following three groundwater basins: Orange County Water District's Groundwater Basin, the La Habra Groundwater Basin, California Domestic Water Company supplies from the main San Gabriel Basin, and San Juan Capistrano Groundwater Basin (San Juan Basin Authority). The Orange County Basin is by far the largest groundwater basin in the County.

Orange County's wastewater infrastructure has very extensive regional infrastructure, as well as locally managed collections systems. Key components of the regional infrastructure includes the reception of wastewater from outside of Orange County via the Santa Ana Regional Interceptor and pipeline, the transmission of treated wastewater to the ocean, and the conversion of 100 million gallons per day of treated wastewater into water used for groundwater recharge via the Ground Water Recovery System. Orange County Sanitation District manages the regional systems and treatment within the northern portion of the County. The South Orange County Wastewater Authority is a Joint Powers Authority that serves the southern portion of the County.

The imported and local water, along with wastewater and storm water, flows through an intricate network of pipes and mains, which are susceptible to damage from natural as well as man-made disasters.

Threats and Hazards

A hazard analysis has indicated that Orange County is at risk from hazards associated with both natural and manmade events. Natural hazards have historically had the largest effect on Orange County and are likely to continue to affect the County; consequently, the process of identifying these hazards includes determining whether or not the hazard has occurred previously. Manmade hazards occur less frequently in the County, but are a priority in water/wastewater security management as the threat of terrorism and technological hazards grow. Through research and experience, 19 potential natural and manmade hazards have been identified as threats to the County.

The Critical Priority Risk Index (CPRI) is used to prioritize hazards that may affect OC and provides a standardized numerical value for each hazard so they can be ranked. CPRI scores were calculated as part of our hazard mitigation planning process by using five categories; probability, impact, special extent, warning time, and duration. Each category is assigned a numerical value (1-4) depending on how the hazard will impact the specific category. Once the numbers for each hazard are calculated, the hazards are organized from highest to lowest priority. The following table taken from the 2018 WEROC Hazard Mitigation Plan ranks each identified hazard that can potentially impact OC water and wastewater infrastructure.

Table 1: Critical Priority Risk Index

HAZARD RANKING WORKSHEET - Orange County Regional Water & Wastewater MJHMP					DATE: 7/26/2017	
Hazard Type	Probability	Impact			Total Score	Hazard Planning Consideration
		Location	Primary Impact	Secondary Impacts		
Power Outage	4	3	4	4	57.60	High
Wildfire	4	3	3	4	52.00	High
Seismic Hazards - ground shaking	3	3	4	4	43.20	High
Seismic Hazards - liquefaction	3	3	4	4	43.20	High
High Winds/Santa Ana	4	4	2	1	40.80	Medium
Drought	4	4	1	1	35.20	Medium
Dam/Reservoir Failure	2	3	4	4	28.80	Medium
Flood	3	3	2	1	25.80	Medium
EQ Fault Rupture	2	1	4	2	18.40	Medium
Landslide/Mudflow	2	2	2	3	18.00	Medium
Contamination	1	2	3	4	11.40	Low
Human-caused Hazards - terrorism (shooting, explosive)	1	1	3	3	8.80	Low
Human-caused Hazards - HazMat	1	1	2	3	7.40	Low
Urban Fire	1	1	2	1	5.40	Low
Geo Hazards - land subsidence	1	1	1	2	5.00	Low
Geo Hazards - expansive soils	1	1	1	2	5.00	Low
Tsunami	1	1	1	1	4.00	Low
Climate Change	1	1	1	1	4.00	Low
Coastal Storm & Erosion	1	1	1	1	4.00	Low

PLANNING ASSUMPTIONS

Certain assumptions were used during the development of this plan. These assumptions are associated with emergency management operations in preparation for, response to, and recovery from major emergencies. The assumptions provide context, requirements, and situational realities that must be addressed in plan development and emergency operations. The following assumption apply to this plan:

- Priority will be given to protecting public health; this includes restoration of fire suppression, potable water delivery and wastewater collection.
- Allocation of water will require a public request for emergency conservation based on the circumstances of the event. It could range from 0% to 50% or more in specific areas.
- WEROC is primarily responsible for coordinating resources and establishing a central communication point for all of WEROC member agencies.
- WEROC will utilize SEMS/NIMS in emergency response operations.
- WEROC and its signatories will commit their own resources to a reasonable degree before requesting mutual aid assistance.

WEROC RESPONSIBILITIES

WEROC is organized on the basis that each member agency is responsible for developing its own EOP in accordance with SEMS, NIMS, and Public Health Security and Bioterrorism Preparedness and Response Act of 2002 to meet specific emergency needs within its service area. In turn, WEROC will coordinate the exchange of resources for member agencies, and if necessary, for MET, the Orange County Operational Area, and other appropriate outside agencies. In the event of a major regional disaster, WEROC would perform but not limit itself to the following functions:

1. Activate the EOC
2. Notify all EOC staff
3. Send a water liaison to the OA EOC and ICP (if needed)
4. Assess overall condition of water supply system, including availability, quantity and quality of MET and member agency water supplies
5. Assess overall condition of the wastewater collection systems, including operability of treatment systems
6. Identify resource and coordination needs of member agencies
7. Collect Initial Damage Estimate (IDE) reports
8. Quantify available Mutual Aid and private resources and secure as necessary
9. Request resources
10. Determine optimal use of resources
11. Establish response and repair priorities
12. Recommend water allocation schemes, if required
13. Maintain liaison with MET, OA EOC and outside agencies
14. Document all actions taken
15. Prepare After Action Reports
16. Implement Corrective Actions

PHASES OF EMERGENCY MANAGEMENT

WEROC recognizes four primary phases of emergency management which relate to a Federal, State, Region, County, City, or Special Districts activities before, during, and after an emergency or disaster has occurred. These include:

- Preparedness
- Response
- Recovery
- Mitigation/Prevention

Preparedness

Preparedness activities, programs, and systems are those that exist prior to an emergency and are used to support and enhance response to an emergency or disaster. Planning, training, and exercises are among the activities conducted under this phase.

WEROC and its member agencies participate in developing procedures and checklists describing how each will respond to an emergency. Such preparedness measures will provide coordination and communications within WEROC, member agencies and other jurisdictions. Elements addressed in these procedures/checklists include:

- Personnel notification rosters and a method for implementation.
- Designation of a WEROC representative to report to the OA EOC during an emergency to advise decision makers and coordinate the member agency's response effort with other responding entities.
- Reporting of appropriate information (staffing, damage assessments, water quality issues, evacuation status, chemical exposure, etc.) to both WEROC and water agency EOCs during an emergency.
- Providing Mutual Aid support to member agencies.

In addition to the above procedures, ongoing actions to be accomplished during this phase include but are not limited to:

- Review and update of Emergency Plans.
- Training of WEROC EOC and member agency staff.
- Inspection and maintenance of critical facilities, including EOC's.
- Regularly scheduled drills and test exercises.
- Recruitment of additional EOC staff, as needed.
- Identification resources

Response

Response involves activities and programs designed to address the immediate and short-term effects of the onset of an emergency or disaster that helps to reduce affects to water infrastructure and speeds recovery. Response activities include alert and notification, EOC activation, direction and control, mutual aid, etc.

The nature of WEROC's emergency operations will depend on the characteristics and requirements of the situation. WEROC and member agency's EOC/DOC will be activated as required to respond to a specific situation and each will operate according to the provisions of their emergency plans. Priority will be given to the following operations:

- Law and Fire will be conducting evacuation and/or rescue operations as required, and implementing health and safety measures.
- Assessing and evaluating the emergency situation.
- Assembling, allocating, and positioning personnel and equipment.
- Disseminating emergency public information as appropriate.
- Protecting, controlling and allocating vital resources.
- Restoring or activating essential facilities and systems.
- Stabilize water and wastewater systems with temporary measures or actions

Recovery
Recovery is the phase that involves restoring systems to normal. Short-term recovery actions are taken to assess damage and return vital life-support systems to minimum operating standards; long-term recovery actions may continue for many years.

Mitigation/Prevention
Mitigation activities are those that either prevent the occurrence of an emergency or reduce the district's vulnerability in ways that minimize the adverse impact of a disaster or other emergency. Mitigation is a best practice that can protect lives and save money. MWDOC and nineteen additional WEROC member agencies came together to produce the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan, which is scheduled to be approved by FEMA in August 2018. The Mitigation Plan outlines the natural and man-made threats that can impact the agencies included in the plan, as well as identified specific mitigation projects per agency and then prioritized those projects. The Mitigation Plan provides eligibility for federal pre-disaster and post-disaster mitigation grant funding for the included agencies. For more information, the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan is available at www.ocweroc.com

STANDARDIZED EMERGENCY MANAGEMENT SYSTEM (SEMS) AND NATIONAL INCIDENT MANAGEMENT SYSTEM (NIMS) RESPONSE LEVELS

Both SEMS and NIMS recognize local jurisdictions as the first line of response for emergency preparedness and response. As stated in the National Response Framework (NRF):

> "The responsibility for responding to incidents, both natural and manmade, begins at the local level with individuals and public officials in the County, City or town affected by the incident."

The Standardized Emergency Management System (SEMS) defines special districts and cities as local governments. During an incident, water and wastewater utilities are responsible for managing the response effort within their service areas. WEROC would provide communication and coordination of information, multi-agency coordination, and mutual aid resources to water and wastewater agencies impacted upon request, and automatically for larger events affecting multiple agencies.

The adoption of NIMS, the national policy that is complementary to the SEMS, and the adoption of the SEMS create an organized system of information flow which can avoid duplication of requests for assistance and ensure a more coordinated and timely response to the effects of a disaster. The SEMS response levels, the federal role, and other key coordinating partners for water and wastewater utilities are described below, along with a chart (Figure 1: WEROC EOC Organization Chart) showing the WEROC Organization within these SEMS/NIMS reporting levels.

The **WEROC Resource Communication Protocol** graphic on page 59 demonstrates the coordination response levels discussed below, including the traditional SEMS response levels,

NIMS, and other coordinating partners important to the water industry. In some instances, primarily localized incidents, local water agencies may coordinate directly with higher response levels, rather than following the traditional SEMS levels of communications and response. However, during incidents in which multiple water utilities are impacted all water utilities are expected to follow traditional SEMS levels of communication (these are indicated with bolder arrows).

The following is an example of how SEMS/NIMS is intended to work in a major disaster with damage in multiple Operational Areas (Counties). It is assumed that appropriate emergency declarations have been made:

Field Response Level: Field crews within affected agencies respond, as feasible, using the Incident Command System. Incident Command Posts (ICP) may be established at various sites throughout the disaster area. The member agencies may set up an ICP or may integrate into a Multi-Agency ICP. Resources are requested via dispatch centers, Department Operations Centers (DOC), and EOCs.

Local Government Level (Local Agency EOC): Local Governments assess capability and report their status to the Operational Area EOC. Water utilities report their status to the WEROC EOC. Local governments mobilize all available resources, establish EOC priorities, allocate available resources to support the field response, and request assistance (through WEROC for Water utilities) from the Operational Area. Water utilities would notify WEROC of any damage to their service areas while responding with available agency crews / resources. Water utilities may choose to provide staff to the WEROC EOC as a liaison for their agency if they feel it necessary or beneficial.

Water Emergency Response Organization of Orange County (WEROC): WEROC is responsible for coordinating the Orange County water and wastewater community information and mutual aid status with the OA EOC. WEROC EOCs are staffed with representatives from member agency Mutual Aid EOC Staff, MWDOC Staff, and volunteers with technical expertise. Assignments to either South EOC or alternate location is based upon the event and the integrity of the building. All pre-assigned EOC Staff have been dedicated by their respective employers to report to WEROC EOC.

In addition to the EOC Staff members assigned to the WEROC EOC, WEROC has assigned staff as a WEROC EOC Liaison to report to the OA EOC located on Loma Ridge or the ICP (if needed). When the OA EOC is activated, this position will report to the Public Works Branch Director at the OA EOC to be briefed on the present situation along with other liaison representatives, e.g. Red Cross. They will serve as liaison between WEROC and OA EOC operations following a disaster.

The DDW will respond to the WEROC EOC to coordinate directly with water utilities, as well as WEROC, to ensure water quality standards are being addressed. WEROC may also coordinate with other entities as needed, such as non-profits, businesses, and non-water utilities.

County Operational Area (OA) Level: All political subdivisions have been organized into Operational Areas by the county to ensure coordination, communication, resource allocation, and to avoid duplication in the response effort. The County OA activates its EOC and notifies the California Office of Emergency Services (CalOES) Southern Regional Administrator. The OA EOC assesses the situation (based in part from damage assessment reports received from WEROC and through face-to-face communication with the WEROC Liaison at the OA EOC) and reports information to the Southern Regional Emergency Operations Center (REOC). The OA EOC coordinates available resources, requests additional mutual aid resources through the EOC and provides overall situation reports to local government (through WEROC for Water utilities).

Regional Level: The CalOES Southern Regional Administrator activates the Regional Emergency Operations Center (REOC) and notifies the State Operations Center (SOC). REOC staff locates and mobilize resources available within the region and from state agencies. Additional resources are requested through the State Operations Center. REOC monitors the situation and updates the State Operations Center (SOC).

WEROC will also directly coordinate with additional regional organizations. The first agency and organization is MET and its Member Agency Response System (MARS); providing direct regional potable member agency coordination. The other two organizations are the California Utilities Emergency Association (CUEA) and the California Water/Wastewater Agency Response Network (CalWARN); providing, respectively, a liaison to many California utilities, and mutual aid coordination with water and wastewater utilities across the State.

State Level: State Operations Center (SOC) is activated and state agency representatives are requested to staff the SOC. SOC coordinates state agency response and mobilization of mutual aid resources from unaffected regions. SOC may direct activation of other CalOES REOC's to assist in resource mobilization. State agency department operations centers are activated, as applicable. Federal assistance is requested, if needed. SOC continuously monitors situation.

Federal Level: At the time that an incident is determined to be an event of National Security, the Federal Emergency Management Agency and the Department of Homeland Security become actively involved in the response and recovery of that incident. Federal support will be coordinated from a Joint Federal Office (JFO) that will be set up at the local level in support of the incident. Federal Emergency Support Functions (ESFs) will be staffed to support specific areas of expertise in the response.

Continuity of Government

A major disaster or national security emergency could result in the death or injury of key government officials and/or the partial or complete destruction of established seats of government, and public and private records essential to continued operations of government. Government at all levels is responsible for providing continuity of effective leadership, authority and adequate direction of emergency and recovery operations. The California Government Code Section 8643(b) and the Constitution of California provide the authority for state and local government to reconstitute itself in the event incumbents are unable to serve. A detailed description of MWDOC's Continuity of Operations Plan can be found in a separate document called 2017 MWDOC Continuity of Operations Plan.

ROLES AND RESPONSIBILITIES

WEROC EOC Personnel

The WEROC EOC is staffed with assigned MWDOC personnel and representatives from member agencies and consultants. WEROC has partnered with special districts, private and government organizations to supplement EOC staff and provide technical expertise at the EOC during emergencies. Some WEROC member agencies have designated personnel to staff the WEROC EOC when requested by WEROC.

Designated WEROC EOC Personnel

MWDOC has assigned EOC personnel that will respond to the EOC when activated. When responding to the EOC, staff must have their agency issued identification or government identification, closed toed shoes, and personal belonging. EOC staff have been given a WEROC Auto Pack (details can be found on page 33) to assist with key contacts, EOC maps, and EOC activation procedures.

Mutual Aid EOC Personnel

Member Agencies may provide staff to the WEROC EOC if their service area has not been affected and assistance is needed to staff WEROC EOC positions and provide technical expertise. WEROC will contact the unaffected Member Agencies to determine if staff can be allocated through mutual aid to the WEROC EOC.

Private EOC Volunteers

WEROC has volunteer personnel from various private sector organizations who have technical expertise. As staff become available, we will incorporate them into the EOP. Volunteers will be sworn in as Disaster Service Workers and will be protected as an employee for workers compensation and other liabilities.

Member Agencies

Member Agencies will provide damage assessment reports and resource requests to the WEROC EOC. In a significant event, water utilities may send a liaison to the WEROC EOC.

Private Sector

Private sector organizations play a key role before, during, and after an emergency. First, they must provide for the welfare and protection of their employees in the workplace. In addition, WEROC must work seamlessly with businesses that provide water, power, communication networks, transportation, security, and numerous other services upon which both response and recovery are particularly dependent.

Nongovernmental Organizations

Nongovernmental organizations (NGOs) play an important roles before, during, and after an emergency. For WEROC, NGOs such as California Water/Wastewater Agency Network and the American Water Works Association are vital partners in supporting and promoting statewide emergency preparedness, disaster response, and mutual assistance process for public and private water and wastewater utilities.

EMERGENCY OPERATIONS

All WEROC EOC responders are pre-assigned to report to the WEROC Primary EOC unless notified otherwise. This plan recognizes that emergency functions requiring specific technical knowledge by EOC staff, i.e. Engineers, Water Quality, and Operators, will generally parallel their normal day-to-day functions. It is also desirable to assign other EOC staff and available personnel to EOC functions with tasks and responsibilities similar to their daily operations, i.e. accounting staff assigned to Finance/Administration EOC functions.

However, in a disaster it may be necessary to draw on the basic capabilities of people, and assign them to areas of greatest need. Day-to-day functions that do not contribute directly to the disaster response effort may be suspended for the duration of the disaster. Actions normally required of those functions will be redirected to accomplish the emergency tasks at hand.

Ongoing training and cross training of both WEROC EOC Staff and Member Agency personnel is critical to maintaining a high level of confidence in performing specific duties in response to a disaster. Training opportunities provided to staff include, but are not limited to, EOP orientations, ICS trainings, SEMS/NIMS trainings, and participation in WEROC hosted Tabletop and Functional Exercises.

ALERT AND WARNING SYSTEMS

Warning is the process of alerting agencies and the general public to the threat of imminent danger. Depending upon the nature of the threat and the population group at risk, warnings can originate at any level of government. Success in saving lives and property is dependent upon timely dissemination of warning and emergency information to persons in threatened areas. There are various mechanical systems in place, described below, whereby an alert or warning may originate or be disseminated.

National Oceanic and Atmospheric Administration (NOAA)
NOAA is an American scientific agency within the United States Department of Commerce that focuses on the conditions of the oceans and the atmosphere. NOAA warns of dangerous weather, charts seas, guides the use and protection of ocean and coastal resources and conducts research to provide understanding and improve stewardship of the environment.

United Stated Geological Survey (USGS)
The USGS provides science about the natural hazards that threaten lives and livelihoods; the water, energy, minerals, and other natural resources we rely on; the health of our ecosystems and environment; and the impacts of climate and land-use change. The USGS provides a free Earthquake Notification Service (ENS) that can send automated notification emails when earthquakes happen in your area. Additionally, the USGS provides Water Alerts service which sends e-mail or text (SMS) messages when certain parameters, as measured by a USGS real-time data-collection station, exceed user-definable thresholds.

Orange County Operational Area Notification

The OA is WEROC's primary link to information about pending emergency conditions. The OA maintains constant communications with CalOES, which notifies the OA of any warnings it receives or becomes aware of. CalOES is considered to be the primary agency for receipt of notification of pending or occurring events from all sectors of response, including the California Department of Public Health, Homeland Security, InfraGard, etc. The State will then use a variety of redundant systems to communicate threat and warning information to the OA. In turn, the OA will notify WEROC and all Orange County jurisdictions using any available means of communication (reverse dial systems, phone, fax, email, radio, etc.).

PUBLIC INFORMATION

The public's response to any emergency is based on an understanding of the nature of the emergency, the potential hazards, the likely response of emergency services and knowledge of what individuals and groups should do to increase their chances of survival and recovery.

Public awareness and education prior to any emergency is crucial to successfully protect the public during and after the emergency. Pre-disaster awareness and education programs must be viewed as equal in importance to all other preparations for emergencies and receive an adequate level of planning. These programs must be coordinated among local, state and federal officials to ensure their contribution to emergency preparedness and response operations.

Community Outreach

Throughout the year, WEROC partners with member agencies to bring awareness to emergencies that may impact the water utilities. This plan encourages WEROC and member agencies to utilize community outreach opportunities to inform residents and business owners of the County's emergency procedures and the community's personal preparedness techniques. Alert OC allows WEROC and water utilities to notify their customers of potential emergencies impacting their water supply as well as offer resources to help alleviate the problem.

Social Media

WEROC maintains a Facebook and Twitter account to keep member agencies and the public informed of events and current news affecting water systems. During an emergency, WEROC will use these social media platforms to notify users of water quality issues, alternative water information, and recovery information. Find WEROC on Facebook or Twitter using @OCWEROC.

Emergency Alert System (Television and/or Radio Broadcast)

The Emergency Alert System (EAS) is a national public warning system that requires broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service (SDARS) providers, and direct broadcast satellite (DBS) providers to provide the communications capability to the President to address the American public during a national emergency. The system also may be used by state and local authorities to deliver important emergency information, such as AMBER alerts and weather information targeted to specific areas.

The President has sole responsibility for determining when the EAS will be activated at the national level, and has delegated this authority to the director of FEMA. FEMA is responsible for implementation of the national-level activation of the EAS, tests, and exercises. The National Weather Survey develops emergency weather information to alert the public about imminent dangerous weather conditions.

Message priorities under Part 73.922(a) of the FCC's rules are as follows:

Priority One……Presidential Messages (carried live)
Priority Two……...Operational (Local) Area Programming
Priority Three…….State Programming
Priority Four……...National Programming and News

Examples of emergencies identified by the Orange County OA which may warrant EAS activation by the broadcast industry include: large water quality notifications, earthquake, serious fires, heavy rains and flooding, widespread power failures, severe industrial accidents, and hazardous material accidents. The context of any emergency broadcast transmitted on EAS should be of concern to a significant segment of the population of Orange County. The message must be a voice message, it may be prerecorded and it must originate from the Sheriff's Communications Center.

The Orange County Sheriff's Department, while not the originator of the EAS material, is responsible for verifying the content and authenticity of the information and is the entity in charge to broadcast EAS messages. Local broadcast stations have the right to edit or use any or all of an EAS broadcast, but are not required to broadcast the messages.

EOC ACTIVATION

The WEROC Emergency Manager or Emergency Coordinator, is the primary contact for WEROC emergencies. Notification may come from a WEROC member agencies, the OA, MET, NOAA and others. Upon receipt of the emergency notification, the Emergency Manager or alternate will communicate with the MWDOC General Manager or alternate to determine appropriate response actions.

If WEROC or MWDOC management receive notification of a disaster, he/she will contact the other Managers (and vice-versa) by telephone. Contact telephone numbers are listed in **Attachment F: WEROC Key Contacts List.** The Activation Decision Steps below provide the WEROC guidance for determining conditions warranting EOC Activation and Notification

The increasing levels of action taken by WEROC are as follows:

- Standby – Assistance remotely
- County Liaison – Send a WEROC representative to the OA
- Support – Send a WEROC representative to either:
    - The Incident Command Post
    - Member Agency DOC
- Full EOC Activation - WEROC EOC activated

The WEROC EOC can be activated in the following methods:

- *Automatic Activation*: Significant events (i.e. earthquake) that impact communication or power infrastructure. These events will most likely result in an Automatic Activation.
- *Manual Activation:* Notification is provided by a member agency, the OA, MET, the Media, or the DDW or RWQCB.
- *Standby for Activation:* WEROC will receive advanced notification of an event or possible need, such as a winter storm or an emergency replacement of a waterline. Given the information, WEROC staff will actively monitor the event and activate the EOC if needed. After a determination is made by MWDOC management and WEROC to activate, EOC staff will be contacted to report to the EOC.

Automatic Activation

WEROC EOC staff will automatically report to the EOC without being notified at any time under the following conditions:

- Following a **magnitude 5.0 or larger** earthquake within Orange County
- An earthquake outside of Orange County strong enough to disrupt public phone systems or cause visible damage, or other large regional event.

Manual Activation
The WEROC EOC will be activated under the following conditions:

- When an earthquake or other event creates damage near MET facilities (outside of Orange County) which may affect Orange County's water supply. WEROC and MWDOC management will determine whether to activate based on MET damage assessment reports.
- Following an earthquake or other emergency such as a fire, flood or power outage affecting one or more WEROC Water utilities, WEROC will activate when requested by any Member Agency.
- Staff will be notified of the activation through AlertOC, Phone, or email.

Stand By For Activation
WEROC EOC staff will standby pending activation under the following conditions:

- An earthquake **less than M5.0** occurs within Orange County and there is damage or suspected damage to the water distribution system in Orange County. WEROC and the EOC director will determine if activation is required.
- When a **magnitude 5.0 or larger** earthquake occurs anywhere within MET's service area (outside of Orange County) and damage to MET facilities is unknown.
- Advanced notification of an event or possible need by NOAA, Orange County OA, CalOES, Member Agency, or MET.
- WEROC EOC Manager will make the decision to activate based upon information received from appropriate Operational Area, MET, WEROC staff, and/or Member Agency personnel after a disaster.
- Includes monitoring and minor coordination.

When an earthquake occurs in Southern California outside of Orange County, WEROC will be concerned about MET facilities that deliver imported water into Orange County. Those MET facilities include the following:

- Diemer Filtration Plant in Yorba Linda
- Lower Feeder from Lake Mathews to Diemer
- Lake Mathews Outlet Facilities
- Weymouth Filtration Plant in La Verne
- Orange County Feeder from the Weymouth Plant to Orange County
- Yorba Linda Feeder between the Weymouth and Diemer Plants
- Colorado River Aqueduct
- State Water Project
- Diamond Valley Lake and Associated Infrastructure
- Baker Treatment Plan
- East Orange County Feeder No.2
- Allen McColloch Pipeline (AMP)
- Santiago Lateral

Note: A map of these facilities can be found at each WEROC EOC

WEROC EOC ACTIVATION DECISION STEPS

Below are steps to be considered when WEROC and MWDOC management determine whether or not to activate the WEROC EOC. Following these steps, there is additional information that can be used to assess if activation is required.

1. Categorize Incident

Using information gathered from one or more sources, the WEROC Primary Contact or Alternate will categorize the incident:

- Natural Disasters
- Manmade Disaster
- Terrorist Threat
- Terrorist Physical Attack

2. Initial Determination of Situation

WEROC and MWDOC management will make an initial determination of the situation based upon:

- Scope and severity of the incident
- Damage to affected agency(s)
- Potential impacts to other agencies and surrounding infrastructure
- Potential impacts to Metropolitan's facilities
- Potential impacts to the County
- Potential requests for mutual aid from affected member agencies

3. WEROC Activation Level

WEROC and MWDOC management will determine the appropriate level of WEROC activation.

- Standby – WEROC monitors, receives and relays information.
- County Liaison - WEROC Liaison at County Operational Area EOC
- Support – WEROC provides a support role to a Utility activation.
- EOC Activation - EOC partially or fully staffed

Operational Area Activation Levels

When the OA EOC is activate their levels of activation are as follows:

- Level 3 (Type III) Low Level Activation
- Level 2 (Type II) Moderate Level Activation
- Level 1 (Type I) High Level Activation

4. Groups That Will Be Notified

When the EOC is activated, at a minimum, the following groups should be notified. Notifications should also be made to the following agencies if activation was not needed.

- WEROC EOC Staff
- Affected Water Utilities

- Metropolitan's EOC at Eagle Rock
- Operational Area Emergency Operations Center (OA EOC)
- Division of Drinking Water
- Health Care Agency
- California Department of Public Health

Once the decision has been made to activate, the EOC will be activated and EOC staff will be notified. Following the determination of activation, the WEROC Emergency Manager or alternate will make an announcement over the WEROC Radio at the EOC and WEROC EOC Staff will be contacted using the EOC Activation Notification Protocols.

EOC ACTIVATION NOTIFICATION PROTOCOL

The following is a standard notification protocol to be used once it is determined that the EOC will be activated. At times, concurrent notification of multiple groups should be utilized when there is available staff to do so. The EOC Director determines which groups should be contacted and the priority of each group's notification.

Key Partner Notifications
Following an event or if notified of a potential emergency situation, partner agencies should be contacted to: inform them of the situation, activation status of the EOC, known damage or impacts, or resource needs. The following agencies should be notified by the EOC Director or alternate when determined necessary:

- WEROC EOC Staff
- Affected Member Agencies
- Nearby Member Agencies
- Metropolitan's EOC at Eagle Rock
- Operational Area Emergency Operations Center (OA EOC)
- Regulatory Agencies **(Attachment L)**

WEROC EOC Staff Notification
The following steps assume a full activation. If the activation is partial, then only those staff members who are identified will be notified. The WEROC emergency manager or alternate will notify EOC staff of activation. Either of the following forms of communication can be utilized until the EOC staff member is reached and has confirmed:

- WEROC will utilize AlertOC as the primary means to notify EOC staff of activation. Staff will receive a phone call, text, and/or email to inform staff of various situations and any actions expected. The system uses a voting mechanism that allows recipients to confirm receipt of the message.
- Email all EOC staff of the situation and actions expected of them. The email should utilize the Message Options button to indicate: high importance, sensitivity level if security incident, and if a reply is requested. The email should request a read receipt in order for the EOC to track who has received the message.

- Staff members should be assigned to call staff and direct them to the designated EOC. Both staff members track messages left and successful contacts.
- Tracking of messages includes: date, time and with whom the message was left
- Successful contacts includes: date, time, and estimated time of arrival
- One hour later, compare email receipts and both tracking pages to determine which staff members should be called again to confirm notification of the event. Make any remaining phone calls needed.

Staff notifications should include:

- Situation Status
- Activation Status
- Report Location
- Safety Instructions
- Shift length
- Expected Action

WEROC Member Agency Notification

The following steps assume the need to contact all member agencies. The EOC Director should assign at least one staff member to Member Agency Notification. Either of the following forms of communication can be utilized until the Member Agency is reached:

- WEROC will utilize AlertOC (Email, phone call, text message) as the primary means to notify member agencies of EOC activation.

- Using WEROC EOC Phone Book or Safety Center Application, email or call affected water utilities to inform them of the situation and expected actions. The email should utilize the Message Options button to indicate: high importance, sensitivity level if it is a security incident, reply requested, and request a read receipt for this message. The text or voice message should include:
  - Why the notification is being made?
  - Who has been effected?
  - What action is being requested?
  - Has your agency been affected?

- Assigned staff member should then utilize the WEROC radio to provide an update of the emergency situation and the EOC activation status. Conduct a member agency roll call utilizing the WEROC radio in order to track who heard the announcement.

- Compare any email receipts to the radio roll call to determine which agencies should be called individually to confirm notification of the event. Make remaining phone calls utilizing the Member Agency Emergency Contacts List found in the WEROC EOC Phone Book or Safety Center Application

EMERGENCY PROCLAMATIONS

The California Emergency Services Act (Chapter 7 of Division 1 of Title 2 of the Government Code), hereafter referred to as the Act, provides the basic authorities for conducting emergency operations following a proclamation of Local Emergency, State of Emergency or State of War Emergency by the Governor and/or appropriate local authorities, consistent with the provisions of the Act. Although the Act refers to cities and counties proclaiming emergencies, it does not exclude districts from the practice. It is a necessary and important step for special districts to proclaim a local disaster for both the purposes of financial purchasing power (California Code, Public Utilities Code 12753), as well as for the use of some mutual aid agreements.

Member Agency Emergency Declaration

Each member agency should have emergency declaration procedures that are activated during emergencies that activate procedures outside of normal operations. When deciding whether to declare an emergency, the agency can use the local emergency procedures on the next page as a guidance. A member agency should declare an emergency when:

- Impacts to public health exist or are possible
- Long term water or wastewater system outages occur or are expected
- Activating the EOC and/or running an ICP
- Impacts to hospitals or schools exist or are possible
- Need for resources or support

The internal emergency declaration should trigger cost tracking procedures for FEMA reimbursement. The emergency declaration helps support the agency's purchasing ordinance policy to make purchases and contract in accordance with state and federal regulations during an emergency. Emergency purchasing authority guidelines can be found on page 52 of the Resource Management section. Member agencies should notify WEROC and the OA of the local emergency as soon as a significant problem arises. Additional notifications should be made to the appropriate regulatory agency.

MWDOC Emergency Declaration

When WEROC is informed that a Member Agency has declared an emergency, WEROC will analyze the extent of the situation, if justified, will ask the MWDOC Board of Directors to declare an emergency. The MWDOC Board of Directors declaration should be made for the purpose of:

- Activate internal emergency purchasing authority which will enable MWDOC to enter into contracts, make purchases, and request mutual aid, that otherwise would not be available without the official declaration. Emergency purchasing authority guidelines can be found in the Resource Management Section.
- Gaining support from stakeholders
- Expending and tracking EOC resources for disaster recovery

WEROC should inform the OA that the member agency and MWDOC have declared an emergency and request the OA to proclaim a local emergency on behalf of the member agency. This action should trigger internal cost tracking procedures for FEMA reimbursement in the case that a state or federal emergency declaration is made. Emergency Purchasing Authority procedures can be found in the Resource Management section.

When informing the OA of the emergency, the member agency and/or WEROC should provide justification for the declaration by providing:

- An overview of the issue
- Potential or current impacts to public health
- Potential or current impacts to water distribution or wastewater collection
- Resources needed to resolve the issue
- A timeline to resolve the issue

The internal emergency declaration should trigger cost tracking procedures for FEMA reimbursement in the case that a state or federal emergency declaration is made. For situational awareness, the appropriate agencies should be notified of the situation.

Local Emergency (Operational Area Emergency Declaration)

A Local Emergency proclaimed by the designated official must be ratified by the elected body within seven days. The governing body must review the need to continue the proclamation at least every fourteen days until the Local Emergency is terminated. The Local Emergency must be terminated by resolution as soon as conditions warrant. Proclamations are normally made when there is an actual incident, threat of disaster, or extreme peril to the safety of persons and property within a jurisdiction, caused by natural or man-made situations.

The proclamation of a Local Emergency provides the governing body with the legal authority to:

- If necessary, request that the Governor proclaim a State of Emergency.
- Promulgate or suspend orders and regulations necessary to provide for the protection of life and property, including issuing orders or regulations imposing a curfew within designated boundaries.
- Exercise full power to provide mutual aid to any affected area in accordance with local ordinances, resolutions, emergency plans, or agreements.
- Request that state agencies and other jurisdictions provide mutual aid.
- Require any local official or employee to provide emergency services support.
- Requisition necessary personnel and materials from any local department or agency.
- Obtain vital supplies and equipment and, if required, immediately commandeer the same for public use.
- Impose penalties for violation of lawful orders.
- Conduct emergency operations without incurring legal liability for performance, or failure of performance. (Note: Article 17 of the Emergency Services Act provides for certain privileges and immunities.)

State Emergency Services Act

A State of Emergency may be proclaimed by the Governor when:

- Conditions of disaster or extreme peril exist which threaten the safety of persons and property within the state caused by natural or man-made incidents.
- The Governor is requested to do so by local authorities.
- The Governor finds that local authorities are inadequate to cope with the emergency.

When the Governor proclaims a State of Emergency, the following conditions apply:

- Mutual aid shall be rendered in accordance with approved emergency plans when the need arises in any county, or city and county for outside assistance.
- The Governor shall, to the extent deemed necessary, have the right to exercise all police power vested in the state by the Constitution and the laws of the State of California within the designated area.
- Jurisdictions may command the aid of citizens as deemed necessary to cope with an emergency.
- The Governor may suspend the provisions of orders, rules, or regulations of any state agency and any regulatory statute or statute prescribing the procedure for conducting state business.
- The Governor may commandeer or make use of any private property or personnel (other than the media) in carrying out the responsibilities of their offices.
- The Governor may promulgate, issue, and enforce orders and regulations deemed necessary.

Presidential Declaration of Emergency or Major Disaster

Definitions

Major disaster: A major disaster is defined as "any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the U.S. which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby."

Emergency: An emergency is defined as "any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement state and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the U.S."

Process

In order for the President to declare a federal major disaster or emergency, the Governor of California must submit the following:

- Local Jurisdiction Emergency Declaration
- The California State of Emergency Proclamation

The Governor's written request for federal assistance must also include:

1. Certification of implementation of the State Emergency Plan
2. Description of how the disaster caused needs beyond state/local capabilities
3. A description of state/local resources already committed

4. Preliminary estimates of supplementary federal assistance needed
5. Certification of compliance with cost-sharing requirements of the Stafford Act

Basis for Request

The situation is of such severity and magnitude that effective response is beyond the capabilities of the state and affected local governments, and federal assistance under the Stafford Act is necessary to supplement the efforts and available resources of the state, affected local governments, disaster relief organizations, and compensation by insurance. The Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Public Law 100-707) is a United States federal law designed to bring an orderly and systemic means of federal natural disaster assistance for state and local governments in carrying out their responsibilities to aid citizens.

(For more information on the Stafford Disaster Relief and Emergency Assistance Act visit www.fema.gov/library/stafact)

EOC OPERATIONS

WEROC EOC staff shall report to the EOC following an automatic trigger or upon notification by WEROC or designee. The WEROC Liaison to the Operational Area (OA) will report directly to the OA EOC and upon arrival make contact (by WEROC Radio, cell phone or telephone) with the WEROC EOC. If the WEROC OA EOC Liaison has not contacted the WEROC EOC within an adequate amount of time following WEROC activation, additional WEROC Staff will be dispatched by the EOC Director to the OA EOC.

WEROC Auto-Pack
WEROC EOC staff are provided an Auto-Packs to keep in their vehicles to assist them in case an event occurs while they are out of the office or after hours that requires EOC activation. The Auto-Pack contains important contact information, maps to the WEROC and OA EOC's and general EOC Activation Protocols (can also be found on page 24 of this plan) so that staff are prepped and have access to vital information that will assist them throughout the process of reporting to the WEROC EOC.

Safety Center Phone Application
The Safety Center Phone Application (Apple and Android) allows users access to timely emergency response information. WEROC staff can assist EOC or MWDOC staff to gain access to the application. The application allows users to access:

- Emergency contact information
- Emergency Operations Plan
- Continuity of Operations Plan
- AlertOC user guide and login information
- WebEOC user guide and login information

EOC LOCATIONS

WEROC maintains two EOC's. The Primary EOC is in the City of Mission Viejo near the cross streets of Los Alisos Boulevard and Trabuco Road. The Alternate EOC is in the MWDOC Administration Offices in the City of Fountain Valley. Additionally, WEROC maintains a facility with limited resources in the City of Orange that can be used as a satellite facility. Maps and addresses to the EOCs are available in **Attachment I: EOC Maps**.

Readiness of the EOCs is the responsibility of WEROC staff. When the use of an alternate EOC site becomes necessary, EOC staff will be instructed to relocate to the alternate EOC site (Fountain Valley or Orange). If the primary EOC is unusable before its activation, staff members will be asked to report directly to the alternate EOC site in Fountain Valley.

GENERAL EOC START UP ACTIONS

When activated, the WEROC EOC will assess the overall condition/status of the Orange County's water distribution and wastewater collection systems, including, regional facilities serving Orange County. Preliminary contact will be made with each agency including MET to determine:

1. If member agency facilities have been damaged
2. Impacts of damages to community
3. Whether any assistance is required
4. Resource Needs
5. Water/wastewater system status updates
6. Facilities threatened
7. Usable water storage levels
8. Pumping capabilities
9. Any deficiencies in service due to damage to member agencies

Following the activation of the EOC, the EOC Director will work with the Intelligence Unit to monitor the situation using WebEOC, email, phone, MARS Radio, and the OA Radio System.

WebEOC

Web Based Emergency Operations Center (WebEOC) is a web-based information management system that is used by all OA signatories and county departments to providesusers a single access point for the collection and dissemination of emergency or event-related information such as, position logs, significant events, logistical requests, press releases, and staffing. Additionally, the user has the ability to provide status updates to include: Initial Damage Estimates, Casualties, Proclamations, Utilities Outages, Evacuations, Mass Care Centers, Road Closures, Infrastructure, Advisories/Press releases, DOC status, Potable and waste Water. Note: WebEOC is not a communication tool, it is an information gathering platform.

WEROC EOC ORGANIZATION AND RESPONSIBILITIES

The following pages is a description of each EOC Section. The WEROC EOC organization chart is visually represented in Figure 1: WEROC EOC Organization Chart.

EOC Organization	
Management Section	Responsible for overall WEROC emergency policy and coordination through the joint efforts of WEROC EOC Management Staff, Rumor Control, Public Inquiries, Identification of Safety Officer, Facility Security, Agency Liaison, and State/federal activity coordination. This section includes the EOC Director, Public Information Officer, Legal Advisor, and liaisons from outside agencies such as MET, the Operational Area (OA), and WEROC Water utilities.
Planning and Intelligence Section	Responsible for collecting, evaluating, disseminating intelligence and information; developing the EOC Action Plan in coordination with other functions; and maintaining documentation, advanced planning, Technical Services, Action Planning, and Demobilization Planning. Communication and coordination is part of the Planning and Intelligence Function and shall be established between the WEROC EOCs, WEROC member agencies, the OA, SWRCB, MET and other appropriate resource agencies.
Logistics Section	Responsible for managing all requests made of WEROC for logistical support by WEROC member agencies during a disaster operation, including the facilitation of mutual aid, Transportation Support, Personnel, Supply and Procurement, Resource Tracking, and IT Support,
Finance and Administration Section	Responsible for managing all financial aspects of the disaster operation, including the tracking of hours, compensation claims, Purchasing, Cost Recovery, contracts, and Travel Request forms and claims.

Note: WEROC does not have an Operations Section as part of its EOC structure because the agency is not responsible operations in the field. Operations are conducted by the member agencies in the field and their Department Operations Center.

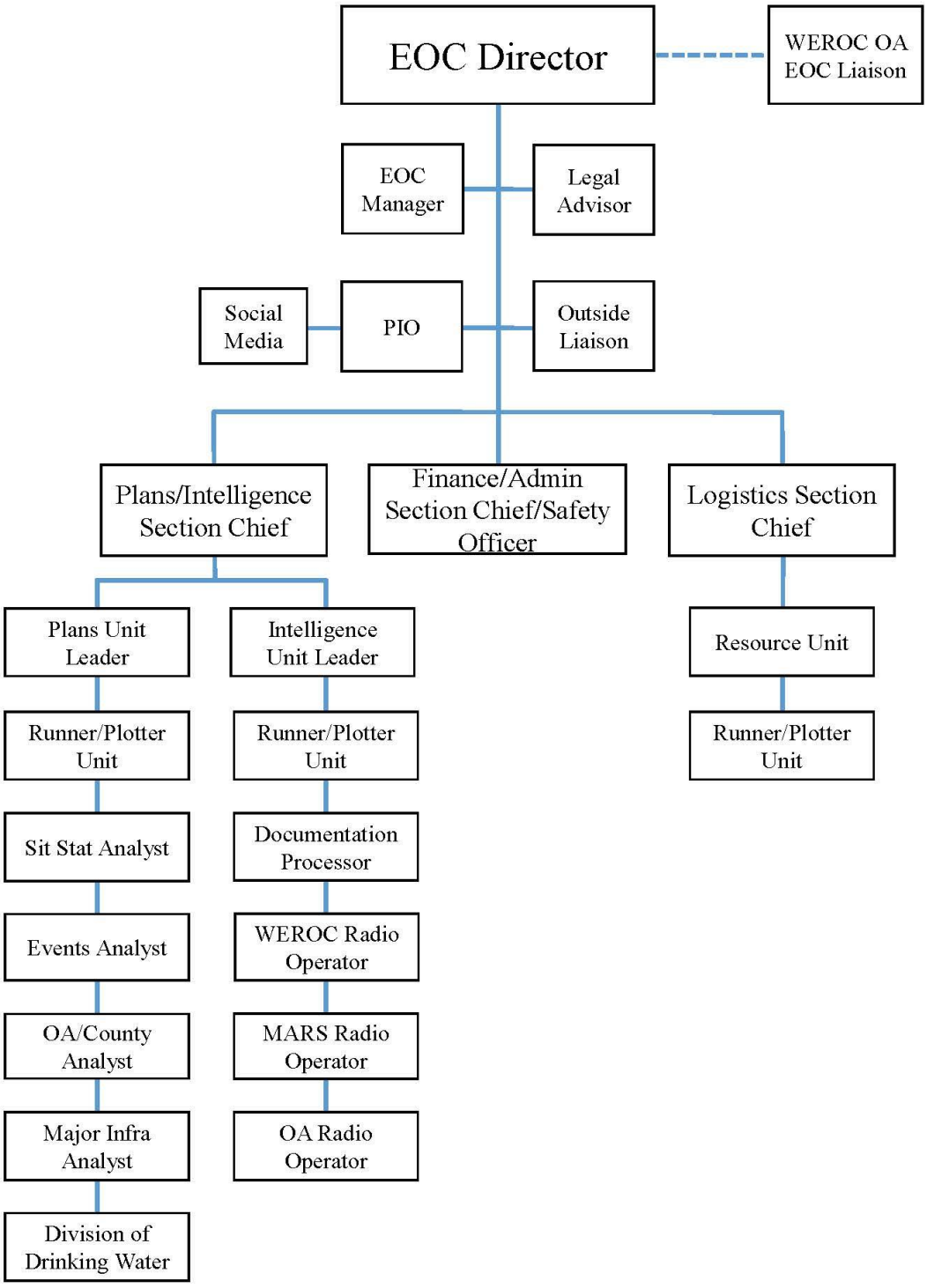
Chain of Command

The first WEROC Staff member to arrive at the EOC will start making the EOC operational. In accordance with ICS, the most qualified EOC management staff member to arrive will exercise overall EOC management responsibility until relieved by the next qualified management staff member. This will be done in the following order:

1. EOC Director
2. EOC Manager
3. Planning/Intelligence Chief
4. Logistics Chief
5. Finance/Administration Chief / Safety Officer

As additional WEROC Staff arrive, a more permanent and expanded EOC organization will begin to identify these initial tasks in a more formal manner, i.e. using functional checklists and the EOC action plan (See position binders in each EOC)

FIGURE 1: EOC ORGANIZATION CHART



EOC SECTION RESPONSIBILITIES AND REPORTING PROCEDURES

Responsibilities for each WEROC Function are listed below. EOC Staff assigned to a specific function should review the checklist for that function found in each EOC position binder in the EOC. In addition staff should review and become familiar with the other checklists in the event that a reassignment of functions is required. It is WEROC's intent to provide opportunities for cross-training in all EOC functional positions to maintain a high level of staff preparedness.

Management Section	
EOC Director	Responsible for the overall emergency management, policies and coordination of the WEROC EOC. Manage WEROC EOC activity and develop EOC priorities and objectives in the EOC Action Plan (IAP). Approve the demobilization plan for the WEROC EOC provided by Planning and Intelligence. This position utilized WebEOC.
EOC Manager	Facilitate the overall functioning of the EOC by providing guidance and technical expertise to the Director and Section Chiefs during EOC operations. Ensure that the mission of WEROC is achieved through the communications and coordination of the EOC. This positions is privy to the tools and resources available at the EOC. This position utilizes WebEOC.
Legal Advisor	Responsible for assessing WEROC and Member Agency risks resulting from the emergency. This function provides professional counsel to the EOC Director regarding emergency actions, liability, legal procedures and possible legal eventualities. Coordination and communication may be accomplished by phone and e-mail; however the position may attend EOC meetings with EOC Director and Management to achieve closer coordination.
Public Information Officer	Provide assistance and coordination to WEROC member agencies for public and media outreach and serves as the dissemination point for all public information released from the WEROC EOC to the affected area(s) throughout the operational period. A PIO Liaison may be assigned to the OA EOC if the OA JIC is activated or the OA hotline in support of water operations. May act as the JIC coordinator for water issues. This position utilizes WebEOC.
Social Media	Reports to the Public Information Officer and has the responsibility of monitoring social media, reporting new information, and posting approved information using WEROC social media accounts.
WEROC OA EOC Liaison	Reports to the OA EOC Public Works Director. This function is located at the Operational Area (OA) EOC and serves as the on-site liaison to the OA as a representative of WEROC and all water/wastewater agencies affected by the disaster. This function utilizes WebEOC.
Outside Agency Liaison	Reports to the EOC Director. This function serves as the liaison of the affected agency. Responsible for coordinating resources between WEROC and the member agency.

Planning Section (Part of Planning & Intelligence Section)	
Planning/ Intelligence Chief	Exercise overall responsibility for the coordination of activities within the Planning & Intelligence Section. This section is responsible for gathering, analyzing, evaluating, displaying, and disseminating emergency information and is made up of the Planning Unit and Intelligence Unit. This section maintains information and intelligence on the current and forecasted situation. The Planning Section plays an integral part in developing the EOC Action Plan, prepares and documents incident maps, maintaining documentation for the overall event, and gathers and disseminates information and intelligence critical to the incident. Responsible for creating the water and wastewater Situation Summary Report. This function utilizes WebEOC.
Planning Unit Leader	Manage the Planning Unit that is responsible for gathering, analyzing, evaluating, displaying, and disseminating emergency information. Based upon information gathered, the Unit formulates and forwards planning recommendations to the Planning and Intelligence Chief and all other affected EOC sections. The Planning Unit Leader also routes information from the Intelligence Unit Leader to the appropriate Planning Unit function to be displayed and maintained on EOC whiteboards. This function utilizes WebEOC.
Situation Status Analyst	Responsible for collecting and following up on general situation status regarding WEROC member agencies The Situation Status Analyst uses a variety of methods to collect situational information, once collected the information is to be organized and displayed on the Situation Status Whiteboard, which will be continuously updated to provide all WEROC EOC staff with general situational awareness. This function utilizes WebEOC.
Events Analyst	Responsible for collecting, evaluating, and tracking, and following up on member agency events of significance during the course of an incident. This position analyzes information it processes and assists the Planning Unit Leader with advanced planning. Additionally, ensures the events board is updated regularly. This function utilizes WebEOC.
OA/County Analyst	Collect and analyze disaster information related to overall OA/County operations and significant events. Be aware that although events may not be directly related to water and wastewater, indirect effects have the potential to significantly affect the operations or recovery of Orange County water and wastewater systems. Summarize and forward significant findings to the Planning Unit Leader and other EOC staff, as needed. This function utilizes WebEOC. Responsible for maintain the OA/County events board updated.
Major Infrastructure Analyst	Collect and analyze damage assessment information to identify issues related to major water and wastewater infrastructure in Orange County. Determine the likely impacts of damage to the Orange County water and wastewater system. Summarize and forward significant findings to the Planning Unit Leader and other EOC staff, as needed. Responsible for major infrastructure board. This function utilizes WebEOC.

Division of Drinking Water	This function serves as the representative from the DDW. Responsible for coordinating resources and providing guidance to member agencies. This function utilizes WebEOC.

Intelligence Unit (Part of Planning & Intelligence Section)	
Intelligence Unit Leader	This function reports to the Planning and Intelligence Chief and is responsible for collecting, evaluating, and designating responsibility of all incoming messages to the WEROC EOC. This function utilizes WebEOC.
WEROC/OA/ MARS Radio Operators	Facilitates all emergency radio communications between WEROC EOC, member agencies, County OA EOC, and MET's EOC. The amount of radio staff will depend on the amount of radio traffic.
Runner Unit	Reports to the Intelligence Unit Leader and is responsible for ensuring a timely and smooth flow of written information between all EOC functions, especially the radio room.
Plotter Unit	Reports to the Intelligence Unit Leader and is responsible for providing an updated visual picture and situation status of the disaster for the EOC Director and staff on the white boards and projector. Assigned to sections as needed.
Documentation Processor	During the initial phases of activation, the Documentation Processor assists: the Situation Status, Events, OA/County, and Major Infrastructure Analyst to collect and organize information. Throughout all phases of activation, the Documentation Processor must review the EOC message flow process and offer critiques on procedures to improve the overall EOC system. Creates the official record of activities for the EOC by collecting, organizing, and documenting all EOC communications throughout the operational period in the Documentation Log and event binder

Logistics Section	
Logistics Chief	Manage all resource requests made by member agencies and provide logistical support to the WEROC EOC operations. This includes tracking resources and determining resource request priorities. Ensure all resource requests are organized and clearly displayed on the WEROC EOC Resource Request board. This function utilizes WebEOC.
Resource Unit	Identify and coordinate resources identified through resource requests made by member agencies. Provide logistical support to WEROC EOC Staff during WEROC EOC operations. Ensure all resource requests are organized and displayed on the WEROC EOC Resource Request board.

Finance and Administration Section	
Finance and Administration Chief/Safety Officer	Manage all WEROC EOC related financial aspects of the disaster operation. This includes maintenance of personnel and equipment time records; providing payments to vendors for supplies and equipment usage; and for determining the cost considerations or various alternative strategies associated with incident planning. Additionally tracks member agency IDE information and collection, and acts as the safety officer for the EOC. As the safety officer, assess and anticipate hazardous or unsafe conditions and recommend measures for assuring personnel safety. Ensure all emergency response personnel follow and demonstrate appropriate safety precautions during an emergency. This function utilizes WebEOC.

Required Forms
Each position at the EOC has a designated position guide to assist personnel throughout the response and recovery phase. Each folder is equipped with documents, checklist, contact information, and supplemental resources each position will need fulfill their role. The folders are designed to be all inclusive, but staff are encouraged to utilize other means that may not be in the function guides to complete their task if necessary. The position guides include:

- General Start Up/Deactivation Procedures
- WEROC Organizational Chart
- WEROC EOC Functional Descriptions
- Job Action Checklist
- Important Contact Information
- Location of Supplies Within the EOC
- General Forms i.e. Activity Log
- Function Specific Forms
- Function Specific Resources

All forms identified above are also available in electronic format by utilizing the USB drive attached to your position guide basket and back up hard copies are available in the position binders.

EOC ACTION PLAN

EOC Action Plans (EAP) provide framework for EOC staff to respond to the situation by providing them with the objectives and the steps required to complete them. EAPs not only provide direction, but also serve to provide a basis for measuring achievement of objectives and overall system performance. EAPs are an important management tool that involves a process for identifying priorities and objectives for emergency response or recovery efforts. EAP's also provides documentation of the priorities, associated tasks, and the personnel assigned to perform the tasks within the EOC.

The EAP is a living document prepared based on the best available information at the time of the planning meeting. EAPs are developed for a specified operational period that may range from a few hours to 24 hours. The operational period is determined by first establishing a set of priority

actions that need to be performed. A reasonable time frame is then established for accomplishing those actions. The EAPs need not be complex, but should be sufficiently detailed to guide EOC elements in implementing the priority actions. For the initial response, the format may be limited to a well-prepared outline for an oral briefing. For most incidents that will span multiple operational periods, the plan will be developed in writing according to ICS procedures.

EOC ACTION PLAN ELEMENTS

The EAP template and sample can be found within the Planning and Intelligence position binders. Below is a brief explanation of what information is requested on that template.

Operational Period: Period of time in which EOC Staff will meet the stated objectives. Typically, during the first day of a major emergency or disaster, change is rapid, thus EOC Management may set the operational period to last only a few hours. Later, change is less rapid and the operational period may expand to cover a number of days.

EOC Objectives: Stated objective(s) the EOC should accomplish within the operational period. Example objectives for the initial stages of EOC activation for a major earthquake include:

- Establish emergency communications with Metropolitan, Orange County Operational Area, and WEROC Water utilities
- Update Situation Status board with each agencies communication resources and availability
- Receive summary of all water and wastewater damages, support needs, and impacts to surrounding communities
- Identify and prepare most likely anticipated resource requests from member agencies

Operational Priorities: List priorities in order of importance (note: the order of priorities may change based on the disaster situation).

Actions Needed: List the steps necessary to accomplish the objectives e.g. Analyze, Coordinate, Formulate, Monitor, etc.

Resources Needed: List Personnel, Equipment, and Supplies, along with the costs associated with those resources. Create a schedule that outlines what kinds of resources are required, how many, where and when. Logistics will order resources based on the EOC Action Plan. The ICS 213 Resource Request form is used to request resources, the form contains the following information:

- Mission Name and Detailed Description
- Requesting Agency Information
- Deployment Information
- Estimated Costs

Support Needed: List the various partner agencies the WEROC EOC will require the support of in order to meet operational objectives.

The EAP process should involve the EOC Director and Section Chiefs along with other appropriate EOC staff and other agency representatives as needed. The Planning/Intelligence Section is responsible for development of the EOC IAP and for facilitation of EOC action planning meetings. Planning meetings will not be delayed in anticipation of future information. A sample EAP can be found within each of the positions of the Planning Unit. The planning process for the first EAP will begin upon the activation of the WEROC EOC and will consist of the following steps:

Planning Process

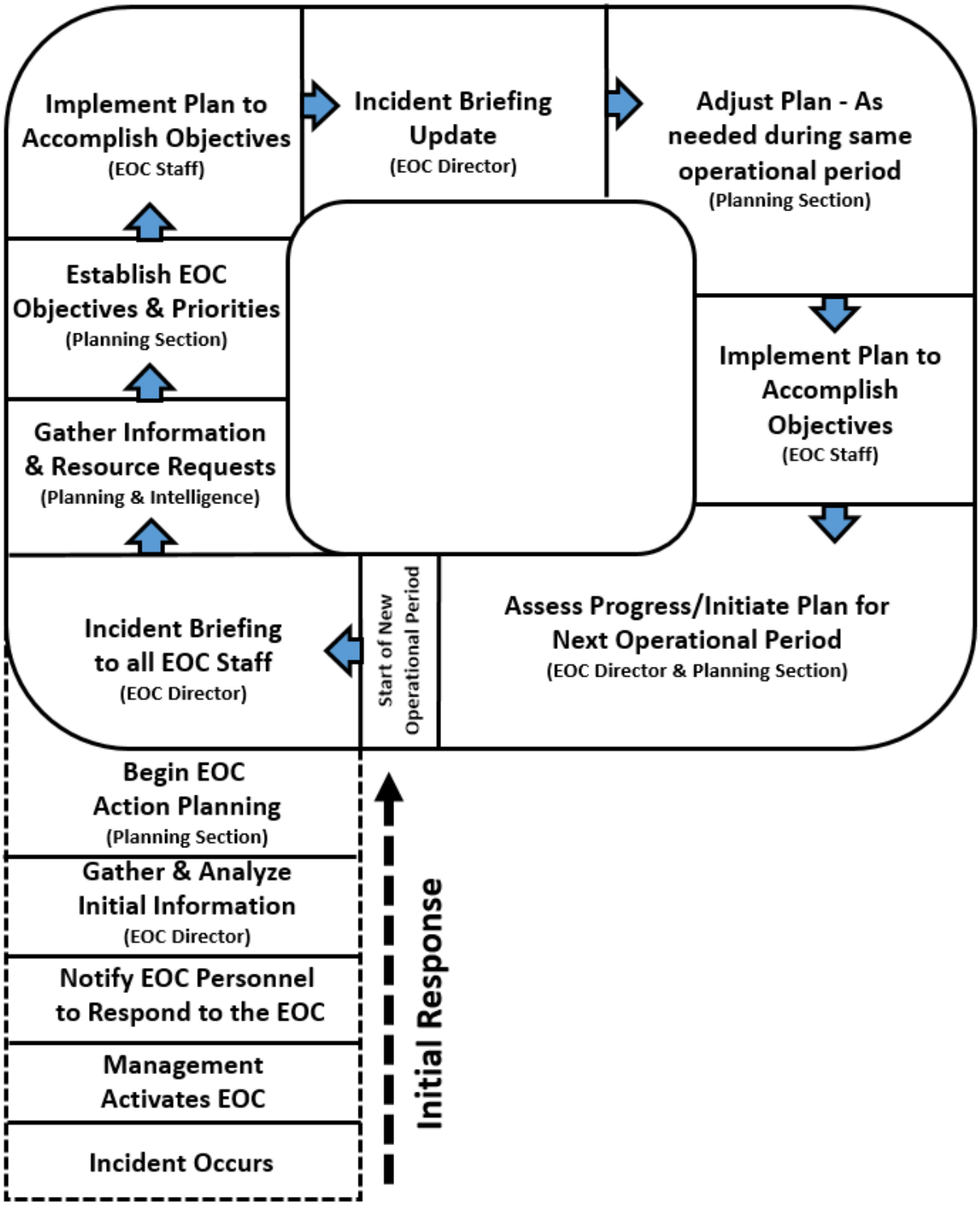
1. Gather, record, analyze, and display situation and resource information in a manner that ensures a clear picture of the magnitude, complexity, and potential impact of the incident **(Planning Section with input from General Staff).**
2. Conduct a briefing with management section and section chiefs on the situation and status of resources **(Planning Section)**.
3. Formulate and prioritize measurable EOC objectives that conform to the legal obligations and management objectives of WEROC as it relates to the response. **(EOC Director with consultation from General Staff and others).**
4. Identify reasonable alternative strategies that will accomplish overall incident objectives to determine the most appropriate strategy for the situation at hand **(EOC Director with consultation from General Staff and others)**.
5. Develop evaluation criteria to include public health and safety factors, estimated costs, and various environmental, legal, and political considerations **(EOC Director with consultation from General Staff and others).**
6. Determine the direction and the specific resource, reserves, and support requirements for implementing the selected strategy for one operational period. I.e. assign responsibilities and staffing **(Planning Section).**
7. Specify known or expected resources and facilities that may be needed by each member agencies to support their response needs. **(Logistics Section).**
8. Place orders for resources, facilities, and overhead personnel **(Logistics Section).**
9. Draft and approve the EOC IAP **(EOC Director, Planning Section).**
10. Distribute the approved EOC IAP to all EOC sections for implementation **(Planning Section)**
11. Compare planned progress with actual progress **(Planning Section)**.
12. Track deviations that occur from the EOC IAP and emerging information to include in the first step of the process for modifying the current plan or developing the plan for the subsequent operational period **(Planning Section).**

A sample EAP can be found within the position guide at the EOC. The first EAP is for the first operational period (12 hours) that the EOC has been activated. The second and subsequent EAPs should be developed and approved prior to the nest operational period.

The planning process should provide the following:

- Current information that accurately describes the incident situation and resource status
- Predictions of the probable course of events
- Alternative strategies to attain critical incident objectives
- An accurate, realistic EOC IAP for the next operational period

Figure 1: EOC Action Planning Cycle



COMMUNICATIONS

The WEROC EOC's have established multiple forms of communications for use during activation. The traditional forms of communication available are landline phones, cellular phones, satellite phones, a fax line and three separate radio communication systems (WEROC, MARS, OA1). In addition to those, the WEROC EOC's have wireless internet capability, Gmail accounts, and the use of WebEOC.

Telephone, Cellular Phone, Fax, and Satellite Phones
Each EOC has six hardline phones, staff cellular phones, one fax machine, and a satellite phone. All phone lines have the capability to call out, transfer calls, and call waiting.

Government Emergency Telecommunications Services/Wireless Priority Service
WEROC staff and both EOC's utilize Government Emergency Telecommunications Service (GETS). GETS is a federally sponsored program that provides government first responders with priority service for landline telecommunications. A GETS card has been issued to all managerial staff, each position in the Planning Section, Logistics Section, and Finance Section, and to both the Emergency Manager and Coordinator. Wireless Priority Service (WPS) is intended to be used in an emergency or crisis situation when the wireless network is congested and the probability of completing a normal call is reduced. All staff can add to their personal pone. A list of active participants is available in **Attachment N.**

AlertOC
AlertOC is a mass notification system designed to inform Orange County residents and businesses of imminent emergencies and protective actions. By registering with AlertOC, time-sensitive voice messages, text messages, and emails from the County, WEROC, or member agencies can be sent to those who live or work in the county. Text messages may also be sent to cell phones, e-mail accounts and hearing impaired receiving devices.

MWDOC may use the system as an internal notification tool to notify staff of imminent or on going emergencies. Additionally, if requested by a member agency, WEROC may send out notifications to the public on behalf of the member agency. If WEROC EOC staff are unsure how to use AlertOC, they may contact the Operational Area EOC to send out a message on the agency's behalf. MWDOC staff with the responsibility to send out notifications have been pre-identified by the general manager.

WhatsApp
WhatsApp is a phone application (Apple or Android) that allows the sending of text messages and voice calls, as well as video calls, images and other media, documents, and user location. The application runs from a mobile device though it is also accessible from desktop computers; the service uses standard cellular mobile numbers. This application allows users with different phone software to easily create and connect to group text messages.

Internet and Email

Both EOC's have internet service with wireless connectivity available. Email accounts have been established for all EOC positions and are listed in position binders as needed. Additionally, any laptop brought to the EOC with wireless capabilities should be able to connect to the service.

WebEOC Operations

During emergencies WEROC and all government agencies in OC use WebEOC as a crisis information management system for real-time information sharing. WebEOC is a software program for electronically sharing disaster information among the WEROC Water utilities, and from WEROC to the Operational Area or with other jurisdictions. WebEOC is accessed through the internet and is thereby accessible from any device with internet access (running Internet Explorer 6.0 or higher) as long as the user has an appropriate username and password. The system is used for, but not limited to:

- Situation status reports for all government agencies
- Monitoring and posting significant events
- Monitoring who is supporting the response, accessing their contact information, and tracking response actions
- Reporting IDEs
- Central location for public information

<u>WebEOC should not be relied upon for up to date information. It is always best to communicate directly to receive a confirmation than to assume an agency is using WebEOC.</u>

RADIO COMMUNICATION

The WEROC EOC's have three radio systems available for different communication purposes: OA1, MARS, and WEROC. In accordance with NIMS policies, WEROC will only use standard speech communications, rather than any type of codes such as Ten-Code. All three radio systems conduct regular radio checks to ensure operability and user knowledge of systems. Practicing proper emergency radio procedures is necessary to ensure that radio operation is an automatic response and to reduce confusion. It is encouraged that a runner or designee assist the radio operator by acting as a second listener to ensure that communications are not misinterpreted. Below is a description of the three radio systems that are utilized at the EOC.

Operational Area One Radio (OA1 Radio)

The OA1 Radio allows the WEROC EOC to communicate with the Operational Area and City EOC's on the OA1 frequency. This frequency is monitored 24/7 by the Sheriff's Control One and can also be overheard by all OA1 Member cities EOCs. As such, they can serve as back-up communications with other jurisdictions if the other jurisdictions are first prompted to continuously monitor the frequency. The Orange County Sheriff's Emergency Management conducts a monthly test of the system. For OA1 Radio operations guidance, refer to the OA Radio System Standard Operations Procedure which is available in the Radio Unit Position Guide.

Metropolitan Member Agency Response System (MARS) Radios

The MARS Radio System provides an emergency communications network for all MET water utilities. Within Orange County, MARS radio units are located at the Diemer Filtration Plant in Yorba Linda, both WEROC EOCs, and the cities of Anaheim, Fullerton and Santa Ana. All three cities have agreed to coordinate emergency response operations through WEROC.

For MARS Radio System operation guidance, refer to the Member Agency Response System Operations Manual, which includes standard operations procedures for the radio system. Copies of the Manual are located in both WEROC EOCs in the Radio Unit Position Guide in each EOC has a copy of the MARS manual for reference.

WEROC 800 MHz Radio System

WEROC's emergency radio system provides an emergency communications network for all WEROC member agencies, Diemer Filtration Plant, DDW, and the OA EOC. The system includes a "WEROC Channel" within the current 800 MHz system, with WEROC and its agency's as "Participating Agencies." WEROC's specific channel has the capacity to be connect with other operations, such as fire, law, public works, etc. at the time of a disaster as needed. Each EOC is equipped with a control station and one portable radio. If all other communication systems are inoperable and an emergency which requires immediate attention occurs, the red button on the radio can be pushed for immediate assistance.

STAFF SAFETY

Ensuring the safety of EOC staff is of upmost importance. The Safety Officer is responsible for addressing all potential hazards within the EOC and responding to any staff who requires medical attention. Protocols for medical attention are listed in detail in the Safety Officer Position guide.

Staff Resources

Each EOC is stocked with: first aid/trauma kits (located in the WEROC office and near the East MWDOC employee entrance), an automatic external defibrillator, sleeping bags, cots, meals ready to eat, drinking water, and hygiene products.

Injuries

Any injury which occurs during working hours will be treated as a workers compensation injury. If medical attention is needed, but is not an emergency, the staff member can be taken to any of the designated clinics or the patients preferred doctor.

Family Notifications

In stressful and fast pace situations, injuries can occur. If a staff member is seriously injured or perishes while on duty, the MWDOC General Manager or alternate will be charged with notifying the staff member's emergency contact. Emergency contact information can be found in the WEROC Staff Information binder located at each EOC. If while on duty an EOC staff member sustains a non-life threatening injury, the Safety Officer will notify the individual's emergency contact. Injury Forms are located in the Safety Center application and in the Safety Officer Position guide and should be utilized to document each incident.

Unauthorized Personnel

Intruders may pose a threat to EOC staff. Doors and access gates to the EOC should remain closed at all times while the EOC is activated. The EOC doors are equipped with panic push bars to allow for easy exit in case of an emergency. The assigned Safety Officer will be in charge of allowing authorized personnel access to the EOC as well as denying access to non-authorized personnel. Unauthorized personnel will be asked to leave the premises and informed that law enforcement will be called if they do not get off the property.

OPERATIONAL PERIODS

The Planning/Intelligence Section will be responsible for establishing formal shifts and staffing schedules. Depending on the circumstance, shifts can last up to but should never exceed 13 hours. It is important to stick to these schedules during EOC activation. Many EOC personnel may want to stay "on-duty" despite the pending end of their shift. Personnel need to be allowed to relax and decompress and should feel confident that appropriate personnel are taking their places.

Shift Transition

Shifts should overlap by at least a half an hour to give the outgoing personnel an opportunity to debrief incoming personnel and to allow time to transition. To sustain continuity from shift to shift, this transition period is required. The incoming person is the one who releases the person they are replacing. The person going off shift cannot leave until the incoming person is ready to assume the role. The Finance/Administration Chief is responsible for ensuring personnel submit time cards and ensuring any staff leaving the EOC are in a physically and mentally safe position to drive home.

ADMINISTRATION AND FINANCE

Administration

The administration function manages all administrative, financial, and cost analysis aspects of the incident. Initially, this work may be done in the EOC, but after the EOC is deactivated the activities can also be conducted from MWDOC. Additionally, this function will be in charge of tracking IDE's from member agencies.

EOC Documentation

During EOC activation, the administration function during an event is a support role and requires proper and accurate documentation of all actions taken. This function coordinates with other sections in the EOC and/or departments to collect the necessary documentation pertaining to the incident for cost recovery purposes. This function also acts as a liaison with other disaster assistant agencies and coordinates the recovery of costs as allowed by law. The documentation gathered must be maintained and becomes official record of the event in order to pass an audit. Accurate and timely documentation is essential to financial recovery for the WEROC and its water utilities.

Finance

WEROC may be reimbursed from ACWA JPIA Insurance, California Disaster Assistance Act, or Stafford Act for disaster-related expenses. Accurate record keeping will assist the recovery process for the said expenses after an incident. Recommended Finance Practices for Stafford Act Public Assistance should be adhered to. All EOC cost are tracked by activity codes, activity codes are located in the Finance and Administration Position Guide

Vital Record Retention

State and federal governments require detailed information to support claims for reimbursement. Funding will be approved or denied based upon the information supplied by applicant agencies. Documentation supporting all costs claimed will be required, and all information must relate back to the original source records. The following guidelines should be followed when documenting disaster-related reimbursable expenses:

- Costs and reimbursements associated with emergency operations should be segregated from normal operation expenses.
- Separate records should be maintained for each vehicle and piece of heavy equipment used for emergency operations.
- Vehicle and equipment documentation should include the miles and/or hours operated by location and by operator.
- Vehicle operating expenses should include fuel, tires, tubes, and maintenance.
- Regular and overtime labor costs should be compiled separate from vehicle and/or equipment expenses.
- Equipment documentation should include exactly where the equipment was used and for what; hours and minutes used; and the name of the equipment operator if applicable.
- Revenues and subsidies for emergency operations must be subtracted from any costs claimed.
- Requisitions, purchase orders, and invoices must be maintained for all supplies, materials and equipment expenses claimed should be tracked by project or job site.
- Cost for supplies and materials must include documentation of exactly where resources were used and for what purpose.
- All non-competitive procurements must be justified and follow the agency's finance policies.

Expenditure tracking should commence in any occurrence of an incident that requires expense of labor, equipment used, materials, and other expenses. The Incident Commander(s), EOC Director and EOC staff are responsible for maintaining written records of all disaster-related staff time, requests for supplies, equipment and contract personnel, and receipts for emergency purchases of supplies, equipment and other disaster-related expense.

The Finance Section will compile reports, including total expenditures by Public Assistance category. The Finance Section Chief will submit a summary report on total costs to the EOC Director as requested. This information will be used for state and federal disaster assistance applications. The expenditure data and documentation is vital to state and federal agencies for requesting financial assistance during and after the incident.

MWDOC owns the records, and has the responsibility and liability for their management, and an obligation to direct employees how they are to manage their records; therefore, MWDOC has created various policies and procedures to retain records in the event of a disaster. MWDOC uses Laserfiche to manage and store vital records. This system is maintained by MWDOC's Record Coordinator. At the completion of each shift and the event, all records should be submitted to the Section Chiefs who will then submit the records to the Finance Section Chief.

WEROC considers the development of a comprehensive resource management strategy a priority. Mutual assistance should only be requested once the agency's own resources are reasonably depleted and private company (purchase, lease, or rent) resources have been exhausted. The WEROC EOC is responsible for managing response resource and will allocate resources for the greater good of the incidents recovery.

MEMBER INTERAGENCY COOPERATION

The WEROC Indemnification Agreement (**Attachment A**) is a mutual assistance agreement between member agencies that outlines cost and liabilities associated with mutual assistance request, but it does not cover response cost reimbursement. It is recommended that reimbursement cost be decided between member agencies prior to any equipment or personnel being transferred. WEROC will assist the coordination of mutual aid resources in the event that various agencies are impacted or need assistance.

Small Scale Emergencies
Depending upon the size and type of emergency affecting member agencies, it may not be necessary to fully activate the WEROC EOC. Emergencies confined to a specific small area (s) e.g. system failure, flooding, rural/urban fires, etc., may only require the DOC activation of the member agency(s) affected by the emergency. In these situations where only one or two agencies are impacted, the member agency affected may request assistance directly from another agency. (However, the requesting agency should always notify WEROC of these activities). In most cases, much of the resources required will come from inventories within our member agencies. WEROC would standby and monitor radio communications, or activate the EOC if requested to do so. Any member agency may request WEROC EOC activation in support of their activities.

Large Scale Emergencies
Local Emergency (No State or Federal Declaration) – When member agencies require assistance that does not warrant an emergency, they look to neighboring member agencies for assistance.

State and/or Federal Declaration Reimbursement for Mutual Assistance Response –. The following process should be taken if using Public Assistance Reimbursement from a State and/or federally declared disaster. The Requesting Agency will pay for any incurred costs regardless which of the reimbursement methods below are used.

1. Responding Agency bills Requesting Agency for response costs
2. Requesting agency submits those costs through the FEMA Public Assistance process

When either process is initiated, the agency should follow the recovery documentation process found on page 64. It is up to the member agencies to come to terms on how the equipment or staff time will be reimbursed.

EMERGENCY PURCHASING AUTHORITY

The following information has been referenced from the FEMA 44 C.F.R. § 13.36 (August 2014) and the FEMA Field Manual for Public Assistance Grantee and Sub-grantee Procurement Requirements under 44 C.F.R PT.13 and 2 C.F.R PT. 215. All agencies should be familiar with State and federal purchasing and contract regulations as they relate to water and wastewater, public works processes and disaster finance processes. The following is not a complete explanations of disaster financial processes, eligibility or regulations.

Vendor Contracts

Emergency Work (Temporary Repairs)

During a public exigency or local emergency where a temporary repair is needed to restore water services and avoid issues to public health, member agencies may contract directly with a vendor and bypass the competitive bidding process of a permanent repair. This work can only include FEMA Category A: Debris Removal and B: Emergency Protective Measures under the Public assistance reimbursement process. If needed, WEROC may facilitate the purchasing contracts for member agencies in order to expedite the process and maintain public health. During extreme circumstances, MWDOC may consider to directly contract with a third party for services, with the caveat that MWDOC will not be eligible for FEMA reimbursement. It is recommended that WEROC request that the local health officer declare a public health emergency prior to MWDOC entering any contracts in order to build a case for the purchase and increase the odds of qualifying for FEMA reimbursement.

Noncompetitive Procurements: Procurement through solicitation of a proposal from only one source or inadequate competition. May be used only when: (a) Full and open competition is infeasible, and either (i) Item available only from single source; or (ii) Public exigency/emergency; or (iii) Awarding agency authorizes; or (iv) After solicitation of a number of sources, competition is determined inadequate; and (b) cost analysis is performed to determine cost reasonableness

Small Purchase Procedures: May use small purchase procedures for procurements under simplified acquisition threshold (SAT) $150,000. This type of procurement is often accomplished by inviting vendors to submit three quotes, which the buyer then evaluates and makes an offer

Permanent Work

During an emergency where a permanent repair is needed to restore water and wastewater services and avoid issues to public health, member agencies must obtain three separate quotes if the total amount for the work performed is between $3,500 and $150,000. If the work exceed $150,000, the agency must enter a competitive sealed bid process (lowest price bid). Member agencies may complete a Request for Proposal process for architectural or engineering consultation services which is categorized as Category C-G under the Public Assistance reimbursement process.

MWDOC Purchasing Authority

Under the MWDOC Administration Code §1307, the MWDOC Board of Directors has authorized the General Manager to expend non-budgeted District funds to meet an emergency that adversely affects, directly or potentially, the ability of the District to perform its services; which puts District property or personnel in jeopardy; or which may jeopardize the health or property of the community and its residents. Per the Administration Code, Chapter 8, Exhibit A the expenditure of those funds are allowed as follows; up to $100,000 with a purchase order/agreement or contract to be ratified by the Board at the next meeting, or if over $100,000 the general manager must present an agreement or contract to the Board for approval. The General Manager shall determine that an emergency exists and shall inform the Board of the emergency, at the earliest opportunity, the steps taken and expenditures incurred to respond and recover.

Member Agency Purchasing Authority

Each member agency should establish an emergency purchasing authority ordinance that is activated when the agency declares an emergency. If an agency is conducting temporary repairs, the agency is allowed to use their internal emergency purchasing procedures as long as it meets the FEMA emergency categories on page 52, and do not have to adhere to federal procurement standards. When the temporary repair is transitioned to a permanent repair, the agency must adhere to federal procurement standards.

Damage Repairs

The entity who owns the damaged infrastructure is in charge of coordinating and paying for the repair cost. Given that damaged infrastructure may affect water distribution to various agencies, it is important for agencies to develop disaster specific agreements that give other agencies the authority during an emergency, to repair infrastructure that is not typically maintained by that agency on a daily basis. During an extreme circumstance when an agency's resources are depleted, this concept can expedite the restoration of water distribution and help ensure that agencies involved are reimbursed given a state or federal emergency declaration. Agreements for maintenance and repair should specifically state who is responsible for those cost and repairs during an emergency response and recovery. The above process will ensure that FEMA public assistance reimbursements are appropriately distributed.

Member agencies who jointly own infrastructure and use roads that might belong to public works or other agencies and need to access the property for safety reasons, should be asked by the owner of such property to make a mutual aid request to the agency willing to conduct the debris removal or temporary repairs.

In limited circumstances, FEMA may determine that emergency protective measures conducted on private property are eligible under the PA Program if:

- The immediate threat is widespread, affecting numerous homes and businesses in a community such that it is a threat to the health and safety of the general public in that community;
- The Applicant has legal authority to perform the work; and
- The Applicant obtained rights-of-entry and agreements to indemnify and hold harmless the Federal Government.

MUTUAL AID

California participates in a statewide mutual aid system that is designed to ensure additional resources are provided to jurisdictions whenever their own resources are exhausted. The basis for the system is the California Disaster and Civil Defense Master Mutual Aid Agreement (MMAA). The agreement requires all government agencies in California to provide aid to each other during an emergency. Under specific conditions, federal and state monies may be appropriated to reimburse public agencies that aid other jurisdictions. Mutual aid is only eligible for reimbursement for temporary repairs and emergency protective measures, and not for permanent repairs. If other agreements, memoranda and contracts are used to provide assistance for consideration, the terms of those documents may affect disaster assistance eligibility and local entities may only be reimbursed if funds are available.

The Master Mutual Aid Agreement (MMAA) requires a Declaration of Emergency from a city, county, or state, and is coordinated through the SEMS system. WEROC will facilitate through the OA on behalf of its member agencies.

Emergency Managers Mutual Aid (EMMA) – The purpose of EMMA is to provide trained EOC personnel from unaffected areas to support local jurisdictions, OA's and regional emergency operations during proclaimed emergencies.

Emergency Water Allocation
Emergency water allocation procedures specified by suppliers will be considered a priority. Water allocation recommendations made by WEROC will be based on:

- Firefighting requirements
- Potential threat to life or property directly related to water supply
- Health and safety considerations
- Water demand by member agencies and the status of their supply

If reallocation of water is needed, WEROC will take the following steps to ensure that the health and safety of the community is maintained:

- Evaluate impacted agencies. water supply, and supply needed
- Coordinate with all member agencies for capability to adjust source supply
- Coordinate movement of available water supply source via:
    - MET and joint agency pipelines, interties, and emergency connections;
    - including closing MET connections to non-impacted agencies with alternate water supply
    - Request and deploy water trailers

Mutual Aid Coordination
Formal mutual aid requests will follow specified procedures and are processed through pre-identified mutual aid coordinators. Mutual aid requests will follow discipline-specific chains (e.g., fire, law enforcement, emergency manager, etc.) from one level of government to the next per SEMS protocols. The mutual aid coordinator receives the mutual aid request and coordinates the provision of resources from within the coordinator's geographic area of responsibility. In the event resources are unavailable at one level of government, the request is forwarded to the next higher level of

government to be filled. These levels are listed below in order from the lowest to the highest level of government.

- **Member Agency Requests:** Requests for resources originate from the Member Agency and are managed by the Incident Commander (IC). If the IC is unable to obtain the resource through existing local channels, the request is elevated to the water utilities DOC. If the DOC is unable to locate the resource, the request will be sent to the WEROC EOC.
- **WEROC Request:** WEROC will work with unaffected member agencies to obtain needed resources. If WEROC is unable to obtain the resource from an unaffected member agency, WEROC will contact the OA for support.
- **Operational Area Requests:** The OA is a composite of its political subdivisions, (i.e. municipalities, contract cities, special districts and county agencies). The OA Mutual Aid Coordinator assesses the availability of resources within the OA and fulfills the resource request based upon that assessment. In the event resources are unavailable at the OA level, the request is forwarded to the responsible Regional Mutual Aid Coordinator to be filled.
- **Region Level Requests:** The state is geographically divided into six Mutual Aid Regions. Each Mutual Aid Region is comprised of multiple Operational Areas and has a Regional Mutual Aid Coordinator. The Regional Mutual Aid Coordinator is granted the authority to coordinate the mutual aid response of discipline-specific resources within the Region to support a mutual aid request by a jurisdiction also within the Region. In the event resources are unavailable at the Region level, the request is forwarded to the State Mutual Aid Coordinator to be filled.
- **State Level Requests:** On behalf of the Governor, the Secretary of Cal OES has the responsibility for coordination of state mutual aid resources in support of local jurisdictions during times of emergency. The Secretary will analyze and coordinate the request by forwarding the request to an unaffected REOC or tasking an appropriate state agency to fill the need.
- **Interstate Mutual Aid**: Mutual aid may also be obtained from other states. California is a member of the Interstate Emergency Management Assistance Compact (EMAC), a congressionally ratified organization that provides form, structure and procedures for rendering emergency assistance between states. After a State of Emergency Declaration, California can request and receive reimbursable assistance through EMAC for other member states quickly and efficiently without issues of liability. The Secretary of Cal OES and the states' EMAC Coordinator are responsible for facilitating requests for assistance pursuant to EMAC.
- **Federal Assistance:** When resources are not available within the state or through existing agreements with other states, California may request assistance from the federal government. Requests for federal assistance during an emergency will be coordinated through the State Operations Center (SOC).

Requests for Resources

When local resources are exhausted and additional resources are required, resource requests will follow an established process for ordering, tracking, mobilizing and demobilizing.

For the WEROC EOC, the Logistics Section Chief will initiate requests. Requests will be prepared by the EOC Logistics Unit using WEROC Resource Request Form or the ICS 213RR Resource Request Form which are to be submitted to the OA EOC by email. The logistics unit is expected to immediately follow up the request with a phone call to ensure that the request was received. The logistics section will continue to monitor the status of the resource request until it has been fulfilled or it is no longer needed.

Resource requests must include the following information:

- Clearly describe the current situation
- Describe the requested resources with as much detail as possible; including supporting concepts such as staffing and fuel
- Specify the type or nature of the service the resource(s) will provide; including criticality and impacts
- Provide delivery location with a common map reference
- Provide local point of contact at delivery location with primary and secondary means of contact
- Provide the name of the requesting agency and/or OA Coordinator contact person
- Indicate time frame needed and an estimate of duration
- Resource requests involving personnel and/or equipment with operators will need to indicate if logistical support will be provided by requesting agency, (e.g., food, shelter, fuel and reasonable maintenance)

The Resource Request form found in the Logistics Position Guide is used to request resources, the form contains the following information:

- Incident Name and Resource Request Number
- Detailed Description of the Resource
- Requesting Agency Information
- Deployment Information
- Estimated Costs

Once the request is coordinated, approved, and resources deployed, the Logistics Unit, in coordination with the Planning Section, is responsible for tracking the resources through demobilization.

Use of Mutual Aid Resources

Each WEROC Member Agency agrees to abide by the following guidelines:

- WEROC will ensure coordination of resources between the OA, member agencies, and outside agencies.

- Mutual Aid resources will be requested through the WEROC EOC or alternate when more than two agencies are impacted.
- Personnel and equipment such as backhoes, graders, portable generators, pumps, valves, coupling, pipe segments, etc., will be made available to requesting WEROC water utilities when the resources is not anticipated to be needed by the providing WEROC member agency.
- Member agencies are responsible for verifying which mutual aid agreement is being utilized at the time of the response and are responsible for understanding the terms of that agreement. Additional information about several mutual aid agreements can be found in the Mutual Aid Matrix on page 60-61.
- Mutual Aid Resources include but are not limited to personnel and equipment.
- Any agency to agency mutual aid request will be reported to WEROC.

It is of utmost importance that WEROC water utilities follow policies and procedures established by SEMS/NIMS utilizing the WEROC, California WARN, and the OA mutual aid agreements. It is understandable that water utilities may want to directly contact neighbor agencies requesting aid; however this is not recommended as all messages should be forwarded to WEROC as the point of dissemination for all water and wastewater agencies. Doing so reduces the spread of false information, duplication of information/requests, and other problematic issues resulting from cross communication.

The WEROC Resource Communication Protocol (Figure 2) describes the path used to access mutual aid from WEROC and other support agencies.

Reimbursement for Use of Mutual Aid Resources
It is important for agencies utilizing mutual aid agreements to fully understand each agreement of which they are signatory and to know which is being used during each transaction of resources with consideration that not all mutual aid agreements reimburse equally, if at all. Potential reimbursement for Mutual Aid Resources (i.e. equipment, supplies, and labor) used by an agency during a major emergency or disaster will be made when the emergency period has ended, according to the following guidelines:

All equipment, labor, and compensation must be documented in writing using the Public Assistance Forms to expedite the reimbursement process..

- Equipment operating costs, as determined by the providing agency will be reimbursed by the requesting agency. Such operating cost should be pre-established by an agency rate sheet, and must not exceed current rate charges by established rental agencies for comparable equipment.
- Agencies supplying equipment operator (s) will be reimbursed for the full amount of the operator' salary plus benefits.
- Supplies used during a major emergency or disaster will be replaced and/or the costs of replacement paid by the requesting agency. All supply / material costs must be documented in writing to expedite the reimbursement process.
- Equipment will be returned to the providing agency in the same condition as when borrowed. If not, requesting agency will pay to restore said equipment.

- Reimbursement for labor costs (including overtime) will be determined by the agencies involved in accordance with normal reimbursement policy.

All WEROC water utilities should document all repair transactions performed following a disaster. It is recommended that all pertinent information regarding equipment costs, labor, supplies, etc., be documented to validate and expedite any requests for mutual aid reimbursement and for reimbursement of agency personnel costs (during the emergency period) by the State Office of Emergency Services. One of the most common reasons for failure to obtain reimbursement from Federal / State Disaster Assistance Agencies is the lack of adequate documentation.

Documenting a disaster simply means providing evidence or proof of what happened. Photographs of damage provide the most irrefutable evidence. Take pictures of damage to facilities, repair work, and completed restorations. Also, keep careful records of expenditures i.e. equipment, supplies, labor.

Federal and State agencies require a complete audit trail from the decision to purchase goods, to proof of payment, and proof that the work was completed. If an agency cannot provide proof that money was spent, that agency may not be reimbursed for expenditure.
The following steps should ensure that you have adequate documentation:

1. Photograph damage and subsequent repairs
2. Document all damages and repairs
3. Clip and file press reports
4. Record all expenditures
5. Document staff/volunteer response hours on timesheets; all hours including non-response hours.
6. Document all pertinent conversations about specific damages and/or repairs to damaged facilities
7. Save all receipts, invoices, statements, and any other relevant paperwork for services rendered by a contractor or vendor.

Figure 2: WEROC Resource Communication Protocol

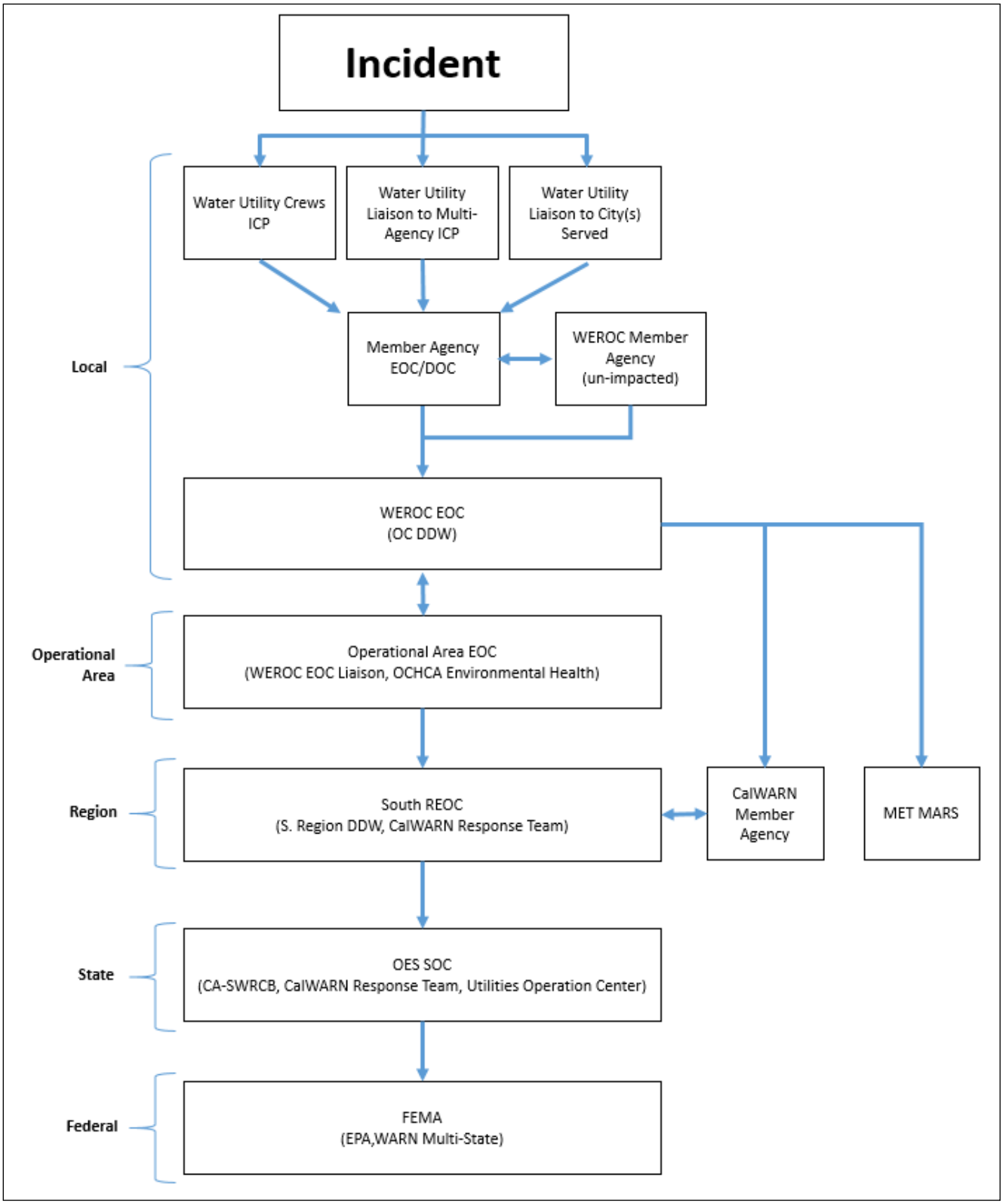


Table 2: Mutual Aid Matrix

Mutual Aid Matrix							
TITLE	**Type**	**MEMBERSHIP**	**ADMINISTRATION**	**AUTHORITY**	**RELEASE OF LIABILITY**	**REIMBURSEMENT OF EXPENSES**	**NOTES**
Master Mutual Aid Agreement	Mutual Aid/ Assistance	State of California; all counties, Cities, and public agencies in California who have signed agreement. Signed by Gov. Earl Warren in 1950.	For planning, State of California Office of Emergency Services (OES); Mutual Aid Regional Advisory Committee (MARAC) at regional level. In emergency, REOC (Regional Emergency Operations Center) has major authority; could go to SOC (State Operations Center).	Agreement has been codified by inclusion in California Emergency Services Act; further codified in Petris Bill (1993). **Once a disaster has been declared, participation is mandatory, subject to not overly depleting specific agency resources.**	Not expressly identified, but covered by the state's Disaster Service Worker Policy	No, unless otherwise expressly provided by agencies. Cost may be recoverable from State or Federal Govt. if disaster funds are approved. Reimbursement of response related costs requires SEMS compliance.	Follows SEMS Resource Request Structure
California Water Agency Response Network – Cal WARN	Mutual Assistance	California water and wastewater agencies that have signed agreement.	State Steering Committee State Chair, and associated organizations.	Signed Agreement : During a localized incident, agencies respond and coordinate directly. During larger incidents, agencies are asked to coordinate through the regional chairs.	YES	YES	Any participating agency can request assistance directly from any other participating water agency. Agreement provides for arbitration of disputes.
Member Agency Response System - MARS	Mutual Aid	Member Agencies of MET who have signed agreement.	Metropolitan Water District	Signed Agreement, declared disaster information.	YES	Not specifically provided in agreement, but assumed	Offers communications on a dedicated radio system.
WEROC	Mutual Assistance / Coordinating Entity	Member Agencies of WEROC who have signed agreement.	MWDOC	Signed Agreement: During a localized incident, agencies respond and coordinate directly. During larger incidents, agencies are asked to coordinate through the regional chairs	YES	Not specifically provided in Agreement.	Offers communications on a dedicated radio system.

Mutual Aid Matrix							
TITLE	**Type**	**MEMBERSHIP**	**ADMINISTRATION**	**AUTHORITY**	**RELEASE OF LIABILITY**	**REIMBURSEMENT OF EXPENSES**	**NOTES**
Orange County Operational Area (Orange County Emergency Management Organization).	Coordinating Entity	All political subdivisions within the geographic boundaries of the County who have signed the agreement.	Orange Co. Operational Area Executive Board, Council, and Sub-Committees.	Signed Agreement: During declared disaster of local area, each agency retains authority.	YES	NA	Organizes all public emergency response agencies in providing a coordinated response to disasters. Comm. link to State.
Public Works Mutual Aid Agreement (PWMAA)	Mutual Aid Agreement	All who have signed agreement	LADPW	During a localized incident, agencies respond and coordinate directly. During larger incidents, agencies are asked to coordinate through the SEMS structure at the REOC.	Requesting party indemnifies the assisting party.	Requesting party pays all direct, indirect, administrative and contracted costs the assisting party incurred as a result of providing assistance within 60 days of receiving a detailed invoice.	
California Utilities Emergency Association (CUEA) Utility Operations Center - UOC	Coordinating Entity	Power, Telephone, Gas, Water, Wastewater, Pipelines (Petroleum) utilities that have applied for membership and paid dues.	Administered by board of public & private agencies. CUEA establishes institutional arrangements & facilitates mutual aid agreements, staffs the utilities desk at the State Operations Ctr.	unknown	NO	NO	CUEA staffs the UOC in time of disaster. CUEA or UOC matches up agencies offering and requesting mutual aid.

EOC DEACTIVATION

EOC deactivation can occur for several reasons, including but not limited to the incident no longer requiring coordination, or the possible movement of operations from one EOC to the other. Deactivation can occur in phases to match the pace of an incident, so that as less coordination is required, the EOC staffing matches that demand. Special considerations should be determined for staff assigned to alternate locations such as the OA EOC, OA JIC, or field ICP. Due to the nuances of deactivation, it is important that the Planning Unit create a Deactivation Plan that encompasses all these considerations well in advance.

Recommendation: Deactivate in phases. It is more efficient and cost effective to deactivate personnel as they are no longer needed

Once the decision to deactivate is made, the EOC Director and Planning Unit should brief all EOC staff of the Deactivation Plan. The briefing should include, but is not limited to:

- Concluding information regarding the event
- What remains to be done
- What resources are required to meet EOC objectives
- Phased deactivation
- How long it will take to meet the objectives
- Duties and assignments that may continue following deactivation
- The restoration and return of resources
- Order in which staff will be released and proper checkout procedures
    - Volunteer staff should be released first
- Documentation required prior to closing the EOC

Some staff may be designated to respond to and relieve staff at another location such as a member agency's EOC, WEROC EOC's, or the OA EOC. The EOC staff should be briefed on their re-assignment and the location they are to report to.

The EOC Manager will assist the EOC Director and Section Chiefs in the deactivation process by utilizing the deactivation plan. Each staff member should refer to the Deactivation section within their function checklists as a guideline, as well as any specific actions that the EOC Director has assigned. The WEROC Manager is responsible for securing the facility once staff has departed and ensuring its readiness for a future activation.

RECOVERY

Recovery is the phase that involves restoring systems to normal. Short-term recovery actions are taken to assess damage and return vital life-support systems to minimum operating standards; long-term recovery actions may continue for many years. Recovery objectives are established during the EOC Action Planning process.

Recovery Organization

The recovery period has major objectives which may overlap with response objectives, including:

- Re-establishment of essential public services.
- Permanent restoration of public and private property.
- Identification of residual hazards.
- Plans to mitigate future hazards.
- Recovery of costs associated with response and recovery efforts.

Damage Assessments

Initial damage assessments will be gathered by the utilities and reported to WEROC. Damage assessment is the process of identifying and quantifying damages that occur as a result of an incident. The objective of the damage assessment is to provide situational awareness to the EOC about the state of critical and essential functions to help facilitate the move from response into recovery. It also facilitates the decision to appropriately direct resources and teams. As a component of the damage assessment, agencies also determine IDE which are used as the initial basis to justify or determine state or federal assistance.

Damage assessment is conducted in two phases outlined below:

- **Initial Damage Assessment (IDA) –** This assessment begins during the response phase and helps to determine life safety issues, identify hardest hit areas, and to estimate the damaged infrastructure within the jurisdiction. The initial damage assessment determines whether more detailed damage assessments are necessary and identifies certain areas where continued efforts should be concentrated. This includes an IDE, an estimated cost for emergency response actions, temporary measures and permanent repairs. These are educated estimates that are needed as soon as possible during the response, and are updated as information becomes available.
- **Preliminary Damage Assessment (PDA) –** This assessment is done to verify the initial damage assessment during the recovery phase (especially for state/federal assistance). A FEMA/State team will usually visit local jurisdictions and view their damage first-hand to assess the scope of damage and estimate repair costs. The assessment also identifies any unmet needs that may require immediate attention.

Unsafe structures will be evacuated immediately, hazardous conditions secured, and occupied buildings will be posted as Unsafe, Restricted Use or Inspected, as indicated. This should be verified by building inspectors or Safety Assessment Program teams.

Recovery Documentation Process

When an agency declares an emergency, the documentation process must be initiated using the following forms to track all associated cost (the forms are also available on the WEROC Google Drive):

- Mutual Aid For Hire or Mutual Assistance Cost Reimbursement Agreement
- EMMA Expense Reconciliation Log
- Member Agency Building Inspector Mutual Aid Daily Expense Report Envelope
- Mutual Aid Request Checklist
- EMMA Documentation Requirements Letter
- Mutual Aid Log For Expense Tracking

Incident Sites

If an agency incurs damage in various locations, each location must be documented as a separate event/project.

AFTER ACTION REPORT

After-Action Reports
Following deactivation, the completion of an After Action Report and a Corrective Action Plan is not only considered a best practice, but is also a component of SEMS and NIMS. Responsibility for the preparation of the report and plan is usually delegated to the WEROC Emergency Services Manager in coordination with other jurisdictions, agencies or department personnel. This process should always include the input of the EOC staff and should take into consideration any feedback provided by member agencies or any outside coordinating partners.

WEROC will use an After Action Report and Corrective Action Plan that will be used after each exercise and actual event. In general, the After Action Report includes the following concepts:

- Executive summary
- Description of the incident
- Discussion of response including a summary chronology of significant events
- Agencies involved in the response
- Mutual aid requested and provided
- Recovery activities to date
- Lessons learned
- Corrective actions
- Conclusions and recommendations for improvement

The Corrective Action Plan takes the lessons learned and recommendations for improvements and assigns each concept a timeframe for making that improvement and a person that will be responsible to ensure that it is accomplished.

The After Action Report and Corrective Action Plan will be made available to WEROC member agencies, OC OA, CalOES, DDW, RWQCB and FEMA. As a general rule, the report and plan will be considered a public document, unless otherwise required for security purposes. Any restrictions on the report and plan will be determined by the WEROC Emergency Manager and the EOC Director.

The CAL OES After-Action Report can be found in **Attachment K.**

Recovery Disaster Assistance

- *Stafford Act – Public Assistance* – Provides aid in the wake of a major disaster to State and local Government to help communities recover.

- *Hazard Mitigation Grant Program Section 404* – Funding can be used to fund structural and non-structural projects, and a facility does not need to be damaged to use these funds.

- *Hazard Mitigation Grant Program Section 406* – Funding is used to restore the parts of a facility that were damaged during a disaster, and the restoration must provide protection from subsequent events.

- *California Disaster Assistance Act (CDAA)* – CDAA authorizes the Director of OES to administer a disaster assistance program that provides financial assistance from the state for costs incurred by local governments as a result of a disaster event.

- *Small Business Disaster Reform Act* – Assistance for private businesses to obtain the best available collateral for a disaster loan of up to $200,000 relating to damage to or destruction of the property of, or economic injury to, a small business.

- *Catastrophic Event Memorandum Account* – The purpose of this account is to allow utilities to recover the incremental costs incurred to repair, restore or replace facilities damaged during a disaster declared by the appropriate federal or state authorities.

TRAINING AND EXERCISES

The WEROC Emergency Manager and Coordinator are responsible for coordination and scheduling of training and exercising of this plan. WEROC will conduct regular exercises of this plan to train all necessary EOC and member agency staff in the proper response to disaster situations.

An exercise is a simulation of a series of emergencies for identified hazards affecting a jurisdiction. During these exercises, emergency response organizations are to respond as though a real emergency had occurred. The public will be made aware of these exercises through normal media communications to eliminate confusion of a real event. WEROC will follow the recommended training cycle of trainings, tabletop exercises, and functional exercises with the goal of completing this cycle on an annual basis. Training and exercises are considered mandatory trainings for all MWDOC staff assigned to the WERO EOC.

The plan will be evaluated through actual use, trainings, and exercises. The results of the evaluations will be gathered and reviewed by the Emergency Manager and Coordinator. The Coordinator is responsible for making revisions to the Emergency Operations Plan that will enhance the conduct of response and recovery operations. The Emergency Coordinator will prepare, coordinate, publish and distribute any necessary changes to the plan to all EOC staff, member agencies and other agencies as shown on the Distribution List in **Attachment D.** The Emergency Coordinator will also review documents that provide the legal basis for emergency planning to ensure conformance to SEMS/NIMS requirements and modify as necessary.

The appropriate SEMS/NIMS/ICS training, e.g. IS-100 Basic Incident Command System and IS-700 National Incident Management System, or the equivalent, will be provided to all EOC staff appropriate with individual responsibilities. Exercises will be conducted utilizing the concepts and principles of the SEMS/NIMS.

WEROC maintains a matrix of EOC Staff Required Trainings. The matrix indicates which trainings each WEROC EOC function is required to complete.

ATTACHMENTS

Attachment A: **VEPO Indemnification Agreement**

Attachment B: **WEROC Member Agency Mutual Aid Membership**

Attachment C: **Authorities and References**

Attachment D: **Distribution List**

Attachment E: **Record of Revisions**

Attachment F: **WEROC Key Contacts List**

Attachment G: **WEROC EOC Phone Book Table of Contents**

Attachment H: **WEROC EOC Forms Table of Contents**

Attachment I: **EOC Maps**

Attachment J: **Glossary**

Attachment K: **After Action Report Questionnaire**

Attachment L: **Water and Wastewater Regulatory Agencies**

Attachment M: **Hazard Specific Equipment (Also available in Position Guides)**

Attachment N: **GETS Card Subscriptions**

Attachment O **WEROC Plans and Member Agency Templates**

ATTACHMENT A: VEPO INDEMNIFICATION AGREEMENT

ORANGE COUNTY

VOLUNTEER EMERGENCY PREPAREDNESS

ORGANIZATION

INDEMNIFICATION AGREEMENT

This indemnification agreement is entered into on the ___ day of _____, 2005, by and between Municipal Water District of Orange County (MWDOC), Coastal Municipal Water District (Coastal), Orange County Water District (OCWD), and the undersigned participants in the Orange County Volunteer Emergency Preparedness Organization (VEPO), (All parties are collectively referred to as "VEPO Participants".), pursuant to California Government Code §895.4.

WHEREAS, VEPO was formed in 1983 by the Orange County water community for the purposes of coordinating an emergency response by all Orange County water agencies in the event of an earthquake, flood, fire, or other regional disaster; and

WHEREAS, to accomplish this purpose each of the VEPO Participants has or will contribute the use of certain of its facilities and equipment and the services of certain of its personnel, both in preparation for an emergency and in response to any emergency situation pursuant to an Emergency Response Plan prepared by VEPO; and

WHEREAS, the VEPO Participants desire to indemnify and hold each other harmless from any liability for injury or property damage incurred by any VEPO Participant or its employees, officers or agents or to third parties in the course of or as a result of their participation in VEPO activities;

NOW, THEREFORE, in consideration of the mutual promises and covenants herein, the VEPO Participants agree as follows:

1. VOLUNTARY PARTICIPATION

Neither this Agreement, nor the VEPO Emergency Response Plan creates, or shall be deemed to create, any contractual or implied duty on the part of any signatory to provide, or attempt to provide, any real property, structures, facilities, tools, vehicles, equipment, machinery, materials, personal property or personnel to any other VEPO Participant or third party. No signatory shall be liable for its failure to provide, or attempt to provide, assistance to any other party. It is the intent of the parties that assistance under the VEPO Emergency Response Plan be provided on a strictly voluntary basis, and that no joint venture be created.

2. LIABILITY FOR JOINING

Notwithstanding Government Code S895.2. it is the intent of the signatories to this Agreement that there shall be no liability assumed by, or imposed upon, any signatory solely by reason of such signatory executing the VEPO Emergency Response Plan or this Agreement."

In the event of any liability, claim, demand, action or proceeding of whatever kind or nature arising out of the rendering of assistance through VEPO, the parties involved in rendering or receiving assistance through VEPO agree to indemnify and hold harmless, to the fullest extent allowed by law, each signatory to the VEPO Emergency Response Plan whose only involvement, in the transaction or occurrence which is the subject of such claim, action, demand or other proceeding, is the execution and approval of the VEPO Emergency Response Plan and this Agreement. Such indemnification shall include indemnity for all claims, demands, liability,

damages and costs, including reasonable attorneys' fees and other costs of defense, for personal injury and property damage and is not waived as a result of the uninvolved party's negligent or willful failure to respond in accordance with the VEPO Emergency Response Plan.

3. COVENANT NOT TO SUE OTHER PARTICIPANTS

Each VEPO Participant agrees to assume the entire risk of loss and to indemnify and hold each of the remaining VEPO Participants harmless from any and all claims, liability, or damages for personal injury or property damage incurred by that VEPO Participant or its agents, employees or officers as a result of any defect or dangerous condition of any real property, structures, facilities, tools, vehicles, equipment, machinery, materials, personal property or other items supplied or contributed for the use of VEPO by itself or any other VEPO Participant. The right to indemnification shall not be barred by the passive negligence of the VEPO Participant which supplies or contributes the real or personal property for use by VEPO, including, but not limited to, the failure to warn of or take action to correct any defect or dangerous condition if the defect or dangerous condition was not the result of active negligence on the part of that VEPO Participant or its agents, employees or officers.

4. COVENANT TO INDEMNIFY OTHER PARTICIPANTS AGAINST CLAIMS BY THIRD PARTIES

Each VEPO Participant agrees to assume the entire risk. of loss and to indemnify and hold each of the remaining VEPO Participants harmless from any and all claims, demands, liabilities, costs and damages (including reasonable attorneys' fees and costs of defense) for personal injury or property damage incurred by any third person, or entity, not a party to this Agreement as a result of any defect or dangerous condition of any real property, structures, facilities, tools, vehicles,

equipment, machinery, materials, personal property or other items, supplied or contributed for the use of VEPO by that VEPO Participant.

5. COVENANT TO INDEMNIFY OTHER PARTICIPANTS FOR ACTS OF OFFICERS AND EMPLOYEES

Except as provided in Paragraph 6 hereof, while carrying out their functions and activities under the Emergency Response Plan, each agent, employee and officer of a VEPO Participant shall continue to act within the scope and duties of his employment or relationship with that VEPO Participant and shall not be deemed to be, or act in the capacity of, an agent, employee or officer of VEPO or of any of the remaining VEPO Participants. Except as provided in Paragraph 6 hereof, each VEPO Participant agrees to assume the entire risk of loss and to indemnify and hold the remaining VEPO Participants harmless from any and all claims, liabilities or damages for personal injury incurred by any VEPO Participant, its officers, employees or agents or any third person, not a party to this Agreement as a result of the active negligence or intentional, willful or malicious acts of that VEPO Participant's officers, employees, or agents while engaged in carrying out their duties, functions or activities pursuant to the VEPO Emergency Response Plan.

6. EMPLOYEE CLAIMS.

Any employee, officer or agent of a VEPO Participant who is acting under the direction, supervision or control of an employee, officer or agent of another VEPO Participant pursuant to the VEPO Emergency Response Plan shall, except as otherwise provided under Labor Code §§3600.2 through 3600.6, be considered to be the special employee of the VEPO Participant which is directing, supervising or controlling the activity and the general employee of his or her regular employer while engaged in carrying out duties, functions or activities pursuant to the

VEPO Emergency Response Plan. The special employer, if any, and general employer, shall indemnify and hold all other VEPO Participants harmless from any and all claims, liabilities or damages for personal injury incurred by such officers, employees or agents while engaged in carrying out their duties, functions or activities pursuant to the VEPO Emergency Response Plan, notwithstanding any passive negligence of other VEPO Participants.

It is the intent of the parties that personnel made available through VEPO be insured against loss or injury through the Workers Compensation insurance of those who controlled and directed their work through VEPO.

7. COVENANT TO MAINTAIN INSURANCE OR SELF-INSURE

Each VEPO Participant agrees to obtain and maintain insurance policies naming the remaining VEPO Participants as additional insureds or participate in a self-insurance pool, or maintain a reasonably adequate self-insurance fund as appropriate for general liability, workers' compensation, automobile and property owners' liability which will cover all activities, personnel, vehicles, equipment, real property, tools, machinery and personal property of that VEPO Participant while engaged in the VEPO Program. The ability to respond in damages shall be in the following minimum amounts:

a. General Liability (including bodily injury): $1,000,000 per occurrence.

b. Workers' Compensation: $200,000 per occurrence

c. Automobile Coverage: Compliance with Vehicle Code Section 16430 for vehicles owned or leased by the VEPO Participant.

d. Property Owner’s Liability, if applicable: $1,000.000 per occurrence

8. ARBITRATION

The parties to this Agreement acknowledge that in the event of a claim for personal injury or property damage arising out of a VEPO activity, it would probably be in the best interests of the VEPO Participants and their insurers to submit the issue, of which VEPO Participant or Participants has the ultimate duty to indemnify the others, to binding arbitration and that the party or parties determined to be ultimately responsible conduct the defense of the claim on behalf of the other VEPO Participant defendants in the event of a lawsuit.

It is the intent of the parties to encourage the use of binding arbitration to effectuate the terms of this Agreement whenever possible. Therefore, each VEPO Participant agrees that, as soon as possible after receiving notice of any claim arising out of a VEPO activity, that VEPO Participant will notify all VEPO Participants in writing of the existence of the claim or potential claim.

Upon receipt of notice of a claim or potential claim arising out of a VEPO activity from a claimant or another VEPO Participant, each VEPO Participant, which is not self-insured, will notify its insurance carrier of the existence of the claim and of the terms of this Agreement. If the insurance carriers of VEPO Participants and self-insured VEPO Participants agree to submit the issue of the obligation to indemnify under this Agreement to binding arbitration, the parties hereto agree not to object to arbitration.

Nothing herein shall be construed as a consent or undertaking on the part of any insured VEPO Participant to pay all or any portion of the costs of arbitration or other costs which it would not otherwise be obligated to pay under its insurance policy in the absence of this Agreement.

9. EXECUTION IN COUNTERPARTS

This Agreement shall be executed by each VEPO Participant in duplicate originals, each of which shall be considered an original Agreement. This Agreement shall not become effective as to any VEPO Participant until all VEPO Participants have executed this Agreement and have delivered an executed original to the VEPO Coordinator who will provide each VEPO Participant with a photocopy of all executed signature pages and a list of all Participants. Prior to the admission of any additional agencies to the VEPO Program, such agency shall be required to execute this Agreement and comply with this provision.

10. SUCCESSORS AND ASSIGNS

This Agreement shall be binding upon and inure to the benefit of the original Participants and all parties who may subsequently enter into this Agreement, and their officers, agents, employees, successors and assigns. The names of the VEPO Participants, all of which are signatories to this Agreement, are and shall be set forth on the list attached hereto as Exhibit "A" and incorporated herein by reference. Additional Participants may be added to the list from time to time upon execution of this Agreement and compliance with Paragraph 5 hereof. Such additions shall automatically constitute an amendment of this Agreement without further action by existing Participants and shall not void or invalidate this' Agreement.

11. MARS PROGRAM

It is the understanding and intention of the VEPO Participants that the VEPO program will be coordinated with the MARS program established by Metropolitan Water District of Southern

California and that the terms and conditions hereof shall apply with equal force and effect to activities performed under the MARS program.

12. CAPTIONS

The Captions heading the various paragraphs of this Agreement are for convenience only and shall not be considered to limit, expand, or define the contents of the respective paragraphs.

IN WITNESS WHEREOF, each of the VEPO Participants has caused this instrument to be executed by its authorized agent or official evidencing the consent of the legislative body hereto.

DATED: _____ MUNICIPAL WATER DISTRICT OF ORANGE COUNTY (MWDOC)
ATTEST: _____ By

DATED:

ATTEST: _____ By

EXHIBIT "A"

VEPO PARTICIPANTS

This list constitutes a complete list of VEPO Participants (We will obviously need to adjust this list as well, as I would need to remove or change the titles of some agencies.)

- City of Anaheim
- City of Brea
- City of Buena Park
- City of Fountain Valley
- City of Fullerton
- City of Garden Grove
- City of Huntington Beach
- City of La Habra
- City of La Palma
- City of Newport Beach
- City of Orange
- City of San Clemente
- City of San Juan Capistrano
- City of Santa Ana
- City of Seal Beach
- City of Tustin
- City of Westminster
- East Orange County Water District
- El Toro Water District
- Golden State Water Company
- Irvine Ranch Water District
- Laguna Beach County Water District
- Mesa Water District
- Moulton Niguel Water District
- Municipal Water District of Orange County
- Orange County Sanitation District
- Orange County Water District
- Santa Margarita Water District
- Serrano Water District
- South Coast Water District
- South Orange County Wastewater Authority
- Trabuco Water District
- Yorba Linda Water District

ATTACHMENT B: MEMBER AGENCY MUTUAL AID MEMBERSHIP

Agency	WEROC	CalWARN	CA Public Works	MARS/MET	OC OA/ OCEMO	CA Master Mutual Aid	CUEA *
Anaheim	X	X	X	X	X	X	X
Brea	X		X		X	X	
Buena Park	X		X		X	X	
EOCWD	X				X	X	
ETWD	X				X	X	
Emerald Bay					X	X	
FV	X		X		X	X	
Fullerton	X		X	X	X	X	
GG	X		X		X	X	
GSWC	X	X					X
HB	X		X		X	X	
IRWD	X				X	X	
Laguna Beach	X		X		X	X	
La Habra	X				X	X	
La Palma	X		X		X	X	
LBCWD	X	X			X	X	
Mesa CWD	X	X			X	X	
MNWD	X				X	X	
MWDOC	X	X		X	X	X	X
Newport	X		X		X	X	
Orange	X		X		X	X	
OCSD	X				X	X	
OCWD	X	X			X	X	
San Clemente			X		X	X	
San Juan Ca.	X	X	X		X	X	
Santa Ana	X		X	X	X	X	
SMWD	X				X	X	
Seal Beach	X		X		X	X	
Serrano WD	X				X	X	
SCWD	X	X			X	X	X
SOCWA	X					X	
Trabuco CWD	X				X	X	
Tustin			X		X	X	
Westminster	X	X	X		X	X	
YLWD	X	X			X	X	

ATTACHMENT C: AUTHORITIES AND REFERENCES

The following authorities and references establish:

- The legal basis (statutes, ordinances, executive orders, regulations, proclamations) for emergency operations.
- The basis for delegation of emergency authority, i.e., enabling measures sufficient to ensure that specific emergency-related legal authorities can be exercised by water agency management or their designated successors.

The California Emergency Plan, promulgated in accordance with provisions of the Act, provides statewide authorities and responsibilities and describes the functions and operations of government at all levels during extraordinary emergencies, including war. Section 8568 of the Act states in part that "the State Emergency Plan shall be in effect in each political subdivision of the state, and the governing body of each political subdivision shall take such action as may be necessary to carry out the provisions thereof."

The WEROC Emergency Plan is, therefore, considered to be an extension of the State Emergency Plan.

AUTHORITIES

The following provide emergency authorities for conducting and/or supporting emergency operations. When dictated by the situation, additional ordinances or other emergency regulations will be enacted by the WEROC Executive Board on behalf of its water utilities.

Federal

- Homeland Security Act of 2002.
- Homeland Security Presidential Directive/HSPD 5, Management of Domestic Incidents.
- Homeland Security Presidential Directive/HSPD 8, National Preparedness.
- U.S. Department of Homeland Security (USDHS) National Incident Management System (NIMS).
- U.S. Department of Homeland Security (USDHS) National Response Plan (NRP).
- Presidential Directives 39 and 62 which direct primary terrorism investigative authority to U.S. Department of Justice/FBI.

State

- California Emergency Services Act (Chapter 7 of Division 1 of Title 2 of the Government Code)
- Government Code 8607(a), and California Code of Regulations, Title 19, Division 2, Chapter 5, NDAA, Section 2900(y) Special Districts, and Sections 2400-2450 (Standardized Emergency Management System - SEMS)
- Water Code, Division 1, Chapter 2, Article I, Section 128 (California Department of Water Resources - Flood Fighting)

REFERENCES

State

- California State Emergency Plan
- California Master Mutual Aid Agreement
- Government Code, Title I, Division 4, Chapter 8, Sections 3100-3109:

    1) Declares all public employees to be disaster service workers
    2) Defines disaster service worker
    3) Defines public employees (excludes aliens)
    4) Describes Loyalty Oath requirements

Local

- County of Orange Resolution, November 28, 1950, adopting the California Master Mutual Aid Agreement
- Orange County Volunteer Emergency Management Organization (VEPO) Indemnification Agreement, December 19, 1994 by and between Municipal Water District of Orange County (MWDOC)
- Operational Area Agreement of the County of Orange and Political Subdivisions (to include Special Districts) October 3, 1995
- A Resolution of the Orange County Volunteer Emergency Preparedness Organization (VEPO) adopting the revised (1997) WEROC Emergency Plan
- Orange County Emergency Operations Plan (2014).

ATTACHMENT D: EOP DISTRIBUTION LIST

WEROC EOC RESPONDERS		
DATE	ISSUED TO	WEROC Function Title
		EOC Director
		EOC Manager
		Legal Advisor
		PIO
		Social Media
		WEROC OA EOC Liaison
		Planning & Intelligence Section Chief
		Finance & Administration Section Chief
		Logistics Section Chief
		Planning Unit Leader
		Runner/Plotter Unit (3)
		Situation Status Analyst
		Events Analyst
		OA/County Analyst
		Major Infrastructure Analyst
		Division of Drinking Water
		Intelligence Unit Leader
		WEROC Radio Operator
		MARS Radio Operator
		OA Radio Operator
		Resource Unit

WEROC MEMBER AGENCIES		
DATE	ISSUED TO	MEMBER AGENCY
		City of Anaheim
		City of Brea
		City of Buena Park
		City of Fountain Valley
		City of Fullerton
		City of Garden Grove
		City of Huntington Beach
		City of Laguna Beach
		City of La Habra
		City of La Palma
		City of Newport Beach
		City of Orange
		City of San Clemente
		City of San Juan Capistrano
		City of Santa Ana
		City of Seal Beach
		City of Tustin
		City of Westminster
		East Orange County Water District
		El Toro Water District
		Golden State Water Company
		Irvine Ranch Water District
		Laguna Beach County Water District
		Mesa Water District
		Moulton Niguel Water District
		Municipal Water District of Orange County
		Orange County Sanitation District
		Orange County Water District
		Santa Margarita Water District
		Serrano Water District
		South Coast Water District
		South Orange County Wastewater Authority
		Trabuco Water District
		Yorba Linda Water District

OTHER AGENCY RECIPIENTS			
DATE	ISSUED TO	AGENCY	Agency Position
		OES	Southern Region OES
		OC OA	OA/EOC Manager
		MET	Operations System Manager
		MET	Emergency Coordinator
		Health Care Agency	Emergency Coordinator

ATTACHMENT E: RECORD OF REVISIONS

DATE	SECTION REVISED	REVISED BY
7/08	Complete Reorganization of Plan.	Kelly Hubbard
9/11	Updated various sections of the Plan	Kelly Hubbard
3/18	Complete Reorganization of Plan	Francisco Soto

ATTACHMENT F: WEROC KEY CONTACTS LIST

Kelly Hubbard	Office: (714) 593-5010	Cell: (714) 715-0283
Francisco Soto	Office: (714) 593-5032	Cell: (323) 868-5970
Karl Seckel	Office: (714) 593-5024	Cell: (714) 423-3361
Rob Hunter	Office: (714) 593-5026	Cell: (404) 557-5107

WEROC EOC's

South EOC	Office: (949) 455-4493	Fax: (714) 455-4492
SEOC Facility Contact (ETWD)	Office: (949) 837-7050	Alt: (949) 837-0660
North EOC	Office: (714) 288-8200	Fax: (714) 288-8206
NEOC Facility Contact (MET)	Richard Ford - Cell: (714) 577-5080	
Alt. EOC (MWDOC)	Office: (714) 593-5010	Fax: (714) 964-9389
MWDOC Facility Contact	24hrs OCWD Contact - Cell: (714) 653-2417	

ORANGE COUNTY OPERATIONAL AREA

Main Line (Admin Desk)	(714) 628-7054	
Staff Directory	(714) 628-7055	
24 Hrs. Emergency Line	(714) 628-7008	
EOC-During Activation	(714) 628-7060	
EOC Liaison	(714) 628-7153	EOCLiaison@ocsd.org
Fax (Special Districts)	(714) 628-7154	
Public Works Branch	(714) 628-7128	EOCPublicWorksOps@ocsd.org
WEROC EOC Liaison	(714) 628-7187	

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Diemer Plant	Office: (714) 528-7237	Alt: (714) 528-7261
MET EOC Eagle Rock (24hrs)		Office: (800) 555-5911
MET Control Center		Office: (323) 681-4010
Water Quality Hotline		Office: (800) 354-4420

STATE OFFICE OF EMERGENCY SERVICES REGION I

Los Alamitos	Office: (562) 795-2900	Fax: (562) 795-2963

ATTACHMENT G: WEROC EOC PHONE BOOK TABLE OF CONTENTS

Additional Contact Lists

There are additional contact lists available in the WEROC EOCs. These lists were not included in the plan due to their high rate of change or confidentially of information. The following lists are available in the WEROC EOC Phone Book:

- WEROC Staff Lists
- Member Agency Contact Information
- WEROC Radio System Participant List
- OES & FEMA Contacts
- MARS Emergency Response Coordinator Information
- OCEMO Phonebook
- California Water/Wastewater Agency Response Network (CalWARN) Contact List
- California Utilities Emergency Association (CUEA) Contact List
- Water Quality Emergency Contacts And Testing Labs
- California Licensed Water Hauler List
- Media Contact List

There are three copies in each WEROC EOC, one copy in the WEROC Coordinators Office, and one copy each with the WEROC Alternate Responder and the MWDOC Assistant General Manage

ATTACHMENT H: WEROC EOC FORMS TABLE OF CONTENTS

Forms and documents related to WEROC EOC emergency response are available to staff in the WEROC EOCs. These documents were not included in the plan because many of the forms are currently under revision and also to make the forms easily accessible. The following forms are available in the WEROC EOC Forms Binder:

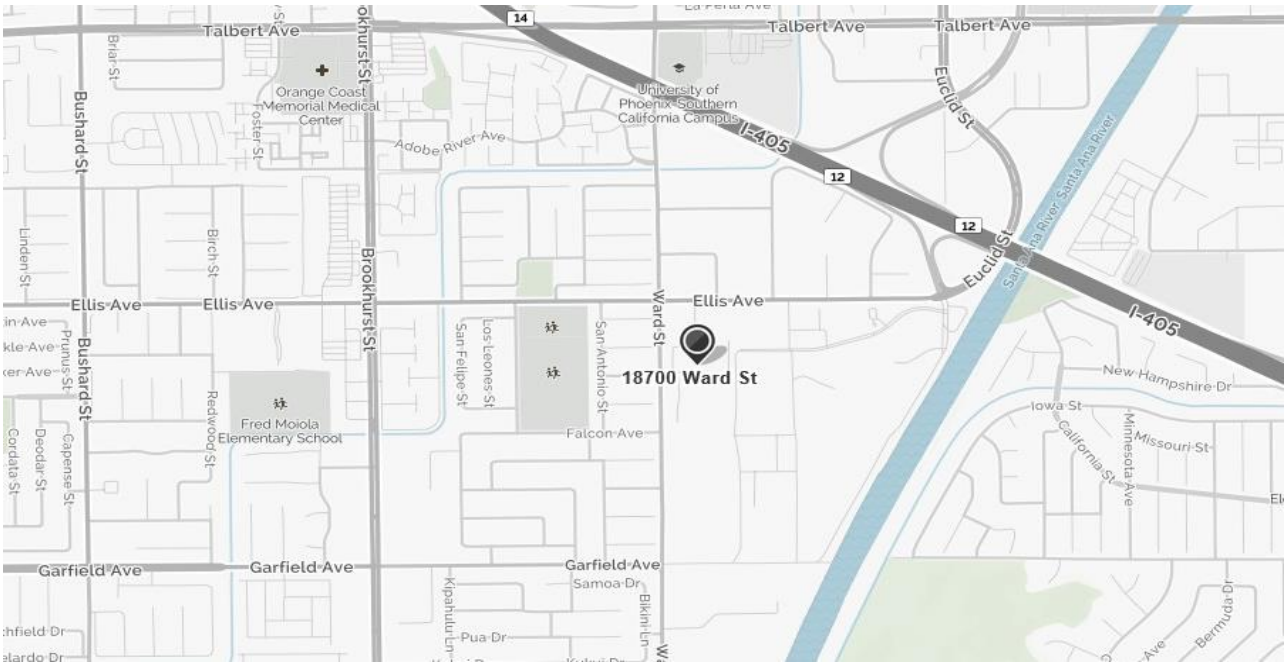
- WEROC- EOC Section/Unit Activity Log
- WEROC- EOC Staff Registration Form
- WEROC- EOC Damage Assessment Form #1
- WEROC- EOC Damage Assessment Form #2
- O.A. Request for Jurisdiction Initial Incident Impact Report
- O.A. Jurisdictional Status Report to the O.A.
- Sample- Agency Damage Assessment Report Form
- Sample-Facilities Damage Checklist Form
- Sample-Agency Radio Message Form
- Water Quality Advisory Forms
- Water Quality Notices
- OES After Action/Corrective Action Report Template
- Incident Action Plan Template
- Change of Shift Briefing Form
- Mutual Aid For Hire or Mutual Assistance Cost Reimbursement Agreement
- EMMA Expense Reconciliation Log
- Member Agency Building Inspector Mutual Aid Daily Expense Report Envelope
- Mutual Aid Request Checklist
- EMMA Documentation Requirements Letter
- Mutual Aid Log For Expense Tracking

There is one copy in each WEROC EOC near the Finance and Administration function desks and one copy in the WEROC Coordinators Office

ATTACHMENT I: EOC MAPS

WEROC South EOC
Address: 26081 Via Pera. Mission Viejo, CA 92691 Phone: (714) 455-4493
(At El Toro Water District's Prothero Filtration Plant, behind condos)

WEROC Alternate EOC
Address: 18700 Ward St. Fountain Valley, CA 92728 Phone: (714) 593-5032
(At WEROC Office inside MWDOC. Report to South EOC unless instructed otherwise))



ATTACHMENT J: GLOSSARY

The glossary contains definitions of terms commonly used in the Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). Becoming familiar with these terms will assist WEROC EOC Staff and individual member agency personnel in performing their specific function throughout the disaster operational period.

A

Action Plan
The plan prepared in the EOC containing the emergency response objectives of a SEMS level i.e. State, County, Local (City or Special District), and reflecting overall priorities and supporting activities for a designated period. The Plan is prepared by the Planning / Intelligence Chief with support from Management & Section Chiefs. Once completed, the Plan is executed by the Operations Chief.

Activation
The necessary action(s) taken by the EOC Director(s) in making an EOC operational i.e. for WEROC, in support of Orange County water agencies responding to a major emergency or disaster, or by one or more agencies in support of their own agency's response.

After Action Report
A report covering EOC activities / response actions, application of SEMS, modifications to plans and procedures, training needs, and recovery operations i.e. For WEROC, this report is prepared by the WEROC Emergency Services Coordinator with assistance from the EOC Management and Section Chiefs.

American Red Cross
A federally chartered volunteer agency that provides disaster relief to individuals and families. Major responsibilities include providing lodging, food, clothing, and registration and inquiry service.

Area Command (AC)
Area Command is an organization established (1) to oversee the management of multiple incidents that are being handled by an Incident Command System (ICS) organization or (2) to oversee the management of large or multiple incidents to which several Incident Management Teams have been assigned. Area Command has the responsibility to set overall strategies and priorities, allocate critical resources according to priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed. Area Command becomes Unified Area Command when incidents are multi-jurisdictional Area Command may be established at an emergency operations center facility or at some location other than an incident command post.

Auto Pack
A resource for WEROC EOC staff to use during emergencies, it contains important contact information, maps to the WEROC EOC's, functional duties and responsibilities, and general EOC activation protocols.

C

California Emergency Council
The official advisory body to the Governor on all matters pertaining to statewide emergency preparedness.

California Emergency Organization
Civil government organized and augmented or reinforced during an emergency by auxiliaries, volunteers, persons pressed into service, the private sector, and community based organizations.

Chain of Command
A series of management positions in order of authority.

Check-in
The process whereby pre-assigned EOC Staff "officially report in" to their EOC location for briefing and to assume a specific function following activation of the EOC.

Checklist
A list of actions taken by an element of the emergency organization in response to a particular event or situation.

Concept of Operations
A general notion of the methods agencies use to organize their response to disasters (such as mutual aid and the Standardized Emergency Management System). Disasters typically progress through identifiable phases and certain responses are appropriate during each of these phases.

Contamination
Deposits of radioactive or other toxic materials that occur on the surfaces of structures, area, objects, people's bodies, flora, and fauna.

Contingency Plan
A sub or supporting plan which deals with one specific type of emergency, its probable effect on the jurisdiction, and the actions necessary to offset these effects.

Coordination
This can be either Multi-agency or Interagency. This process is found at all SEMS levels and is the most efficient and cost effective way to meet specific objectives in support of the disaster response.

D

Damage Survey Report
Under 206.202 of CFR 44, a Damage Survey Report is prepared by an inspection team. The team is accompanied by an authorized local representative who is responsible for representing the applicant and insuring that all eligible work and costs are identified. A Damage Survey Report Data Sheet (FEMA Form 90-91) is prepared for each site with damage over a specified amount established by regulation.

Deactivation
The process of closing down EOC operations. This may be accomplished as one action or a series of actions i.e. section by section within the EOC by authority of the EOC Director. Deactivation will be initiated based upon the status of the disaster operation and water agency support needs.

Disaster
A sudden calamitous emergency event bringing great damage loss or destruction over a wide area affecting the entire population of one or more counties.

Disaster Field Office (DFO)
A central facility established by the Federal Coordinating Officer within or adjacent to an affected area. DFOs are used to coordinate and control State and Federal efforts which support disaster relief and recovery operations.

Disaster Service Worker
Any persons registered with a disaster council or State OES to provide disaster service without pay. Disaster service workers include public employees, registered volunteers, and person pressed into service during an emergency by persons authorized to command such services.

Disaster Support Area
A special facility where disaster relief resources can be received, stockpiled, allocated, and dispatched. A separate portion of the area may be used to receive and provide emergency treatment to casualties and for their transfer to adequate medical care facilities.

Documentation Unit
Functional unit within the Planning/Intelligence Section of the EOC responsible for collecting, recording and safeguarding all documents relevant to the EOC operational period.

E

Emergency
A condition of extreme peril to the safety of persons and/or property caused by such conditions as fire, flood, hazardous material incident, sudden and severe energy shortage, etc. This condition may affect one or more water agencies but would not be considered on the level of a disaster.

Emergency Operations Center (EOC)
A location from which centralized emergency management can be performed. EOC facilities are established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency or disaster.

Emergency Management
The provision of overall operational control or coordination of emergency operations at each level of the California Emergency Organization, whether by the actual direction of field forces or by the coordination of joint efforts of governmental and private agencies.

Emergency Manager
An individual duly appointed by State agencies, counties, cities and counties, and cities of the State of California, in accordance with State authority, adopted ordinance, by resolution as provided for by ordinance, or section §26622 of the Government Code, (based on what I found this would be the only section for 26622)who is responsible for administering State law and local ordinances relating to emergency management. The provisions of this article shall become operative only upon their adoption by a resolution passed by unanimous vote of the board of supervisors thereof at a regular meeting at which all members are present. Such resolution may be repealed by the board of supervisors at any time by a three-fifths vote.

Emergency Operations
Those actions taken during the emergency period to protect life and property, care for the people affected, and temporarily restore essential community services.

Emergency Operations Center
A centralized location from which emergency operations can be directed and coordinated.

Emergency Plan
The Plan that each agency or jurisdiction has developed and maintains for responding to appropriate hazards.

Emergency Response Agency
Any organization responding to an emergency, or providing mutual aid support to such an organization, whether in the field, at the scene of an incident, or to an emergency operations center.

Emergency Response Personnel
Personnel involved with an agency's response to an emergency.

Emergency Services Coordinator
The individual within each jurisdiction that is delegated the day-to-day responsibility for the development and maintenance of all emergency management coordination efforts. During WEROC EOC activation, this individual serves as EOC Manager

EOC Director
The individual responsible for all response activities within the assigned EOC throughout the operational period.

F

Federal Agency (Federal definition)
Any department, independent establishment, Government Corporation, or other agency of the Executive Branch of the Federal Government, including the United States Postal Service, but not the American Red Cross.

Federal Assistance (Federal definition)
Aid to disaster victims or State or local governments by federal agencies under the provisions of the Federal Disaster Relief Act (P.L. 93-288), the Stafford Act (see Stafford Act) and other statutory authorities of federal agencies. The Federal Disaster Relief Act, PL 93-288, was amended by the Stafford Act which was signed into law November 23, 1988.

Federal Disaster Relief Act: see **Stafford Act**.

Federal-State Agreement
A legal document entered into between the State and the federal government following a Presidential Declaration of an Emergency or Major Disaster. Executed by the Governor, acting for the State, and the Federal Emergency Management Agency (FEMA) Regional Director, acting for the Federal Government, the agreement shall contain the necessary terms and conditions consistent with the provisions of applicable laws, executive orders and regulations, as required and set forth by the type and extent of federal assistance to be provided.

Finance /Administration Section
One of the five primary functions found at all SEMS levels which is responsible for all costs and financial considerations associated with an agency's disaster operation.

Function
Describes the activity involved, e.g., "the Operations function" for the five major EOC levels (Management, Operations, Planning/Intelligence, Logistics, and Finance/Administration) used in the Incident Command System (ICS).

H

Hazard
Any source of danger or element of risk to people or property.

Hazardous Material
A substance or combination of substances which, because of quantity, concentration, physical, chemical, radiological, explosive, or infectious characteristics, poses a substantial present or potential danger to humans or the environment. Generally, such materials are classed as explosives and blasting agents, flammable and nonflammable gases, combustible liquids, flammable liquids and solids, oxidizers, poisons, disease-causing agents, radioactive materials, corrosive materials, and other materials including hazardous wastes.

Hazardous Material Incident
Any release of a material (during its manufacture, use, storage, or transportation) which is capable of posing a risk to health, safety, and property. Areas at risk include facilities that produce, process, transport, or store hazardous material, as well as all sites that treat, store, and dispose of hazardous material.

Homeland Security Presidential Directive/ HSPD-5
Establishes a single, comprehensive national incident management system (later to become NIMS).

I

Incident Action Plan (IAP)
An oral or written plan containing general objectives reflecting the overall strategy for managing an incident. It may include the identification of operational resources and assignments. It may also include attachments that provide direction and important information for management of the incident during one or more operational periods. As referenced in the WEROC Emergency Plan, the Incident Action Plan refers to the field level or incident site plan.

Incident Commander (IC)
The individual responsible for the command of all functions at the field response level.

Incident Command Post (ICP)
The location at which the primary command functions are executed. The ICP may be collocated with the incident base i.e. water district admin. headquarters or other incident base or other incident facilities.

Incident Command System (ICS)
The nationally used standardized on-scene emergency management concept specifically designed to respond to single or multiple incidents without being hindered by jurisdictional boundaries.

This system allows for facilities, equipment, personnel, procedures and communications to operate within a common organizational structure which is understood by all participants, in managing the incident.

Incident Objectives
Statements of guidance and direction for planning appropriate actions to be taken in response to the disaster situation(s). They are based on realistic expectations of what can be accomplished when all allocated resources have been effectively deployed. The EOC action plan utilizes incident objectives in formulating strategies and the movement of resources.

J

Joint Information Center (JIC)
A facility established to coordinate all incident-related public information activities. It is the central point of contact for all news media at the scene of the incident. Public information officials from all participating agencies should collocate at the JIC.

Joint Information System (JIS)
Integrates incident information and public affairs into a cohesive organization designed to provide consistent, coordinated, timely information during crisis or incident operations. The mission of the JIS is to provide a structure and system for developing and delivering coordinated interagency messages; developing, recommending, and executing public information plans and strategies on behalf of the incident commander (IC); advising the IC concerning public affairs issues that could affect a response effort; and controlling rumors and inaccurate information that could undermine public confidence in the emergency response effort.

Jurisdiction
The range or sphere of authority. Public agencies have jurisdiction at an incident related to their legal responsibilities and authority for incident mitigation. Jurisdictional authority at an incident can be political / geographical (e.g., special district, city, county, state or federal boundary lines), or functional (e.g., police department, health department, etc.)

Jurisdictional Agency
The agency having jurisdiction and responsibility for a specific geographical area, or a mandated function.

L

Liaison
A member of the EOC Management Staff responsible for coordinating with representatives from cooperating and assisting agencies i.e. designated WEROC EOC Staff serve as liaison at the County Operational Area (O.A.) EOC.

Local Emergency (State definition)
The duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the territorial limits of a county, city and county, or city, caused by such conditions as air pollution, fire, flood, storm, epidemic, riot, earthquake, or other conditions which are, or are likely to be, beyond the control of the services, personnel, equipment, and facilities of a political subdivision and require the combined forces of other political subdivision to combat.

Local Government (Federal definition)
Any county, city, village, town, district, or other political subdivision of any state, any Indian tribe or authorized tribal organization, or Alaskan native village or organization that includes any rural community or incorporated town or village or any other public entity for which an application for assistance is made by a state or political subdivision thereof.

Local Government Emergency Planning Guidance
A document which lays a foundation for emergency response planning for counties, cities, as well as other political subdivisions.

Logistics Section
One of the five primary functions found at all SEMS levels responsible for identifying and providing services and materials needed in support of the operation.

M

Major Disaster (Federal)—see also Emergency
Any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, drought, fire, explosion, or other catastrophe which in the determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Federal Disaster Relief Act.

Master Mutual Aid Agreement
The California Disaster and Civil Defense Master Mutual Aid Agreement made and entered into by and among the State of California, its various department and agencies, and the various political subdivision of the State. The agreement provides for support of one jurisdiction by another.

Media
All means of providing information and instructions to the public, including radio, television, and newspapers.

Mitigation
Pre-event planning and other actions which lessen the effects of potential disasters. (See also Comprehensive Emergency Management).

Mutual Aid
Mutual Aid occurs when two or more parties (or agencies) agree to furnish resources, services, personnel, facilities, etc., to each other in support of the emergency or disaster response. Mutual Aid among agencies is best carried out when pre-disaster Mutual Aid Agreements are prepared, specifying what resources are on hand, how they will be made available to the requesting agency, reimbursement costs involved, etc.

Mutual Aid Agreement
An agreement authorized under the Emergency Services Act, in which two or more parties agree to furnish resources and facilities and to render services to each and every other party of the agreement to prevent and respond to any type of disaster or emergency.

Mutual Aid Region
A subdivision of the State emergency services organization established to coordinate mutual aid and other emergency operations.

Multi-Agency or Inter-Agency Coordination (MAC)

The participation of agencies and disciplines involved at any level of the SEMS organization working together in a coordinated effort to facilitate decisions for overall emergency response activities.

N

National Incident Management System (NIMS)
A system mandated by HSPD 5 that provides a consistent nationwide approach for Federal, State, local, and tribal governments; the private-sector, and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among Federal, State, local, and tribal capabilities, the NIMS includes a core set of concepts, principles, and terminology. HSPD 5 identifies these as the ICS; multiagency coordination systems; training; identification and management of resources (including systems for classifying types of resources); qualification and certification; and the collection, tracking, and reporting of incident information and incident resources.

National Response Plan (NRP)
The National Response Plan is an all-discipline, all-hazards plan that establishes a single, comprehensive framework for the management of domestic incidents. It provides the structure and mechanisms for the coordination of Federal support to State, local and tribal incident managers and for exercising direct Federal authorities and responsibilities.

National Warning System (NWS)
The federal portion of the civil defense warning sytem, used to disseminate warning and other emergency information from the warning centers or regions to warning points in each state.

O

Office of Emergency Services (OES)
Part of the Governor's office, the primary State agency responsible for the coordination and administration of statewide operations to support emergency mitigation, preparedness, response, and recovery activities within California.

Operational Area (OA)
An intermediate level of the state emergency organization, consisting of a county and all political subdivisions within the county area.

Operational Duties
Pre-assigned tasks (usually in checklist form) to be performed by a specific function / unit at the incident or in the EOC, in response to the emergency or disaster.

Operational Period
The period of time scheduled for execution of a given set of operation actions as specified in the Incident or EOC Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

Operations Section
One of the five primary functions found at all SEMS levels. This Section is responsible for all tactical operations at the incident or for the coordination of operational activities at an EOC. It may be supported by branches or units with specific technical expertise as needed in response to the emergency situation.

P

Plan
As used by OES, an emergency management document which describes the broad, overall jurisdictional response to potential extraordinary emergencies or disasters.

Planning / Intelligence Section
One of the five primary functions found at all SEMS levels. Responsible for the collection, evaluation, and dissemination of information related to the emergency or disaster, and for the preparation and documentation of Incident or EOC Action Plans. This Section may include Situation Status i.e. Runners & Plotters, Communications, and Documentation units.

Political Subdivision (California Emergency Services Act definition)
Any city, city and county, county, district, or other local government agency or public agency authorized by law.

Public Information Officer (PIO)
The function at field or EOC level that is responsible for preparing public information releases and interacting with the media throughout the operational period. At the WEROC EOC level, this function provides assistance to the WEROC water utilities in their public information efforts.

R

Regional Emergency Operations Center
The Regional Emergency Operations Center is the first level facility of the Office of Emergency Services to manage a disaster. It provides a single consistent emergency support staff operating from a fixed facility, whose staff are responsible to the needs of the operational areas and coordinates with the State Operations Center.

Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288 as amended
Gives the President broad powers to supplement the efforts and available resources of state and local governments in carrying out their responsibilities to alleviate suffering and damage resulting from declared emergencies and major disasters.

S

Safety Center
A phone application administered by WEROC that allows EOC staff access to timely contact information, plans and procedures, AlertOC and WebEOC user guides, and instructions that are readily available and can be utilized during emergencies.

Safety Officer
The function at the field or EOC level responsible for monitoring and assessing safety hazards or unsafe conditions, and for developing measures for ensuring personnel safety. At the EOC level, this function reports directly to the EOC Director but may coordinate duties with other functions. This function may have additional staff assigned to it.

Search
Systematic investigation of an area or premises to locate persons trapped, injured, immobilized, or missing.

Security Officer
The function at the field or EOC level responsible for maintaining a security perimeter, handling EOC staff check-in/check-out procedures and other related duties as assigned by the Incident Commander or EOC Director during the operational period. If necessary and practical, this function may be combined with the Safety Officer function. It may also have additional staff assigned to it.

Section
The organization level responsible for a major functional area within the EOC, i.e., Operations, Planning/Intelligence, Logistics, Finance/Administration.

Special Districts
A unit of local government i.e. Water, School, Sanitation, Cemetery Districts, etc. These districts are part of the State Emergency Organization and as such, coordinate with the Orange County Operational Area (O.A.) and all political subdivisions i.e. incorporated Cities, in supporting disaster preparedness and response activities.

Stafford Act
Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988; amended the Disaster Relief Act of 1974, PL 93-288. This Act constitutes the statutory authority for most Federal disaster response activities especially as they pertain to FEMA and FEMA programs.

Standard Operating Procedures
A set of instructions having the force of a directive, covering those features of operations which lend themselves to a definite or standardized procedure. Standard operating procedures support an annex by indicating in detail how a particular task will be carried out.

Standardized Emergency Management System (SEMS)
A system required by California Government Code for managing response to multi-agency and multi-jurisdictional emergencies in California. SEMS consists of five organizational levels which are activated as necessary: Field Response, Local Government, Operational Area, Region, and State.

Start-up Actions
These can be either general, or specific to a particular function at the incident or in the EOC. General Start-up Actions are those taken by the first personnel to arrive. Specific Start-up Actions are those related to a particular function.

State Agency (State definition)
Any department, division, independent establishment, or agency of the executive branch of the State government.

State Coordinating Officer
The person appointed by the Governor to coordinate and work with the federal coordinating officer.

State Emergency Plan
The State of California Emergency Plan, as approved by the Governor, which serves as the basis for statewide emergency planning and response.

U

Unified Command (UC)
An application of ICS used when there is more than one agency with incident jurisdiction or when incidents cross political jurisdictions. Agencies work together through the designated

Unit
An organizational element having functional responsibility at the incident or in the EOC. Units operate under the direction of a Section Chief.

V

Volunteer Emergency Preparedness Organization (VEPO)
Original name of the Water Emergency Response Organization of Orange County.

ATTACHMENT K: AFTER-ACTION REPORT QUESTIONAIRE

#	Response/Performance Assessment Questions	Yes	No	Comments
1.	Were procedures established and in place for responding to the disaster?			
2.	Were procedures used to organize initial and ongoing response activities?			
3.	Was the ICS used to manage field response?			
4.	Was Unified Command considered or used?			
5.	Was the EOC and/or DOC activated?			
6.	Was the EOC and/or DOC organized according to SEMS?			
7.	Were sub-functions in the EOC/DOC assigned around the five SEMS functions?			
8.	Were response personnel in the EOC/DOC trained for their assigned position?			
9.	Were action plans used in the EOC/DOC?			
10.	Were action planning processes used at the field response level?			
11.	Was there coordination with volunteer agencies such as the Red Cross?			
12.	Was an Operational Area EOC activated?			
13.	Was Mutual Aid requested?			
14.	Was Mutual Aid received?			
15.	Was Mutual Aid coordinated from the EOC/DOC?			
16.	Was an inter-agency group established at the EOC/DOC level? Were they involved with the shift briefings?			
17.	Were communications established and maintained between agencies?			
18.	Was the public alert and warning conducted according to procedure?			
19.	Was public safety and disaster information coordinated with the media through the JIC?			
20.	Were risk and safety concern addressed?			

#	Response/Performance Assessment Questions	Yes	No	Comments
21.	Did event use Emergency Support Function (ESFs) effectively and did ESF have clear understanding of local capability?			
22.	Was communications inter-operability an issue?			

Additional Questions

23. What response actions were taken by your agency? Include such things as mutual aid, number of personnel, equipment and other resources. *Note: Provide statistics on number of personnel and number/type of equipment used during this event. Describe response activities in some detail*

_____
_____
_____

24. As you responded, was there any part of SEMS/NIMS that did not work for your agency? If so, how would (did) you change the system to meet your needs?

_____
_____
_____

25. As a result of your response, did you identify changes needed in your plans or procedures? Please provide a brief explanation

_____
_____
_____

26. As a result of your response, please identify any specific areas needing training and guidance that are not covered in the current SEMS Approved Course of Instruction or SEMS Guidelines.

_____
_____
_____

27. If applicable, what recovery activities have you conducted to date? Include such things as damage assessment surveys, hazard mitigation efforts, reconstruction activities, and claims filed.

_____
_____
_____

Additional Comments

_____

_____

_____

_____

_____

Potential Corrective Actions

Identify issues, recommended solutions to those issues, and agencies that might be involved in implementing these recommendations. Address any problems noted in the SEMS/NIMS Function Evaluation.

Indicate whether issues are an internal agency specific or have broader implications for emergency management.

(Code: I= Internal; R =Regional, for example, OES Mutual Aid Region, Administrative Regions, geographic regions, S=Statewide implications)

Code	Issue or Problem Statement	Corrective Action/Improvement Plan	Agency/Depts. to be Involved	Point of Contact Name/Phone	Estimated Date of Completion

ATTACHMENT L: WATER AND WASTEWATER REGULATORY AGENCIES

FEDERAL

Center for Environmental Health – Protects people from toxic chemicals by working with communities, consumers, workers, government, and the private sector to demand and support business practices that are safe for public health and the environment.

Food and Drug Administration (FDA) – Responsible for protecting the public health by ensuring the safety, efficacy, and security of human and veterinary drugs, biological products, and medical devices; and by ensuring the safety of our nation's food supply, cosmetics, and products that emit radiation. The FDA regulates water trailers and bottled water.

STATE

State Water Resource Control Board (SWRCB) – The SWRCB is one of six branches of the California Environmental Protection Agency. It ensures the quality of California's water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper water resource allocation and efficient use. SWRCB has regulatory authority for protecting the water quality of nearly 1,600,000 acres (6,500 km2) of lakes, 1,300,000 acres (5,300 km2) of bays and estuaries, 211,000 miles (340,000 km. The SWRCB coordinates the state's nine Regional Water Quality Control Boards (RWQCB).

- **Regional Water Quality Control Boards (RWQCB)** – Serves as the frontline for state and federal water and wastewater pollution control efforts of rivers and streams, and about 1,100 miles (1,800 km) of exquisite California coastline. California is broken into 9 regional boards.
- **Department of Water Resources (DWR)** – Manages state-owned water infrastructure, such as dams, reservoirs and aqueduct. DWR works with other agencies to benefit the State's people and to protect, restore and enhance the natural and human environments.
- **Division of Drinking Water (DDW)** – Regulates public water systems; oversees water recycling projects; permits water treatment devices; supports and promotes water system security; and performs a number of other functions.

LOCAL

Orange County Health Care Agency (HCA) – Coordinates and oversees water quality for Orange County by issuing well permits and managing the county's Cross Connection Prevention Program. Additionally, HCA monitors for sewage spills and works with the sanitary district to ensure the sewage is contained and/or issues public notices for wastewater spills in beaches and harbors.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

(Orange County's boundaries fall on Region 8 and 9)

NORTH COAST REGION (1)
www.waterboards.ca.gov/northcoast
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403
E-mail: info1@waterboards.ca.gov
Tel: (707)576-2220
Fax: (707)523-0135

SAN FRANCISCO BAY REGION (2)
www.waterboards.ca.gov/sanfranciscobay
1515 Clay Street, Suite 1400
Oakland, CA 94612
E-mail: info2@waterboards.ca.gov
Tel: (510)622-2300
Fax: (510)622-2460

CENTRAL COAST REGION (3)
www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
E-mail: info3@waterboards.ca.gov
Tel: (805)549-3147
Fax: (805)543-0397

LOS ANGELES REGION (4)
www.waterboards.ca.gov/losangeles
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
E-mail:
info4@waterboards.ca.gov
Tel: (213)576-6600
Fax: (213)576-6640

CENTRAL VALLEY REGION (5)
www.waterboards.ca.gov/centralvalley
11020 Sun Center Drive, Suite 200. Rancho Cordova, CA 95670
E-mail:info5@waterboards.ca.gov
Tel: (916)464-3291
Fax: (916)464-4645

Fresno Branch
1685 E Street
Fresno, CA 93706
Tel: (559)445-5116
Fax: (559)445-5910

Redding Branch
364 Knollcrest Drive, Suite 205
Redding, CA 96002
Tel: (530)224-4845
Fax: (530)224-4857

LAHONTAN REGION (6)
www.waterboards.ca.gov/lahontan
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
E-mail:
info6@waterboards.ca.gov
Tel: (530)542-5400
Fax: (530)544-2271

Victorville Branch
15095 Amargosa Road - Bldg 2, Ste 210
Victorville Ca 92394
Tel: (760)241-6583
Fax: (760)241-7308

COLORADO RIVER BASIN REGION (7)
www.waterboards.ca.gov/coloradoriver
73-720 Fred Waring Dr., Suite 100
Palm Desert, CA 92260
E-mail:
info7@waterboards.ca.gov
Tel: (760)346-7491
Fax: (760)341-6820

SANTA ANA REGION (8)
www.waterboards.a.gov/santaana
3737 Main Street, Suite 500
Riverside, CA 92501-3348
E-mail:
info8@waterboards.ca.gov
Tel: (951)782-4130
Fax: (951)781-6288

SAN DIEGO REGION (9)
www.waterboards.ca.gov/sandiego
2375 Northside Drive, Suite 100
San Diego, CA 92108
E-mail:
info9@waterboards.ca.gov
Tel: (619)516-1990
Fax: (619)516-1994

(Map with specific locations can be found on the next page)

Figure 1: California Regional Water Quality Control Board Map

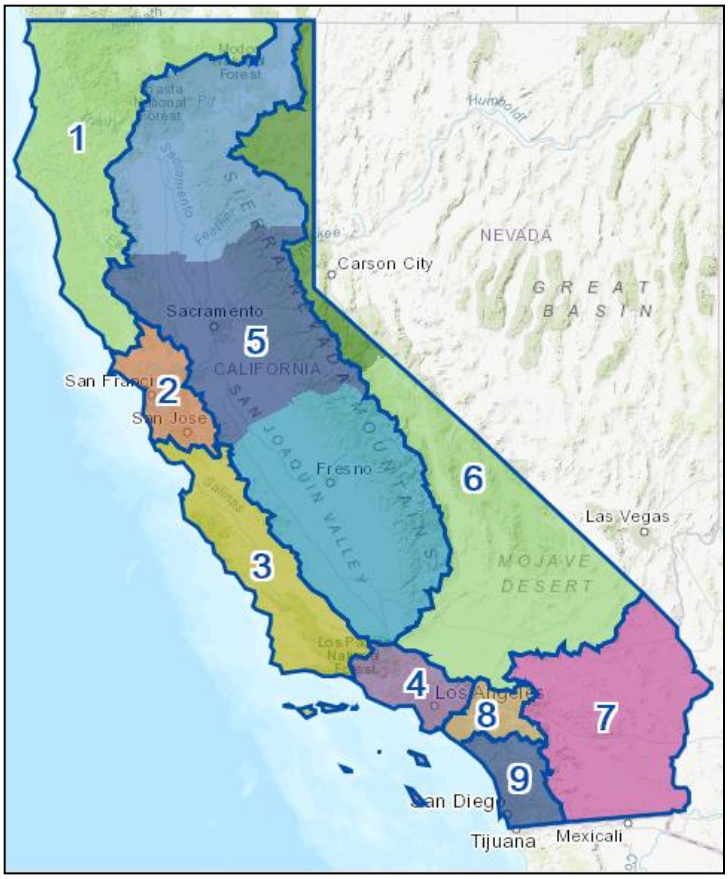


Figure 2: Border between Region 8 and 9 in Orange County map

ATTACHMENT M: HAZARD SPECIFIC EQUIPMENT

This list is available in the Logistics Chief and Resource Unit Position Binder

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Hazard Specific Equipment Resource Request			
Category	**Item**	**Specifications**	**Other**
Chemicals	☐ Chlorine	Type:	Amount:
	☐ Salt		Amount:
	☐ Sodium Hypochlorite		Amount:
Debris Removal Equipment	☐ Front Loader		
	☐ Trucks and Trailer		
	☐ Trained Operator Needed		
Emergency Lighting	☐Lighting	Needed for:	
	Type of power: Generator or Battery	Fuel Type:	
	☐ Extra Batteries	Type:	
Food/Water	☐ Food Supply		Number of staff:
	☐ Water for staff	1 gallon per person per day	Number of staff:
	☐ Sodium Hypochlorite	1 gallon per person per day	Number of staff:
Fuel Trucks/Carrier	☐ Fuel Type	Diesel Gasoline Propane	# of Gallons:
	☐Licensed Driver		
	☐ Mount Type	Trailer Truck	
Hose	☐ For Potable Water		Amount:
	☐ For Wastewater		Amount:
Laboratory Analysis/ Services	☐ Water Quality Sample Kit	Delivery Address:	
	☐ Laboratory Identified	Where:	
Misc.	☐ Medication/ Vaccination	Yes No	
	☐ Comfort stations		
	☐ Temporary facilities	Type:	
	☐ Conference Call Line	Yes No	
	☐ Office furniture	Type: Amount:	
Portable Generator	Fuel Type:	Diesel Gasoline Propane	
	Pumping Capacity	Gallons Per Minute:	
	Hitch Size	1 7/8 inch 2 inch	
	Connection		
	Vehicle Needed to Haul Generator?	Yes No	
Portable Temporary Pumps	Type of water	Potable Wastewater	
	Pumping Capacity	Gallons Per Minute:	
	Required Power	Kilowatts (KW):	
	Connection		

Hazard Specific Equipment Resource Request			
Category	**Item**	**Specifications**	**Other**
Responder Equipment	☐ Non-permeable gloves	Amount:	
	☐ First Aid Kits	Amount:	
	☐ Hard Hats	Amount:	Amount:
	☐ Safety glasses	Amount:	Amount:
	☐ Other Equipment	Type:	Amount:
Safety Equipment	☐ Emergency Lighting		Amount:
	☐ Temporary Fencing		Amount:
	☐ Traffic Control Equipment	Type:	Amount:
	☐ Sanitation Supplies	(N95 Mask, Vinyl Gloves, Eye protection, Hand Sanitizer, Surface Sanitizer)	Amount:
	☐ Other Equipment	Type:	Amount:
SCADA System	☐ Temporary Telemetry Stations		
Shoring Equipment	☐ Trencher	Operator: Yes No	Amount:
	☐Excavator	Operator: Yes No	Amount:
	☐ Shields		Amount:
Staffing	☐ Administrative		Amount:
	☐ Water Quality Tester		Amount:
	☐ Reverse Dial System		Amount:
	☐ Maintenance Operator Supervisor	Class:	
	☐ Maintenance Operator	Class:	
	☐ Reverse Dial System		
	☐ Door Hanger/ Notification		Amount:
Water Distribution System	☐ Coupling	Type: Size:	Amount:
	☐ Valves	Type:	Amount:
	☐ Reservoir/tank covers/crack sealers/ sealant	Type:	Amount:
	☐ Pipe	Type: Size:	Amount:
	☐ Pipe segments	Type: Size:	Amount:
Water Haulers	☐ Holding Capacity	How many gallons?	Amount:
	Potable Water	Wastewater	Amount:
	☐ Licensed Driver?		Amount:
	☐ Connections	Size:	Amount:

ATTACHMENT N: GETS CARD SUBSCRIPTIONS

Last Name	First Name	Title	Card Number
SEOC	Legal Advisor	Legal Advisor	42425011
Alt EOC	Legal Advisor	Legal Advisor	78178253
SEOC		Extra Position 1	64499089
SEOC		Extra Position 2	85317524
SEOC		Extra Position 3	81714458
Alt EOC	DIRECTOR	EOC DIRECTOR	82299670
Alt EOC	LOGISTICS	NEOC LOGISTICS	49966847
Alt EOC	MAIN LINE	MAIN LINE	67033680
Alt EOC	MANAGER	NEOC MANAGER	67536619
Alt EOC	MULTI AGENCY COORDINATOR	NEOC MULTI AGENCY COORD.	04183057
Alt EOC	PLANS	NEOC PLANS	98372056
Berg	Joseph	Dir. of Water Use Efficiency	27325704
Berg	Joseph	Dir. of Water Use Efficiency	WPS
De La Torre	Harvey	Associate General Manager	84540562
HUBBARD	KELLY	WEROC PROGRAMS MANAGER	90079535
HUBBARD	KELLY	WEROC PROGRAMS MANAGER	WPS
Hunter	Robert	General Manager	91731047
SEOC	SEOC	MULTI AGENCY COORDINATOR	27388687
MWDOC COOP		MWDOC COOP BORG	54203490
MWDOC COOP		MWDOC COOP FINANCE/IT	08686273
MWDOC COOP		MWDOC COOP MGT & POLICY	73428580
NEOC	FINANCE	NEOC FINANCE	64927153
NEOC	PIO	NEOC PIO	93106944
NEOC	WEROC ICP LIAISON	WEROC ICP LIAISON	14338959
Seckel	Karl	Assistant General Manager	38475093
Seckel	Karl	Assistant General Manager	WPS
SEOC	DIRECTOR	SEOC DIRECTOR	02114807
SEOC	FINANCE	SEOC FINANCE	70383429
SEOC	LOGISTICS	SEOC LOGISTICS	75740299
SEOC	MAIN LINE	SEOC MAIN LINE	36465899
SEOC	MANAGER	SEOC MANAGER	69411554
SEOC	PIO	SEOC PIO	84182290
SEOC	PLANS	SEOC PLANS	29637844
SEOC	WEROC ICP LIAISON	WEROC ICP LIAISON	89985434
Soto	Francisco	Emergency Coordinator	86648362
Soto	Francisco	Emergency Coordinator	WPS
WEROC OA LIAISON		WEROC OA LIAISON	91311027

ATTACHMENT O: WEROC PLANS AND MEMBER AGENCY TEMPLATES

WEROC Plans

- WEROC Emergency Operations Plan
  - Hazard Specific Annexes
  - EOC Position Checklist
- WEROC Hazard Mitigation Plan
- Business POD Plan
- Water POD Plan
- Power Plan

WEROC Templates

- Business POD Plan
- Chemical Supply Distribution Plan
- Power Outage Plan
- Water POD Plan
- Unknown Water Contaminant Plan

MWDOC Plans

- Continuity of Operations Plan

Joint Agency Plans

- Joint Information Center Plan
- Water & Fire Coordination Template
- Water Procurement and Distribution Plan
- OA Dam Failure Response Plan
- OCFA Wildland and Urban Interface Plan
- Water POD Plan (Future Plan)

HAZARD SPECIFIC ANNEXES

The following hazard annexes were identified as high priority in the risk assessment. Various other hazards were also identified in the risk assessment but it was determined that the response to those hazards mirrors that of other hazards.

- Annex 1: Earthquake
- Annex 2: Tsunami
- Annex 3: Flood/Dam Failure
- Annex 4: Pandemic
- Annex 5: Power Outage
- Annex 6: Nuclear Release
- Annex 7: Unknown Water Contaminant
- Annex 8: Wildfire

ANNEX 1: EARTHQUAKE

Planning Assumptions

1. The EOC will be automatically activated following a M5.0 or greater earthquake within Orange County, or when an earthquake outside of Orange County strong enough to disrupt public phone systems or cause visible damage
2. Communications infrastructure could be damaged, causing disruption in landline, telephone, cellular telephone, radio, internet, and other communication services
3. Transportation infrastructure could be damaged and in limited operation, potentially hampering response operations and staff reporting to the EOC
4. Vital infrastructure such as potable water supplies, sewer, electrical power, natural gas lines can be compromised
5. Local response partners may not be available for hours, or even days following the event

Earthquake Checklist

In addition to the procedures in the base plan and position guides, this checklist should be used following an earthquake.

- ☐ Determine whether communication systems are operable
- ☐ Determine the location and extent of the earthquake using resources such as the USGS website
- ☐ Determine which member agencies and/or pipelines could have the greatest potential impacts based on epicenter
- ☐ Communicate with potentially impacted member agencies and/or MET to determine extent of damage
- ☐ Determine if EOC activation is necessary. See Activation Decision Steps located in the WEROC EOP. (if the EOC was automatically activated, disregard this item)
- ☐ If the EOC is activated, follow the EOC Activation protocols on page 24
- ☐ Inform member agencies that WEROC is in the process of activating the EOC

Earthquake Resources

1. Monitor AM radio (e.g. 600 AM) and TV for reports of damage and areas impacted
2. Monitor Web EOC for reports of damage and areas impacted – https://webeoc.ocsd.org/eoc7/
3. USGS – https://earthquake.usgs.gov/ Use the USGS website to determine the epicenter and magnitude of the earthquake (If internet service is down, the EOC should be activated.)
4. Earthquake Map – https://earthquake.usgs.gov/earthquakes/map/
5. Fault Maps of Orange County – Located at each EOC
6. Richter scale & Modified Mercalli Intensity Scale (Figure 1)

Notification Considerations

WEROC staff should verify that the following response partners or regulatory agencies are notified:

- DDW
- HCA
- Control 1 (OA)
- Fire Department

Figure 1: Richter scale & Modified Mercalli Intensity Scale

Descriptor	Richter Scale	Magnitude Intensity	WEROC EOC Activated?	Description
Very Minor	1.0-3.0	I	No	I. Not felt except by a very few under especially favorable conditions.
Minor	3.0-3.9	II-III	No	II. Felt only by a few persons at rest, especially on upper floors of buildings. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
Light	4.0-4.9	IV-V	No	IV. Felt indoors by many, outdoors by few during the day. Some awakened at night. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
Moderate	5.0-5.9	VI-VII	Yes, Only if within OC	VI. Felt by all, many frightened. Some heavy furniture moved; a few cases of fallen plaster. Damage slight. VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
Strong	6.0-6.9	VIII-IX	Yes, If within OC or disrupts communication channels or disrupts MET services	VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned. IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
Major	7.0-7.9	X-I	Yes, If within OC or disrupts communication channels or disrupts MET services	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
Great	8.0 and Higher	XII >	Yes, If within OC or disrupts communication channels or disrupts MET services	XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

ANNEX 2: TSUNAMI

Planning Assumptions

1. The tsunami will impact member agencies located near the coast
2. The EOC will be automatically activated following a M5.0 or greater earthquake within Orange County, an earthquake outside of Orange County strong enough to disrupt public phone systems or cause visible damage, or other large regional event
3. WEROC and member agencies may have several hours to prepare for a distant tsunami
4. There may be a disruption to water and sewer lines
5. Local evacuations may cause traffic gridlock, requiring a law enforcement escort
6. Power outage may occur and communication systems may be damaged
7. WEROC will distribute all the information from the OA to the Member Agencies

Tsunami Checklist

In addition to the procedures in the base plan and position guides, this checklist should be used before or following a tsunami.

Pre-Event

- ☐ The OA Liaison will send a message to WEROC of a potential Tsunami and conference call information
- ☐ Participate in OA conference call and notify agencies of potential impacts and OA recommendations
- ☐ The following agencies are in potential tsunami zones:
    - City of Seal Beach
    - City of Huntington Beach
    - City of Newport Beach
    - City of Laguna Beach
    - City of Dana Point
    - City of San Clemente
    - Laguna Beach County Water District
    - South Coast Water District
    - Emerald Bay Service District
    - Orange County Sanitation District (Boat and Harbor Operations)
    - South Orange County Wastewater Authority
- ☐ Inform agencies if evacuations are needed
- ☐ Recommend that agencies isolate or shut off their system before evacuations
- ☐ Determine if EOC activation is necessary. See Activation Decision Steps in the WEROC EOP

Post Event

- ☐ Determine whether communication systems are operable

- ☐ Communicate with potentially impacted member agencies and/or MET to determine extent of damage
- ☐ If not yet activated, determine if EOC activation is necessary. See Activation Decision Steps in the WEROC EOP
- ☐ If EOC is determined, follow the EOC Activation protocols on page 24 of the EOP
- ☐ Inform member agencies that WEROC is in the process of activating the EOC
- ☐ Monitor AM radio (e.g. 600 AM) and TV for reports of damage and areas impacted
- ☐ Monitor WebEOC for reports of damage and areas impacted

Tsunami Resources

- *Types of Tsunamis*
    - Near Source Tsunamis: A near source tsunami (local) is one that can hit the coast within minutes following an offshore geological event. This type of locally generated tsunami is possible at many points along the Southern California coast and provides little time for warning the population and less time for evacuation
    - Distant Source Tsunamis: A distant source tsunami is one that may be generated by a very large earthquake in remote areas of the Pacific Ocean, such as the Cascadia Subduction Zone near Eureka which is considered by experts as the most threatening. Since distant tsunamis, such as from Cascadia, may take several hours to reach the Southern California coast following the event, they allow time for warnings to be issued to give coastal residents time to evacuate
- *Tsunami Alerts* - There are four levels of tsunami alerts that are issued by the West Coast/Alaska Tsunami Warning Center. These alerts should be sent to all potentially impacted member agencies upon notification:
    - *Tsunami Warning* means a potential tsunami with significant widespread inundation is imminent or expected
    - *Tsunami Advisory* means there is the threat of a potential tsunami, which may produce strong currents or waves dangerous to those in or near the water
    - *Tsunami Watch* is issued to alert emergency management officials and the public of an event that may later impact the watch area
    - *Tsunami Information Statement* is issued to inform emergency management officials and the public that an earthquake has occurred, or that a tsunami warning, watch or advisory has been issued for another section of the ocean. Tsunami preparedness and response efforts can utilize preparedness and response efforts for flood hazards, including public education programs, warning, evacuation and other measures

- *Potential Inundation and Evacuation Zone* - WEROC has identified the area to be effected in the event that the County is threatened by a Tsunami. This Zones are depicted in the Tsunami Inundation map located at both EOCs
- *Tsunami Warning System* - http://ntwc.arh.noaa.gov/

Notification Considerations

WEROC staff should verify that the following response partners or regulatory agencies are notified:

- Regional Water Quality Control Board
- MET
- Cal WARN
- HCA

ANNEX 3: FLOOD/DAM FAILURE

Planning Assumptions

1. Extreme floods could damage communications infrastructure causing disruption in landline, telephone, cellular telephone, radio, Internet, and other communication services
2. Water utilities structures may be damaged requiring resources to recover
3. Floods might limit transportation of resources, potentially hampering response operations
4. Floods may result in damage to critical infrastructure, loss of utilities (gas, water, electricity)
5. Effective prediction and warning systems have been established that make it possible to anticipate flooding occurrences. However, severe weather conditions may occur with little or no warning
6. Water and wastewater infrastructure within flood control channels could be impacted
7. A dam or reservoir failure can result from a number of manmade or natural hazards
8. A dam/reservoir failure may trigger a large flooding event

Flood/Dam Failure Checklist

- ☐ Inform agencies of projected rainfall and flooding concerns
- ☐ During persistent heavy rain fall, contact dam/reservoir owner to obtain an overview of the situation
  - Confirm notifications have been made
  - Gather situation status summary
- ☐ Review OA Dam Plan and agency specific Dam Plan with inundation maps
- ☐ *EOC Activation Protocol*
  The following table should be used when determining WEROC's EOC activation level**.** Based on the current conditions and threat to member agencies, some stages might trigger a greater response.

Flood Watch Stages		**WEROC Response**
Stage 1	Light to moderate rain	Standby/Monitor
Stage 2	Moderate to Heavy Rain	Standby/Monitor
Stage 3	Continuation of heavy rain – High threat of damage.	Standby/Monitor/Check-in with Member Agencies
Stage 4	Member agencies report that there is a threat to infrastructure – (Local Emergency may be declared)	Support/County Liaison/Potentially Activate EOC
Stage 5	Heavy damage potential – Damage to member agencies infrastructure (Local Emergency Declared)	EOC Activation/County Liaison
Stage 6	Damage beyond OA Resources and impacting various member agencies. Significant damage to member agencies infrastructure/Loss of water (State of Emergency Declared)	EOC Activation/County Liaison
Stage 7	Damage beyond state resources (Presidential Declaration)	EOC Activation/County Liaison

- ☐ Ensure all information is received by the OA EOC
- ☐ Contact potentially impacted agencies to record impacts and resource needs
- ☐ If needed, coordinate debris removal for member agencies

Flood/Damn Failure Resources

- Monitor radio (e.g. 600 AM) and TV for reports of damage and areas impacted.
- OC Public Works Watershed & Costal Resources – 714-834-5173
- OC Public Works Rain Fall and Weather Data – http://www.ocwatersheds.com/rainrecords/rainfalldata jj
- National Weather Service, San Diego Office – 858-675-8700, http://w2.weather.gov/climate/index.php?wfo=sgx
- National Weather Service Radar - https://radar.weather.gov/ridge/radar.php?rid=nkx&product=N0R&overlay=11101111&loop=no

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- Operational Area EOC – 714-628-7008
- OC Public Works – 714-834-2300
- OC Public Works DOC (when activated) – 714-955-0200 or 714-955-0333
- Army Corps of Engineers – 202-761-1001

ANNEX 4: PANDEMIC

Planning Assumptions

1. A pandemic in any given community will last about eight to twelve weeks
2. Organizations will be provided guidance and/or direction by federal, state, and/or local governments regarding current pandemic status in the area
3. Activation of each agency's COOP including MWDOC, may be required
4. A pandemic flu is not a water-borne virus, it will have no direct effect on water quality. Other pandemics could be water borne
5. Staff absenteeism will rise due to personal illness, family member illness, community mitigation measures, quarantines, school, childcare, or business closures, public transportation disruptions, or fear of exposure to ill individuals, as well as first responder, National Guard, or military reserve obligations
6. Each WEROC member agency is responsible for taking the necessary steps and precautions they deem appropriate for the situation. WEROC and its member agencies should take into consideration information released by the State Department of Public Health and the Orange County Health Care Agency
7. When antivirals and vaccines become available, they will be allocated according to the WEROC Business POD Plan

Pandemic Checklist

In addition to the procedures in the base plan and position guides, this checklist should be used for an imminent or real-time pandemic

- ☐ Monitor the approaching pandemic through the OCHCA, CDC, and/or CDPH
- ☐ Enact pre-pandemic mitigation strategies and encourage member agencies to do the same
- ☐ Employees/Disaster Service Workers (DSW) should be reminded of their obligation to report to work during a pandemic
- ☐ Determine if a virtual work or EOC environment is appropriate and favored, ensure all technological methods are available and utilized
- ☐ Determine the appropriate EOC activation level and operational periods based on the incident.
- ☐ If the decision is made to activate the WEROC EOC, the EOC Activation and Notification Protocol located in the WEROC EOP will be utilized
- ☐ Participate in the periodic conference calls hosted by the OA EOC
- ☐ Provide member agencies and MWDOC staff with informational material
- ☐ Provide the necessary resources to ensure member agencies sustain a safe working environment
- ☐ Encourage member agencies to only allow essential functions to report for work and to have a plan and description on how those essential functions will be carried out through a prolonged period
- ☐ Utilize the Public Information Officer to ensure public is informed of the current situation and any protective actions related to water or wastewater
- ☐ Coordinate public messaging related to water and wastewater safety
- ☐ Monitor for health situation reports, medical bulletins and press releases
    - review and verified information

- distribute to appropriate personnel

- Maintain contact with OA and member agencies to ensure situation status is timely, accurate and shared
- When medications become available, activate the WEROC Business POD Plan

Pandemic Resources

- *Alert Phases*
  The designation of phases, including decisions on when to move from one phase to another, is made by the Director General of WHO. A diagram of the phases is located in figure 1 below. These phases are defined as follows:

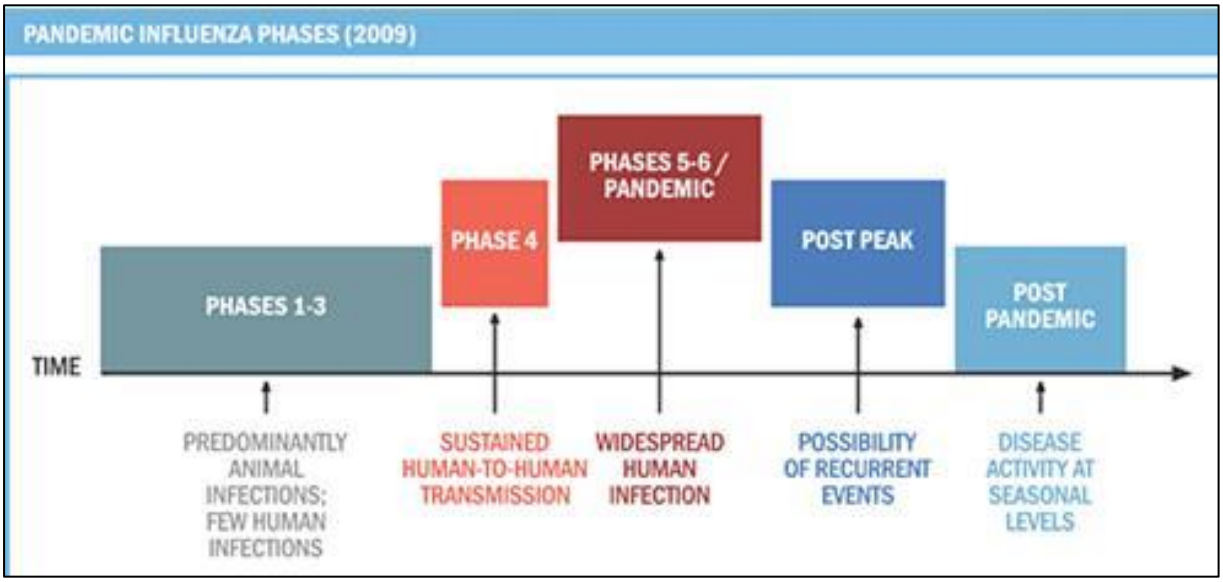
  Phase 1 - no viruses circulating among animals reported to cause infections in humans.
  Phase 2 - animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans, and is therefore considered a potential pandemic threat.
  Phase 3 - animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.
  Phase 4 - characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause "community-level outbreaks." Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a foregone conclusion.
  Phase 5 - characterized by human-to-human spread of the virus into at least two countries in one WHO region. Declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.
  Phase 6 – Pandemic phase characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.
  Post-peak period – The post-peak period signifies that pandemic activity appears to be decreasing; however, it is uncertain if additional waves will occur and countries will need to be prepared for a second wave.
  Post-pandemic period - At this stage, it is important to maintain surveillance and update pandemic preparedness and response plans accordingly. An intensive phase of recovery and evaluation may be required.
- OCHCA's Pandemic Influenza Preparedness and Response Plan
- WEROC Business POD Plan

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- DDW
- SWRCB
- HCA

Figure 1 World Health Organization Pandemic Influenza Phases



ANNEX 5: POWER OUTAGE

Planning Assumptions

1. Many member agencies lack adequate back-up power sources to rely upon during power outages and other emergencies
2. Energy disruptions are unpredictable and may occur for a variety of reasons. A local, countywide, or regional power outage may occur at any time
3. There are environmental events that significantly increase the possibility of a power outage, such as extreme temperatures, wind storms and rain storms
4. A power outage will may disrupt WEROC and/or MWDOC operations
5. During active fires, the power company will de-energize power lines in the fire zone
6. There will be fuel coordination needs for power generators
7. Energy within Orange County is mostly controlled by non-governmental entities; therefore the County of Orange has no legal authority over how the energy resources supplied by these entities are distributed or the priority for restoration in the event of a power disruption

Power Outage Checklist

In addition to the procedures in the base plan and position guides, this checklist should be used for a power outage.

- ☐ Determine power outage perimeter by requesting an official briefing from the OA and/or the power utility or using the power outage resources below
- ☐ The OA EOC may conduct a conference call after a CAISO Stage 3 Emergency or during a widespread power outage
- ☐ Monitor WebEOC to obtain a situational overview of the power outage
- ☐ Contact affected member agencies, if without power, determine:
    - If backup systems are available or needed
    - The duration on which backup systems can continue to operate
        - Frequency of fuel needed
        - How much fuel is needed
    - Resource needs to withstand the duration of the power outage
- ☐ Maintain contact with OA and member agencies to ensure situation status is timely, accurate and shared
    - Send a WEROC representative to the OA EOC (if needed)
- ☐ Work with the affected member agency to determine if water quality notifications are needed
- ☐ If it is decided to activate WEROC EOC, the WEROC EOC Activation Notification Protocol located in the WEROC EOP should be utilized

Power Failure Resources

- Monitor radio (e.g. 600 AM) and TV for reports of damage and areas impacted.
- WEROC Power Plan
- Member Agency Power Plan
- SCE Outage Map- https://www.sce.com

- SDG&E Outage Map - https://www.sdge.com/residential/customer-service/outage-center/outage-map
- California Energy Emergency Response Plan, California Energy Commission
- ***CAISO Alert Levels***
  When a significant imbalance between the supply and demand for electricity occurs, Cal-ISO may issue an Alert, a Warning, or a Stage 1, 2, or 3 Emergency. Table #1 outlines the CAISO Notifications

Table 1# CAISO Notifications

CAISO Notifications	
Alert	Cal-ISO informs power utility that operating reserves in the day-ahead market are forecasted at less than 7%, but plans to serve all customers unless loads are significantly higher or resources are lost.
Warning	Cal-ISO informs power utility that operating reserves in the hour-ahead market are forecasted at less than 7%, but plans to serve all customers unless loads are significantly higher or resources are lost.
Emergency Stage 1	Cal-ISO informs power utility that operating reserves are less than 7% in real time or are unavoidable. Consumers are urged to reduce their use of electricity voluntarily to avoid more severe conditions.
Emergency Stage 2	Cal-ISO informs power utility that operating reserves are less than 5% in real time or are unavoidable. Cal-ISO can order the power utility to curtail interruptible load ("voluntary interruptions"). These voluntary interruptions are intended to prevent more severe conditions.
Emergency Stage 3	Cal-ISO informs power utility that operating reserves are less than 1.5% in real time or are unavoidable. Cal-ISO can order the power utility to curtail firm load ("involuntary interruptions"). If ordered to curtail firm load, the power utility will implement CPUC-approved rotating outage plans in which controlled service interruptions (of about one hour) are rotated among groups of customers. These outages are intended to prevent more severe imbalance conditions, such as a total system collapse, and will be implemented until the Cal-ISO notifies the power utility that the emergency has passed.

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- SDG&E
- SCE
- CAISO
- Army Corps of Engineers, Emergency Power Planning and Response Teams, 213-452-3440+
- Generator Rental Companies
- Fuel Supply Companies

ANNEX 6: NUCLEAR RELEASE (SONGS)

Planning Assumptions

1. An emergency at SONGS may occur without warning at any time of day or night.
2. There are five Hazmat teams in Orange County (Anaheim, Huntington Beach, OCFA (2), HCA) that provide 24 hours-a-day staffing for emergency responses and are dispatched by 911 operations
3. Responding agencies will need to provide information to reduce public concern about the incident and response activities

Risk Assessment

During a Nuclear Power Plant "General" Emergency, an atmospheric release of radioactive material (or "plume") could be dispersed inland by prevailing winds causing a number of exposed sources of drinking water to become contaminated. Several sizable reservoirs within the County qualify as exposed sources. They include: helm

Domestic

- Big Canyon Reservoir (owned by City of Newport Beach)
- Santiago Reservoir a.k.a. Irvine Lake (operated by Serrano WD and jointly owned by Irvine Ranch WD and Serrano WD)
- Walnut Canyon Reservoir (owned by City of Anaheim)

Irrigation (landscape & agriculture)

- Bonita Reservoir (operated by Irvine Company)
- Laguna Reservoir (owned by the Irvine Company)
- Lambert Reservoir (owned by the Irvine Company)
- Oso Reservoir (owned by Santa Margarita WD)
- Rattlesnake Reservoir (operated by Irvine Ranch WD)
- San Joaquin Reservoir (operated by Irvine Ranch WD)
- Sand Canyon Reservoir (operated by Irvine Ranch WD)
- Syphon Reservoir (owned by the Irvine Company)

MET also has exposed sources of drinking water i.e. Diamond Valley Lake, Diemer Filtration Plant, Lake Mathews, Mills Filtration Plant, Lake Perris, Lake Skinner, and Skinner Filtration Plant. These exposed sources are not found in the 10-mile Emergency Planning Zone found on the SONGS Emergency (Evacuation) Planning Zone Map, but do lie within the 50-mile Public Education (Monitoring) Zone surrounding the SONGS facility found on the California Public Utility Commission's SONGS Emergency Planning Zone Map (D-12-3).

SONGS Emergency Plan Information

To facilitate WEROC response to a nuclear release at SONGS, the SONGS Emergency Plan Information insert is available to WEROC staff in both WEROC EOCs. Two sections which will help WEROC staff form a basic understanding of response to a SONGS incident are found below. The Event Code Designation briefly describes response codes used by SONGS staff. Key Phone

Numbers list the different entities that would be involved in and affected by an incident involving SONGS.

Other information not shown here but found on the full insert includes the following: Unusual Event, Alert, Site Area Emergency, and General Emergency descriptions, and Abbreviations. To view the full SONGS Emergency Plan Information insert refer to the checklist found in the WEROC EOC function binders.

Event Code Designation:
The event code comprises three characters (*i.e.* A1-2, D2-1, etc.) which designate the event category, the emergency class, and the emergency action level, respectively.

Event Categories	
A	Uncontrolled release of radioactivity
B	Loss of reactor coolant system inventory
C	Reactor core degradation or overheating
D	Loss of plant safety equipment
E	Disasters (natural or manmade)
F	Security contingency
G	Miscellaneous
Emergency Classes	
1	**Unusual Event:** Potential degradation of plant safety. No offsite response required.
2	**Alert:** Actual or potential significant degradation of plant safety. A radioactive release will be small fraction of EPA limits.
3	**Site Area Emergency:** Actual or likely failures of plant functions needed for protection of the public. A radioactive release not expected to exceed EPA limits.
4	**General Emergency:** Actual or imminent substantial plant damage. A radioactive release can be expected to exceed EPA limits.

SONGS Key Phone Numbers:

Orange County	24 Hrs	(714) 628-7008
San Diego County	24 Hrs	(619) 565-3490
San Clemente*	Work Hrs	(949) 361-6100
San Juan Capistrano*	Work Hrs	(949) 443-6337
Dana Point*	Work Hrs	(949) 248-3500
CA State Parks	Work Hrs	(949) 492-8412
Camp Pendleton	Work Hrs	(760) 725-6419
	Off Hrs	(760) 725-5617
American Red Cross	24 Hrs	(714) 481-5300
CA Highway Patrol	24 Hrs	(858) 467-3333
Capistrano Unified School District	Work Hrs	(949) 489-7276
	Off Hrs	(949) 493-2748

Governor's OES	24 Hrs	(800) 852-7550
SCE Switchboard/Corporate Communications	24 Hrs	(800) 621-8516
SCE Telecom Trouble Desk (Sirens)	24 Hrs	(949) 587-5500
*Off hours contact (714) 628-7008		

Potential Impacts

A serious meltdown at SONGS would result in a massive release of radioactivity that could immediately kill more than 100,000 people in South County and northern San Diego County and ultimately cause hundreds of thousands of injuries. However, the circumstances and geographic features in the vicinity of potential incidents vary greatly. Incidents may occur over a very large geographic area or at fixed facilities where there are opportunities for development of site-specific contingency plans.

The area affected by radioactive release is determined by:

- The amount of radiation released from the plant.
- Wind direction and speed.
- Weather conditions.

In the event that any open sources of water were to become contaminated from radioactive fallout, they would need to be isolated from the regional distribution system until water quality tests could be performed. In this situation, WEROC would coordinate information flow with Calif. State Office of Drinking Water; Metropolitan; and Orange County Health Care Agency (HCA) through the County Operational Area (O.A.) EOC.

In addition to the initial damage a nuclear incident may trigger one or more secondary events, such as: explosions, radioactive fallout, fires, power failures, dam failures, transportation disruptions, accidents, overpass failures, building collapse, fuel shortages, food and/or water supply contamination or disruption of distribution systems.

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- SONGS
- Local Police Departments
- CDPH
- OCHCA

ANNEX 7: UNKNOWN WATER CONTAMINANT

Planning Assumptions

1. The affected member agency will determine if the threat is significant enough to warrant the activation of the unknown water contaminant annex
2. Agency response to an unknown contaminant in the water system should follow the water sampling response guidelines in the Emergency Water Quality Sample Kit (EWQSK)
3. There are five Hazmat teams in Orange County (Anaheim, Huntington Beach, OCFA (2), HCA) that provide 24 hours-a-day staffing for emergency responses and are dispatched by 911 operations
4. Do not use water for any purpose including, firefighting

Unknown Water Contaminant Checklist

In addition to the procedures in the base plan and position guides, this checklist should be used during an unknown water contaminant response.

- ☐ Receive a complete debrief from the affected member agency to include but not limited to:
  - Site location
  - How they came to the conclusion of a potential contaminant in their system
  - Area of containment (if possible)
  - The length of time the potential contaminant has been present
  - Whether a perimeter has been established to keep people of the hot zone
  - Has the DDW been contacted
- ☐ Remind the member agency of the SOP and walk them through the procedures
- ☐ Contact the following agencies and inform them of the situation (if needed by the member agency)
  - DDW
  - Control 1 – OA
  - Hazmat
  - OCIAC
  - Local Law Enforcement
  - HCA
- ☐ Dispatch a WEROC staff member to the affected member agency ICP or EOC
- ☐ Consider the support needs of the impacted agency
- ☐ Consider the activation of the EOC. If it is decided to activate the WEROC EOC, the WEROC EOC Activation Procedures are located in the WEROC EOP

Roles and Responsibilities

Division of Drinking Water (DDW)
When notified of a potential Unknown Water Contaminant, the DDW will respond to the incident location with three Emergency Water Quality Sample Kits (EWQSK).

Hazmat Team
The Hazmat team will be responsible for working with the affected agency to physically take the samples from the contaminated water source

Law Enforcement
Responsible for transporting the samples to Richmond Laboratory.

Unknown Water Contaminant Resources

- Member agency Unknown Contaminant SOP Template
- Water Trailer SOP
- Water POD SOP

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- DDW
- Control 1
- OCHCA
- OCFA
- CalWARN
- CDPH

ANNEX 8: WILDFIRE

Planning Assumptions

1. Wildfires could damage communications infrastructure causing disruption in landline, telephone, cellular telephone, radio, Internet, and other communication services
2. Water utilities structures may be damaged requiring resources to recover
3. Wildfires may result in damage to infrastructure, loss of utilities (gas, water, electricity), and street closures that hamper response operations
4. Several water and wastewater entities with critical facilities in close proximity to areas of very high to extreme fire threat include: Orange, Yorba Linda Water District, Santa Margarita Water District, Moulton Niguel Water District, Trabuco Canyon Water District Irvine Ranch Water District, Brea, San Clemente, San Juan Capistrano, Anaheim, Serrano Water District, Emerald Bay Service District, Laguna Beach County Water District, and the Metropolitan District of Southern California's Diemer Water Filtration Plant.
5. Fire suppression efforts take a toll on water agencies as it requires massive amounts of water, which may lead to pressure loss and low water storage levels
6. Sediments, ash effluents, and fire suppression chemicals can contaminate the water system through open waterways and storage facilities to cause water quality degradation

Wildfire Checklist

- ☐ Check City or OCFA twitter page for up to date information on the fire
- ☐ Determine which agencies could or have impacts and inform them of the situation
  - Atlas Maps are available at both EOC's to determine potentially impacted agencies
- ☐ If a member agency loses power to infrastructure, see Power Outage Annex
- ☐ If infrastructure is threatened by the fire contact the OA EOC Operations Section Chief or OA Liaison, or OA EOC general line to inform them of the situation. Make sure you provide:
  - Location of threatened infrastructure (GPS coordinates or Pin drop from mobile phone)
  - Impacts if the structure was destroyed
- ☐ Dispatch a WEROC staff member to the ICP and/or OA EOC. (If needed)
  - Ensure transportation routes are safe before dispatching staff
- ☐ Consider the support needs of the impacted agency
- ☐ Consider the activation of the EOC. If it is decided to activate the WEROC EOC, the WEROC EOC Activation procedures are located in the WEROC EOP
  - Use the EOC Staffing Map to ensure EOC staff are not in the impacted area
    - If EOC staff are in the impacted area, inform staff member

Wildfire Resources

1. Cal Fire - http://www.fire.ca.gov/
2. Incident Information System (Fire Maps) - https://inciweb.nwcg.gov/state/5/#
3. Fire/Police Amateur Live Radio - http://www.broadcastify.com/listen/stid/6
4. Water Districts and City Boundaries Map – http://cehtp.org/page/water/water_system_map_viewer

Notification Considerations

WEROC staff should verify the following response partners or regulatory agencies are notified:

- OCFA
- Control 1 – OA
- DDW
- RWQCB
- HCA

Appendix D

MWDOC Hazard Mitigation Plan

FINAL

Orange County Regional Water and Wastewater Hazard Mitigation Plan

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SECTION 1 INTRODUCTION

Across the United States, natural and manmade disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The impact to water and wastewater utilities and the individuals they serve can be immense and damages to their infrastructure can result in regional economic and public health consequences. The water and wastewater utilities are vulnerable to a variety of hazards that can result in damaged equipment, loss of power, disruption to services, contaminated water supply, and revenue losses. By planning for natural and manmade hazards and implementing projects that mitigate risk, utilities can reduce costly damage and improve the reliability of service following a disaster.

As a best practice Orange County water and wastewater agencies have worked together for decades to improve regional and local reliability and resiliency through joint or collaborative capital improvement projects, planning processes and emergency management practices. Throughout the county's history the need for, and development of, water and wastewater services has been driven by the principles of economies of scale, and limitations of risk by working together among the wholesale and retail water and wastewater agencies. Below is a brief history of this collaborative process that developed the framework for this multi-agency plan today.

- In 1921 the Orange County Joint Outfall Sewer (JOS) is formed. Santa Ana and Anaheim agree to construct an outfall extending into the Pacific Ocean.
- In 1928 the Cities of Anaheim, Fullerton and Santa Ana realized that groundwater supplies were insufficient to meet the demands of their growing communities, prompting them to join the Metropolitan Water District of Southern California (MET) in order to get access to water imported from the Colorado River.
- In 1931 local agencies again recognized the importance of economies in scale by forming the Orange County Water District (OCWD). One of the goals of OCWD is to protect Orange County's Santa Ana River water rights from upstream interest.
- Growth in Orange County continued into the 1940's and 1950's when it was realized that the next increment of supplies was needed. That is when portions of what is now Orange County (outside of those original three cities) joined MET. MET was formed for much the same reason in that it was more economical and less risky to pursue importation of water from the Colorado River and later Northern California as part of a large co-op rather than having each local entity rely on their own planning and development of water supplies.
- Following a 1946 Board of Supervisor's Orange County Sewerage Survey Report, seven individual districts combine into the JOS. While individual cities continue to maintain sewage collection systems, county-wide collections and treatment become a regional operation. And after several reiterations becoming the Orange County Sanitation District.
- Later, as Orange County continued to develop and expand, these new developments were located further and further from the MET pipelines bringing water into Orange County. Economically it was again much more efficient, and less risky, for local members to ban together to participate in regional pipelines and other water facilities to convey the MET water from where it was available to where it was needed. Even today, water reliability planning is conducted based on these original areas, each with its own supply reliability risk profile. The three areas are:

    1. Brea/La Habra service area – have about 80% of their supplies are from Cal Domestic Water Company groundwater sources in San Gabriel Valley.

2. Orange County Water District service area – gets about 75% of their supplies from groundwater sources
3. South Orange County service area – has few local resources, thereby requiring the import of about 95% of their potable water demands

- In 1983 the Volunteer Emergency Preparedness Organization (VEPO) was formed, creating a mutual aid agreement and communications system for Orange County's 33 water utilities to work together.
- Following the 1994 Northridge Earthquake and subsequent Standardized Emergency Management System in 1996, OC water agencies recognized the need to staff the VEPO program as a shared service to support its member agency's disaster readiness.
- VEPO was renamed to the Water Emergency Response Organization of Orange County (WEROC) in 1999 to better reflect its goal and purpose.
- The agency known today as the South Orange County Wastewater Authority (SOCWA) was formed in 2001 when the South East Regional Reclamation Authority (SERRA), Aliso Water Management Agency (AWMA) and South Orange County Reclamation Authority (SOCRA) consolidated to meet the wastewater needs of more than 500,000 homes and businesses across South Orange County.
- In 2006 WEROC staff realized the importance of including wastewater agencies in its program, as many of its water utilities also provided wastewater services and that the sectors had similar resources that could support each other. With this change, the program welcomed in wastewater agencies and grew to support 37 agencies in total.
- In 2008 the internationally awarded Ground Water Replenishment System (GWR) was completed. This was a joint project of the Orange County Water District and the Orange County Sanitation District enhancing reliability for all of the county.

As has been demonstrated throughout the history of Orange County, the principles of banding together with neighboring interests to create joint regional infrastructure, connected systems and economies of scale has been applied time and time again. Working together to develop a multi-jurisdictional hazard mitigation plan focused on the agencies (cities and special districts) that provide drinking water and wastewater services came from an already standing practice of regional planning and coordination to improve resiliency and response. Additionally, it gave the participating agencies the opportunity to focus on risk as it applies specifically to these services and not all of their jurisdiction's services.

In 2005, WEROC started to work with its member agencies, CalOES and FEMA to fund the first multi-jurisdictional plan through a Hazard Mitigation Planning Grant. In 2007, with the assistance of the Mitigation Grant, the Municipal Water District of Orange County (MWDOC) along with 20-member agencies prepared a Multi-Jurisdictional Hazard Mitigation Plan (HMP or Plan) that identified critical water and wastewater facilities in the county, and mitigation actions in the form of projects and programs to reduce the impact of natural and manmade hazards on these facilities. The vision of a plan that takes into consideration regional and local infrastructure and how it works together while building it stronger, supported other planning efforts such as the South Orange County Reliability Study and later the Orange County Reliability Study.

This plan builds on the original 2007 Plan and a previous update approved in 2012. MWDOC was joined in this current update by 18 participating water and wastewater utilities, hereafter, referred to as Member Agencies (MA), that serve communities in Orange County, California. The Plan was prepared with input from county residents, orange county emergency managers, and with the support of the California Governor's Office of Emergency Services (Cal OES) and the Federal Emergency Management Agency

(FEMA). The process to develop the Plan included five planning team meetings and coordination with representatives from MWDOC and each participating MA.

The Plan is a guide for MWDOC and the MAs over the next five years toward greater disaster resistance in harmony with the character and needs of the local community and the MAs. The Plan focuses on participating water and wastewater facilities in the county and identifies mitigation actions to reduce the impact of natural and manmade hazards on critical facilities. In addition, each agency will utilize current, approved planning documents that identify implementation strategies for capital improvement, risk reduction, system upgrades, and operations. These documents complement the Plan and include but are not limited to: All Hazards SEMS/NIMS Emergency Response Plans, capital improvement plans, and asset management plans.

The Plan is a working document that will grow and change as our communities and MAs do. This means at times participating agencies may identify a higher priority than noted in this Plan, or a redirection of goals based on current information or updated decisions. In consideration of this concept, there may be projects or policies that need to be considered that were not included in this document. These changes will be documented during the Plan implementation and formal updates to the Plan will be made every five years as required.

1.1 PURPOSE OF THE PLAN AND AUTHORITY

Federal legislation has historically provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process (Public Law 106-390). This legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). The Pre-Disaster Mitigation Act of 2010 was signed into law in January of 2011 but does not impact the planning process. The 2010 Act reauthorizes the pre-disaster mitigation program.

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies the requirements that allow HMGP funds to be used for planning activities and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving pre- or post-disaster funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network is intended to enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

FEMA prepared the Final Rule, published in the Federal Register on September 16, 2009 (Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201 and 206)), which establishes planning and funding criteria for states and local communities.

For federal approval, the following criteria must be met during the planning process:

- Complete documentation of the planning process.
- Detailed risk assessment of hazard exposures in the community and water and wastewater infrastructure.
- Comprehensive mitigation strategy, describing goals and objectives, proposed strategies, programs and actions to avoid long-term vulnerabilities.
- A planned maintenance process will describe the method and schedule of monitoring, evaluating and updating the plan, and the integration of the Plan into other planning mechanisms.
- The formal adoption of the governing bodies of each participating jurisdiction.
- Plan review by both Cal OES and FEMA.

As the cost of recovering from natural disasters continues to increase, the MAs realize the importance of identifying effective ways to reduce vulnerability to disasters. Hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while guiding and coordinating mitigation activities.

The Orange County Water and Wastewater Hazard Mitigation Plan (HMP or Plan) provides a framework for participating water and wastewater utilities to plan for natural and man-made hazards in Orange County. The resources and information within the Plan will allow participating jurisdictions to identify and prioritize future mitigation projects, meet the requirements of federal assistance programs and grant applications, and encourage coordination and collaboration in meeting mitigation goals.

The Plan is intended to serve many purposes, including:

- *Enhance Public Awareness and Understanding* – To help county residents better understand the natural and man-made hazards that threaten public health, safety, and welfare; economic vitality; and the operational capability of important facilities;

- *Create a Decision Tool for Management* – To provide information so that water and wastewater managers and leaders of local government may act to address vulnerabilities;

- *Enhance Local Policies for Hazard Mitigation Capability* – To provide the policy basis for mitigation actions that will create a more disaster-resistant future;

- *Provide Inter-Jurisdictional Coordination of Mitigation-Related Programming* – To ensure that proposals for mitigation initiatives are reviewed and coordinated among MWDOC and MAs; and

- *Promote Compliance with State and Federal Program Requirements* – To ensure that MWDOC and MAs can take full advantage of state and federal grant programs, policies, and regulations.

To qualify for certain forms of federal aid for pre- and post-disaster funding, local jurisdictions must comply with the federal DMA 2000 and its implementing regulations. The Plan has been prepared to meet FEMA and Cal OES requirements, thus making MWDOC and the participating MAs eligible for funding and technical assistance for State and federal hazard mitigation grant programs.

DMA 2000 requires local hazard mitigation plans, including this Plan, to be updated every five years. This means that the Plan is designed to carry the MAs through the next five years, after which its assumptions, goals, and objectives will be revisited, updated, and resubmitted for approval.

1.2 MULTI-JURISDICTIONAL PARTICIPATION

1.2.1 Overview of Water and Wastewater Systems in Orange County

Water distribution and wastewater collection and treatment in Orange County involves dozens of agencies and utilities working together, and relies on integrated, regional systems and facilities. There are several retail water and wastewater utilities in Orange County, each with its own distinct service area and sources of potable water. The retail water agencies include water districts and city water departments.

The Municipal Water District of Orange County (MWDOC) is a wholesale water supplier and resource planning agency that serves all of Orange County (except Anaheim, Fullerton, and Santa Ana) through 28 retail water agencies. MWDOC purchases imported water from the Metropolitan Water District of Southern California (Metropolitan) for distribution to its member agencies, which provide retail water services to the public. Local supplies meet more than half of Orange County's total water demand. To meet the remaining demand, MWDOC purchases imported water from northern California (through the State Water Project) and the Colorado River. This water is provided by Metropolitan, which in addition to Orange County, also serves Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties.[1]

Local water supplies in Orange County vary regionally and include groundwater, recycled wastewater, and surface water. Water supply resources in MWDOC's service area include groundwater basins, which provide a reliable local source and are also used as reservoirs to store water during wet years and draw from storage during dry years. Recycled water and surface water provide an additional local source to some MWDOC retail agencies, with surface water captured mostly from Santiago Creek into Santiago Reservoir.[2]

The Orange County Water District (OCWD) manages and replenishes the Orange County Groundwater Basin (Basin), ensures water reliability and quality, prevents seawater intrusion, and protects Orange County's rights to Santa Ana River water. The Basin contains approximately 500,000 acre-feet of usable storage water and covers 270 square miles. The Basin is a reliable source of water and provides approximately 75 percent of north and central Orange County's water supply, as south Orange County is virtually 100 percent dependent on imported water.[3]

MWDOC and OCWD work cooperatively and continue to evaluate new and innovative programs, including seawater desalination, wetlands expansion, recharge facility construction, surface storage, new water use efficiency programs, and system interconnections for enhanced reliability.

Wastewater collection and treatment in Orange County is managed by two regional agencies: The Orange County Sanitation District (OCSD) and the South Orange County Wastewater Authority (SOCWA). OCSD and SOCWA, which cover north and central Orange County and south Orange County, respectively, are responsible for the trunk line collection, treatment, biosolids management, and ocean outfalls for treated wastewater disposal. OCSD has two primary treatment facilities and SOCWA has three primary treatment facilities that treat wastewater from residential, commercial and industrial sources.

[1] Municipal Water District of Orange County, *2015 Urban Water Management Plan*, May 2016.
[2] Ibid.
[3] Orange County Water District, *OCWD Brochure*, July 2017.

1.2.1.1 Potable Water Supplies – Current and Future

Potable water demand for Orange County was about 485,000 acre-feet per year (AF/yr) in 2017. The County's population is projected to rise from 3.1 million to 3.7 million people by 2025, and potable water demand is projected to rise at just about the same rate to about 575,000 AF/yr.

With planned local water-supply projects plus the continued availability of Metropolitan water to replenish the OCWD Basin, demand projections show a 12 percent decrease in demand for imported, full-service Metropolitan water by 2025. If the local projects do not get built or produce less than planned or are merely delayed, then additional Metropolitan water will be needed.

1.2.2 Participating Jurisdictions

Following is a list of the jurisdictions (MAs) participating in the Plan update; refer to Figure 1-1. This list is organized first by the four utilities that have regional management responsibilities that extend to several water districts or city utilities and then by local water retail utilities:

- Municipal Water District of Orange County
- Orange County Water District
- Orange County Sanitation District
- South Orange County Wastewater Authority
- City of Buena Park (Utilities Division)
- El Toro Water District
- City of Garden Grove Water Division
- City of La Habra (Water Division and Wastewater Division)
- Laguna Beach County Water District
- Mesa Water District
- Moulton Niguel Water District
- City of Newport Beach (Utilities Department)
- City of Orange (Water and Wastewater Division)
- Santa Margarita Water District
- Serrano Water District
- South Coast Water District
- Trabuco Canyon Water District
- City of Westminster (Water Division)
- Yorba Linda Water District
- Garden Grove Sanitary District

It should be noted that the City of Tustin was a participant in the original 2007 Plan and 2012 Update; however, the City is not a participant in the 2018 Update. It should also be noted that the Cities participating in the Plan did not represent all of the services of that city, but rather only the services noted being water or/and wastewater. This focus was purposeful to support the collaboration of these services on a regional and local level. Additionally, the city services participating are typically "enterprise funds," which allowed for those services to participate in a hazard mitigation process regardless of whether the entire city could support the planning process fiscally through funding and staff commitments.

Retailers can be grouped into the following three regions based on the availability of local groundwater resources:

- The Basin provides approximately 75 percent of north and central Orange County's water supply. The rest of their supply is primarily imported water provided by Metropolitan; although Serrano Water District and the City of Orange are partly served by local runoff captured in Irvine Lake. Participating MAs within the Basin include the water departments for the cities of Buena Park, Garden Grove, Newport Beach, Orange, and Westminster and the Mesa, Serrano, and Yorba Linda water districts.

- South Orange County is almost 100 percent dependent on Metropolitan for its potable water supply. Parts of this area are within the San Juan Capistrano Groundwater Basin, which is managed by the San Juan Basin Authority. Local groundwater in the area is high in salts and accounts for less of the water supply than utilities in the OCWD Basin. MAs include El Toro, Laguna Beach County, Moulton Niguel, Santa Margarita, South Coast, and Trabuco Canyon water districts.

- The Brea/La Habra region receives groundwater from the San Gabriel Basin in Los Angeles County through the California Domestic Water Company and from Metropolitan. Of the two utilities in the region, the City of La Habra is a MA. The city also operates a small groundwater well.

Although located within Orange County, the participating MAs do not comprise or serve the entire County. In addition, the service areas for each of the MAs participating in the Plan do not necessarily align with incorporated or unincorporated boundaries or city boundaries. In many cases a MA may serve multiple cities and/or portions of cities/unincorporated areas. This includes even the city MA further contributing to why some city MA choose to participate in a sector specific hazard mitigation plan process. Profiles for each of the participating water and wastewater utilities are provided in the Jurisdictional Annexes.

The Plan must be formally adopted by each jurisdiction's governing body, which may be the Board of Directors for each agency and districts and the City Council for each city water and/or wastewater department. In order to meet the FEMA guidelines for mitigation plans to address a jurisdiction in its entirety, the participating cities have a current adopted, or are in the process of completing, a single-jurisdiction local hazard mitigation plan in effect for the entire city. In these cases, it has been incumbent upon the individual cities and their decision-makers to decide how best to integrate elements of this Plan into its overall mitigation strategy and other existing plans and processes. Information on each participating city's single-jurisdiction mitigation plan has been provided within their respective annex for cross-reference. It is recognized that eligibility for hazard mitigation grant funding for the city water and/or wastewater services within this plan, will occur through an approved and adopted city-wide mitigation plan.

The resources and background information in the Plan are applicable countywide, providing the groundwork for goals and recommendations for other local mitigation plans and partnerships. In the identification of shared action items, the Plan fosters the development of partnerships and implementation of preventative activities. A unified, multi-jurisdictional plan will ensure that any proposals for mitigation initiatives are reviewed and coordinated among the participating agencies and utilities.

1.3 WHAT IS NEW/WHAT HAS CHANGED FROM THE 2012 PLAN

Several sections of the 2018 Plan update have been modified from the original 2007 Plan and 2012 Plan update, including the use of annexes for each of the participating jurisdictions. Changes made to specific sections of the Plan are summarized below:

Several sections of the 2018 Plan update have been modified and reorganized from the original 2007 Plan and 2012 Plan update, including the use of annexes for each of the participating jurisdictions. Changes made to specific sections of the Plan are summarized below:

- *Section One:* Section One has been significantly modified to move profile information specific to each participating jurisdiction to the Jurisdictional Annexes. Text has also been modified to clarify the multi-jurisdictional involvement, updated outdated or irrelevant information, and to streamline the section. This subsection, what is new/what has changed from the 2012 plan, has also been added.

- *Section Two:* Section Two now documents the Planning Process. This section has been completely revised and updated to discuss the process for the Plan update, including the Planning Team, meetings, public outreach, and overall process for the Plan update.

- *Section Three:* Section Three now comprises the Risk Assessment. The hazards have been updated to reflect hazards that affect the planning area, as determined by the Planning Team. This includes the removal of tornados and extreme heat (included in the 2012 plan) and the addition of power outage and climate change. In some cases, the hazards were reorganized or combined under a primary heading, such as Geologic Hazards, which includes expansive soils and land subsidence and Seismic Hazards, which include fault rupture, ground shaking and liquefaction. Each of the hazard profiles were updated to reflect hazard occurrences (if any) since the 2012 plan was prepared.

  In preparation of the 2018 Plan update, infrastructure mapping for each of the MAs was completed. An independent consultant working directly with MWDOC (who coordinated with the MAs), updated water and wastewater infrastructure information for each MA. As part of the 2018 Plan update, these critical facilities were overlaid with mapped hazard areas to determine which assets are in each hazard area and to assess overall vulnerabilities.

- *Section Four:* Section Four now documents the Mitigation Strategy. This section was renamed and includes overarching hazard mitigation goals for the planning area. It was determined through the Planning Team meetings that mitigation goals are similar for all participating jurisdictions and therefore one set of goals were developed. Some participating jurisdictions identified additional goals specific to their agencies, which have been included in the respective Jurisdictional Annex. Updated mitigation actions and capabilities assessments specific to each participating jurisdiction have been moved to the Jurisdictional Annexes. An overview of hazard mitigation is provided, including the methodology for identifying and prioritizing mitigation actions.

- *Section Five:* Section Five now documents the Plan Maintenance process. This section involves minor modifications and updates.

- *Section Six:* Section Six now documents the Plan references and has been updated to reflect references used in preparation of the 2018 Plan update.

- *Jurisdictional Annexes:* The Jurisdictional Annexes are new to the Plan update. An annex is provided for each MA and includes updated components of the hazard mitigation plan that are specific to each jurisdiction.

- *Appendices:* The Appendices have been completely updated to include 2018 Plan update materials.

1.4 PLAN ORGANIZATION

The Orange County Regional Water and Wastewater HMP is organized into the following sections:

- *Section One – Introduction:* Provides an overview of the Plan, a discussion of the Plan's purpose and authority, a description of the multi-jurisdictional participation, a summary of how this update differs from previous versions of the Plan and describes the Plan's organization.

- *Section Two – Planning Process Documentation:* Describes the HMP planning process, as well as the meetings and outreach activities undertaken to engage the MAs and the public.

- *Section Three – Risk Assessment:* Identifies and profiles the hazards that threaten the area served by the MAs and identifies the vulnerability and risk to critical water and wastewater infrastructure associated with each hazard. Due to the vast planning area associated with the MAs participating in the Plan, this section addresses the entire geographic area served by the MAs. The Jurisdictional Annexes detail the hazards, risk assessments, and mitigation strategies specific to each MA.

- *Section Four – Mitigation Strategy:* Includes multi-jurisdictional goals for the 2018 Plan and summarizes the mitigation action plan process. Mitigation actions and capabilities specific to each MA are detailed in the Jurisdictional Annexes.

- *Section Five – Plan Maintenance:* Discusses how the 2018 Plan update will be monitored, evaluated, and updated over the next five years.

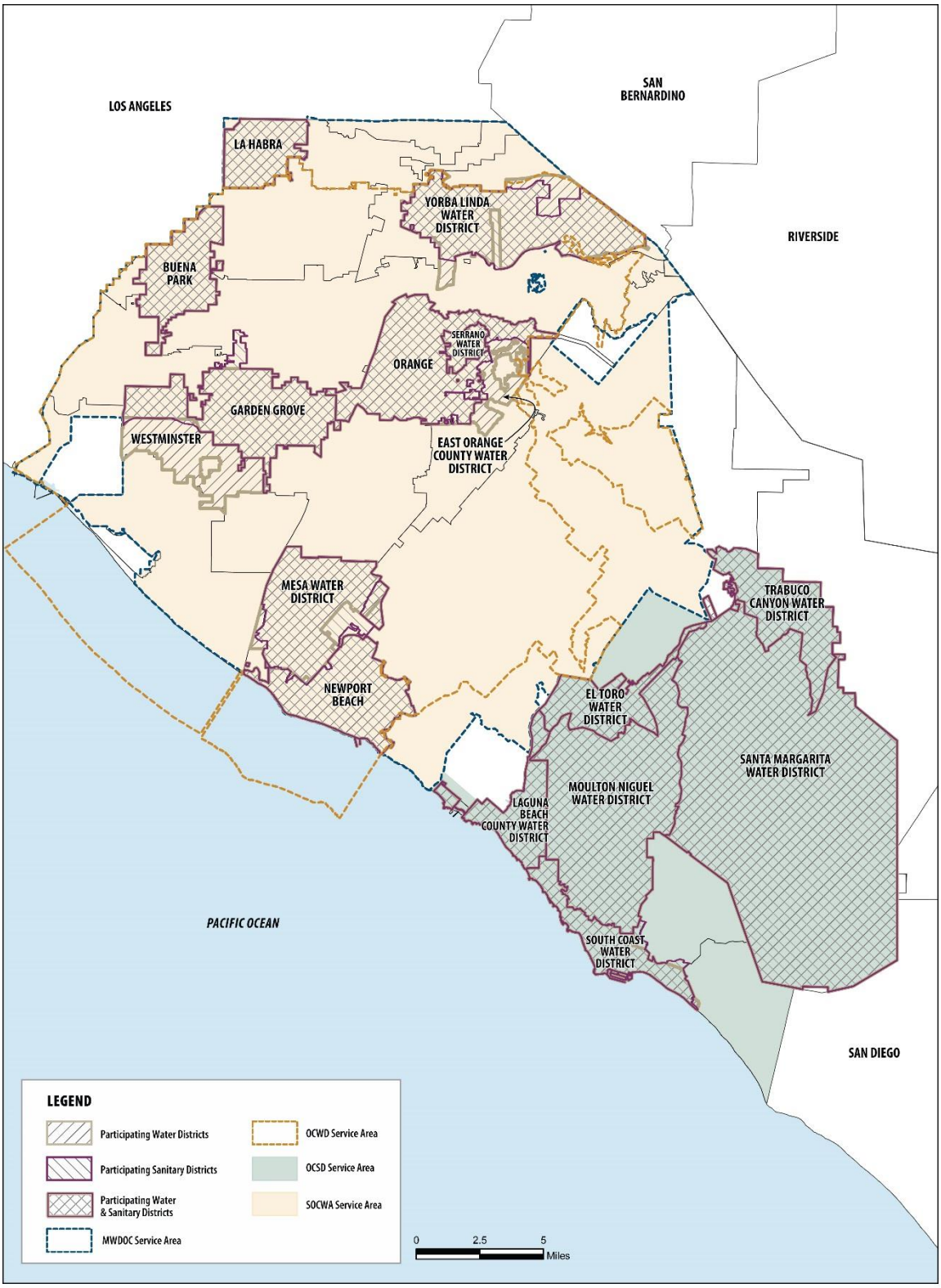
- *Section Six – References:* Identifies the resources used in preparation of the 2018 Plan update.

- *Jurisdiction Annexes:* Provides a profile of the jurisdiction, describe the hazards, assess the vulnerabilities, identify the capabilities, and describe the mitigation strategy specific to each participating jurisdiction.

- *Appendices:* Provides the 2018 Plan update materials.

Sections one through seven comprise the primary HMP. It describes the Plan, multi-jurisdictional planning process, and hazard mitigation planning requirements for each MA. The information in these sections are applicable to all the MAs. The Jurisdictional Annexes provide hazard mitigation planning information specific to each MA and supplements the information contained in the other sections.

Figure 1-1
Member Agency Plan Participants



SECTION 2 PLANNING PROCESS DOCUMENTATION

This section describes each stage of the planning process used to update the Multi-Hazard Mitigation Plan (Plan). The planning process provides a framework to document the Plan's update and follows the FEMA-recommended steps. The Plan update follows a prescribed series of planning steps, which includes organizing resources, assessing risk, updating the mitigation actions, updating the Plan, reviewing and revising the Plan, and adopting and submitting the Plan for approval. Each step is described in this section.

Hazard mitigation planning in the United States is guided by the statutory regulations described in the DMA 2000 and implemented through 44 Code of Federal Regulations (CFR) Parts 201 and 206. FEMA's hazard mitigation plan guidelines outline a four-step planning process for the development and approval of Hazard Mitigation Plans (HMPs). Table 2-1, *DMA 2000 CFR Crosswalk*, lists the specific CFR excerpts that identify the requirements for approval.

Table 2-1
DMA 2000 CFR Crosswalk

DMA 2000 (44 CFR 201.6)	2018 Plan Update Section
(1) Organize Resources	Section 3
201.6(c)(1)	Organize to prepare the plan
201.6(b)(1)	Involve the public
201.6(b)(2) and (3)	Coordinate with other agencies
(2) Assess Risks	Section 4
201.6(c)(2)(i)	Assess the hazard
201.6(c)(2)(ii) and (iii)	Assess the problem
(3) Develop the Mitigation Plan	Section 5
201.6(c)(3)(i)	Set goals
201.6(c)(3)(ii)	Review possible activities (actions)
201.6(c)(3)(iii)	Draft an action plan
(4) Plan Maintenance	Section 6
201.6(c)(5)	Adopt the plan
201.6(c)(4)	Implement, evaluate, and revise

As documented in the corresponding sections, the planning process for the 2018 Plan update is consistent with the requirements for hazard mitigation planning with customizations, as appropriate. All basic federal guidance documents and regulations are met through the customized process.

2.1 ORGANIZING RESOURCES

One of the first steps in the planning process involved organization of resources, including identifying the Project Management Team, and convening the Hazard Mitigation Plan Planning Team (Planning Team) and performing document review.

2.1.1 PROJECT MANAGEMENT TEAM

The Project Management Team was responsible for the day-to-day coordination of the Plan update work program, including forming and assembling the Planning Team; scheduling Planning Team meetings; preparing, reviewing, and disseminating Planning Team meeting materials; coordinating, scheduling, and participating in community engagement activities and meetings; and coordinating document review. The Project Management Team was led by an Emergency Coordinator from the Water Emergency Response Organization of Orange County (WEROC), administered by the Municipal Water District of Orange County (MWDOC), who served as Project Manager and participated on the Planning Team. The Project Manager monitored planning progress and met with participating jurisdictions as needed to assist with obtaining and updating information for the Plan. The Project Management Team also included the Emergency Manager from WEROC/MWDOC, who served as the Project Manager for the 2012 Plan update and provided guidance as well as historical insight and knowledge associated with the 2012 Plan.

The Project Management Team worked directly with the Consultant Project Management Team throughout development of the Plan update. The Consultant Team, consisting of a variety of hazard mitigation/planning professionals, provided guidance and support to MWDOC and the Planning Team through facilitation of the planning process, data collection, community engagement, and meeting material and document development.

2.1.2 PLANNING TEAM

The planning process for the Plan update involved ten water districts, two regional wastewater agencies, and the water departments for eight cities; a total of 20 jurisdictions participated in the planning process. Representatives from all Member Agencies (MA) provided input into the Plan update process. Each of the MA provided at least one representative to participate on the Planning Team and attend meetings. Each local team, made up of other jurisdictional staff/officials, met separately and provided additional local-level input to the Planning Team representative for inclusion into the Plan. The MA participated in the planning process by exchanging information, discussing planning strategies, sharing goals, resolving issues, and monitoring progress. The MA benefited from working closely together because many of the hazards identified are shared by neighboring jurisdictions and participants were involved in the discussion of potential mitigation actions. Jurisdictional representatives included but were not limited to utility engineers, planners, and emergency management officers.

The Planning Team worked together to ensure the success of the planning process and is responsible for its implementation and future maintenance. The Planning Team's key responsibilities included:

- Participation in Planning Team meetings.
- Coordination of jurisdiction-specific meetings to relay information and obtain input.
- Collection of valuable local information and other requested data.
- Decision on plan process and content.
- Development and prioritization of mitigation actions for the Plan.
- Review and comment on Plan drafts.
- Coordination and involvement in the public engagement process.

Table 2-2, *Members of the Planning Team*, identifies the Planning Team members and their roles in the Plan update.

Table 2-2
Members of the Planning Team

Name	Title/Role	Organization	Planning Team Role
Francisco Soto	Emergency Programs Coordinator/Plan Update Project Manager	WEROC/MWDOC	Project Manager/Planning Team Representative – Organization of Planning Team and meetings, development of and participation in community outreach, hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan coordination and review.
Kelly Hubbard	WEROC Programs Manager	WEROC/MWDOC	Project Management Team – Historical knowledge and insight into 2012 Plan, overall guidance on 2018 Plan update, hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Karl Seckel	Assistant General Manager	MWDOC	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Paula Bouyounes	Risk and Safety Manager	Orange County Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Rod Collins	Safety and Health Supervisor	Orange County Sanitation District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Richard Spencer	Human Resources/Risk Manager	Orange County Sanitation District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Sean Peacher	Environmental Compliance Safety Risk Manager	South Orange County Wastewater Authority	Capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Bill Paddock	Supervising Mechanic	South Orange County Wastewater Authority	Hazard identification.
Michael Grisso	Utilities Manager	City of Buena Park	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Sherri Seitz	Public Relations/ Emergency Preparedness Administrator	El Toro Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Rick Olson	Operations Superintendent	El Toro Water District	Hazard identification, capabilities assessment.
Katie Victoria	Senior Administrative Analyst	City of Garden Grove	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Raquel Manson	Senior Administrative Analyst	City of Garden Grove	Hazard identification, capabilities assessment.

Table 2-2 [continued]
Members of the Planning Team

Name	Title/Role	Organization	Planning Team Role
A.J. Holmon	Streets/Environmental Division Manager	City of Garden Grove	Hazard identification.
Brian Jones	Water and Sewer Manager	City of La Habra	Hazard identification, mitigation actions and prioritization.
Leo Lopez	Safety Officer	Laguna Beach Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Kaying Lee	Water Quality and Compliance Supervisor	Mesa Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Tracy Ingebrigtsen	Safety and Compliance Coordinator	Moulton Niguel Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Dan West	Water Distribution Supervisor	Moulton Niguel Water District	Hazard identification, capabilities assessment.
Kevin Crawford	Operator	Moulton Niguel Water District	Hazard identification.
Todd Novacek	Director of Operations	Moulton Niguel Water District	Hazard identification.
Casey Parks	Water Production Supervisor	City of Newport Beach	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Steffen Catron	Utilities Manager	City of Newport Beach	Hazard identification, mitigation actions and prioritization, plan review.
Mark Ouellette	Supervisor	City of Orange	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Chris Lopez	Safety Specialist	Santa Margarita Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Daniel Peterson	Operations Business Manager	Santa Margarita Water District	Hazard identification.
Jerry Vilander	General Manager	Serrano Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Trisha Woolslayer	Environmental Health and Safety Manager	South Coast Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Lorrie Lausten	Principal Engineer	Trabuco Canyon Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Becky Rodstein	Administrative Analyst	City of Westminster	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.

Table 2-2 [continued]
Members of the Planning Team

Name	Title/Role	Organization	Planning Team Role
Anthony Manzano	Senior Project Manager	Yorba Linda Water District	Hazard identification, capabilities assessment, goal development, mitigation actions and prioritization, plan review.
Ethan Brown	Senior Program Coordinator	Orange County Sheriff's Department Emergency Management	Overview and perspective of the plan preparation process and review; information relevant to their area of expertise.

It should be noted that although 20 MA participated in the Plan, all MWDOC's 28 MA were invited to participate in the Plan either through an Annex or as part of the Planning Team. In addition, through the Orange County Emergency Management Organization (OCEMO), the County of Orange, and all cities within the county were provided the opportunity to participate in the Plan process, including dissemination of the Draft Plan to OCEMO's distribution list for review and comment. This includes all Orange County cities, colleges, and school districts; special districts; water districts; State and county agencies; hospital association; affiliates and other approved agencies; refer to Appendix B.

MWDOC also provided an opportunity for State and county agencies and emergency services providers to be part of the Planning Team. Email invitations were extended to the following:

- State Water Resources Control Board
- Orange County Health Care Agency
- Orange County Fire Agency
- Orange County Sheriff's Department

Businesses, academia and other private and non-profit interests were provided notification of the Draft Plan's availability via the MA email distribution and notification lists and social media. Distribution documentation will be provided in Appendix B of the Final Plan.

The Planning Team held five meetings. The meetings were designed to aid the MA in completing a thorough review of the hazards within their jurisdictions, identifying capabilities, understanding and assessing vulnerabilities, and identifying mitigation strategies. Table 2-3, *Planning Team Meeting Summary*, provides a summary of the meetings. Meeting materials, including PowerPoint presentations, sign-in sheets, agendas, notes, and other relevant handouts are provided in Appendix B.

Table 2-3
Planning Team Meeting Summary

Date	Meeting	Discussion
July 26, 2017	Planning Team Meeting #1	• Introductions • Project goals and objectives • Roles and responsibilities • Data/information needs • Plan Update and requirements • Preliminary discussion of community engagement strategy • Hazard identification and prioritization • Meeting schedule
August 30, 2017	Planning Team Meeting #2	• Summary of hazard profiles • Risk assessment methodology • Capabilities assessment • Community engagement update • Data/information needs
September 27, 2017	Planning Team Meeting #3	• Review/update of goals • Discussion of mitigation actions • Community engagement update • Capabilities assessment • Data/information needs
January 23, 2018	Planning Team Meeting #4	• Overview of process • Public involvement and survey results • Overview of vulnerability/risk assessment • Discussion of hazard mapping • Schedule for plan review and submittal
April 11, 2018	Planning Team Meeting #5	• Review of Draft Plan • Discussion of comments and revisions
April 11, 2019	Planning Team	• Meeting with specific MA to address comments from FEMA

In addition to the regularly scheduled meetings, Planning Team members coordinated individually with the Plan Update Project Manager, as necessary, to resolve any questions or discuss information requested at the Planning Team meetings. This was typically accomplished via telephone or email. Any MA that missed a scheduled planning meeting coordinated with the Project Manager separately to review what was discussed in the meeting and to obtain jurisdiction-specific information. The City of Orange was not able to participate directly in the scheduled Planning Team meetings and met separately with the Plan Update Project Manager to review items discussed at the meetings and provide information necessary for the Plan update.

2.1.3 PUBLIC OUTREACH

A public outreach and engagement strategy was developed to inform the public and maximize public involvement in the Plan update process. The public outreach strategy included posting information on the MA websites, email and social media distribution, community survey, and presentations at the Orange County Business Council and Orange County Emergency Management Organization meetings, as described below; refer to Appendix B.

MEMBER AGENCY WEBSITES

Information regarding the Plan update was made available on each MA website. The webpages provided information on the Plan, the Plan update process, and how the public can be involved in the planning process, including a link to the community survey (discussed below). A link to the draft Plan was also made available for review and comment.

SOCIAL MEDIA

Social media notifications regarding the Plan update, including a link to the community survey were sent to MA social media accounts.

COMMUNITY SURVEY

A community survey was developed to obtain input from the community about various hazard mitigation topics. The survey was designed to help the MA gauge the level of knowledge the community has about natural disaster issues and to obtain input about areas of the County that may be vulnerable to various types of natural disasters. The information provided was used to identify and coordinate projects focused on reducing the risk of injury or damage to property from future hazard events. A link to the survey was provided on each of the MA websites. Twenty surveys were completed.

STAKEHOLDER OUTREACH

Orange County Business Council – August 8, 2017

The Plan Update Project Manager presented to the Orange County Business Council during their monthly meeting. Francisco presented about hazard mitigation, the planning process, hazards affecting Orange County water and wastewater infrastructure, and the importance of their involvement in the development process. Participants of this meeting were extended the opportunity to be part of the Planning Team and/or provide information and input through the process, including:

- Orange County Transportation Authority (OCTA)
- Metropolitan Water District of Southern California (Metropolitan)
- Southern California Association of Governments (SCAG)
- California Department of Transportation (Caltrans)
- Transportation Corridor Agency (TCA)

Orange County Emergency Management Organization – April 5, 2018

The Plan Update Project Manager presented to the OCEMO during their monthly meeting. OCEMO is a subcommittee comprised of the County of Orange and all subdivisions that ensure the cooperative maintenance of the Operational Area Emergency Operations Plan, policies and procedures, training and exercises. Francisco presented about hazard mitigation, the planning process, hazards affecting Orange County water and wastewater infrastructure, and the importance of their involvement in the development process. As noted previously, the Draft Plan was disseminated to OCEMO's distribution list for review and comment; refer to Appendix B.

Public Review Draft Hazard Mitigation Plan

The public review draft Plan was made available to the public for review and comment for a 30-day period beginning August 10, 2018 and concluding on September 10, 2018. The draft Plan was made available on the MA webpages and at the MA offices and/or front counters. Information was provided on how to submit comments or ask questions regarding the draft Plan.

2.1.4 REVIEW AND INCORPORATE EXISTING INFORMATION

The Planning Team and each MA local team reviewed and assessed existing plans and studies available from local, state, and federal sources during the planning process. The types of documents reviewed and incorporated as part of the Plan update are listed in Table 2-4, *Existing Plans and Studies*. Due to the number of MA involved in the Plan update, similar plans and studies (e.g., General Plans, Municipal Codes, Urban Water Management Plans) specific to each jurisdiction were reviewed and incorporated in the Plan update. A complete list of references is included in Section 7.0, *References*.

2.2 ASSESS RISKS

In accordance with FEMA requirements, the Planning Team identified and prioritized the hazards affecting the County and assessed the associated vulnerability from those hazards. Results from this phase of the planning process aided subsequent identification of appropriate mitigation actions to reduce risk from these hazards; refer to Section 3.0.

Table 2-4
Existing Plans and Studies

Existing Plans and Studies	Planning Process / Area of Document Inclusion
Orange County Hazard Mitigation Plan	Hazard Profiles; Capabilities Assessment; Mitigation Strategy
State of California Multi-Hazard Mitigation Plan (2013)	Hazard Profiles
Agency Urban Water Management Plans	Hazard Profiles; Capabilities Assessment
Local General Plans	Hazard Profiles; Capabilities Assessment; Local Plan Integration
Local Municipal Codes	Capabilities Assessment; Mitigation Strategy
FEMA Hazard Mitigation How-to Guides	Plan Development; Plan Components
FEMA Local Mitigation Planning Handbook (March 2013)	Plan Development; Local Plan Integration Methods
FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (January 2013)	Mitigation Strategy Development
Orange County Water and Wastewater GIS Layers with Critical Infrastructure Facilities	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy
Seismic Hazard Assessment, Orange County Seismic Vulnerability, Mitigation and Recovery Planning Study (August 28, 2015)	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy
Agency-specific Reliability Studies	Hazard Profiles; Risk/Vulnerability Assessments; Mitigation Strategy

2.2.1 IDENTIFY/PROFILE HAZARDS

The Planning Team reviewed the hazards profiled in the 2012 Plan as well as a list of FEMA-identified hazards to determine which hazards had the potential to impact the County and should be profiled as part of the Plan update. Both the 2012 Plan and this Plan update include natural and human-caused hazards that may threaten all or a portion of the County and individual MA. It was noted that some location-specific hazards would not be applicable to every jurisdiction, but still warranted identification. Through discussions of the hazards, including the probability, location, maximum probable extent, and potential secondary impacts, a list of hazards was developed and prioritized. Content for each hazard profile is provided in Section 3.0.

2.2.2 ASSESS VULNERABILITIES

Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas within the County are vulnerable to specific hazard events. The vulnerability assessment included input from the Planning Team and a GIS overlaying method for hazard risk assessments using infrastructure mapping completed in preparation of the Plan update. Using these methodologies, water and wastewater infrastructure impacted by the profiled hazards were identified and potential loss estimates were determined. Detailed information on the vulnerability assessments for each hazard is provided in Section 3.0.

2.3 DEVELOP MITIGATION PLANS

The Plan update was prepared in accordance with DMA 2000 and FEMA's HMP guidance documents. This plan provides an explicit strategy and blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and the MA ability to expand on and improve these existing tools. Developing the mitigation plan involved identifying goals, assessing existing capabilities, and identifying mitigation actions. This step of the planning process is detailed in Section 4.0 and summarized below.

2.3.1 IDENTIFY GOALS

The Planning Team reviewed the goals identified in the 2012 Plan and determined that many of the MA shared similar goals. As a result, one set of regional goals were developed as part of the Plan update. The Mitigation Goals are presented in Section 4.0. For some MA, it was determined that additional goals specific to their agency were still warranted and are included in the Jurisdiction Annexes, where applicable.

2.3.2 DEVELOP CAPABILITIES ASSESSMENT

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to the MA to implement the mitigation actions that are prescribed in the Plan. The Planning Team reviewed planning and regulatory, administrative and technical, financial, and education and outreach capabilities to implement mitigation actions. Each MA reviewed capabilities information from the 2012 Plan and working with their local teams, identified and updated the capabilities assessment specific to their agency. The capabilities assessments for each MA are included in the Jurisdiction Annexes.

2.3.3 IDENTIFY MITIGATION ACTIONS

As part of the planning process, the Planning Team worked to identify and develop mitigation actions to address the profiled hazards. The mitigation actions in the 2012 Plan were reviewed to determine whether they had been achieved, were still relevant, or were no longer relevant due to changing circumstances. Each MA considered the hazards applicable to their agency and identified and prioritized mitigation actions. The mitigation actions for each MA are included in the Jurisdiction Annexes.

2.3.4 PLAN REVIEW AND REVISION

Once the draft Plan was completed, a public review period was provided from August 10, 2018 to September 10, 2018 to allow public review and comments. Comments received on the draft Plan were reviewed and the Plan was revised, as appropriate.

2.3.5 PLAN ADOPTION AND SUBMITTAL

This plan will be submitted and approved by FEMA and adopted by the MA approving bodies as the official statement of their hazards. Copies of the resolutions will be provided in Appendix A.

2.3.6 PLAN MAINTENANCE

Plan maintenance procedures, found in Section 5, include the measures each MA will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly monitored, reported upon, evaluated, and updated to remain a current and meaningful planning document.

SECTION 3 RISK ASSESSMENT

Risk Assessment requires the collection and analysis of hazard-related data to enable local jurisdictions to identify and prioritize appropriate mitigation actions that will reduce losses from potential hazards. FEMA's Local Hazard Mitigation Plan How-to Guide recommends four steps for conducting a risk assessment:

1. Describe hazards that pose a threat to the planning area;

2. Identify community assets (for the purposes of this Plan this includes water and wastewater infrastructure) in the planning area;

3. Analyze risks associated with the hazards, including describing the potential impacts and estimating losses for each hazard; and

4. Summarize vulnerability to understand the most significant risks and vulnerabilities associated with the identified hazards.

The risk assessment must result in an evaluation of potential impacts and overall vulnerability for each participating jurisdiction to develop specific mitigation actions. The following identifies the hazards for the entire planning area and notes if the hazard is applicable to all jurisdictions or is unique to specific jurisdictions. Hazards applicable to all jurisdictions are described in this section and are not described separately in the Jurisdictional Annexes. Hazards unique to a jurisdiction are further discussed in the Jurisdictional Annexes.

3.1 HAZARD IDENTIFICATION AND PRIORITIZATION

3.1.1 Hazard Identification

Hazard identification is the process of identifying hazards that threaten an area including both natural and man-made events. A natural event causes a hazard when it harms people or property. Such events would include floods, earthquakes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. Human-caused hazard events are caused by human activity and include technological hazards and terrorism. Technological hazards are generally accidental and/or have unintended consequences (for example, an accidental hazardous materials release). Terrorism is defined by the *Code of Federal Regulations* as "…unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." Natural hazards that have harmed the County in the past are likely to happen in the future; consequently, the process of identifying hazards includes determining if the hazard has occurred previously.

The Planning Team reviewed the list of FEMA-identified hazards, the 2012 Plan, as well as other relevant information to determine the extent of hazards with potential to affect the planning area; refer to Table 2-4, *Existing Plans and Studies*. A discussion of potential hazards during the first Planning Team meeting resulted in the identification of the natural and human-induced hazards that pose a potential risk to all or a portion of the County and individual Member Agency (MA). Table 3-1, *Hazard Identification*, summarizes the Planning Team's discussion and identification of the hazards for inclusion in the Plan update.

Table 3-1
Hazard Identification

List of Hazards	Included in 2012 Plan?	Included in 2016 Plan?	Discussion Summary
Avalanche	No	No	Not applicable. Snowfall is not a typical occurrence in Orange County and there is no historical record of this hazard in the region.
Climate Change	No	Yes	Climate change is a phenomenon that could exacerbate hazards. This hazard has been added to the Plan update.
Coastal Erosion	No	Yes	Coastal erosion and storms occur within the coastal communities, which include development along the coast. These hazards are combined in the Plan.
Coastal Storm	Yes	Yes	Coastal erosion and storms occur within the coastal communities. These hazards are combined in the Plan.
Contamination	Yes	Yes	Water supplies are susceptible to contamination from human activities. In addition, salt water intrusion has occurred previously due to the low water table.
Dam Failure	Yes	Yes	Several dams and reservoirs are located throughout the County or in areas that could impact the County in the event of a failure. Infrastructure is located within inundation areas. This hazard includes dams and reservoirs.
Disease/Pest Management	No	No	Not applicable. Disease/pest management is not a hazard that impacts water/wastewater facilities and infrastructure.
Drought	Yes	Yes	Water supplies are dependent upon groundwater and imported surface water, both of which are susceptible to drought. The County has experienced historical droughts, including the most recent State-declared drought emergency (2014-2017).
Earthquake Fault Rupture	Yes	Yes	Alquist-Priolo fault zones occur within the County. The County has a long history of earthquakes, some resulting in considerable damage. This topic has been combined with Seismic Hazards (Ground Shaking and Liquefaction).
Expansive Soils	Yes	Yes	Expansive soils conditions occur within portions of the County and can be exacerbated by seismic ground shaking. This topic is addressed under Geological Hazards.
Extreme Heat	Yes	No	Extreme heat is not a hazard that typically affects the County, which is characterized by mild temperatures. This hazard has been removed from the Plan update.
Flood	Yes	Yes	Portions of the County are located within floodplains and have experienced historic flooding. More localized flooding also occurs during rainstorms.
Geological Hazards	Yes	Yes	The County is located in an area of geological hazards, including seismic activity. This topic has been combined with Expansive Soils and Land Subsidence.
Hailstorm	No	No	Not applicable. Hailstorms rarely occur within the County and there is no historical record of this hazard in the region.
Hazardous Materials	Yes	Yes	Water supplies could be compromised from accidental or intentional release of hazardous materials. These topical areas are addressed under Human-Caused Hazards.

Table 3-1 [continued]
Hazard Identification

List of Hazards	Included in 2012 Plan?	Included in 2016 Plan?	Discussion Summary
Human-Caused Hazards	Yes	Yes	Water supplies could be compromised from release of hazardous materials or as a result of terrorist activities. Heightened security concerns have resulted in increased measures to protect infrastructure systems. These topical areas are addressed under Human-Caused Hazards.
Hurricane	No	No	Not applicable.
Land Subsidence	Yes	Yes	Land subsidence conditions occur within the County. This topic is addressed under Geological Hazards.
Landslide and Mudflow	Yes	Yes	Areas of the County are susceptible to landslide and mudflow which can be exacerbated by other hazards including seismic ground shaking, drought conditions, and wildfires.
Lightning	No	No	Not applicable. Although lightning sometimes occurs during storm events, it is limited within the region and there is no historical record of this hazard in the region.
Liquefaction	Yes	Yes	Liquefaction zones occur within the County. This topic has been combined with Earthquake Fault Rupture and Seismic Hazards (Ground Shaking and Liquefaction).
Power outage	No	Yes	Although typically associated with other hazards, power outages can directly impact water and wastewater systems and has been added to the Plan update.
Sea Level Rise	No	Yes	Sea level rise has been identified as a hazard affecting some of the coastal communities. This hazard has been added to the Plan update.
Seismic Hazards	Yes	Yes	The County has a long history of earthquakes, some resulting in considerable damage. This topic has been combined with Earthquake Fault Rupture and addresses Ground Shaking and Liquefaction.
Severe Winter Storm	No	No	Not applicable. Severe winter storms are not common in the County and there are no historical records of this hazard in the region.
Tornado	Yes	No	Tornados are not a typical occurrence in the County. This topic has been removed from the Plan.
Tsunami	Yes	Yes	Portions of the Orange County coastline are identified as tsunami inundation areas.
Volcano	No	No	Not applicable. There are no active volcanoes in the County or surrounding area.
Wildfire	Yes	Yes	Portions of the County are located within very high and high fire hazard zones, which are adjacent to existing urban development. Wildland and urban fires are combined topics in the Plan.
Wind	No	No	Regular wind is not a typical occurrence and does not cause severe damage within the area. High winds/Santa Ana winds are common throughout the County and are addressed in the Plan (see Windstorm below).
Windstorm	Yes	Yes	High Winds/Santa Ana Winds are a common occurrence in the planning area and can impact power transmission lines.

3.1.2 Hazard Prioritization

The Planning Team used a Microsoft Excel-based tool to prioritize the identified hazards by assigning each hazard a ranking based on probability of occurrence and the potential impact. These rankings were assigned based on a group discussion, knowledge of past occurrences, and familiarity with each MAs vulnerabilities. Four criteria were used to establish priority:

- Probability (likelihood of occurrence)
- Location (size of potentially affected area)
- Maximum Probable Extent (intensity of damage)
- Secondary Impacts (severity of impacts to community)

A value from 1 to 4 was assigned for each criterion. The four criteria were then weighted based on the Planning Team's opinion of each criterion's importance. Table 3-2, *Hazard Rankings*, presents the results of the hazard rankings.

Table 3-2
Hazard Rankings

Hazard Type	Probability	Impact			Total Score	Hazard Planning Consideration
		Affected Area	Primary Impact	Secondary Impact		
Power Outage	4	3	4	4	57.60	High
Wildfire	4	3	3	4	52.00	High
Seismic Hazards – Ground Shaking	3	3	4	4	43.20	High
Seismic Hazards – Liquefaction	3	3	4	4	43.20	High
High Winds/Santa Ana Winds	4	4	2	1	40.80	Medium
Drought	4	4	1	1	35.20	Medium
Dam/Reservoir Failure	2	3	4	4	28.80	Medium
Flood	3	3	2	1	25.80	Medium
Earthquake Fault Rupture	2	1	4	2	18.40	Medium
Landslide/Mudflow	2	2	2	3	18.00	Medium
Contamination	1	2	3	4	11.40	Low
Human-Cause Hazards – Terrorism	1	1	3	3	8.80	Low
Human-Caused Hazards – Hazardous Materials	1	1	2	3	7.40	Low
Urban Fire	1	1	2	1	5.40	Low
Geologic Hazards – Land Subsidence	1	1	1	2	5.00	Low
Geologic Hazards – Expansive Soils	1	1	1	2	5.00	Low
Tsunami	1	1	1	1	4.00	Low

Scores are based on a scale from 1 to 4, where 4 is the highest score and 1 is the lowest. Refer to Table 3-3 for additional information.
The total score is based on an equation that weights categories by importance. Refer to Table 3-3 for additional information.

Table 3-3, *Hazard Ranking Methodology*, provides additional detail regarding how the probability, affected area, and impact categories are weighted and how the total score is calculated for the hazard rankings.

Table 3-3
Hazard Ranking Methodology

Probability	**Importance**	**2.0**
Based on estimated likelihood of occurrence from historical data.		
Probability		*Score*
Unlikely (less than 1% probability in next 100 years or has a recurrence interval of greater than every 100 years)		1
Somewhat Likely (between 1% and 10% probability in next year or has a recurrence interval of 11 to 100 years)		2
Likely (between 10% and 100% probability in next year or has a recurrence interval of 10 years or less)		3
Highly Likely (near 100% probability in next year or happens every year)		4
Affected Area	**Importance**	**0.8**
Based on size of geographical area of community affected by hazard.		
Affected Area		*Score*
Isolated		1
Small		2
Medium		3
Large		4
Primary Impact	**Importance**	**0.8**
Based on percentage of damage to typical facility in community.		
Impact		*Score*
Negligible – less than 10% damage		1
Limited – between 10% and 25% damage		2
Critical – between 25% and 50% damage		3
Catastrophic – more than 50% damage		4

Secondary Impacts	**Importance**	**0.5**
Based on estimated secondary impacts to community at large.		
Impact		*Score*
Negligible – no loss of function, downtime, and/or evacuations		1
Limited – minimal loss of function, downtime, and/or evacuations		2
Moderate – some loss of function, downtime, and/or evacuations		3
High – major loss of function, downtime, and/or evacuations		4

Total Score = Probability x Impact, where:

Probability = (Probability Score x Importance)

Impact = (Affected Area + Primary Impact + Secondary Impacts), where:

Affected Area = Affected Area Score x Importance

Primary Impact = Primary Impact Score x Importance

Secondary Impacts = Secondary Impacts Score x Importance

Hazard Planning Consideration

Total Score	Range	Distribution	Hazard Level
0.0	20.0	0	Low
20.1	42.0	6	Medium
42.1	64.0	3	High

The probability of each hazard is determined by assigning a level, from unlikely to highly likely, based on the likelihood of occurrence from historical data. The total impact value includes the affected area, primary impact, and secondary impact levels of each hazard. Each level's score is reflected in the matrix. The total score for each hazard is the probability score multiplied by its importance factor times the sum of the impact level scores multiplied by their importance factors. Based on this total score, the hazards are separated into three categories based on the hazard level they pose to the communities: High, Medium, and Low.

It should be noted that climate change and coastal storm/erosion were not prioritized for the planning area; refer to the Jurisdiction Annexes for an assessment of each of the hazards specific to the individual jurisdiction. Although climate change is identified as a hazard in the Plan update, there was not consensus on how it impacts the individual jurisdictions. Similarly, coastal storm/erosion was considered distinct to specific MAs and potentially exacerbated by climate change. Regardless of the prioritization (low, medium, or high), it was determined by the Planning Team that all the hazards identified in Table 3-1 would be profiled. Due to the vast geography and hazards that impact the various MAs, it was recognized by the Planning Team that some hazards that ranked low overall, may be a high priority depending upon the jurisdiction.

3.2 HAZARD PROFILES

This section contains profiles for the hazards identified in Table 3-1. Due to the nature of the hazards, some hazards were combined for purposes of the profiles as noted in Table 3-1. Information was obtained from various Federal, State and local sources, as well as the Planning Team. A detailed list of References is provided in Section 6.0.

The service areas for each of the MAs participating in the Plan update do not always align with incorporated City or unincorporated County boundaries. In many cases, a MA may serve multiple cities and/or portions of cities/unincorporated areas. For purposes of this Plan update, the planning area refers to Orange County, since the MAs provide services and infrastructure throughout most of the County. Because much of the available hazard data is provided by jurisdictional boundary (County or City), it is not always possible to obtain or delineate data specific to the MA jurisdictional (service) boundary. The Jurisdictional Annexes detail the hazards, risk assessments, and mitigation strategies specific to each jurisdiction.

Each hazard profile addresses the following:

- *Description (Nature) of the Hazard:* Describes the hazard and its characteristics.

- *History/Past Occurrences:* Provides a history of the hazard and identifies previous occurrences. Where an occurrence is specific to a MA, this information is provided.

- *Location/Geographic Extent:* Describes the location (geographic) area affected by the hazard. If the hazard affects the entire planning area, it is noted. For geographically specific hazards, the specific MAs affected by the hazard are identified and discussed further in the Jurisdictional Annexes.

- *Magnitude/Severity:* Describes the extent (magnitude or severity) of each hazard. If a hazard has a uniform extent for all the MAs, it is noted. For geographically specific hazards, mapping is provided that illustrates the extent of the hazard for the entire planning area. Mapping for applicable hazards specific to a MA are provided in the Jurisdictional Annexes.

- *Probability of Future Occurrences:* Provides a discussion of the probability of future occurrences of the hazard based on the history of past occurrence, location, and severity. If the likelihood of occurrence is the same for all jurisdictions or varies amongst the jurisdictions, it is noted.

3.2.1 Climate Change

3.2.1.1 Description (Nature) of the Hazard

According to NASA's Global Climate Change website, the mean global temperature has increased 1.8 degrees Fahrenheit since 1880, and 17 of the 18 warmest years on record have occurred since 2001.[1] The scientific consensus is that these changes are the result of human activity increasing the levels of carbon dioxide and other greenhouse gases in the atmosphere, and that they will intensify. The Intergovernmental Panel on Climate Change forecasts temperatures to rise an additional 2.5 to 10 degrees over the next century. Such drastic changes to the earth's climate will have significant consequences around the globe. Long-term effects include rising sea levels due to melting ice, changes in precipitation patterns, heat waves, and more frequent and intense storms.

Based on local data from the National Oceanic and Atmospheric Administration (NOAA)[2], Orange County can expect to see its daily maximum temperature increase from a current annual average of 73 degrees to 78 degrees by 2100 under a low-emission scenario and 82 degrees under a high-emission scenario. The County currently experiences an average of 4.5 days a year where temperatures reach 95 degrees; that is projected to increase to as many as 31 days a year. Under both emission scenarios, the County is likely to see a 43 to 44 percent increase in the amount of rain that falls during the winter by the latter half of the century.

Climate Change presents a number of challenges for Orange County. According to the 2014 National Climate Assessment Report, as is common in coastal areas, many roads and bridges, high-priced homes, and wastewater systems are located in low-lying areas near the ocean. Increases in storm water runoff have the potential to overwhelm the capacity of wastewater and drainage systems, flood control channels, and pump stations. Climate change may endanger vulnerable coastal ecosystems and wildlife habitats or degrade water quality at beaches. In addition, because the region relies extensively on imported water, climate effects beyond Orange County, particularly in Northern California and the Colorado River watershed, will have consequences for the County's water supply.

Climate change may influence many of the other hazards addressed in this plan. As the oceans rise, more areas may be subject to coastal flooding and tsunami risk, coastal erosion may increase, and aquifers may be contaminated by additional salt water intrusion. Seasonal changes in rainfall may result in greater risk of flooding, dam failure, drought, wildfire, land subsidence, expansive soils, and landslides and mudflows. Extreme heat can reduce soil moisture, further exacerbating such hazards as drought, wildfire, and expansive soils.

This profile focuses on the hazard of coastal flooding as a result of sea-level rise, while any interactions between climate change and other hazards will be primarily addressed in those hazard profiles. In contrast to the Atlantic and Gulf coasts, where coastal flooding is mainly associated with major storms, flooding along the Pacific Coast is the result of a number of more subtle factors, including tidal cycles; the El Nino climate pattern; distant, wind-generated ocean swells; local storms; and the time of year. Sea-level rise means that more areas will be more susceptible to the complex interactions between these processes and more frequent flooding.

[1] NASA (2018, March 19). Global Climate Change Vital Signs of the Planet. https://climate.nasa.gov/. Accessed March 2018.

[2] U.S. Climate Resilience Toolkit, The Climate Explorer. https://toolkit.climate.gov/climate-explorer2/. Accessed March 2018.

3.2.1.2 History/Past Occurrences

NOAA offers an online Climate Explorer toolkit[3] that shows climate projections and observed historical trends by county. The data shows that, from 1949 to 2009, the daily maximum temperature in Orange County has been gradually rising at a rate of about 0.02 degrees Fahrenheit per year. This is expected to accelerate through the end of the century, although the degree depends on the success of efforts to limit global carbon emissions.

NASA reports that the global average sea level has risen almost 7 inches in the last 100 years. Rising sea levels have been observed in Orange County, as well. Measurements taken at Newport Beach since 1955 show that the sea level there has risen an average of 2.22 millimeters, or 0.09 inches, per year.[4] This is also expected to accelerate as more ice melts due to rising global temperatures.

King tides have flooded Orange County coastal communities, including Seal Beach, Huntington Beach, Balboa Peninsula and Balboa Island in Newport Beach, and Sunset Beach in the past.[5] In the last 10 years, the National Centers for Environmental Information (NCEI) Storm Events Database reports four coastal flooding incidents affecting Orange County: in October and November 2015, and May and October 2017. It is difficult to say how higher sea levels may have affected the severity of these events. The independent organization Climate Central estimates that La Jolla, California, located 46 miles from Huntington Beach, experienced 60 days of coastal flooding between 2005 and 2014, based on observed impacts such as flooded roads. Of those events, only four would have occurred without climate-linked sea-level rise.[6]

3.2.1.3 Location/Geographic Extent

Sea-level rise presents a risk for all coastal communities with low-lying areas. In Orange County, Huntington Beach is particularly vulnerable.

A 2017 report by the Union of Concerned Scientists, "When Rising Seas Hit Home," includes a mapping tool that shows what coastal areas will experience flooding at least 26 times a year under various sea-level rise scenarios. Under a moderate scenario of a 4-foot rise, the area of north Orange County roughly bounded by the Santa Ana River and State Route 22 will see 14 percent of its land chronically inundated by 2100, even with existing levees. With a rise of 6 feet, 24 percent of the land will be chronically inundated. Affected areas include neighborhoods in Seal Beach, Huntington Beach, and Newport Beach.

NOAA offers another mapping tool to visualize areas vulnerable to flooding due to climate change. Its Sea Level Rise Viewer projects that, with a 1-foot rise in sea levels, there will be flooding through many parts of southeastern Huntington Beach, including neighborhoods between the Talbert Chanel and Huntington Beach Channel. A 2-foot rise will also start to affect parts of Sunset Beach and Balboa Island in Newport Beach, as well as less developed areas of Upper Newport Bay, Bolsa Chica Ecological Reserve.

[3] Available at https://toolkit.climate.gov/climate-explorer2/

[4] NOAA. Tides and Currents. https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9410580. Accessed March 2018.

[5] The OCR. January 10, 2017. Orange County Beach Cities Bracing for 7-foot King Tides; Flooding Possible. https://www.ocregister.com/2017/01/10/orange-county-beach-cities-bracing-for-7-foot-king-tides-flooding-possible/. Accessed March 2018.

[6] Climate Central, Surging Seas Risk Finder. https://riskfinder.climatecentral.org/place/huntington-beach.ca.us?comparisonType=place&forecastName=Single-year&forecastType=NOAA2017_int_p50&level=3&unit=ft. Accessed March 2018.

3.2.1.4 Magnitude/Severity

Sea level is measured by local tide gauges and satellite. Sea-level rise describes projected changes in those measurements based on different climate models. NOAA's Sea Level Rise Viewer projects that the sea level at Newport Bay will rise by at least 0.75 feet and as much as 2.72 feet by 2050, based on different global scenarios. By 2100, the level may rise by as much as 10.14 feet under the most extreme scenario.

3.2.1.5 Probability of Future Occurrences

FEMA's Flood Insurance Rate Map (FIRM) panels, which show areas that are subject to a 1 percent annual chance of flooding, reflect only current risk; they do not attempt to make projections based on anticipated changes due to climate change and sea-level rise.

Climate Central's Surging Sea Risk Finder attempts to estimate the probability that coastal floods will reach elevations above the local high tide line. The tool does not have estimates for every tide gauge, and estimates for Orange County are based on data from the gauge at Los Angeles' Outer Harbor. It shows that, while there is currently less than a 1 percent chance of coastal flooding reaching areas three feet above the tide line in any given year, those chances increased to 6 percent annually by 2040 under a medium sea-level rise scenario. By 2070, these areas will be flooding every year. Under an extreme scenario, annual flooding will happen as soon as 2040.

3.2.2 Coastal Storms/Erosion

3.2.2.1 Nature of Hazard

Erosion is a naturally occurring phenomenon all along California's coastline. Erosion can be severe during winter storms, which are often accompanied by high surf, particularly during El Nino events. Rising sea levels caused by climate change will increase coastal erosion by exacerbating the impact of high tides and waves. Climate change is also expected to increase the frequency and severity of storms. As a result, even areas that have not experienced significant erosion in the past may be at risk in the future. (Effects of climate change are discussed in detail in Section 3.1.1).

Erosion can also be affected by manmade structures that impede the deposit of new sediment at beaches; these include inland dams, channelized rivers, harbors, jetties, and seawalls/revetments.[7] This has been the case in Orange County, where the channelization of the Santa Ana River has reduced the amount of sediment reaching the coast, while the construction of jetties at Anaheim Bay and breakwaters at Long Beach have changed deposit patterns.[8] This led to the formation of several chronic erosion hotspots along the County's coastline. In some cases, long-term beach replenishment efforts and management plans have been able to counteract or reverse these trends.

In addition to the gradual narrowing of sandy beaches, storms and erosion can damage steep coastal bluffs and cliffs. Landforms that appear to have been stable for years may retreat several feet in just a few hours. In either case, erosion can cause considerable damage to coastal infrastructure and property. As

[7] Coastal Erosion – Needs for Beach Nourishment. http://www.dbw.ca.gov/csmw/PDF/Results_From_CSMW_Task1.pdf.

[8] California Beach Restoration Study. January 2002. https://www.parks.ca.gov/pages/28702/files/cbrs_ch6_effectiveness.pdf.

Orange County's beaches are centers for recreation and tourism, loss of land has economic consequences, as well.

3.2.2.2 History/Past Occurrences

Problems with chronic erosion in Orange County have been recognized since at least 1945, when beach nourishment operations were undertaken to shore up the eroding Surfside-Sunset shoreline.[9] A 2006 U.S. Geological Survey (USGS) assessment of the entire California coast found that, between Los Angeles Harbor and Dana Point, the shoreline had receded since the early 1970s for 35 percent of the 29-miles coastline. Beach nourishment projects prevented further observable erosion during this period.

California typically experiences the most erosion during significant El Nino events. The three strongest El Nino events on record were during the winters of 1982-1983, 1997-1998, and 2015-2016. Historic erosion was reported all along the West Coast in 2015-2016, according to the USGS.[10] While the winter storms brought extreme wave action to California's shores, they featured surprisingly little rainfall. With California in the midst of a major drought, less sediment was washed to the ocean to replenish beaches. Portions of beaches in San Clemente and Laguna Beach were temporarily closed to the public due to hazardous conditions.[11]

3.2.2.3 Location/Geographic Extent

Orange County's coastline includes sand and cobble beaches, rocky cliffs and coastal bluffs, and intertidal areas. In general, beach erosion is more of an issue along the County's northern coast, while bluff retreat is a greater concern along the southern portion.

Beginning in 1964, the Orange County Erosion Control Project targeted Surfside-Sunset and West Newport Beach as locations in need of restoration. The U.S. Army Corps of Engineers spearheaded efforts to import sand and installing retention devices in these areas.

The 2006 USGS study found that West Newport Beach had the largest measurable erosion rate in Orange County between the early 1970s and 1998.

As part of the Coastal Storm Modeling System (CoSMoS), data available from the USGS shows the projected location of the California shoreline under various scenarios of sea-level rise. The Coastal Storm Modeling System (CoSMoS-COAST) shows that with a 3.3-foot rise in sea levels, Huntington State Beach will see the greatest erosion, followed by parts of Huntington City Beach, West Newport Beach, Surfside, and Bolsa Chica State Beach.

3.2.2.4 Magnitude/Severity

Erosion is usually described in terms of how much the beach width deceases per year. The 2006 USGS study, for example, found that erosion at West Newport Beach was at a rate of -2.2 meters per year.

[9] California Beach Restoration Study. January 2002. https://www.parks.ca.gov/pages/28702/files/cbrs_ch6_effectiveness.pdf.

[10] USGS. February 14, 2017. Severe West Coast Erosion During 2015-16 El Nino. https://www.usgs.gov/news/severe-west-coast-erosion-during-2015-16-el-ni-o.

[11] The Orange County Register. February 9, 2016. Our Eroding Coastline: Recent storms are reshaping beaches, and some are getting tougher to visit. https://www.ocregister.com/2016/02/09/our-eroding-coastline-recent-storms-are-reshaping-beaches-and-some-are-getting-tougher-to-visit/. Accessed August 2017.

Overall, the shoreline of Los Angeles Harbor and Dana Point grew by an average of 0.5 meters per year, the highest rate in all of California, due largely to beach nourishment projects. Among those sections that did experience erosion, it happened at an average rate of -0.5 meters per year.

The volume of sand used to fight erosion can also indicate the magnitude of the problem. For example, from 1945 to 2009, more than 20 million cubic yards of sediment has been added to Surfside-Sunset Beach.[12]

3.2.2.5 Probability of Future Occurrences

Climate change all but ensures that the entire Orange County coast will experience some degree of erosion through the end of the century. The amount will depend on how much sea levels rise, which is contingent on global efforts to curb greenhouse gas emissions. An online mapping tool produced by Our Coast Our Future, a collaborative effort of 15 organizations including the USGS and California Coastal Commission, using CoSMoS data projects that very few sections of the County's shoreline will maintain their current position assuming a 3.3-foot rise in sea level, even with the continuation of current beach nourishment efforts.

A new study released in 2017 using CoSMoS data found that, without human intervention, 31 to 67 percent of Southern California beaches may be completely eroded by 2100 if sea levels rise by 1 to 2 meters.[13]

3.2.3 Contamination/Salt Water Intrusion

3.2.3.1 Description (Nature) of the Hazard

GROUNDWATER CONTAMINATION

Groundwater contamination occurs when pollutants are released to the ground, navigate through the soil, and ultimately end up in the groundwater. Human activity is almost always the underlying cause of groundwater contamination. In areas where population density is high and human use of land is intensive, groundwater is especially vulnerable. Virtually any activity whereby chemicals or wastes may be released to the environment, either intentionally or accidentally, has the potential to pollute groundwater.

SALT WATER INTRUSION

When fresh water is withdrawn from aquifers at a faster rate than it is replenished, a drawdown of the water table occurs with a resulting decrease in the overall hydrostatic pressure. When this happens near a coastal ocean area, salt water from the ocean can intrude into the fresh water aquifer. The result is that fresh water supplies become contaminated with salt water.

[12] U.S. Army Corps of Engineers. 2012. Orange County Coastal Regional Sediment Management Plan Draft Report. http://www.dbw.ca.gov/csmw/pdf/OCCRSMP_DraftReport.pdf.

[13] USGS. March 27, 2017. Disappearing Beaches: Modeling Shoreline Chane in Southern California. https://www.usgs.gov/news/disappearing-beaches-modeling-shoreline-change-southern-california.

3.2.3.2 History/Past Occurrences

GROUNDWATER CONTAMINATION

Over the last several decades, Orange County's North Basin has experienced industrial solvent spills and leaks from manufacturing, metals processing businesses, and dry-cleaning facilities. As a result, a contamination plume several miles long and over a mile wide currently exists under the cities of Fullerton, Anaheim, and Placentia. The Orange County groundwater basin is a source of drinking water for the region, providing most of the water used in 22 cities. The contamination plume has already taken five wells off line, including three of Fullerton's 12 total wells. Those wells draw water from shallower sources closer to the surface and consequently are closer to the pollution. Under the supervision of the United States Environmental Protection Agency (USEPA), a remedial investigation and feasibility study will be conducted to address the extent of contamination and to develop an initial cleanup plan.

Salt Water Intrusion

In Orange County, by 1956, years of heavy pumping to sustain the region's agricultural economy had lowered the water table by 15-feet below sea level and saltwater from the Pacific Ocean had encroached as far as five miles inland. The area of intrusion is primarily across a four-mile front between the cities of Newport Beach and Huntington Beach known as the Talbert Gap. The mouth of an alluvial fan formed millions of years ago by the Santa Ana River; the Talbert Gap has since been buried along the coast by several hundred feet of clay. In 1976 the Water Factory 21 Direct Injection Project, operated by OCWD, began injecting highly treated recycled water into the aquifer to prevent salt water intrusion, while augmenting the potable groundwater supply. This system was shutdown to make way for the Groundwater Replenishment System (GWRS) Project which began operation in 2008. The GWRS provides highly treated water for injection into the seawater barrier system to prevent seawater intrusion into the groundwater basin managed by OCWD. As of March 21, 2018, approximately 248 billion gallons of water have been successfully treated and injected into the seawater barrier system.

3.2.3.3 Location /Geographic Extent

Groundwater contamination may occur County wide by means of intentional or accidental spillage to groundwater.

Conversely, the coastal area of the Basin is vulnerable to seawater intrusion due to geologic features and increased pumping from inland municipal wells to meet consumer demands. The susceptible locations in the Basin are the Talbert, Bolsa, Sunset, and Alamitos Gaps.

3.2.3.4 Magnitude/Severity

The 1974 Safe Drinking Water Act require the USEPA set standards for contaminants in drinking water that may pose health risks to humans. The USEPA standard for lifetime exposures in drinking water, the maximum contaminant level (MCL), is the highest amount of a contaminant allowed in drinking water supplied by municipal water systems.[14] In Orange County over 700 monitoring wells assess water quality conditions.[15] Thus, it is unlikely that human consumption of contaminated groundwater will occur. A

[14] USEPA. National Primary Drinking Water Regulations. https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.

[15] Orange County Water District Groundwater Management Plan. 2015. https://www.ocwd.com/media/3622/groundwatermanagementplan2015update_20150624.pdf.

large environmental spill could result in contamination of groundwater; however, the extent and the severity cannot be predicted. Based on historical occurrences, a contamination in the groundwater basin could extend several miles and result in water wells being unavailable.

Massive seawater intrusion has been prevented in Orange County by the OCWD basin management programs. However, the threat of saltwater intrusion along the coast is still present. To prevent further intrusion and to provide basin management flexibility, OCWD operates a hydraulic barrier system. A series of 23 multi-point injection wells four miles inland delivers fresh water into the underground aquifers to form a water mound, blocking further passage of seawater. Continued injection of recycled water into the aquifer is essential to keep saltwater from intruding into the groundwater table and contaminating a major source of the county's potable water. OCWD maintains the Coastal Aquifer Mergence Zones and Chloride Concentration map, which indicates a 250 mg/L Chloride Concentration Contour. This contour is used to indicate the approximate leading edge of seawater intrusion. OCWD monitors the movement of the chloride contour to provide an indication of whether seawater intrusion is worsening or improving in a given area.

3.2.3.5 Probability of Future Occurrences

Due to the amount and types of urban development that occur within the County, and the transportation systems that allow for the movement of hazardous materials through the County and greater region, future groundwater contamination is likely. However, as a result of groundwater monitoring and protection systems, human consumption of contaminated groundwater is unlikely.

Due to the successful operation of the OCWD basin management programs, the probability of saltwater intrusion to occur in the future is unlikely.

3.2.4 Dam/Reservoir Failure

3.2.4.1 Description (Nature) of the Hazard

Dam failures can result from several natural or human caused threats such as earthquakes, erosion of the face or foundation, improper silting, rapidly rising flood waters, malicious events, and structural/design flaws. Seismic activity can also compromise dam regulating structures, resulting in catastrophic flooding. A dam failure can cause loss of life, damage to property, the displacement of persons, and other ensuing hazards residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

In the event of a major dam failure, mutual aid from all levels of government would be required for an extended period. Recovery efforts would include the removal of debris, clearing roadways, demolishing unsafe structures, assistance in reestablishing public services, and providing continued care and welfare for the affected population.

There are 33 dams in Orange County with ownership ranging from the Federal government to homeowners' associations. These dams hold billions of gallons of water in reservoirs. The major reservoirs are designed to protect Southern California from flood waters and to store domestic and recycled water.

In addition to reservoirs with dams in Orange County, there are many water storage tanks that are potentially susceptible to failure or damage by natural or manmade events. These water tanks contain millions of gallons of water each and provide an important source of water storage. Their capacity is large enough to cause substantial damage down slope from a tank should one fail. Correspondingly, the history of failure of water storage tanks is considered.

Because dam failure can have severe consequences, FEMA and Cal OES require all dam owners to develop Emergency Action Plans (EAP) for warning, evacuation, and post-flood actions. Although there has been extensive coordination with County officials in the development of a County Response Plan, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the dam owner.

3.2.4.2 History/Past Occurrences

Orange County has never experienced a major dam failure, but there have been two deadly incidents involving dams built to supply water for the City of Los Angeles. In addition, the failure of a water tank caused considerable damage within the City of Westminster in 1998. These three disasters are detailed below.

ST. FRANCIS DAM, DISASTER OF 1928

In Los Angeles, the failure of the St. Francis Dam, and the resulting loss of over 500 lives was a scandal that resulted in the almost complete destruction of the reputation of its builder, William Mulholland. It was he who proposed, designed, and supervised the construction of the Los Angeles Aqueduct, which brought water from the Owens Valley to the city. The St. Francis Dam, built in 1926, was 180 feet high and 600 feet long. It was located near the City of Saugus in San Francisquito Canyon.

The dam failed on March 12, 1928 three minutes before midnight. Its waters swept through the Santa Clara Valley toward the Pacific Ocean about 54 miles away. The valley was devastated before the water finally made its way into the ocean between Oxnard and Ventura. At its peak the wall of water was said to be 78 feet high. At the time the water flowed through Santa Paula, 42 miles south of the dam, the water was estimated to be 25 feet deep. Almost everything in its path was destroyed: livestock, structures, railways, bridges, and orchards. In the end Ventura County lay below 70 feet of mud and damage estimates topped $20 million.

BALDWIN HILLS DAM, DISASTER OF 1963

The Baldwin Hills Dam collapse sent a 50-foot wall of water down Los Angeles' Cloverdale Avenue on December 14, 1963. Five people were killed. Sixty-five hillside houses were ripped apart, and 210 homes and apartments were damaged. The flood swept northward in a V-shaped path roughly bounded by La Brea Avenue, Jefferson Boulevard, and La Cienega Boulevard.

The earthen dam that created a 19-acre reservoir to supply drinking water to West Los Angeles residents ruptured at 3:38 p.m. A pencil thin crack widened to a 75-foot gash allowing 292 million gallons to surge out in 77 minutes. The cascade caused an unexpected ripple effect that is still being felt in Los Angeles and beyond. It prompted the end of urban-area earthen dams as a major element of water storage systems, and a tightening of the Division of Safety of Dams control over reservoirs throughout the state.

WESTMINSTER WATER TANK FAILURE, DISASTER OF 1998

In September of 1998, a 5-million-gallon municipal water storage tank in the City of Westminster ruptured because of corrosion and construction defects. There was no loss of life, but damage was extensive. The flow of water from the 32-year-old tank destroyed most of the storage facility as well as several private residences. Additionally, there were approximately 30 more homes inundated with water and silt. Through the Public Works Mutual Aid Agreement, the Orange County Public Works Department assisted the City of Westminster in the cleanup and temporary repair of the streets.

City employees, the Orange County Fire Authority, neighboring fire services, and the Red Cross were on-site for days assessing the damage and assisting residents. Water storage for the City was non-existent following this event while the other 5-million-gallon tank of similar age and construction was removed from service as a precautionary measure.

A new reservoir facility came on-line in March 2003, consisting of two 8-million-gallon water storage tanks, a 17-million-gallon-per-day booster station, and a new groundwater well with a capacity of 3,000 gallons per minute. All new construction has passed rigorous inspections and has obtained the required permits from the California Department of Public Health.

3.2.4.3 Location/Geographic Extent

The following is a list of the larger reservoirs and dams in Orange County and their owners/operators:

Name of Facility	Owner/Operator
Santiago Dam/Reservoir (Irvine Lake)	Serrano Water District/Irvine Ranch Water District
Villa Park Dam	County of Orange
Sulphur Creek Dam	County of Orange
Peters Canyon Dam	County of Orange
Walnut Canyon Dam/Reservoir	City of Anaheim
San Joaquin Dam/Reservoir	Irvine Ranch Water District
Sand Canyon Dam/Reservoir	Irvine Ranch Water District
Rattlesnake Canyon Dam/Reservoir	Irvine Ranch Water District
Big Canyon Dam/Reservoir	City of Newport Beach
Lake Mission Viejo	Lake Mission Viejo Association
El Toro R-6 Dam/Reservoir	El Toro Water District
El Toro Reservoir/Rossmoor #1 Dam	El Toro Water District
Diemer Filtration Plant	Metropolitan Water District
Palisades Bradt Dam/Reservoir	South Coast Water District
Portola Dam/Reservoir	Santa Margarita Water District
Syphon Canyon Dam/Reservoir	The Irvine Company
Trabuco Dam & Reservoir	Trabuco Canyon Water District
Dove Canyon Dam	Dove Canyon Master Association/ Trabuco Canyon Water District
Upper Oso Dam/Reservoir	Santa Margarita Water District
Upper Chiquita Dam/Reservoir	Santa Margarita Water District
Brea Dam	U. S. Army Corps of Engineers
Fullerton Dam	U. S. Army Corps of Engineers
Carbon Canyon Dam	U. S. Army Corps of Engineers
Prado Dam	U.S. Army Corps of Engineers

As mentioned above, the responsibility for developing maps showing areas that would be inundated in the event of a failure is the responsibility of the dam's owner. Dams and reservoirs impacting the planning area are summarized below:

Big Canyon Reservoir is a 600-acre foot potable water storage facility constructed in 1959 and owned by the City of Newport Beach. It is in the San Joaquin Hills overlooking Newport Bay. Big Canyon Reservoir is retained on three sides by a homogenous earth filled embankment dam, while the east side was formed by a slope cut. At its maximum section the dam embankment is 65 feet high. The spillway is an ungated concrete lined overflow structure located on the west side of the reservoir. The bottom of the reservoir and the cut slopes are lined with minimum 5-foot-thick clay blanket, and the entire inside surface, including the embankments and cut slopes, is overlain with a three-inch-thick porous asphalt pavement. The reservoir is covered with a reinforced polypropylene weight-tensioned floating cover that was installed in 2004.

Dove Canyon Dam is an earth-filled dam completed in 1990. The dam is in the Dove Canyon residential community within the City of Rancho Santa Margarita, Orange County. The dam is owned by the Dove Canyon Master Association (DCMA). DCMA owns and operates recreational facilities situated immediately downstream of the dam crest on compacted backfill. The recreational facilities were included in the construction documents for the Dam and approved by the State Division of Safety of Dams. The impounded reservoir is located on land owned by Trabuco Canyon Water District (TCWD) and is used to store up to about 415 acre-feet of runoff. TCWD and DCMA have an agreement to operate and maintain the dam and reservoir. TCWD utilizes storage in the reservoir to supplement its recycled water demands for landscape irrigation. The impounded water can be stored to an elevation of 1090 feet, approximately 11 feet below the top of the dam crest's elevation of 1101 feet, MSL.

El Toro Reservoir/Rossmoor #1 Dam is an embankment type dam owned and operated by ETWD. The reservoir is located in the City of Mission Viejo. The impounded reservoir has a storage capacity of 275 million gallons (850 acre-feet) with a surface area of approximately 20.6 acres. The bottom and internal slopes of the reservoir are lined, and the reservoir surface has a floating cover. There is no surface water influent to the reservoir. The reservoir includes an emergency spillway and drainage facilities. Storage capacity in the El Toro Reservoir is owned through a regional partnership between ETWD, Santa Margarita Water District and Moulton Niguel Water District.

Rossmoor #1 dam is an embankment type dam, with a height of 36 feet and a length of approximately 305 feet. The dam is located in the City of Laguna Woods. The impounded Holding Pond is used to provide emergency storage of secondary effluent from the ETWD Water Recycling Plant and has a storage capacity of 14 million gallons (43 acre-feet). The reservoir includes an emergency spillway and drainage facilities.

Palisades Bradt Reservoir provides up to 48 million gallons of potable water storage with a 146-foot-high, zoned, earthen embankment dam constructed in 1963. The bottom and internal slopes of the reservoir are lined and the reservoir surface has a floating cover. The dam has a low-level outlet, an emergency outlet, and an emergency spillway. The upstream watershed that contributes inflow to the reservoir has an area of 19 acres.

Peters Canyon Dam is an earth-filled structure owned by the County of Orange and has a capacity of 626 acre-feet at the spillway pipe elevation of 537 feet MSL. Water storage varies from 200 acre-feet to 600 acre-feet depending on seasonal rain amounts. Alerting would come primarily from the Park Ranger at Peters Canyon Regional Park who would notify the Sheriff Department, Control One of dam failure or possible dam failure.

Prado Dam is owned and operated by the Army Corps of Engineers and provides flood control and water conservation storage for Orange, Riverside and San Bernardino counties. Prado Dam is a major component of the Santa Ana Mainstem Project, which extends from the upper canyon in the San Bernardino Mountains downstream to the Pacific Ocean at Newport Beach - some 75 miles along the Santa Ana River. The entire system is designed to provide various levels of flood protection ranging from 100 to 190 years for areas most susceptible to damage from flooding.

Prado Dam collects upstream water releases from storage facilities and runoff from uncontrolled drainage areas. It primarily benefits Orange County by reducing the potential for flood-induced damage and by providing water conservation storage. Prado Dam has been undergoing major improvements including raising the embankment and spillway; increasing the maximum discharge capacity, constructing new levees and dikes, relocating and protecting utility lines, increasing reservoir area and increasing impoundment.

Portola Dam is located near the northern end of Canada Gobernadora in southern Orange County; within the Coto de Caza gated community. Canada Gobernadora flows north to south and confluences with San Juan Creek approximately 7.5 miles upstream of the Pacific Ocean. Portola Dam is an earth-filled structure situated about 8 miles north of San Juan Creek with a maximum recycled water (or domestic water blend) storage capacity of 586 acre-feet and a high-water elevation of 936 feet.

The Canada Gobernadora valley channel area between the dam and San Juan Creek has been developed with a golf course and lined on each side by thousands of homes positioned just at or above the 100-year flood plain. If a dam break occurred, the flow would likely destroy streets crossing the flood plain, damage the water, sewer and recycled water pipeline infrastructure in them and may also affect some or many home locations near the stream channel. Streets in Coto de Caza certain to be affected are: Trigo Trail, Via Pajaro, Via Conejo, Vista Del Verde, San Miguel, Cantamar and South Bend Road. Along with the golf course and the equestrian center, additional District facilities that are anticipated to be damaged or destroyed by a dam break in Coto de Caza and farther downstream are:

- Coto Lift Station and force main
- South Ranch lift station and force main
- South County pipeline
- Ortega Lift Station (Talega) force mains
- Talega recycled water transmission main
- Chiquita Land Outfall pipeline

Per the compliance report, after entering San Juan Creek, the dam break inundation flood area would be about the same as the 100-year flood plain all the way down to the Pacific Ocean.

Santiago Dam is an earth fill dam with a 25,000 acre-feet capacity reservoir (Irvine Lake). The dam is jointly owned by the Irvine Ranch Water District and the Serrano Water District. Villa Park Dam is a flood control dam located downstream from Santiago Dam. It is an earth-fill structure with a capacity of

15,600 acre-feet and is owned by the Orange County Flood Control District. Initial alerting is expected from Dam keepers who are on duty at both Santiago Dam and Villa Park Dam.

Trabuco Dam is an earth-filled dam completed in 1984. The dam is located adjacent to the Robinson Ranch residential community within the City of Rancho Santa Margarita, Orange County. The dam and impounded reservoir is owned and operated by the Trabuco Canyon Water District (TCWD). TCWD utilizes the reservoir to store up to approximately 135 acre-feet of reclaimed water produced from the Robinson Ranch Wastewater Treatment Plant located adjacent to the reservoir. The reclaimed water can be stored to an elevation of 1274 feet, approximately 6 feet below the top of the dam crest's elevation of 1280 feet, MSL.

Upper Oso Reservoir (UOR) and Dam are located within the Cities of Mission Viejo and Rancho Santa Margarita near the northern end of the Oso Creek watershed in southern Orange County. Upper Oso Dam is an earth-filled structure situated between El Toro Road and Los Alisos Boulevard nearly 10 miles north of the Trabuco Creek confluence point. UOR has a high-water elevation of 953 feet and stores up to 4000 acre-feet of recycled water for landscape irrigation that is mainly used within Santa Margarita and Moulton Niguel Water Districts.

Immediately downstream of the UOR dam, a long bridge for State Route 241 crosses the flood channel and may not experience problems during a major flood event. Just upstream of Los Alisos Boulevard, some commercial property lies adjacent to the Oso Creek channel and may be affected. About three miles downstream on Oso Creek and upstream of Olympiad Road, a large basin area was created (now a sports park) to capture and attenuate major discharges from UOR before they enter Lake Mission Viejo (LMV). LMV is created by a dam lying under Alicia Parkway. A UOR dam breach may also overflow LMV and damage the dam to point where it could release stored water and create a catastrophic flood hazard all the way to the Pacific Ocean.

Downstream of LMV, two golf courses have been developed within the Oso Creek channel area and numerous commercial properties are on adjacent sides. Housing tracts have been built above the 100-year flood plain but if a dam break occurred, the flow from UOR and LMV would likely destroy streets crossing the flood plain and damage the water, sewer and recycled water pipeline infrastructure in them. In addition to the many pipelines crossing the flood plain, District facilities that are anticipated to be damaged or destroyed by a UOR dam break are:

- Eastbrook RW Pump Station
- Lakeside Pump Station
- South County Pipeline
- Oso Creek Water Reclamation Plant
- Oso Creek Trunk Sewer
- Oso Barrier RW Pump Station and Pipelines

Due to proximity and elevation, a considerable number of the residential and commercial properties in many areas close to the banks of Oso Creek and farther downstream would likely be flooded for short period of time and damaged. Streets in Mission Viejo and farther south likely to be affected by a dam failure are: Los Alisos Boulevard, Santa Margarita Parkway, Olympiad Road, Alicia Parkway, Jeronimo Road, Marguerite Parkway, Casta del Sol, La Paz Road, Oso Parkway, Interstate 5, Camino Capistrano, Del Obispo Street, Stonehill Drive and Pacific Coast Highway.

Upper Chiquita Reservoir (UCR) – SMWD constructed the Upper Chiquita Reservoir to provide the South Orange County region with substantial new water reserves to meet customer demand during disruptions of water deliveries. These interruptions can be unanticipated, like the break of the Allen McColloch Pipeline in 1999, or planned, like the shutdowns of the Diemer Filtration plant in Yorba Linda to complete improvements or maintenance and repairs.

The Upper Chiquita Reservoir Emergency Storage Reservoir consists of an earthfill dam structure and a covered, domestic water reservoir with a storage volume of 750 acre-feet. The reservoir footprint is approximately 19.7 acres with a surface area of approximately 15.4 acres and has a High-Water Level (HWL) of 860 feet.

In addition to the dam and reservoir, the site contains the following facilities:

- Floating Cover
- Access Roads
- Spillway and Drainage Facilities
- Inlet/Outlet Facilities and Pipelines
- Pump Station
- Disinfection Equipment
- Pipeline connection to the South Orange County Pipeline

The Upper Chiquita reservoir site is located on the western side of Chiquita Canyon north of Oso Parkway and west of the current terminus of State Route 241 (SR-241) within the City of Rancho Santa Margarita, east of the community of Las Flores in southern Orange County.

A portion of the site is encumbered within the Transportation Corridor Agency's (TCA) Chiquita Canyon Perimeter Conservation Easement. The closest developed areas are the Tesoro High School campus (located across Oso Parkway and south of the reservoir site) and the residential community of Las Flores (approximately 0.8-mile west of the site). Additional land uses in the proximity to the reservoir site include a neighborhood park, Crestview Park, located just over 300 feet west of the site, and the SMWD Las Flores Reservoir, located approximately 250 feet west of the site.

Under an extreme catastrophic dam failure scenario, the flood zone would exceed the FEMA 100-year floodplain in the Canada Chiquita Channel. Under this extreme scenario, land use categories that would be affected include the Oso Parkway, SR-241 and the Tesoro High School. Once the flood waters reach the San Juan Creek the flood flows would be less than the FEMA 100-year flood.

The Upper Chiquita Reservoir is located on the western slope of Chiquita Canyon, just north of Oso Parkway in the City of Rancho Santa Margarita. Completed in October 2011, the 244 million-gallon Upper Chiquita Reservoir is the largest domestic water reservoir built in south Orange County in nearly 45 years. Information regarding UCR:

- Storage capacity of approximately 244 million gallons of domestic water (750 acre-feet) is contained in a lined and covered reservoir.

- Surface area of approximately 17.8 acres.

- A regional partnership between SMWD (lead agency), Moulton Niguel Water District, City of San Juan Capistrano, City of San Clemente and South Coast Water District (storage owners).

- Capable of providing upwards of 168,000 families with approximately 200 gallons of fresh water a day for one week.

- Included in the South Orange County Natural Community Conservation Plan, which designates habitat conservation and species protection measures to ensure an environmentally sensitive design.

- Reservoir is not visible from homes in local neighborhoods, including Las Flores and Wagon Wheel.
- Earthen embankment significantly reduces any visual impacts while traveling west along Oso Parkway near Highway 241.

- Reservoir design conforms to the rigorous standards set forth by the State of California.

- Safety features, including piezometers (moisture sensors), to continually monitor water levels and test for irregularities.

3.2.4.4 Magnitude/Severity

Orange County's reservoirs range in capacity from 18 to 196,235 acre-feet of water storage. Inundation maps and studies, when available, indicate the area that would be flooded and can be used to gauge the severity of a dam failure.

A compliance analysis and inundation study report was prepared for Upper Oso Dam in 1979 to allow for construction permitting by the State of California. This study indicated that if the dam was breached, a potential maximum flow rate exceeding 250,000 cubic feet per second may be expected when the water surface elevation drops to about 935 feet. Should such an event occur, the Upper Oso Reservoir could potentially empty in about a half hour.

A similar report for Portola Dam was done in 1980. This study indicated that if the dam was breached, a potential maximum flow rate of 22,645 cubic feet per second may be expected after about three hours once the water surface elevation is at elevation 920 feet. Should such an event occur, Portola Dam would potentially empty in just over six hours.

Failure of a reservoir or a dam could extend throughout most of the planning area, depending upon the size of the facility and associated failure.

3.2.4.5 Probability of Future Occurrences

There has been just one incident involving a water storage structure in the 110 years since construction of the first contemporary dam in Orange County. It is expected that future events will remain highly unlikely, with a less than 1 percent chance of happening in any given year. However, such occurrences have the potential to be highly destructive.

In the more than 50 years since the collapse of the Baldwin Hills Dam, there have been very few incidents in California due to stringent standards, regulations, and regular inspections. The near-catastrophic failure of the main spillway of the Oroville Dam in Northern California in 2017 is a reminder of the ongoing risk presented by dams.

3.2.5 Drought

3.2.5.1 Description (Nature) of the Hazard

Many governmental utilities, the National Oceanic and Atmospheric Administration (NOAA) and the California Department of Water Resources, as well as academic institutions, such as the University of Nebraska-Lincoln's National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending on one's location within a state, the country or globe. Drought in its simplest definition is an extremely dry climatic period where the available water falls below a statistical average for a region. Drought is also defined by factors other than rainfall, including vegetation conditions, agricultural productivity, soil moisture, water levels in reservoirs, and stream flow. In effect, there are essentially three forms of drought: meteorological or hydrological drought, agricultural drought, and regulatory drought:

- A meteorological or hydrological drought is typically defined when there is a prolonged period of less than average precipitation resulting in the water level in aquifers, lakes, or above ground storage reservoirs falling below sustainable levels.

- An agricultural drought occurs when there is insufficient moisture for an average crop yield. Agricultural drought can be caused by the overuse of groundwater, poor management of cultivated fields, as well as lack of precipitation.

- A regulatory drought can occur when the availability of water is reduced due to imposition of regulatory restrictions on the diversion and export of water out of a watershed to another area. A significant percentage of water in Southern California is imported from other regions (Colorado River and Northern California) via aqueducts. Correspondingly, drought in California can be made worse by water availability conditions in the regions at which the water originates.

  An example of regulatory drought occurred between 1999 and 2004; a six-year drought on the Colorado River basin, a major water supply for Southern California, resulted in a draw-down of Colorado River water storage by more than 50%. More recently, beginning in 2008, regulatory restriction in exporting water via the State Water Project combined with unusually dry weather patterns resulted in two years of water rationing in Southern California. Additionally, a meteorological drought can lead to regulatory restrictions; for example, California experienced prolonged drought from 2013 to 2017, resulting in mandatory water restrictions for residents through November 25, 2017.

  Even distant droughts may have consequences for the plan area and participating jurisdictions. The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Orange County, increases in intensive agriculture led to overuse of the Santa Ana River watershed and groundwater resulting in regional water shortages.

Droughts cause public health and safety impacts, as well as economic and environmental impacts. Public health and safety impacts are primarily associated with catastrophic wildfire risks and drinking water shortage risks for small water systems in rural areas and private residential wells. Examples of other impacts include costs to homeowners due to loss of residential landscaping, degradation of urban

environments due to loss of landscaping, agricultural land fallowing and associated job loss, degradation of fishery habitat, and tree mortality with damage to forest ecosystems. Drought conditions can also result in damage to older infrastructure that is located within dry soils with potential to leak or break. Dead or dying vegetation poses a risk to falling and damaging water and wastewater infrastructure systems.

In Orange County, drought conditions typically result in implementation of large-scale conservation efforts, reducing water supplies to customers and altering the pricing system by implementing higher rates for water usage that exceeds certain levels (e.g., wasteful). Higher rates that may be imposed during a drought could have disproportionate impacts on lower-income households. Reduction in groundwater supplies during drought conditions can also result in the need for water agencies that have high reliance on local groundwater supplies to purchase larger amounts of imported water. Drought conditions have also resulted in drier brush and an increase in the size and severity of wildfires. Water and wastewater infrastructure systems located within areas susceptible to wildfires are at a greater risk of being impacted. Damage or failure to water and wastewater infrastructure systems can significantly reduce or even interrupt service to customers. For more on wildfire hazards, see Section 3.2.12. In addition, climate change (see Section 3.2.1) may lead to more frequent and persistent droughts in the future.

Several bills have been introduced into Congress to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

3.2.5.2 History/Past Occurrences

Based on years of recorded water trends in Southern California, it is quite apparent that droughts and water shortages can occur. Paleo records indicate that much more extreme events can occur than those since historical record-keeping began. A significant drought, reported by many of the ranchers in Southern California, occurred in 1860.

The National Drought Mitigation Center maintains a Drought Risk Atlas with historic data on drought classifications throughout the United States. Based on the Palmer Drought Severity Index (PDSI), there have been six occasions since records began in 1920 when the monitoring station in the City of Santa Ana recorded "severe" or "extreme" drought conditions for a period of at least 12 months. These periods, based on a "self-calibrating" PDSI, which uses data adjusted to be more sensitive to the local climate, are listed in Table 3-4, S*evere and Extreme SC-PDSI Drought Periods 1920-2012 Lasting 12 Months or Longer (Santa Ana, CA)*.[16]

[16] NDMC. U.S. Drought Risk Atlas. http://droughtatlas.unl.edu/Data.aspx. Accessed March 2018.

Table 3-4
Severe and Extreme SC-PDSI Drought Periods 1920-2012
Lasting 12 Months or Longer (Santa Ana, CA)

Drought Start	Drought End	Duration (Months)
February 1961	September 1963	31
March 1971	January 1978	82
May 1984	December 1992	103
January 1994	January 1995	12
December 1999	October 2004	58
January 2006	October 2010	57

The certified Drought Risk Atlas data does not yet include the historic, statewide drought that California experienced within the last five years. Governor Jerry Brown proclaimed a State of Emergency in January 2014; the declaration was not lifted until April 2017. In Orange County, precipitation totals were well below average for five 12-month periods in a row. From July 2013 to June 2014, the weather station in Santa Ana recorded just 4.4 inches or rain, about one-third of the normal annual amount.[17]

3.2.5.3 Location/Geographic Extent

Droughts occur over large regions and thus can affect the entire planning area.

3.2.5.4 Magnitude/Severity

Of the many varied indexes used to measure drought, the Palmer Drought Severity Index (PDSI) is the most commonly used in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, where 0 indicates normal conditions, negative numbers indicate drought, and positive numbers indicate wet spells; refer to Table 3-5, *Palmer Drought Severity Index*.

Table 3-5
Palmer Drought Severity Index

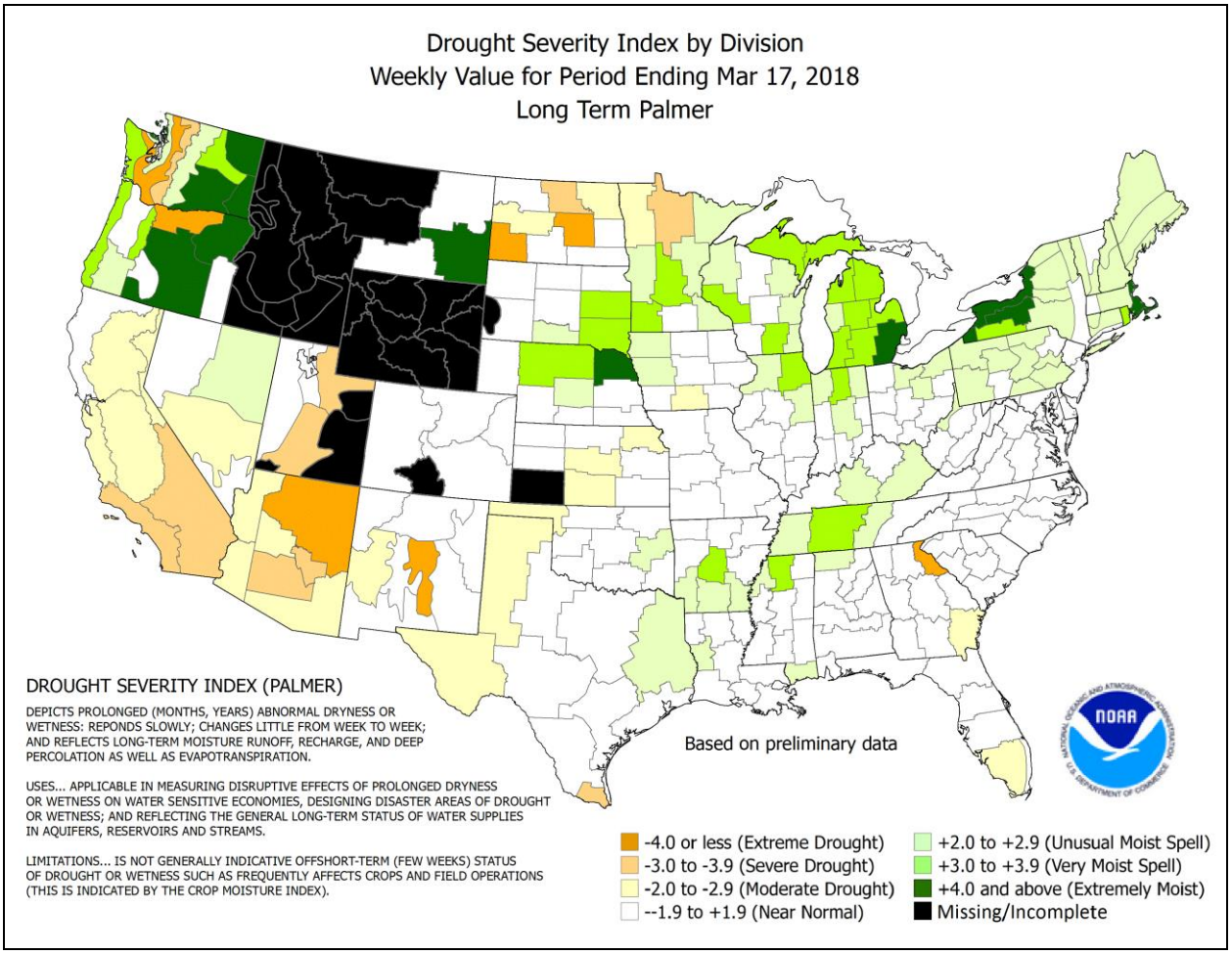
Drought	Wet Spells
-4.0 or less (Extreme Drought)	+2.0 or +2.9 (Unusual Moist Spell)
-3.0 or -3.9 (Severe Drought)	+3.0 or +3.9 (Very Moist Spell)
-2.0 or -2.9 (Moderate Drought)	+4.0 or above (Extremely Moist)
-1.9 to +1.9 (Near Normal)	

The PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. NOAA publish weekly PDSI maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected

[17] Orange County Public Works. Historic Rainfall Data. http://www.ocwatersheds.com/rainrecords/rainfalldata/historic_data.

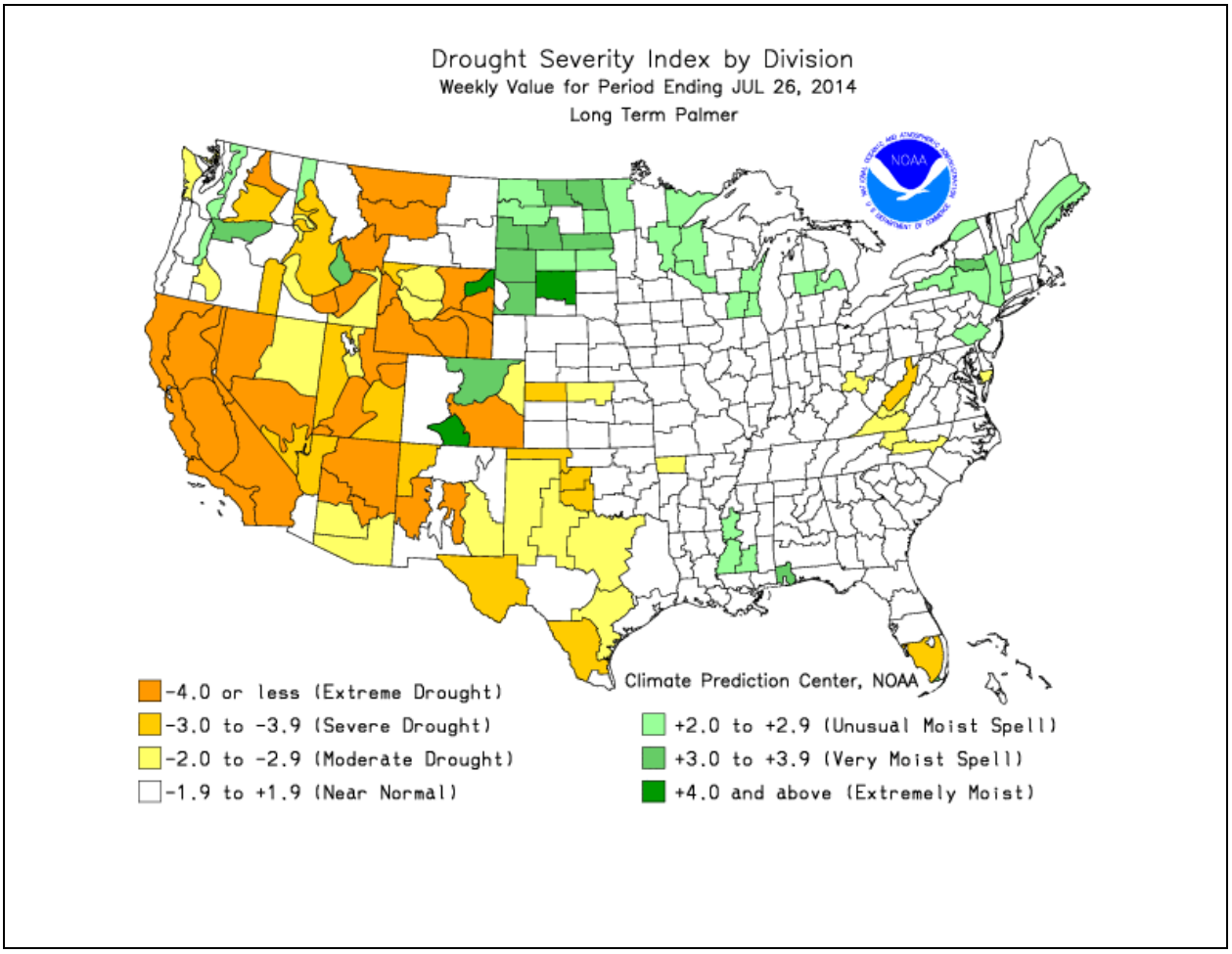
drought conditions. Figure 3-1 shows the current NOAA PDSI map for the week ending on March 17, 2018.

Figure 3-1
March 17, 2018 PDSI



In 2014, at the peak of the statewide drought, the index assigned the extreme drought category to the southern coastal California climate division for 40 consecutive weeks. Figure 3-2 shows the NOAA PDSI for the week ending on July 26, 2014.

Figure 3-2
July 26, 2014 PDSI



The average duration of the droughts listed in Table 3-4, which includes drought periods classified as severe or extreme, is 57 months.

3.2.5.5 Probability of Future Occurrences

The University of Nebraska-Lincoln has published PDSI maps analyzing trends over the past 100 years (National Drought Mitigation Center 2005; Figure 1). In coastal southern California, from 1895 to 1995, severe droughts occurred 10 to 15 percent of the time. From 1990 to 1995, severe droughts occurred 10 to 20 percent of the time.

Based on the droughts listed in Table 3-4, Orange County has been in severe or extreme drought for a total of 343 months, or 31 percent of the time since 1920 and 54 percent of the time since 1960 (Note: these calculations do not include the historic drought that officially ended in 2017).

3.2.6 Earthquake Fault Rupture & Seismic Hazards (Ground Shaking & Liquefaction)

3.2.6.1 Description (Nature) of the Hazard

Earthquakes are considered a major threat to the County, especially when focusing on water and wastewater facilities and pipelines that run throughout the County. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to infrastructure, fires, and other threats to life and property. Significant damages and outages of water and wastewater facilities could also occur. The effects could be aggravated by aftershocks and by secondary effects such as fire, landslides and dam failure. A major earthquake could be catastrophic in its effects on the population and could exceed the response capability of the local communities and even the State.

Following major earthquakes, extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food/water and temporary shelter would be required for injured or displaced persons. In the event of a truly catastrophic earthquake, identification and burial of the dead would pose difficult problems. Mass evacuation may be essential to save lives. Emergency operations could be seriously hampered by the loss of communications, damage to transportation routes within, to, and out of the disaster area, and by the disruption of public utilities and services. With damage to critical water and wastewater infrastructure there will be significant public health concerns, such as dehydration or exposure to contaminated water, and the potential for reduced fire protection due to limited sources of water. Facilities at greatest risk from severe earthquakes are dams and pipelines. Additionally, damage to water and sewer lines that service commercial and industrial areas could have a significant impact on the economy of the region. Extensive mutual aid for an extended period may be required to bring water and wastewater services back online.

Earthquakes strike with little to no warning and they can have multiple impacts on an area. After effects from an earthquake may include impacted roadways, downed power and communication lines, fires, and damages to structures (especially poorly built, or those already in disrepair). Should a major event occur, major damages and losses should be expected to pumping systems and wastewater treatment infrastructure. Earthquakes are not a seasonal hazard, and thus can be experienced year-round. This fact presents its own set of planning and preparedness concerns.

Seismic-specific building codes can provide MAs with reasonable guidance for structural mitigation. As maintenance and potentially new building occurs within the planning area, seismic retrofitting is highly recommended to prevent extensive damage to essential infrastructure.

For decades, partnerships have flourished between the United State Geological Survey (USGS), Cal Tech, the California Geological Survey (CGS) and California universities to share research and educational efforts with Californians. Tremendous earthquake mapping and mitigation efforts have been made in California in the past two decades, and public awareness has risen remarkably during this time. Major federal, state, and local government utilities and private organizations support earthquake risk reduction. These partners have made significant contributions in reducing the adverse impacts of earthquakes.

LIQUEFACTION

Liquefaction is the phenomenon that occurs when ground shaking causes groundwater to mix with the soil. The mixture temporarily becomes a fluid and loses its strength. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength. Lateral spreads develop on gentle slopes and entails the sidelong movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength results when the soil supporting structures liquefies and causes structures to settle and/or collapse from weakened foundations. Liquefaction can also occur independently of an earthquake, if any sudden and significant stress causes the mixing of groundwater and soil. The risk of liquefaction depends on several factors, including the height of the groundwater table and the types of soil in the area.

3.2.6.2 History/Past Occurrences

Southern California and Orange County have experienced several powerful earthquakes. The earliest recorded earthquake in California occurred in Orange County in 1769. To better understand the potential for damaging earthquakes in southern California, the scientific community has reviewed historical records and conducted extensive research on faults that are the sources of the earthquakes occurring in southern California. Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, historic records of past earthquakes are based on observations and the level of information is often dependent upon population density in the area of the earthquake. Since California was sparsely populated in the 1800s, detailed information on pre-instrumental earthquakes is relatively sparse. However, two very large earthquakes, the Fort Tejon in 1857 (M 7.9) and the Owens Valley in 1872 (M 7.6) are evidence of the tremendously damaging potential of earthquakes in southern California. Other notable earthquakes that have impacted southern California include the 1910 Glen Ivy Hot Springs earthquake (Elsinore Fault Zone, M 6.0), the 1933 Long Beach earthquake (Newport-Inglewood Fault Zone, M 6.4), the 1952 Kern County and Lander earthquakes (M 7.3), the 1971 San Fernando earthquake (San Fernando Fault Zone, M 6.6), the 1987 Whittier earthquake (Whittier Fault Zone, M 5.9), and the 1994 Northridge earthquake (Pico Thrust, M 6.7). The 1987 Whittier Quake caused damage to the Puente Hills Reservoir in La Habra and after inspection the reservoir was found to have cracks in the concrete lining.

Damage from some of these earthquakes was limited because they occurred in areas which were sparsely populated at the time they occurred. However, developed areas were much more severely affected. Damage from the 1933 Long Beach earthquake was estimated at more than $40 million ($889 million in 2018 dollars), and 115 lives were lost. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons. Earthquakes of great magnitudes have caused lasting effects in developed regions.

The most recent significant earthquake event affecting southern California was the 1994 Northridge Earthquake. At 4:31 A.M. on Monday, January 17, a moderate, but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures. In this earthquake, 57 people were killed and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity, tens of thousands had no gas, and nearly 50,000 had little or no water. Out of the approximately 66,000 structures inspected, approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but earthquake triggered liquefaction, and dozens of fires also caused additional severe damage. The extremely strong ground motion felt in sizable portions of Los Angeles County resulted in record

economic losses. The fact that the earthquake occurred early in the morning on a holiday considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses ran into the tens of billions of dollars.

Clearly, no community in southern California is beyond the reach of a damaging earthquake. The historical earthquake events that have affected southern California are listed below in Table 3-6, *Magnitude 5.0 or Greater Earthquakes in the Southern California Region*.

Table 3-6
Magnitude 5.0 or Greater Earthquakes in the Southern California Region

Date / Location / Magnitude	
1769 Los Angeles Basin (M 6.0)	1941 Carpentaria (M 5.9)
1800 San Diego Region (M 6.5)	1952 Kern County (M 7.7)
1812 Wrightwood (M 7.0)	1954 West of Wheeler Ridge (M 5.9)
1812 Santa Barbara Channel (M 7.0)	1971 San Fernando (M 6.5)
1827 Los Angeles Region (M 5.5)	1973 Point Mugu (M 5.2)
1855 Los Angeles Region (M 6.0)	1979 Imperial Valley (6.5)
1857 Great Fort Tejon Earthquake (M 8.3)	1986 North Palm Springs (M 6.0)
1858 San Bernardino Region (M 6.0)	1987 Whittier Narrows (M 5.8)
1862 San Diego Region (M 6.0)	1990 Upland (M 5.7)
1892 San Jacinto or Elsinore Fault (M 6.5)	1991 Sierra Madre (M 5.6)
1893 Pico Canyon (M 5.8)	1992 Landers (M 7.3)
1894 Lytle Creek Region (M 6.0)	1992 Big Bear (M 6.2)
1894 E. of San Diego (M 5.8)	1994 Northridge (M 6.7)
1899 Lytle Creek Region (M 5.8)	1999 Hector Mine (M 7.1)
1899 San Jacinto and Hemet (M 6.4)	2004 San Luis Obispo (M unknown)
1907 San Bernardino Region (M 5.3)	2008 Greater Los Angeles Area (M 5.5)
1910 Glen Ivy Hot Springs (M 5.5)	2008 Borrego Springs (M 5.4)
1916 Tejon Pass Region (M 5.3)	2009 El Centro/Baja, Ca (M 5.9)
1918 San Jacinto (M 6.9)	2010 El Centro/Baja, Ca (M 7.2)
1923 San Bernardino Region (M 6.0)	2010 El Centro/Baja, Ca (M 5.7)
1925 Santa Barbara (M 6.3)	2014 La Habra (5.1)
1933 Long Beach (M 6.3)	

LIQUEFACTION

Comprehensive, historic accounts of damage to structures from liquefaction are not readily available. Some damage caused by the Northridge earthquake of 1994, such as damage to the King Harbor area of Redondo Beach in Los Angeles County, was due to liquefaction, as opposed to ground shaking.

3.2.6.3 Location/Geographic Extent

Nearly all of Orange County is at risk of moderate to extreme ground shaking. Figure 3-3 shows ground shaking severity zones for Orange County. The areas most susceptible to damage from earthquakes based on the shaking intensity hazard map include Yorba Linda Water District and the Cities of La Habra and Buena Park. These communities can be severely impacted by landslides, liquefaction, extensive infrastructure damage, fire, dam failure, and other secondary earthquake affects. A major earthquake could be catastrophic in its effect on the population and could exceed the response capability of the local communities and even the State. Although the above noted water/wastewater utilities are most likely to experience "extreme" shaking, all of the County's water/wastewater utilities fall within a moderate to extreme shaking intensity zone and therefore should expect the potential of damage from an earthquake.

The area at risk of fault rupture is limited to areas in the immediate vicinity of a fault. California began extensive mapping of earthquake faults with the Alquist-Priolo Earthquake Fault Zoning Act of 1972. Figure 3-4 shows both the fault zones in Orange County that have been mapped through the act. The Whittier Fault Zone near the county's northern border passes through part of the Yorba Linda Water District. The Newport-Inglewood Fault Zone parallels the coast in western Orange County.

There are many additional large faults that could affect Orange County in addition to the Whittier and Newport-Inglewood-Rose Canyon faults. These include the Elsinore Fault, Peralta Fault, Puente Hills Fault, San Andreas Fault, and San Jacinto Fault. Smaller faults include the Norwalk Fault and the El Modena Faults. In addition, newly studied thrust faults, such as the San Joaquin Hills Fault could also have a significant impact on the County. Each of the major fault systems are described briefly below and are presented in alphabetical order. This order does not place more danger on one fault over another; it is simply for organizational purposes.

- *Elsinore Fault Zone / Whittier Fault / Chino Fault:* Located in the northeast part of the county, the Elsinore Fault Zone follows a general line easterly of the Santa Ana Mountains into Mexico. The main trace of the fault zone is about 112 miles long. The last major earthquake on this fault occurred in 1910 (M 6.0), and the interval between major ruptures is estimated to be about 250 years. Southern California Earthquake Center (SCEC) reports probable earthquake magnitudes for the main trace of the Elsinore fault to be in the range of 6.5 to 7.5. At the northern end of the Elsinore Fault zone, the fault splits into two segments: the 25-mile-long Whittier Fault (probable magnitudes between 6.0 and 7.2), and the 25-mile-long Chino Fault (probable magnitudes between 6.0 and 7.0). The location of the Whittier Fault makes it especially critical to the Diemer Filtration Plant in Yorba Linda and pipelines bringing water into Orange County and/or from the Diemer Plant which is located very near this fault.

Figure 3-3
Ground Shaking Hazard

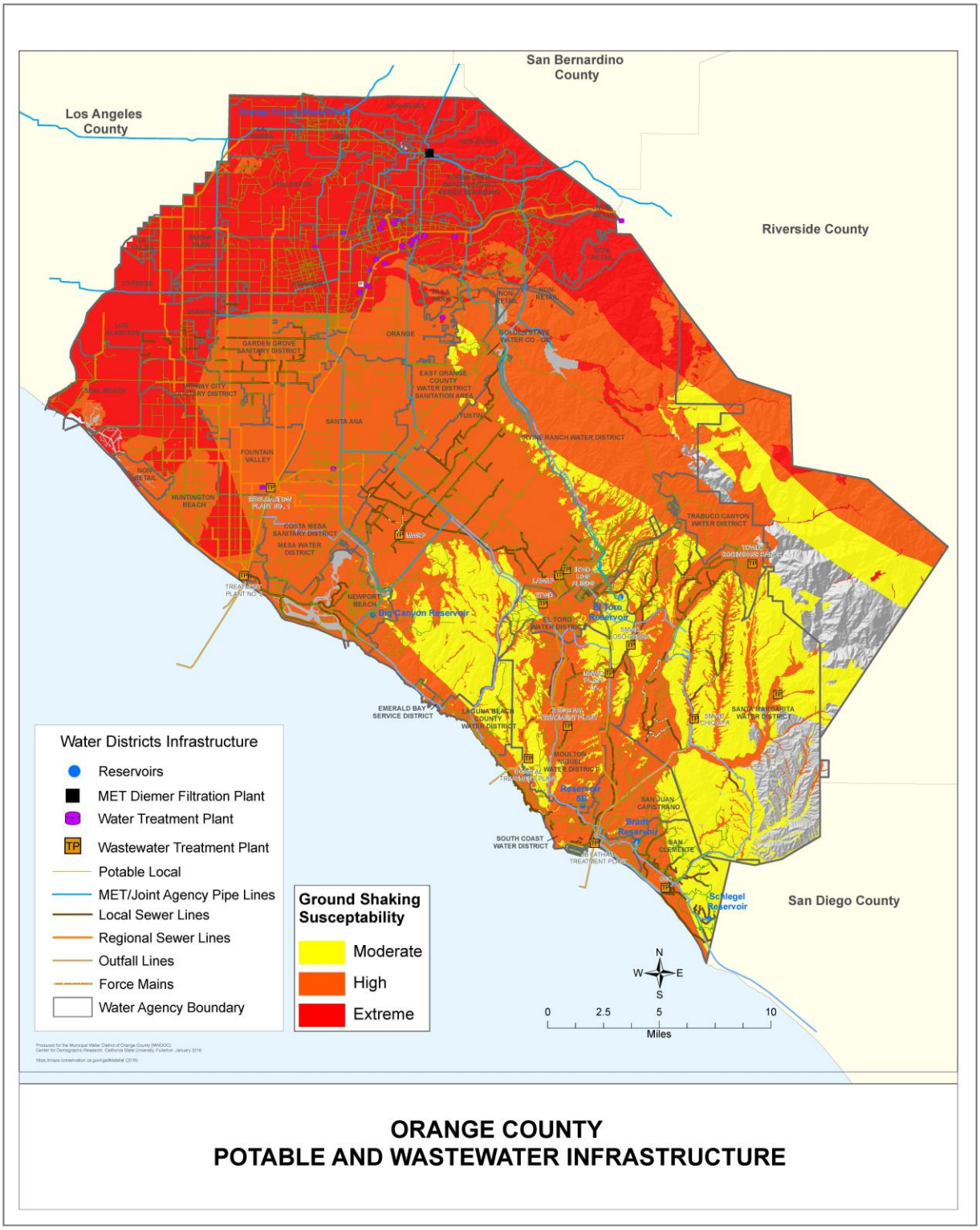


Figure 3-4
Alquist-Priolo Rupture Zones

- *Newport-Inglewood-Rose Canyon Fault Zone:* This fault zone extends from the Santa Monica Mountains in a southeast direction through the western part of Orange County, then continues offshore (not more than four miles from the coast) down to San Diego Bay. Originally, this was thought to have been two separate systems; the Newport-Inglewood Fault and the Rose Canyon Fault Line. However, a study prepared in March 2017 found that they are in fact one continuous fault line with three main stepovers. This fault line was the source of the destructive 1933 Long Beach earthquake (magnitude 6.4), which caused 120 deaths and considerable property damage. SCEC reports probable earthquake magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4.

- *Peralta Hills Fault:* Limited information is available to paleoseismically characterize the fault and no studies have been undertaken to determine the timing of earthquakes. There is a strong geomorphic expression along Lincoln Boulevard west of Tustin Avenue in the City of Orange. Some believe the fault is not active while others believe it is active. On-going research has linked the fault as a back thrust with the Elsinore Fault, with a potential magnitude of 6.8.

- *Puente Hills Thrust Fault:* This is another recently discovered blind thrust fault that runs from northern Orange County to downtown Los Angeles. It is now known to be the source of the 1987 Whittier Narrows earthquake. Recent studies indicate that this fault has experienced four major earthquakes ranging in magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.

- *San Andreas Fault Zone:* As the dominant active fault in California, it is the main element of the boundary between the Pacific and North American tectonic plates. The longest and most publicized fault in California, it extends approximately 650 miles from Cape Mendocino in northern California to east of San Bernardino in southern California and is approximately 35 miles northeast of Orange County. This fault was the source of the 1906 San Francisco earthquake, which resulted in some 700 deaths and millions of dollars in damage. It is the southern section of this fault that is currently of greatest concern to the scientific community. Geologists can demonstrate that at least eight major earthquakes (Richter Magnitude 7.0 and larger) have occurred along the southern San Andreas Fault in the past 1,200 years with an average spacing in time of 140 years, plus or minus 30 years. The last such event occurred in 1857 (Fort Tejon earthquake). Based on that evidence and other geophysical observations, the Working Group on California Earthquake Probabilities (SCEC, 1995) has estimated the probability of a similar rupture (M 7.8) in the next 30 years (1994 through 2024) to be about 50 percent. The range of probable magnitudes on the San Andreas Fault Zone is reported to be 6.8 to 8.0.

- *San Jacinto Fault Zone:* The San Jacinto fault zone is located approximately 30 miles north and east of the county. The interval between ruptures on this 130-mile-long fault zone has been estimated by SCEC to be between 100 and 300 years, per segment. The most recent event (1968 M6.5) occurred on the southern half of the Coyote Creek segment. SCEC reports probable earthquake magnitudes for the San Jacinto fault zone to be in the range of 6.5 to 7.5.

- *San Joaquin Hills Fault:* This fault is a recently discovered southwest-dipping blind thrust fault originating near the southern end of the Newport-Inglewood Fault close to Huntington Beach, at the western margins of the San Joaquin Hills. Rupture of the entire area of this blind thrust fault could generate an earthquake as large as magnitude 7.3. In addition, a minimum average

recurrence interval of between about 1650 and 3100 years has been estimated for moderate-sized earthquakes on this fault (Grant and others, 1999).

In addition to the major faults described above, the rupture of several smaller faults could potentially impact Orange County, including the Norwalk Fault (located in the north of the county in the Fullerton area) and the El Modeno Fault (located in the City of Orange area).

In 2005, MWDOC hired Earth Consultants International to prepare specific ground acceleration and shaking maps for five fault earthquake scenarios in Orange County. Table 3-7, *Characteristics of Important Geologic Faults in Orange County*, summarizes the characteristics of these five major geologic faults. Earthquake maps for the individual jurisdictions are included in the Jurisdictional Annexes.

Table 3-7
Characteristics of Important Geologic Faults in Orange County

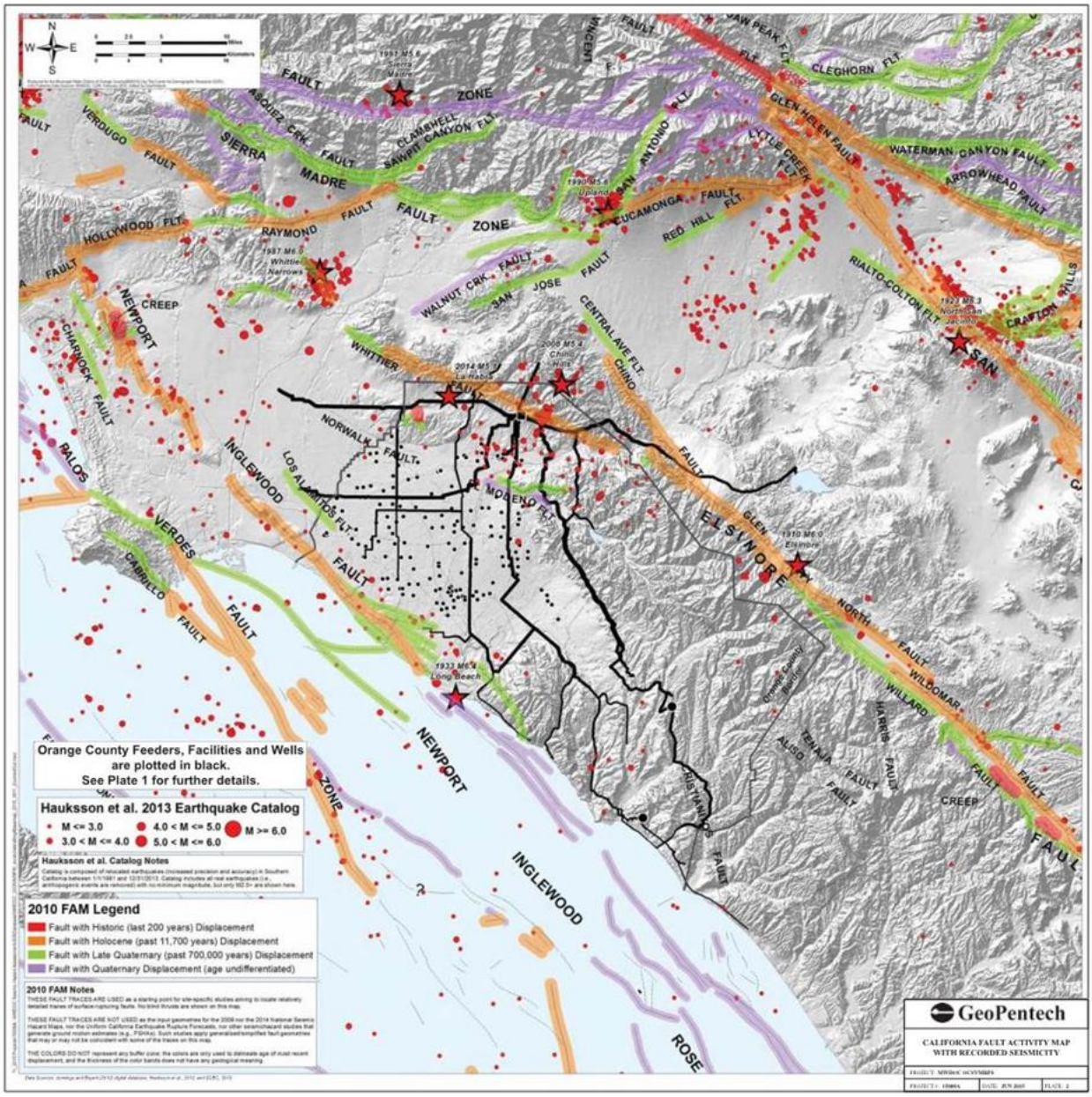
Characteristic	Newport-Inglewood-Rose Canyon (onshore)	Peralta Hills	Puente Hills	San Joaquin Hills	Whittier
Fault Type	Strike-slip	Thrust	Blind thrust	Blind thrust	Strike-slip
Slip Rate (mm/yr)	1 +/-0.5	Unknown, Prob. <1	0.7 +/-0.4	0.5 +/-0.2	2.5 +/-1.0
Magnitude[1]	6.9	6.8	7.5	6.6	6.8
Recurrence Interval (years)	2,200-3,900	Unknown	2,750	1,600-3,100	1,100
Last Activity (years ago)	M6.3 in 1933	Unknown	<3,000	200-300	1,600-2,000

1 The magnitude shown represents the fault's average behavior. Reference: "Five Earthquake Scenarios Ground Motion Maps for Northern Orange County" prepared for Municipal Water District of Orange County by Earth Consultants International, July 22, 2005.

Figure 3-5, prepared for the California Domestic Water Corp., a private wholesaler, shows the location of earthquake epicenters from 1941 to 2013 in and around Orange County, which is outlined in the center of the map.

Earthquakes that occur outside of southern California and Orange County could also have a significant impact on drinking water supplies. Such scenarios include disruptions of the Colorado River Aqueduct, the State Water Project (especially at an area such as the Edmonston Pumping Station and Porter Tunnel bringing water over and through the Tehachapi), and in the Bay-Delta Region, where failure of levees and flooding of islands with salt water from San Francisco Bay could disrupt water supplies for months or years. Orange County is 50 percent dependent on supplies from beyond its borders to meet the drinking water needs. This leaves it exposed to these occurrences from outside the region.

Figure 3-5
Location of Earthquake Faults Bounding the CDWC Service Area and Orange County



LIQUEFACTION

The potential for liquefaction exists in areas susceptible to ground shaking with loose soils and/or shallow groundwater. Given the active faults in the region and the presence of geologically young, unconsolidated sediments and hydraulic fills, liquefaction is possible throughout much of Orange County. The California Geological Survey's Seismic Hazards Zonation Program identifies and maps areas prone to liquefaction. These zones for Orange County are shown in Figure 3-6. The most extensive liquefaction zones occur in coastal areas, including parts of Huntington Beach and Newport Beach, and along Upper Newport Bay. In addition, a 2016 Seismic Hazard Assessment conducted by GeoPentech, Inc. found that the highest liquefaction hazard areas are the flat, coastal portions of the planning area, and the risk decreases moving inland. The areas identified as being highly susceptible to liquefaction are the San Juan Creek/San Clemente Beach areas.

3.2.6.4 Magnitude/Severity

Ground shaking is measured using either the moment magnitude scale (MMS, denoted as Mw or simply M) or the Modified Mercalli Intensity Scale. The MMS is a replacement for the Richter scale, which is still often referred to but is no longer actively used, as the Richter scale is not reliable when measuring large earthquakes.[18] The weakest earthquakes measured by the MMS start at 1.0, with the numbers increasing with the strength of the earthquake. The strongest recorded earthquake, which struck Chile in 1960, measured 9.5 on the MMS.[19] Like the Richter scale, the MMS is a logarithmic scale, meaning the difference in strength between two earthquakes is much larger than the difference in their measurements. For example, a 6.0 Mw earthquake is 1,000 times stronger than a 4.0 Mw earthquake and about 1.4 times as strong as a 5.9 Mw event.

The Modified Mercalli Intensity Scale is based on the damage caused by the earthquake and how it is perceived, rather than an actual measurement. When comparing multiple earthquakes, one event may have a higher Mercalli rating than another even if it released less energy, and thus was measured lower on the MMS. The Mercalli scale ranges from I (instrumental, rarely felt by people) to XII (catastrophic, total damage and lines of sight are distorted). Table 3-8, *Comparison of MMS and Modified Mercalli Intensity Scale*, shows a general comparison between the MMS and the Modified Mercalli Intensity Scale. Note that there is some overlap toward the higher end of the Mercalli ratings, with certain intensities produced by multiple ranges of magnitude measurements.

[18] 2014. ''Moment Magnitude, Richter Scale.'' https://www.usgs.gov/faqs/moment-magnitude-richter-scale-what-are-different-magnitude-scales-and-why-are-there-so-many.

[19] 2015. ''Earthquake Lists, Maps, and Statistics.'' https://earthquake.usgs.gov/earthquakes/browse/.

Figure 3-6
Liquefaction Susceptibility Zones

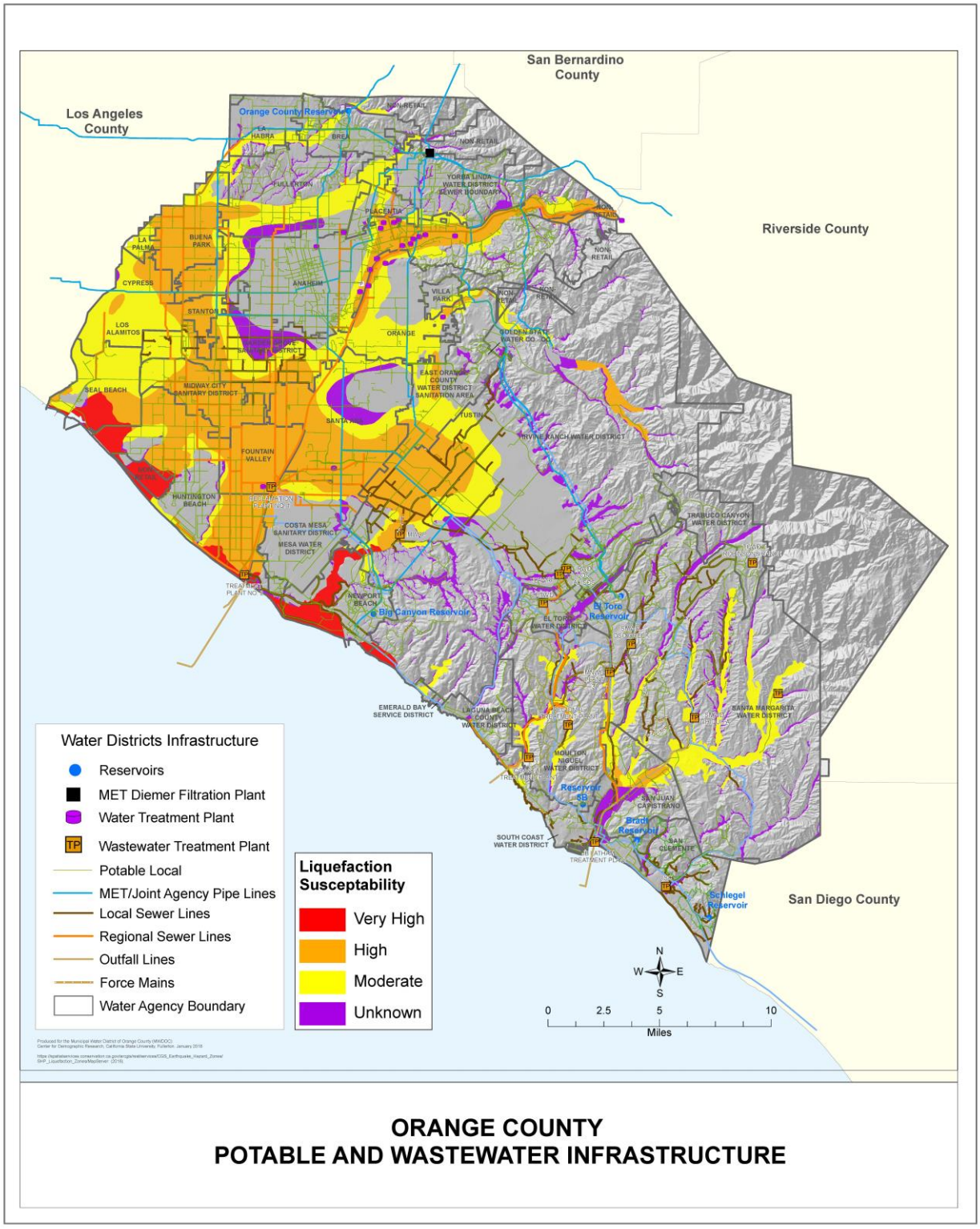


Table 3-8
Comparison of MMS and Modified Mercalli Intensity Scale

Magnitude (MMS)		Modified Mercalli Intensity Scale	
		Intensity	Description
1.0 to 3.0		I	Not felt except by very few persons under especially favorable conditions.
3.0 to 3.9		II	Weak: Felt only by a few persons at rest, especially on upper floors of buildings.
		III	Weak: Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 to 4.9		IV	Light: Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
		V	Moderate: Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 to 5.9		VI	Strong: Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
	6.0 to 6.9	VII	Very Strong: Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
7.0 and greater		VIII	Severe: Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
		IX	Violent: Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
		X	Extreme: Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
		XI	Extreme: Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
		XII	Extreme: Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Source: USGS 2017.

Several faults in Orange County can produce severe to extreme earthquakes. The SCEC and the Working Group on California Earthquake Probabilities have determined the probable magnitude for an earthquake along these major faults:

- *Elsinore Fault Zone:* SCEC reports probable earthquake magnitudes for the main trace of the Elsinore fault to be in the range of 6.5 to 7.5. The two northern segments, the Whittier Fault and the Chino Fault, have probable magnitudes of 6.0 to 7.2 and 6.0 to 7.0, respectively. The Whittier Fault location is extremely critical because it crosses the two main sources of untreated water being brought into the County (Yorba Linda Feeder and the Lower Feeder) and it passes very close to the Diemer Filtration Plant which serves as the treatment facility for the bulk of Orange County. Metropolitan does not have a backup system to supply treated water to many parts of central and southern Orange County in the event of an outage of the Diemer Plant.

- *Newport-Inglewood Fault Zone:* SCEC reports probable earthquake magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4.

- *Puente Hills Thrust Fault:* Recent studies indicate that this fault has experienced four major earthquakes ranging in magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.

- *Peralta Hills Fault:* The Earth Consultants International study for MWDOC indicates that this may be a back thrust fault to the Elsinore fault and may be capable of a magnitude 6.8.

- *San Andreas Fault Zone:* Based on that evidence and other geophysical observations, the fault has estimated the probability of a rupture with a magnitude 7.8 in the next 30 years (1994 through 2024) to be about 50 percent (SCEC, 1995). The range of probable magnitudes on the San Andreas Fault Zone during this period is reported to be 6.8 to 8.0.

- *San Joaquin Hills Fault:* Recent reports have determined that the blind thrust fault can generate an earthquake as large as 7.3. In addition, a minimum average recurrence interval of 1650 to 3100 years has been estimated for moderate-sized earthquakes on this fault.

- *San Jacinto Fault Zone:* SCEC reports probable earthquake magnitudes for the San Jacinto fault zone to be in the range of 6.5 to 7.5.

Although the San Andreas Fault Zone can produce an earthquake with a magnitude greater than 8.0 M, some of the smaller faults have the potential to inflict greater damage on the urban core of the Los Angeles Basin. Seismologists believe that a 6.0 earthquake on the Newport-Inglewood Fault Zone would result in far more death and destruction than a larger earthquake on the San Andreas Fault Zone, due to the San Andreas' relatively remote location from the urban centers of southern California.

3.2.6.5 Probability of Future Occurrences

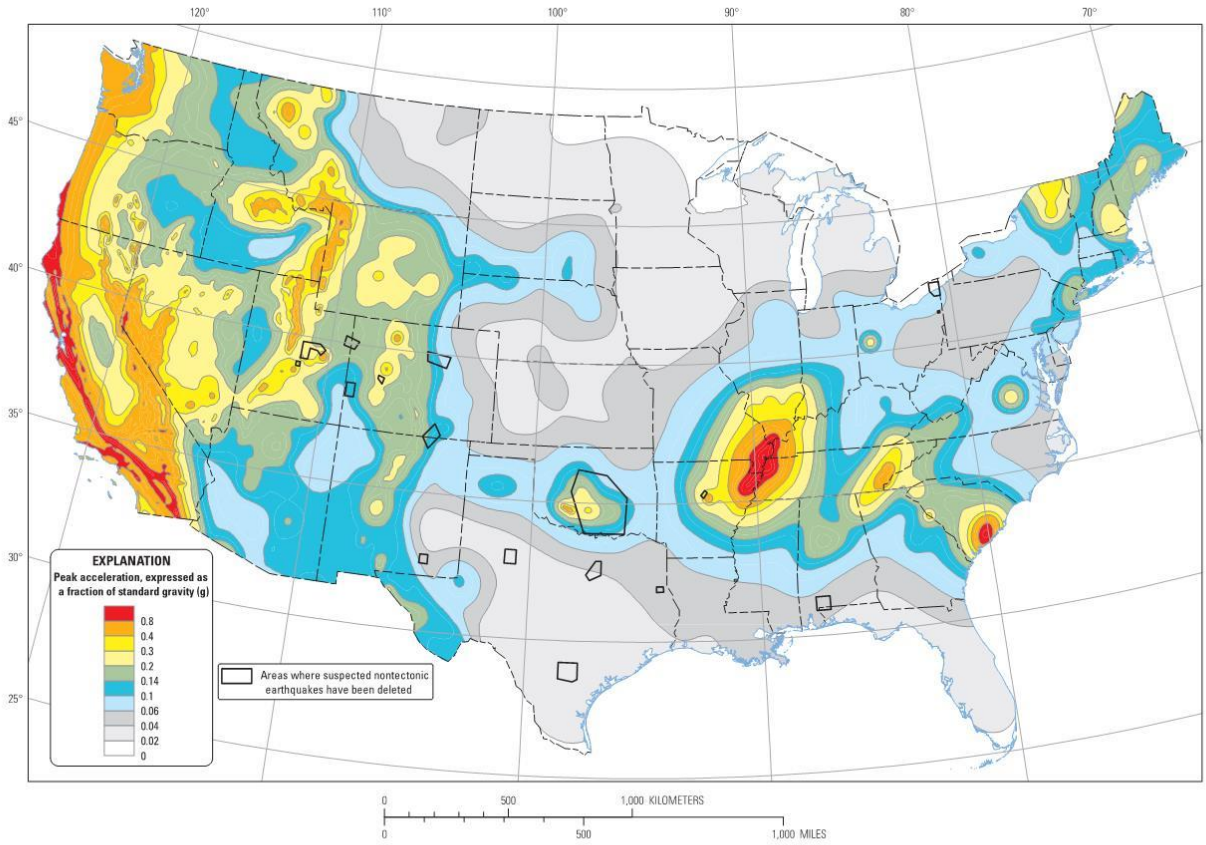
Based on the amount of seismic activity that occurs within the region, there is no doubt that communities within the jurisdictional boundaries of MWDOC will continue to experience future earthquake events. It is reasonable to expect that a major event (5.0 M or higher) and possibly even more severe will occur within a 30-year timeframe.

The Third Uniform California Earthquake Rupture Forecast (UCERF3), developed in 2014 by the Working Group on California Earthquake Probabilities and led by the USGS, provides estimates of the magnitude, location, and likelihood of fault rupture for more than 350 fault segments throughout the state. For Southern California, the study estimated the likelihood of a 6.0 M earthquake at 100 percent, a 7.0 earthquake at 75 percent, and an 8.0 earthquake at 7 percent.[20]

Predicted ground shaking patterns throughout southern California for hypothetical scenario earthquakes are available from the USGS as part of their on-going "ShakeMap" program. These maps are provided in terms of Instrumental Intensity, which is essentially Modified Mercalli Intensity estimated from instrumental ground motion recordings. ShakeMaps in graphical and GIS formats are available on the USGS website at: https://earthquake.usgs.gov/data/shakemap/.

In 2014, USGS released a simplified Peak Ground Acceleration (PGA) map to demonstrate the 2 percent probability of exceedance within a 50-year time period; refer to Figure 3-7. This analysis was done at the nationwide level and can be seen in the figure below. California, and many parts of southern California, have a risk of high PGA at this probability level.

Figure 3-7
Peak Ground Acceleration with 2 Percent Probability in 50 Years for the United States



Two-percent probability of exceedance in 50 years map of peak ground acceleration

[20] https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf.

3.2.7 Flood

3.2.7.1 Description (Nature) of the Hazard

Flooding may result from heavy rains raising water levels in rivers and streams; storms, tides, and weather patterns pushing ocean water into coastal areas; and when debris blocks normal storm water drainage systems. Other causes are discussed in more detail elsewhere in the plan, including sea-level rise in Section 3.2.1 and dam/reservoir failure in Section 3.2.4. Flooding can happen fast and with little warning, or water levels may rise slowly over the course of several days.

Orange County's terrain makes it naturally susceptible to flooding. Many of the rivers, creeks, and streams flow through natural floodplains on their way to the ocean. The County's rapid growth and transformation from an agricultural community to an urban community has changed flood-control practices in the region. Drainage is managed through reservoirs, dams, diversion structures and developed plains. In addition, seven pump stations (Huntington Beach, Cypress, Seal Beach, Los Alamitos, Rossmoor, Harbor-Edinger, and South Park) regulate storm water discharge to flood control channels. Although there is a countywide system of flood-control facilities, many of these are not designed for or capable of conveying runoff from major storms.

Orange County also has a warning system in place to detect potential flooding. The County began installing its ALERT (Automated Local Evaluation in Real Time) system in 1983. Operated by the County's Environmental Resources Section of the Resource Development and Management Department (RDMD) in cooperation with the National Weather Service, ALERT uses remote sensors located in rivers, channels and creeks to transmit environmental data to a central computer in real time. Sensors are installed along the Santa Ana River, San Juan Creek, Arroyo Trabuco Creek, Oso Creek, Aliso Creek, as well as flood control channels and basins. The field sensors transmit hydrologic and other data (e.g., precipitation data, water levels, temperature, wind speed, etc.) to base station computers for display and analysis.

3.2.7.2 History/Past Occurrences

Residents reported damaging floods caused by the Santa Ana River as early as 1770 (as recorded by explorer and missionary Father Juan Crespi). Major floods in Orange County along the Santa Ana River occurred in 1810, 1815, 1825, 1862, 1884, 1891, 1916, 1927, 1938, 1969, 1983, 1993, 1995, 1998, 2005, 2010, and 2017. Often these events involved additional hazards, such as landslides, mud flows, and high winds. Table 3-9, *Presidential Disaster Declarations for Flooding in Orange County Since 1969*, lists Presidential Disaster Declarations since 1969 that involved flooding and affected Orange County.

Table 3-9
Presidential Disaster Declarations for Flooding in Orange County Since 1969

Disaster Number	Incident Type	Title	Incident Begin Date	Incident End Date
4305	Flood	Severe winter storms, flooding, and mudslides.	1/18/2017	1/23/2017
1952	Flood	Severe winter storms, flooding, and debris and mud flows.	12/17/2010	1/4/2011
1585	Severe Storm(s)	Severe storms, flooding, landslides, and mud/debris flows.	2/16/2005	2/23/2005
1577	Severe Storm(s)	Severe storms, flooding, debris flows, and mudslides.	12/27/2004	1/11/2005
1203	Severe Storm(s)	Severe winter storms and flooding.	2/2/1998	4/30/1998
1046	Severe Storm(s)	Severe winter storms, flooding landslides, mud flow.	2/13/1995	4/19/1995
1044	Severe Storm(s)	Severe winter storms, flooding, landslides, mud flows.	1/3/1995	2/10/1995
979	Flood	Severe winter storm, mud & landslides, and flooding.	1/5/1993	3/20/1993
935	Flood	Rain/snow/wind storms, flooding, mudslides.	2/10/1992	2/18/1992
812	Flood	Severe storms, high tides and flooding.	1/17/1988	1/22/1988
677	Coastal Storm	Coastal storms, floods, slides and tornadoes.	1/21/1983	3/30/1983
615	Flood	Severe storms, mudslides and flooding.	1/8/1980	1/8/1980
547	Flood	Coastal storms, mudslides and flooding.	2/15/1978	2/15/1978
253	Flood	Severe storms and flooding.	1/26/1969	1/26/1969

The most significant flood events to affect the county are summarized below:

- *Great Flood of 1862*. The flood of January 1862, called the Noachian deluge of California, was unusual in two ways: 1) the storm causing the flood occurred during a very severe drought spanning 1856 to 1864; and 2) the flood lasted 20 days, which is considered an extremely long duration. Under normal circumstances, major floods last only a few days. The only structure left standing along this portion of the Santa Ana River was the Aqua Mansa chapel and residents gathered on the small point of high-land to take refuge from the storm. Miraculously, there were no recorded deaths.

- *Great Flood of 1916*. On January 27, 1916, flood waters inundated a large area along the Santa Ana River, including Main Street in downtown Santa Ana, where the water was 3 feet deep. Adjacent farm lands, which later became the City of Westminster, also flooded. Three vehicular bridges and three railroad bridges were washed away by the flood and four people drowned.

- *Great Flood of 1938*. The flood of 1938 is considered the most devastating flood to occur in Orange County during the 20th Century and affected all Southern California. The storm began on February 27 and lasted until March 3. In the Santa Ana Basin, 34 people died, and 182,300 acres were flooded. All buildings in Anaheim were damaged or destroyed. Two major railroad bridges, seven vehicular bridges, and the town of Atwood were destroyed. The Santa Ana River inundated the northwestern portion of Orange County and train service to and from Santa Ana was cancelled. The maximum discharge on March 3, 1938 was 46,300 cfs, with a gage height at 10.20 feet. Damage exceeded $50 million.

- *Great Flood of 1969*. The floods of January and February 1969 were the most destructive on record in Orange County. Previous floods had greater potential for destruction, but the County

was relatively undeveloped when they occurred. During the flood of 1969, rain fell almost continuously from January 18 to January 25, resulting in widespread flooding. Orange County was declared a national disaster area on February 5. A second storm hit on February 21 and lasted until February 25 bringing rain to the already saturated ground. This second storm culminated in a disastrous flood on February 25. The storm resulted in the largest peak outflow from Santiago Reservoir since its inception in 1933. The reservoir at Villa Park Dam reached its capacity for the first time since its construction in 1963; the dam had a maximum inflow of 11,000 cfs. The outlet conduit was releasing up to 4,000 cfs yet the spillway overflowed at 1:30 p.m. and continued for 36 hours. The maximum peak outflow from the dam reached 6,000 cfs. Although the safety of the dam was never threatened the outflow caused serious erosion downstream in the cities of Orange and Santa Ana and in some parks and golf courses. A Southern Pacific Railroad bridge, water and sewer lines, a pedestrian over crossing, and three roads washed out. Approximately 2,000 Orange and Santa Ana residents were evacuated from houses bordering Santiago Creek.

- *Great Flood of 1983*. An intense downpour and high tides associated with El Niño (due to the presence of a low-pressure system) caused intense shoreline flooding. Meanwhile the Santa Ana River crested its sides near the mouth of the ocean; creating a disaster for the low-lying areas of Huntington Beach; floodwaters were 3 to 5 feet deep.

- *1992 Coastal Storms*. In 1992, several coastal storms affected many coastal utilities storm drain and sewage treatment processes. SOCWA reported significant cracks and damage to its Aliso Creek Ocean outfall.

- *Great Floods of 1993*. El Niño caused more flooding. An intense storm was concentrated in the Laguna Canyon Channel area extending from Lake Forest to downtown Laguna Beach. In spite of a valiant effort to save downtown merchants by sandbagging, the stores were flooded. Laguna Canyon Road was damaged extensively, as well as homes and small businesses in the Laguna Canyon Channel. There were no fatalities reported.

- *Great Flood of 1995*. A disaster was declared in Orange County after extremely heavy and intense rains exceeded the storm runoff capacity of local drainage systems in many Orange County cities and regional Flood Control District systems. As a result, widespread flooding of homes and businesses occurred throughout these cities. There were approximately 1,000 people evacuated and extensive damage sustained to both private and public property.

- *Great Floods of 1997/1998*. El Niño Storms that occurred during this period created extensive storm damage to private property and public infrastructure, with damages reaching approximately $50 million. Storm conditions caused numerous countywide mudslides, road closures, and channel erosion. Hillside erosion and mudslides forced the continual clearing of roads of fallen trees and debris. Protective measures, such as stabilizing hillside road slopes with rock or K-rail at the toe of slopes, were taken to keep the normal flow of transportation. Harbors, beaches, parks, and trails also sustained substantial storm damage.

- *2010/2011 Winter Storms*. On January 26, California received Presidential Declaration for the Severe Winter Storms, Flooding, and Debris and Mud Flows that occurred December 17, 2010 through January 4, 2011. At the time of the declaration the State of California incurred well over $75 million in damages, while Orange County sustained over $36 million in damages. Orange

County sustained extensive damage sustained to private and public property, as well as critical infrastructure.

- *2017 Winter Storms*.[21] Southern California experienced three storms over six days starting on January 18. The heavy rains, combined with already saturated soil, produced flash flooding across much of Orange County. Streets flooded with 1 to 3 feet of water in Huntington Beach, Santa Ana, and Newport Beach. Responders conducted rescue operations on the Santa Ana River in the cities of Orange and Huntington Beach. The storms resulted in a Presidential Disaster Declaration for 16 counties throughout the state.

3.2.7.3 Location/Geographic Extent

Orange County covers 789 square miles and its landscape varies from mountainous terrain (in the northeast and southeast) to floodplains (in the central and western section). Figure 3-8 identifies the 100- and 500-year FEMA floodplains within the County. A sizable portion of north Orange County, including some of the County's most densely populated areas, is within a 500-year floodplain, which denotes areas with a one-in-500, or 0.2 percent, chance of flooding in any given year. These floodplains are further explained in Sections 3.2.7.4 and 3.2.7.5.

The Santa Ana River, flowing through the heart of Orange County to the Pacific Ocean, is the County's greatest flood threat. Other areas subject to flooding during severe storms include areas adjacent to Atwood Channel, Brea Creek Channel, Fullerton Creek Channel, Carbon Creek Channel, San Juan Creek Channel, and East Garden Grove-Wintersburg Channel. Areas adjacent to Santiago Creek and Collins Channel in the central portion of the County and large portions of the San Diego Creek watershed in the City of Irvine and unincorporated areas of the County are also subject to inundation. In the southern portion of the county, canyon areas are subject to flooding. The continued development in these areas has made the flood hazard even greater.

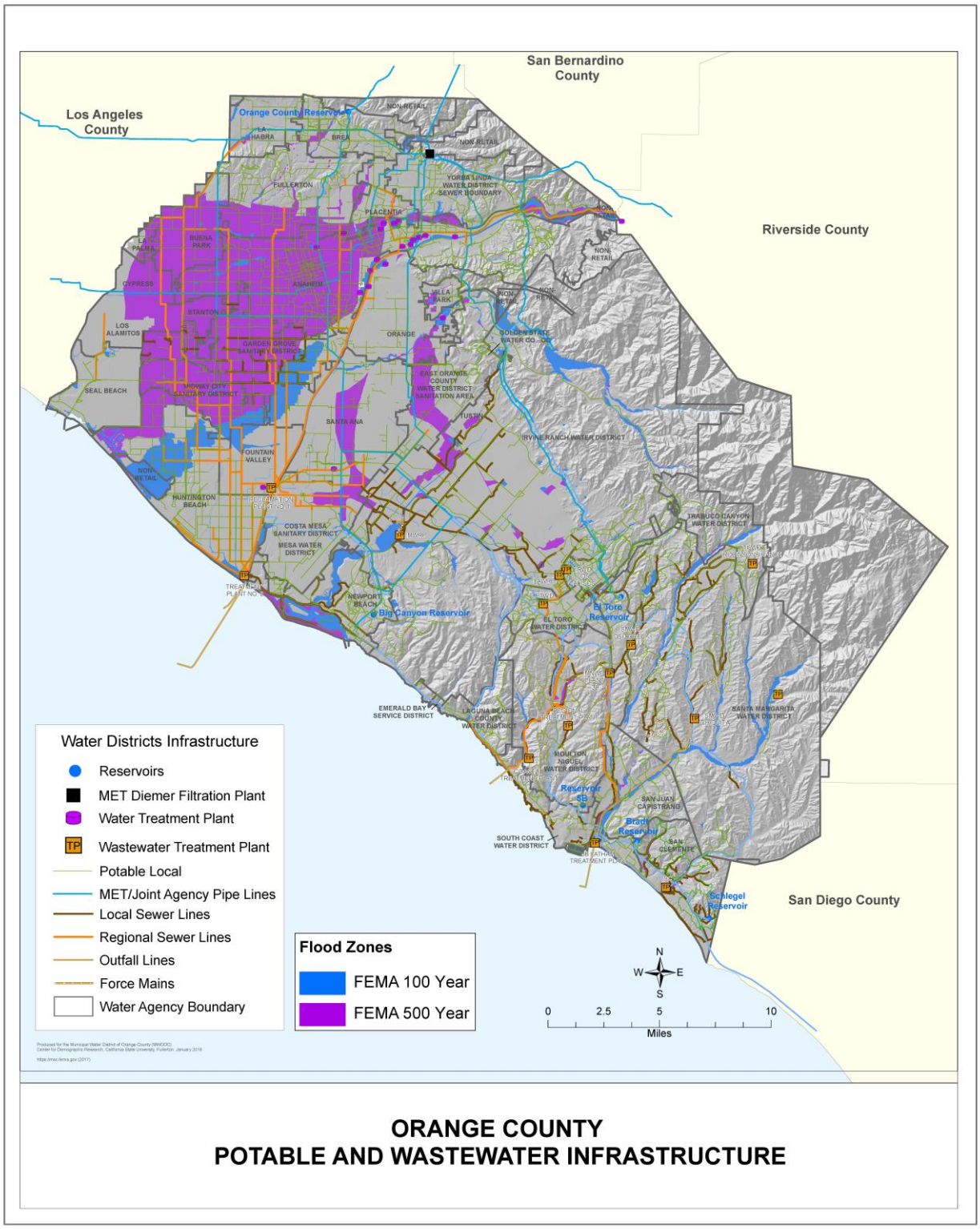
3.2.7.4 Magnitude/Severity

Flood severity is often described in terms of a 100-year flood, describing an event that is likely to occur once in a 100-year period. In other words, there is a 1 percent probability of an event this severe occurring in any given year. Flood Insurance Rate Map (FIRM) panels produced by FEMA identify areas subject to this level of risk as being within the 100-year floodplain. Figure 3-8 shows these locations throughout Orange County, as well as a 500-year floodplain, which indicates a 0.2 percent annual chance of flooding.

Floods can also be measured in terms of data collected by U.S. Geological Survey through a nationwide system of stream gages. The primary gage on the Santa Ana River is in the City of Santa Ana. During the Great Flood of 1938, this gage measured a water level of 10.2 feet, compared to a normal height of about 1.44 feet. During both two most recent flood events in 2010/2011 and 2017, the river reached 7.6 feet.

[21] NCEI. Storm Events Database. https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=676168; and The Orange County Register. January 23, 2017. Flooding, mudslides, power outages follow torrential rainstorm. https://www.ocregister.com/2017/01/23/flooding-mudslides-power-outages-follow-torrential-rainstorm/.

Figure 3-8
Flood Zones



The greatest flood in terms of water flow occurred in 1862, when the Santa Ana River saw an estimated flow rate of 317,000 cubic feet per second (cfs). This flood was three times greater than the Great Flood of 1938 which had an estimated flow of 110,000 cfs. Peak discharges measured on the Santa Ana River during declared flood disasters since 1993 have ranged from 8,220 to 31,700 cfs.

On December 22, 2010, during the peak of that winter's floods, a weather station in Silverado Canyon recorded more than 7 inches of rain in a single day, according to NOAA climate data. During other flood events in the last 25 years, the maximum daily rainfall recorded within Orange County has ranged from 2 to 4 inches.

3.2.7.5 Probability of Future Occurrences

As mentioned in Section 3.2.7.4, FIRM panels depict areas that have a 1 percent chance of flooding in any given year, identified as a 100-year floodplain, as well as a 0.2 percent chance, or a 500-year floodplain. Such areas within Orange County are depicted in Figure 3-8.

3.2.8 Geologic Hazards (Expansive Soils & Land Subsidence)

3.2.8.1 Description (Nature) of the Hazard

EXPANSIVE SOILS

According to a scientific paper published in the Journal of Geotechnical Engineering (Day 1994), "expansive soil is a worldwide problem that causes extensive damage to civil engineering structures." Expansive soils are particularly problematic in the southwestern United States and especially in southern California, where there are large clay deposits compounded by "alternating periods of rainfall and drought." The problem with constructing on expansive soils is that the clay, often referred to as adobe, expands rapidly during the rainy season and contracts gradually during the dry season causing "shrink-swell." Shrink-swell is particularly problematic for "slab-on-grade" foundations which can be placed directly on expansive soil which are constantly in a state of movement as the soil expands and contracts causing the foundation to fatigue and crack. Buildings with balloon frame construction are also susceptible to bowing and cracking when built on expansive soils. Shrink and swell can affect water/wastewater facilities particularly buildings or structures built using slab on grade or balloon frame construction techniques.

Expansive soil is also known to "creep" on unstable slopes eventually leading to landslides. Typically, this is found when expansive soil underlies compact topsoil. As the expansive soil expands-contracts, the compact topsoil slides or creeps downhill. Facilities built on unstable slopes with underlying expansive soils are prone to movement and can be damaged or destroyed in extreme circumstances.

LAND SUBSIDENCE

The United States Geological Survey (USGS) defines land subsidence as a gradual settling or sudden sinking of the ground surface because of subsurface movement of underlying geologic units. Scientists at the USGS have determined that nearly 17,000 square miles in 45 states have been directly affected by land subsidence, caused by aquifer-system compaction, drainage of organic soils, underground mining, hydro-compaction, natural compaction, sinkholes, and thawing permafrost. More than 80 percent of land subsidence is caused by over-use of groundwater and the increasing development of land and water resources threatens to worsen existing land-subsidence problems (while initiating) new ones.

Land subsidence in California is mainly caused by groundwater pumping in areas where aquifer recharge is exceeded. Known as "over-drafting," the dewatering of aquifers has led to lower water tables and subsidence, resulting in damage to infrastructure, water quality and in coastal areas has resulted in the intrusion of seawater. USGS notes "the compaction of unconsolidated aquifer systems that can accompany excessive groundwater pumping is by far the single largest cause of subsidence" and "the overdraft of such aquifer systems has resulted in permanent subsidence and related ground failures," thus "the extraction of this resource for economic gain constitutes 'groundwater mining' in the truest sense of the term." Over-drafting is further exacerbated in hot geographic regions with a large population; this includes much of the southern California.

3.2.8.2 History/Past Occurrences

EXPANSIVE SOILS

In 1980, Krohn and Slosson (1980) made an assessment and cost estimate of the damage caused by expansive soils throughout the United States. They estimated that approximately $7 billion in property damage was reportedly attributed to construction on expansive soils. While no recent figures have been identified, the increase in construction activity in areas of expansive soil, especially in southern California, will undoubtedly cause this number to increase. J. David Rogers of the University of Missouri found that "expansive soils are the second leading cause of property damage in the United States."

There are no reported occurrences of expansive soils causing considerable damage within the County; although expansive soils are known to exist. Typically, expansive soils would be identified at a local level on a site-by-site or area basis and are addressed as part of the development review process.

LAND SUBSIDENCE

The relationship between subsidence and groundwater pumping was not fully recognized until 1928 when O.E. Meinzer, scientist with the United States Forest Service (USFS), realized that aquifers were compressible. By the 1950s, the USGS made a concerted effort to measure the amount of ground subsidence. In 1952, Joseph Poland studied large discrepancies between the U.S. Coast and Geodetic Survey for the Santa Clara and San Joaquin valleys. Poland noted that the increased use of groundwater correlated with the amount of ground subsidence. Poland's work led to the verification of "consolidation theory" or compressible aquifers, as well as leading to the development of "definitions, methods of quantification, and confirmation of the interrelationship among hydraulic-head declines, aquitard (clay) compaction, and land subsidence."

Subsidence has historically occurred in Orange County associated with groundwater pumping and from peat decomposition. The areas of historic subsidence associated with groundwater pumping are illustrated in Figure 3-9, below. Localized subsidence possibly due to peat decomposition has also been reported in scattered areas inland from the coast between Sunset and Newport Beaches.

3.2.8.3 Location/Geographic Extent

EXPANSIVE SOILS

According to the County of Orange General Plan Safety Element, much of Orange County is covered by soil that may cause cracking in concrete foundations. The most prevalent problems occur from clay or "expansive" soils that contract and expand. Problems attributed to expansive soils are usually related to

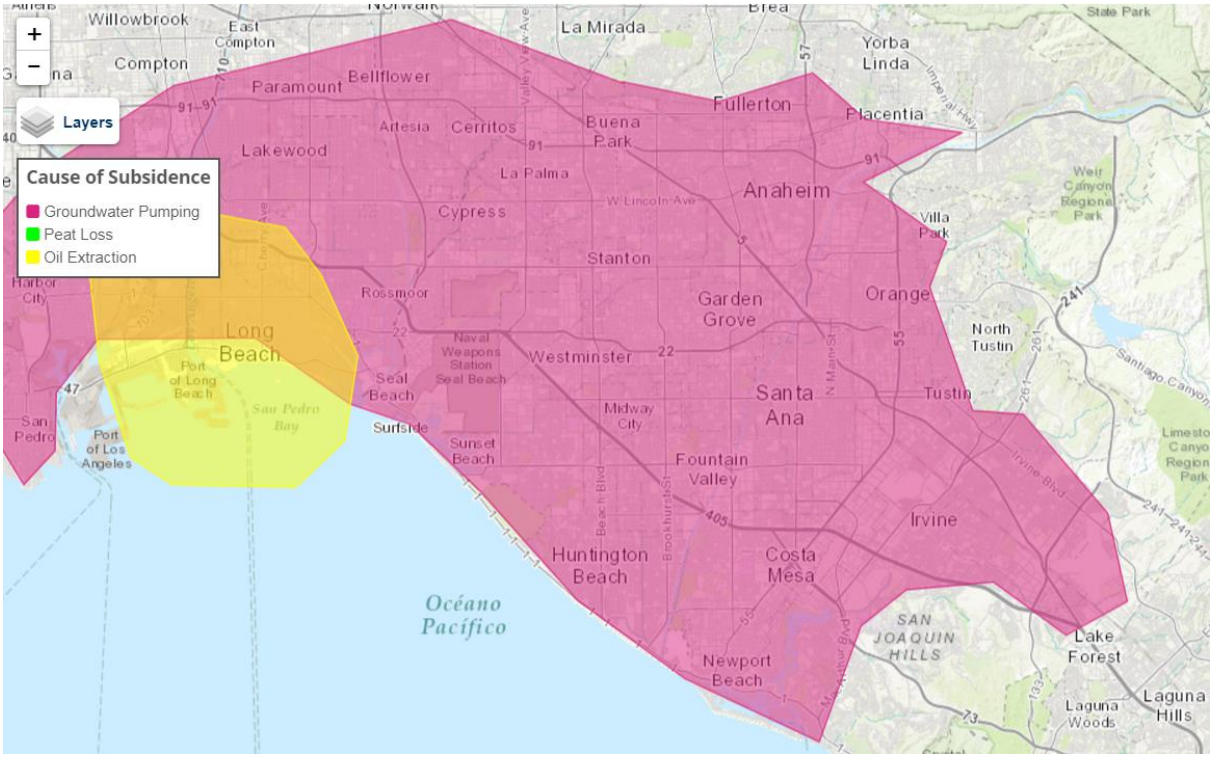
improperly designed or constructed foundations. Due to the diversity of soil conditions, structures are not completely safe from cracking, slipping, or sinking to some degree. Expansive soils are typically mitigated through structural and design regulations as well as through soil treatment techniques. The California Building Code specifically addresses expansive soils in Sections 1804.4, 1806.5 and 1815. The California Health and Safety Code Section 17954 states that "If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision" and "The soil investigation shall be prepared by a civil engineer who is registered in this state." Expansive soils can impact the entire planning area.

LAND SUBSIDENCE

Currently, land subsidence affects much of the west coast. The major land-subsidence affected area of Orange County exists between Newport Beach and Huntington Beach and five miles inland from this point. This area is referred to as the Talbert Gap, which formed millennia ago from alluvial deposition from the Santa Ana River.

According to the USGS online map viewer, areas starting from Newport Beach up to Seal Beach, and out east to Placentia, experience subsidence impacts due to groundwater pumping. Figure 3-9, shows the areas impacted by subsidence.

Figure 3-9
Subsidence



3.2.8.4 Magnitude/Severity

EXPANSIVE SOILS

Damages to property due to erosion and deposition are usually classified as cosmetic, functional, or structural. Cosmetic damages refer to slight problems where only the physical appearance of a structure is affected (e.g., cracking in plaster or drywall). Functional damages refer to situations where the use of a structure has been impacted due to subsidence. Structural damages include situations where entire foundations require replacement due to subsidence-caused cracking of supporting walls and footings.

Buildings and infrastructure across Orange County are vulnerable to the impacts of soil expansion, instability, and erosion-related hazards. Cities in southern California have established guidelines for construction in areas of expansive soils. The MAs generally conduct soil surveys prior to construction of water and wastewater facilities and take the specific circumstances into consideration during design and construction. The magnitude and severity of expansive soils are similar throughout the planning area.

LAND SUBSIDENCE

The Talbert Gap, as described above, has sustained nearly a century of underground water aquifer pumping which was used to sustain intensive grazing and agriculture practices. By 1956 the water table had lowered to below sea level allowing saltwater from the Pacific Ocean to intrude through the Talbert Gap. Because of studies identifying subsidence and saltwater intrusion in Orange County, OCWD began a massive management program to minimize the loss of aquifer-stored water and reduce saltwater intrusion. Although subsidence is a concern within Orange County, programs have been implemented to address subsidence issues. The MAs within the portion of the planning area identified as having historic subsidence could continue to be impacted if it is not monitored and addressed.

3.2.8.5 Probability of Future Occurrences

EXPANSIVE SOILS

Expansive soils will continue to occur throughout the planning area. Potential impacts associated with these hazards will need to be addressed through site design and development review, including preparation and adherence to geotechnical constraints recommendations.

LAND SUBSIDENCE

In areas that have experienced decreased precipitation in the summer months and reduced surface-water supplies, communities are often forced to pump more ground water to meet their needs. Orange County has historically experienced long term-droughts, especially in recent years. Although specific areas of excessive pumping, such as Talbert Gap, have been addressed, there is still a high probability that communities within the planning area will continue to experience impacts of these events.

It is important that these communities consider future mitigation actions that will address this hazard, particularly in newly developing areas near water. In areas where groundwater pumping has caused subsidence, switching to surface water supplies can be instrumental. Changing climate norms are expected to affect soil resources and especially during hot, dry years annual grasses that stabilize and protect topsoil often fail to germinate or do not grow well. This leaves soil surfaces highly vulnerable to

erosion from wind and precipitation and can further exacerbate the consequences of soil expansion and subsidence.

3.2.9 *High Winds/Santa Ana Winds*

3.2.9.1 Description (Nature) of the Hazard

High winds are defined as those that last longer than one hour at greater than 39 miles per hour (mph) or for any length of time at greater than 57 mph. High winds that affect Orange County, notably Santa Ana winds, are generally defined as warm, dry winds that blow from the east or northeast (offshore). Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon and forecasters at the National Weather Service in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots. The complex topography of southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high-pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees Fahrenheit per 1,000 feet due to compression of the air mass. The air is dry since it originated in the desert, and it dries out even more as it is compressed.

3.2.9.2 History/Past Occurrences

Most high wind incidents in the planning area are the result of Santa Ana wind conditions. While high impact wind incidents are not frequent in the area, significant Santa Ana wind events have impacted the County. The National Oceanic and Atmospheric Administration (NOAA) Storm Events Database identifies 145 events reported within Orange County between December 1, 1950 and December 31, 2017. Table 3-10, *Major High Wind Events*, identifies and describes some of the major events occurring within Orange County.

3.2.9.3 Location/Geographic Extent

Santa Ana winds blow westward through the canyons toward the coastal areas of southern California. Orange County commonly experiences Santa Ana winds between October and March. The winds are not location specific, but rather impact the entire planning area.

3.2.9.4 Magnitude/Severity

Wind speeds are typically 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas with gusts greater than 100 knots in some areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high fire danger associated with them. Santa Ana winds can adversely affect power utilities that have transformers and power lines, in turn affecting the ability of some water and wastewater utilities to operate when back-up generation is unavailable. The magnitude and severity of Santa Ana winds are similar throughout the planning area.

Table 3-10
Major High Wind Events

Date	Location	Magnitude (kts)	Property Damage (dollars)	Description
12/9/1998	North East Orange County	81	50,000	Severely disrupted transportation, power, and daily activities. Broken trees and power poles were common throughout the area and power was knocked out to 180,000 customers. Downed power lines also started several wild fires, damaging one house.
12/3/1999	Santa Ana Mountains and Foothills	104	20,000	Most of the major highways in the Inland Empire and through the Santa Ana Mountains were closed, partially due to two semi-tractor trailers that overturned, partially from blowing dust reducing visibility, and partially from road signs and other debris being blown onto the roads.
3/20 – 3/21/2000	Santa Ana Mountains and Foothills	51	25,000	Damage ranged from downed power poles, trees falling on cars and houses, fruit being knocked off of trees, and blowing sand and dust lowering visibility to zero.
1/5 – 1/7/2003	Santa Ana Mountains and Foothills			Numerous trees and power poles were blown down. At least 60 communities were affected. A commuter train was delayed for several hours in Orange County when power poles were blown down onto the track. A brush fire whipped by the winds, damaged 5 houses and burned 150 acres. Sparks from downed power lines started numerous small brush fires, but these were quickly contained. Many houses and at least 300 parked automobiles were damaged by falling trees.
11/23/03	Santa Ana Mountains and Foothills	50	50,000	Trees, power lines, and signs were knocked down.
12/16/04	Northeast Orange	68	20,000	
2/3/05	Santa Ana Mountains and Foothills	53	5,000	
3/31/05	Northeast Orange	54	5,000	Strong Santa Ana winds caused power outages, blew over big rigs, and knocked down trees.
1/22/06	Santa Ana Mountains and Foothills	62	15,000	Surface high pressure over the Great Basin resulted in gusty Santa Ana winds from the San Bernardino mountains, through the Inland Empire, and into Orange County. Wind gusts over 60 mph toppled trees and power poles. Downed power lines caused sporadic power outages. Most of the property damage that occurred came as a direct result of falling trees.
10/21-22/2007	Santa Ana Mountains and Foothills/Orange County Coastal Areas	74	100,000	Santa Ana winds toppled trees, brought down power lines, and knocked out power to thousands in many parts of Orange County. The strongest winds were felt along the foothills of the Santa Ana mountains and near the Chino Hills area.

Table 3-10 [continued]
Major High Wind Events

Date	Location	Magnitude (kts)	Property Damage (dollars)	Description
12/16/11	Santa Ana Mountains and Foothills	56	15,000	This system set off intense showers and isolated thunderstorms with pea-sized hail (accumulations in Rancho Cucamonga and Mission Viejo), as well as several funnel clouds spotted east of John Wayne Airport. Most of the rain with this system was confined to Orange County, the Inland Empire and the northern mountains. Heavy rain was observed in Orange County and the Inland Empire on the 15th and 16th with locations there recording between one-quarter and one-half inch. Strong winds were also observed with this storm, especially on the 16th, which was a more widespread wind event than early December, impacting all counties, including San Diego County, with warning-level winds. Several wind gusts of 45-65 mph were reported in the Santa Ana Mountains, the Inland Empire and San Diego County Mountains. Several trees and power poles were downed, leaving many without power. Power poles were reported down in Yorba Linda and around 240 customers were reported without power in Tustin.
1/14/14	Santa Ana Mountains and Foothills	67	2,000	The highest wind gusts occurred in the San Diego County foothills and inland Orange County, including the Santa Ana Mountains. Winds downed fiber optic lines near Santiago Canyon in Orange County.
2/12/16	Orange County Inland	52	20,000	Strong northeasterly winds downed numerous trees near Irvine, Santa Ana and Orange. Approximately 85 customers lost power in the city of Santa Ana.
2/17/17	Orange County Coastal	52	75,000	A strong trough and associated Pacific cold front swept into southern California from the west, bringing strong winds, heavy snow and rain. The storm was noteworthy for the strong prefrontal southerly winds that produced significant tree damage over the coast and valleys. In the mountains the ski resorts received 1-2 ft of snow, while elevations as low as 5,000 ft saw a few inches of accumulation. Rainfall ranged from 2-6 inches along the coastal slopes to 1-2 inches at the coast. At the beaches surf heights reached 8 to 12 ft. An isolated peak gust of 60 mph occurred at San Clemente Pier. Numerous trees were downed over the coastal areas.
12/4/17	Orange County Inland	52	15,000	Report of a large tree downed by strong winds in Orange. Tree damage, minor roof damage, and an exploding transformer were also reported in Santa Ana.

Notes: kts = knots. One (1) knot is equal to 1.151 miles per hour (mph).

National Oceanic and Atmospheric Administration, National Centers for Environmental Information, *Storm Events Database*, Event Types: High Winds, https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=6,CALIFORNIA, accessed March 21, 2018.

3.2.9.5 Probability of Future Occurrences

High winds, including Santa Ana winds, will continue to occur annually in the County. The probability of future occurrence throughout the planning area is high.

3.2.10 Landslide/Mudflow

3.2.10.1 Description (Nature) of the Hazard

Landslide is a general term for a falling mass of soil or rocks. Mudflow consists of material that is wet enough to flow rapidly and contains at least 50 percent sand, silt, and clay-sized particles. The primary effects of landslides/ mudflows can include:

- Abrupt depression and lateral displacement of hillside surfaces over distances of up to several hundreds of feet.
- Disruption of surface drainage.
- Blockage of flood control channels and roadways.
- Displacement or destruction of improvements such as roadways, buildings, and water wells.

Landslides are a type of 'mass wasting' which denotes any down slope movement of soil and rock under the direct influence of gravity. The term 'landslide' encompasses events such as rock falls, topples, slides, spreads, and flows. Landslides can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by man-made construction activities, or any combination of these factors. Landslides can occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides (USGS Fact Sheet 0071-40, Version 1.0).

Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They can move slowly, (millimeters per year) or can move quickly and disastrously, as is the case with debris-flows. Debris-flows can travel down a hillside of speeds up to 200 miles per hour (more commonly, 30 – 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes can happen because of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions.

A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. This high rate of speed makes debris flows extremely dangerous to people and property in its path. Earthquakes often trigger flows. Debris flows normally occur when a landslide moves down-slope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Flows are typically rapid moving and also tend to increase in volume as they scour out the channel. Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

Wildland fires on hills covered with chaparral are often a precursor to debris flows in burned out canyons. The extreme heat of a wildfire can create a soil condition in which the earth becomes impervious to water by creating a waxy-like layer just below the ground surface. Since the water cannot be absorbed into the soil, it rapidly accumulates on slopes, often gathering loose particles of soil into a sheet of mud and debris. Debris flows can often originate miles away from unsuspecting persons, and approach them at a high rate of speed with little warning.

Natural processes can cause landslides or re-activate historical landslide sites. The removal or undercutting of shoreline-supporting material along bodies of water by currents and waves produces countless small slides each year. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes can also cause additional failure (lateral spreading) that can occur on gentle slopes above steep streams and riverbanks.

3.2.10.2 History/Past Occurrences

The following identifies some of the more major landslide occurrences within Orange County. There have been no disaster declarations within Orange County associated with landslides/mudflows.

- *1978 Bluebird Canyon, Orange County*. The cost of recovery was $52.7 million (2000 dollars) with 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

- *1980 Southern California Slides*. The damage was estimated at $1.1 billion in 2000 dollars. Heavy winter rainfall in 1979-80 caused damage in six southern California counties. In 1980, the rainstorm started on February 8 with 5 days of continuous rain and 7 inches of precipitation. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as 8 inches of rain fell in a six-hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

- *1983 San Clemente, Orange County*. The damage to California Highway 1 was estimated at $65 million in 2000 dollars. Litigation at that time involved approximately $43.7 million (2000 dollars).

- *1994 Northridge, California Earthquake Landslides*. As a result of the magnitude 6.7 Northridge, California, earthquake, more than 11,000 landslides occurred over an area of 10,000 km2. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. They destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. It caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil by the landslide activity and blown toward the coastal populated areas.

- *March 1995 Los Angeles and Ventura Counties, Southern California*. Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small town of La Conchita, about 20 km west of Ventura. There also was widespread debris-flow and flood damage to homes, commercial buildings, and roads and highways in areas along the Malibu coast that had been devastated by wildfire 2 years before.

- *1998 Laguna Niguel, Orange County, Landslide*. During the 1997/1998 El Nino Season, heavy rainfall increased movement on the site of an ancient landslide in Laguna Niguel. The storms in December 1997 had accelerated its movement and in early 1998, a crumbling hillside forced the evacuation of 10 hilltop homes and more than 10 condominium units resting below. Ultimately four of the hilltop homes collapsed, falling down hillside into the void created by the slide area. The condominium complex has since been demolished and the site remains open space.

- *2005 Blue Bird Canyon, Laguna Beach, Orange County; Landslide*. On June 1, 2005, Bluebird Canyon in Laguna Beach experienced a landslide. Exceptionally heavy rainfall during the winter period was the underlying cause of the instability in an ancient landslide. A 30-acre piece of hillside between 50 to 60 feet deep broke free and fell on the homes below; 15 homes were destroyed, and 32 others had varying levels of damage. The approximate cost of damage was about $35 million.

- *2005 SCWD Landslide Impact to the Joint Regional Transmission Line*. Following a year of heavy rainfall, a slope failure occurred in Laguna Niguel in an area that included a section of the Joint Regional Transmission Pipeline. The pipeline had to be shut down and a temporary pipeline was routed around the slide area while evaluations of the stability of the area were made. Ultimately, the pipeline will be rerouted around the unstable area or located back in the slope after it has stabilized. Because the problem occurred in the winter/spring period and there are other pipelines into South Orange County, no water shortages were experienced.

- *2018 Cannon Cliff, Dana Point, Orange County; Rockslide*. Approximately 18 tons of rocks, including a two-ton boulder dropped from the cliff area under Cannons Restaurant and struck a public restroom across from Baby Beach at the north end of Dana Point Harbor. The rocks are part of a four- to -five-million-year-old rock formation called the Capistrano Formation.

Rain induced landslides were reported in Santa Margarita in 1980, 1993, 1995 and 2005. In 1980 rains washed out an access road in Coto De Caza uncovering an 8-inch water line. The same series of storms also exposed a 21-inch trunk sewer line along the Oso Creek in Mission Viejo resulting in damages of $300,000. In 1993 bank failures caused many pipelines to break which had to be replaced, relocated, or re-protected at a cost of nearly 2.1 million dollars. A slope failure in 1995 caused pipeline failures costing nearly $30,000 and in 2005 a reservoir slope failure in Talega Valley cost $350,000. Landslides, resulting in erosion along Aliso Creek, affected the South Orange County Water Authority's Aliso Creek Effluent Transmission Main (a 36-inch pipeline carrying treated wastewater).

3.2.10.3 Location/Geographic Extent

Figure 3-10 illustrates the portions of the planning area susceptible to landslides based upon topography, surface and subsurface geology, borehole data, historical ground-water levels, existing landslide features, slope gradient, rock-strength measurements, geologic structure, and probabilistic earthquake shaking estimates. These areas are primarily comprised of the southern coastal communities and the communities containing steeper topography or located adjacent to mountain areas.

The extent of landslides/mudflows varies throughout the County depending upon the location and contributing conditions, such as an earthquake, heavy rain or recent fires. Earthquake-induced landslides are relatively shallow falls and slides, in which highly disrupted masses of rock and soil travel down slopes at high speed. The Northridge earthquake, in Los Angeles County, triggered more than 11,000 landslides in an area of 6,200 square miles. Most slides were shallow, brittle failures of surficial rock and soil.

Deep-seated landslides are triggered by cumulative rainfall during long periods (weeks to years). Resulting landslides are relatively deep earth flows and translational or rotational earth slides and rock slides. Translational landslides are typically a few meters to tens of meters deep, and rotational slides range in depth from several meters to tens of meters. Deep-seated translational and rotational landslides, including rock slides, tend to fail a little at a time and move more slowly than debris flows, but a few do

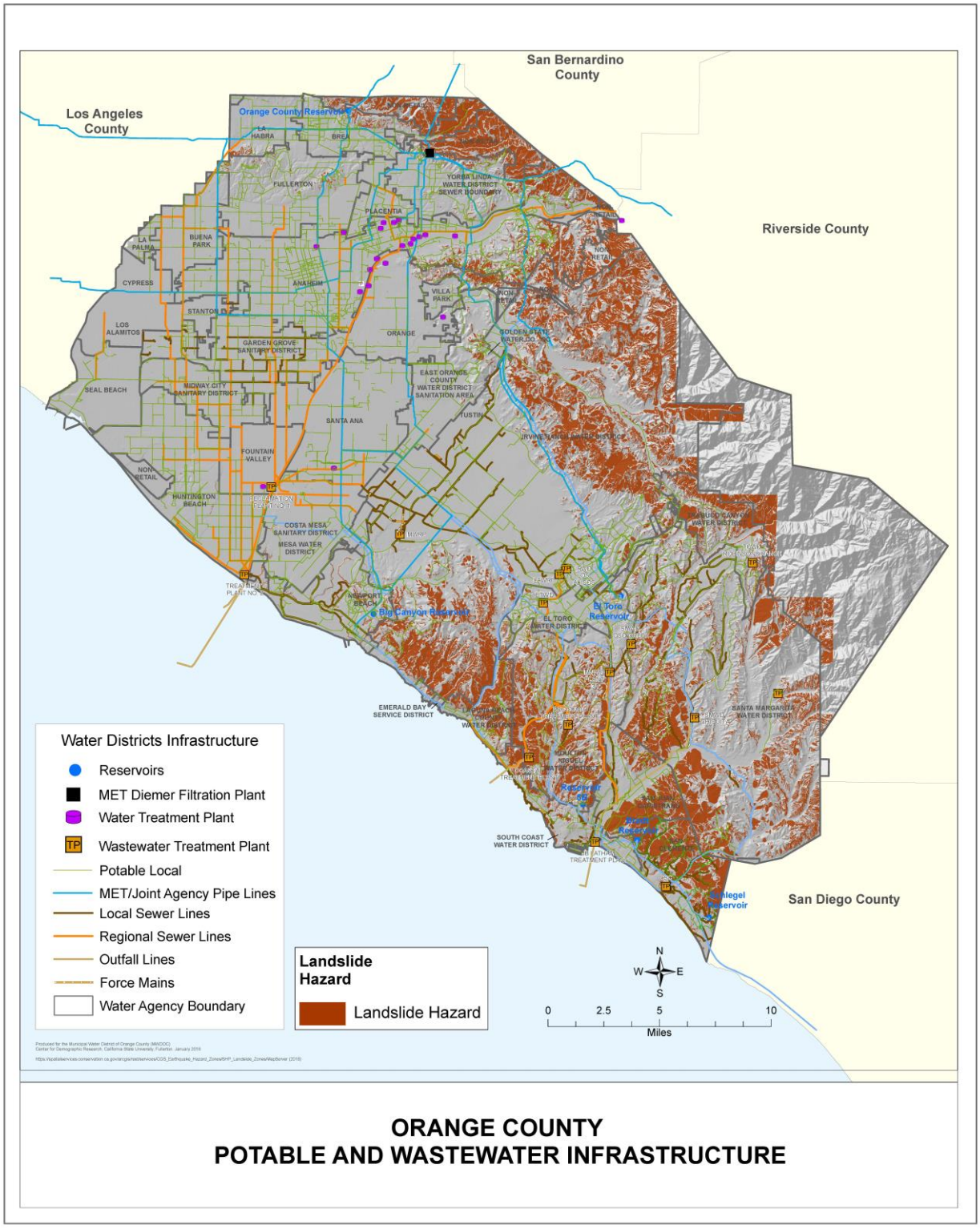
accelerate to rapid movement. A previous landslide within the County due to over saturated soils resulted in a 40-foot landslide below a five-million-gallon water tank. Other landslides in the county have measured approximately 3.5 acres and 25 acres.

Similarly, short-duration, intense rainfall, generally greater than 0.5-inch per hour has the potential to trigger post-fire debris flows. These flows can extend several miles. Documented debris flows from burned areas in southern California and the western United States have ranged in volume from as small as 600 cubic meters to as much as about 300,000 cubic meters. This larger volume is enough material to cover a football field with mud, rocks, and debris to about 65 meters deep.

3.2.10.4 Magnitude/Severity

Factors included in assessing landslide magnitude/severity include population and property distribution in the hazard area, the frequency of landslide or debris flow occurrences, slope steepness, soil characteristics, and precipitation intensity. The California Geological Survey landslide maps prepared as part of the Seismic Hazard Program (refer to Figure 3-10) indicate the extent of landslide susceptibility within the County, which includes the southernmost coastal areas and eastern areas of the County. These areas would also be more likely to experience mudflows due to the topography of the areas.

Figure 3-10
Landslide Susceptibility



3.2.10.1 Probability of Future Occurrences

A study conducted by Nature Geoscience in 2015 indicated that the projected upsurge of El Nino and La Nina events will increase the likelihood that coastal communities will experience erosion and flooding. This is separate from sea level rise, which has also been identified as a cause of future hazard vulnerabilities. In addition to erosion and flooding, the onset of El Nino and La Nina events will also increase the magnitude and severity of mudflow events. The more recent wildfires also contribute to the probability of mudflows in the event of more intense rainfall over a short duration. Earthquakes of magnitude 4.0 and greater have been known to trigger landslides. The potential for an earthquake to induce a landslide is highly dependent upon the location of the earthquake and magnitude in relation to a landslide area. Based on previous landslide and mudflow incidents, along with studies predicting future occurrences, it is reasonable to state that these hazards will continue to impact the jurisdictions identified within the landslide susceptibility areas of the County. According to the Planning Team ranking, landslides and mudflows are somewhat likely – having between a 1% and 10% probability in next year or a recurrence interval of 11 to 100 years.

3.2.11 Tsunami

3.2.11.1 Description (Nature) of the Hazard

The phenomenon we call "tsunami" is a series of traveling ocean waves of extremely long length generated primarily by earthquakes occurring below or near the ocean floor. In the deep ocean, the tsunami waves move across the deep ocean with a speed exceeding 500 miles per hour, and a wave height of only a few inches. Tsunami waves are distinguished from ordinary ocean waves by their great length between wave crests, often exceeding 60 miles or more in the deep ocean, and by the time between these crests, ranging from 10 minutes to an hour.

As they reach the shallow waters of the coast, the waves slow down, and the water can pile up into a wall of destruction up to 30 feet or more in height. The effect can be amplified where a bay, underwater features, or harbor or lagoon funnels the wave as it moves inland. Large tsunamis have been known to rise over 100 feet. Even tsunamis one to three feet high can be very destructive and cause many deaths and injuries.

There are many causes of tsunamis, but the most prevalent is earthquakes. In addition, landslides, volcanic eruptions, explosions, and even the impact of meteorites can generate tsunamis. Not all earthquakes generate tsunamis. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean and cause vertical movement of the sea floor over a large area, hundreds or thousands of square miles. By far the most destructive tsunamis are generated from large, shallow earthquakes with an epicenter or fault line near or on the ocean floor. The amount of vertical and horizontal motion of the sea floor, the area over which it occurs, the simultaneous occurrence of slumping of underwater sediments due to the shaking, and the efficiency with which energy is transferred from the earth's crust to the ocean water are all part of the tsunami generation mechanism. The sudden vertical displacements over such large areas disturb the ocean's surface, displace water, and generate destructive tsunami waves. Although all oceanic regions of the world can experience tsunamis, the most destructive and repeated occurrences of tsunamis are in the Pacific Rim region.

Tsunami waves can travel at the speed of a commercial jet plane, over 500 miles per hour, moving from one side of the Pacific Ocean to the other in less than a day. This great speed makes it important to be aware of the tsunami as soon as it is generated. Scientists can predict when a tsunami will arrive at

various locations by knowing the source characteristics of the earthquake that generated the tsunami and the characteristics of the sea floor along the path to the shore from the point of origin.

Offshore and coastal features can determine the size and impact of tsunami waves. Reefs, bays, entrances to rivers, undersea features and the slope of the beach all modify the tsunami as it converges on the coastline. People living near areas where large earthquakes occur may find that the tsunami waves can reach their shores within minutes of the earthquake. For these reasons, the tsunami threat to many areas such as Alaska, the Philippines, Japan and the United States West Coast can be immediate (for tsunamis from nearby earthquakes which take only a few minutes to reach coastal areas) or less urgent (for tsunamis from distant earthquakes which take from three to 22 hours to reach coastal areas). When a tsunami reaches the coastline and moves inland, the water level can rise several feet, flooding homes, businesses and infrastructure from several thousand feet to miles inland, depending on the topography.

Scientists cannot accurately predict when earthquakes will occur, and as a result they cannot determine exactly when a tsunami will be generated or how destructive it will be. However, past tsunami height measurements are useful in predicting future tsunami impact and flooding limits at specific coastal locations and communities.

3.2.11.2 History/Past Occurrences

Tsunamis can be categorized as Pacific-wide or "local." Typically, a Pacific-wide tsunami is generated by a major vertical shift in the ocean floor creating a wave that includes the entire column of water that has the potential to travel long distances. A "local" tsunami can be a component of a Pacific-wide tsunami in the immediate area of the earthquake, or a wave that is confined to the area of generation; such as a landslide within a bay or harbor. Worldwide, tsunamis have resulted in loss of thousands of lives, billions of dollars in damages, and the closure of many local economies.

All of the coastal areas in Orange County are susceptible to tsunamis, although most tsunamis have occurred in Northern California. The Channel Islands were impacted by a tsunami in the early 1800s. In the 1930s, four tsunamis struck the Los Angeles, Orange County, and San Diego coastal areas. In Orange County the tsunami wave reached heights of approximately 20 feet above sea level. In 1964, following the Alaska 8.2 earthquake, tidal surges of approximately 4 feet to 5 feet battered Huntington Harbor causing moderate damages.

According to the OCSD Emergency Management Division, two events generated response by their office:[22]

- *April 1, 2014*. An 8.2 earthquake off the coast of Chile had the potential to generate a tsunami that could impact the Orange County coastline. The event was monitored, but no watch, advisory, or warning was issued for the County.

- *September 16, 2015*. An 8.3 earthquake off the coast of Chile triggered a Tsunami Advisory for the Orange County coastline. The Orange County EOC was activated and beaches were closed as a precaution; no evacuation orders were issued, and no damages occurred.

The National Oceanic and Atmospheric Administration reports one tsunami event in Orange County:[23]

[22] Ethan Miller Brown, OCSD Emergency Management Division, email correspondence, September 5, 2017.

- *September 16-17, 2015*. As described above, an 8.3 magnitude earthquake off the coast of Chile led the National Tsunami Warning Center to issue a tsunami advisory for a portion of California, including Orange County. All beaches, harbors, piers, and marinas in the Cities of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, Dana Point and San Clemente, including County and State beaches were closed. Tsunami wave heights were observed to be just under one foot along the Orange County coast. The Orange County EOC reported no significant coastal flooding, but to be aware of the high likelihood of strong currents and waves dangerous to persons in or near the water.

3.2.11.3 Location/Geographic Extent

Figure 3-11 illustrates the portions of the planning area within a tsunami hazard zone. Tsunami inundation maps are provided by the California Geological Survey and represent a combination of the maximum considered tsunamis for each area.

As illustrated on Figure 3-11, tsunami inundation areas are contained to the coastal areas of the planning area, extending into areas of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, Dana Point, and San Clemente.

3.2.11.4 Magnitude/Severity

The magnitude/severity of a tsunami would be dependent upon the severity and location of the event causing the tsunami. The California Geological Survey tsunami inundation maps (refer to Figure 3-11) identify the maximum extent of the tsunami inundation area within the County, which is primarily contained to the coastline. However, the inundation areas extend into several coastal communities with the largest potential inundation areas occurring within the cities of Seal Beach, Huntington Beach, Newport Beach, and Dana Point.

3.2.11.5 Probability of Future Occurrences

The historic record indicates that there is a low probability of occurrence of a major tsunami in Orange County. However, there is the potential for future tsunami events to impact water and wastewater infrastructure located within a tsunami inundation area. This probability is similar for each of the jurisdictions located within these areas.

[23] National Oceanic and Atmospheric Administration, National Centers for Environmental Information, *Storm Events Database*, Event Types: Tsunami, https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=6,CALIFORNIA, accessed March 21, 2018.

Figure 3-11
Tsunami Hazard Zones

3.2.12 Wildland/Urban Fire

3.2.12.1 Description (Nature) of the Hazard

A variety of fire protection challenges exist within Orange County, including structure fires, urban fires, wildland fires, and fires at the wildland/urban interface. This hazard analysis focuses on wildland fires, but also addresses issues specifically related to the wildland/urban interface. There are three categories of interface fires: the classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas, the mixed wildland/urban interface is characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings, and the occluded wildland/urban interface existing where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather, the inability of fire protection forces to contain or suppress the fire, the occurrence of multiple fires that overwhelm committed resources, and a large fuel load (dense vegetation). The three primary factors that lead to severe wildfires in Orange County are drought, insect infestation causing tree decimation (bark beetles), and wildfire suppression. Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

A key challenge Orange County faces regarding the wildfire hazard is the increasing number of houses being built in the wildland/urban interface. Every year the growing population has expanded further and further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and open space areas has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design and capability.

3.2.12.2 History/Past Occurrences

Although no federally-declared wildfire disasters have occurred in Orange County, significant wildfires have impacted the County and surrounding areas. Since 1950, the National Oceanic and Atmospheric Administration reports 28 wildfire events occurring with Orange County. Table 3-11, *Major Wildfires*, identifies significant fires that have occurred since 1950.

Table 3-11
Major Wildfires

Date	Location	Description
8/22/2000	San Clemente	Hot temperatures and dry conditions allowed a brush fire to quickly race up hill and ignite the underside of two roofs. Fifteen families were evacuated as more than 40 firefighters worked for several hours to control the blaze.
9/11/2000	San Clemente	A wild fire was fanned by east winds and burned 500 acres before being contained.
8/7/2001	Laguna Beach	A wild fire in a steep canyon near the main toll plaza on the San Joaquin Hills Toll Road (Highway 73).
9/9/2001	El Toro	A brush fire burned 30 acres before it was brought under control.
1/23/2002	Trabuco	Santa Ana winds gusted between 60 to 70 mph for several days across Southwest California.
5/13/2002	Mission Viejo	Extremely dry conditions, above normal temperatures, and gusty winds, helped a brush fire, started by an arsonist, to quickly consume 1100 acres before being controlled. Two trucks and one structure were destroyed. Many residential homes suffered smoke damage and residents were evacuated. Traffic was halted on Highway 241. No injuries occurred.
2/6-12/2006		Santa Ana Winds and Red Flag conditions resulted in the rapid spread of a wildfire in the Santa Ana mountains. Named the Sierra Fire, this fire burned 10,854 acres from Sierra Peak to the 241 Toll Road. While evacuations were ordered, no structures were burned. Eight minor injuries were reported.
3/11-14/2007	Santa Ana Mountains and Foothills	The Windy Ridge Fire was intentionally set during the early stages of a red flag event at the mouth of Fremont Canyon. Humidity values less than 10% and wind gusts in excess of 40 mph caused the fire to spread quite rapidly across the rain starved hillsides. At the time of the fire, the Santa Ana Fire Station had only measured 1.81 inches of rain on the season, nearly 9 inches below the average rainfall for that date. Mandatory evacuations were posted for 1200 homes in Anaheim Hills and Orange as the wind-driven fire spread westward. The fire burned 2036 acres, damaged one home, and destroyed two out-structures before it was extinguished.
10/21/2007	Santa Ana Mountains and Foothills	The Santiago Fire was intentionally set and burned 28,400 acres in Modjeska and Santiago Canyons. The fire destroyed 15 homes and 9 outbuildings. An additional 20 structures were damaged. Sixteen firefighters were injured during the blaze.

Table 3-11 [continued]
Major Wildfires

Date	Location	Description
9/23/2010	Santa Ana Mountains and Foothills	The Long Canyon fire started in the Cleveland National Forest in eastern Orange County, west of the Ortega Highway near the Riverside County line. Some structures were threatened, but the fire generally burned away from the populated areas, 40 acres total. Three firefighters and one police officer suffered non-life-threatening heat-related and smoke inhalation injuries. One of the Cleveland National Forest's fire engines was destroyed by fire, cause unknown, no injuries.
8/5/2013	Santa Ana Mountains and Foothills	The Falls Fire started off Ortega Highway near Decker Canyon, in Riverside. Due to the fire burning on the Trabuco Ranger District, the San Mateo Wilderness, El Cariso Campground, Blue Jay Campground, the Firefighter Memorial Picnic Area and Wildomar OHV area were closed. Road closures included Ortega Hwy 74 from Lake Elsinore west to San Antonio Parkway. Evacuations were ordered for Lakeland Village, Rancho Capistrano and Decker Canyon residents. Evacuation perimeter was between Grand/Ortega and Grand/Corydon. No structures were threatened and no injuries. Minor guardrail damage occurred because of a rock fall along Ortega Highway. The fire burned 1416 acres before being fully contained.
9/12-13/2014	Santa Ana Mountains and Foothills	The Silverado Fire began along Silverado Canyon Road in the Cleveland National Forest of the Santa Ana Mountains. The fire burned at a critical rate of spread, threatening power lines and forcing evacuations and road closures. Mandatory Evacuations were ordered from 30331 Silverado Canyon east to the end of the road (fire gate) and included 50 residences affecting approximately 220 people. The American Red Cross opened an evacuation center at 1530 at El Modena High School at 3920 East Spring Street. The 12kV line servicing Silverado residents was down. One pole and the downed lines required replacement. There were 71 customers without power in Silverado Canyon. After burning a total of 1600 acres, the Silverado Fire was completely contained.
9/25/2017	Santa Ana Mountains and Foothills	The Canyon fire began near Highway 91 in Orange County. The fire spread rapidly due to dry fuel conditions and very low humidity, and firefighting efforts were hindered by a transition from light Santa Ana Winds to onshore flow. This initially pushed the fire into the foothills before sending it back eastward toward Corona. The fire was estimated at 1700+ acres and was threatening residences. Winds calmed over the ensuing days and the fire was quickly contained at 2662 acres. The cause of the wildfire was determined to be a roadside flare.
10/9/2017	Orange County Inland	The Canyon 2 fire began near the 91 Freeway and Gypsum Canyon Road in Anaheim Hills. The fire spread rapidly threatening numerous structures. In the first 24 hours the fire consumed more than 7,000 acres. In total, 25 structures were destroyed, 55 were damaged and 9,217 acres burned. Four injuries were also reported. The cause of the fire was reported to be embers from the Canyon Fire which began September 25 and was contained October 4, 2017.

National Oceanic and Atmospheric Administration, National Centers for Environmental Information, *Storm Events Database*, Event Types: Wildfire, https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=6,CALIFORNIA, accessed March 21, 2018.

At 9:01 am on November 15, 2008 the Corona Fire Department responded to calls reporting a brush-fire in Riverside County. Upon arrival it became apparent to first responders the fire would be significant and of a highly destructive nature. At the time of the alarm a Red-Flag Warning had been in effect due to low-humidity levels, high temperatures, and strong Santa Ana winds. These conditions along with the terrain of the areas burned facilitated the rapid growth and spread of the fire and significantly affected first responder's efforts of containment and in the protection of property and lives. Initial calls reported the fires location as west of the Green River exit off the 91 Freeway in Riverside County. From there the fire quickly advanced in a Northwesterly direction towards Orange County where the fire split into two separate branches shortly after crossing over the county line; the first branch of the fire followed the Santa Ana river basin southwest into Anaheim hills, and the second continued northwest into Yorba Linda. Both branches of the fire became of concern to the water utilities of Orange County as the fire threatened infrastructure or moved into the service areas of Anaheim, Brea, the Yorba Linda Water District, and MET's Diemer Filtration Plant facility. Eventually, the fire burned through approximately 30,305 acres and damaged or destroyed over 300 structures in Riverside, San Bernardino, Los Angeles, and Orange Counties.

A brush fire erupted along State Route 241 near Santiago Canyon Road in Irvine on the morning of July 13, 2015. Campgrounds near Irvine Lake were evacuated, and three abandoned structures caught fire. The blaze encompassed a total of approximately 214 acres. Around one year later, a fire occurred in the Laguna Coast Wilderness Park near Bommer Ridge Trail on June 26, 2017. The fire burned approximately 47 acres and was reported as contained on June 27, 2017. On August 31, 2016, the Holy Fire started in the early morning just east of Trabuco Canyon in the Cleveland National Forest. The blaze did not threaten any homes; however, it was in an area around Holy Jim Canyon that was difficult for firefighters to reach. The fire burned through approximately 150 acres.

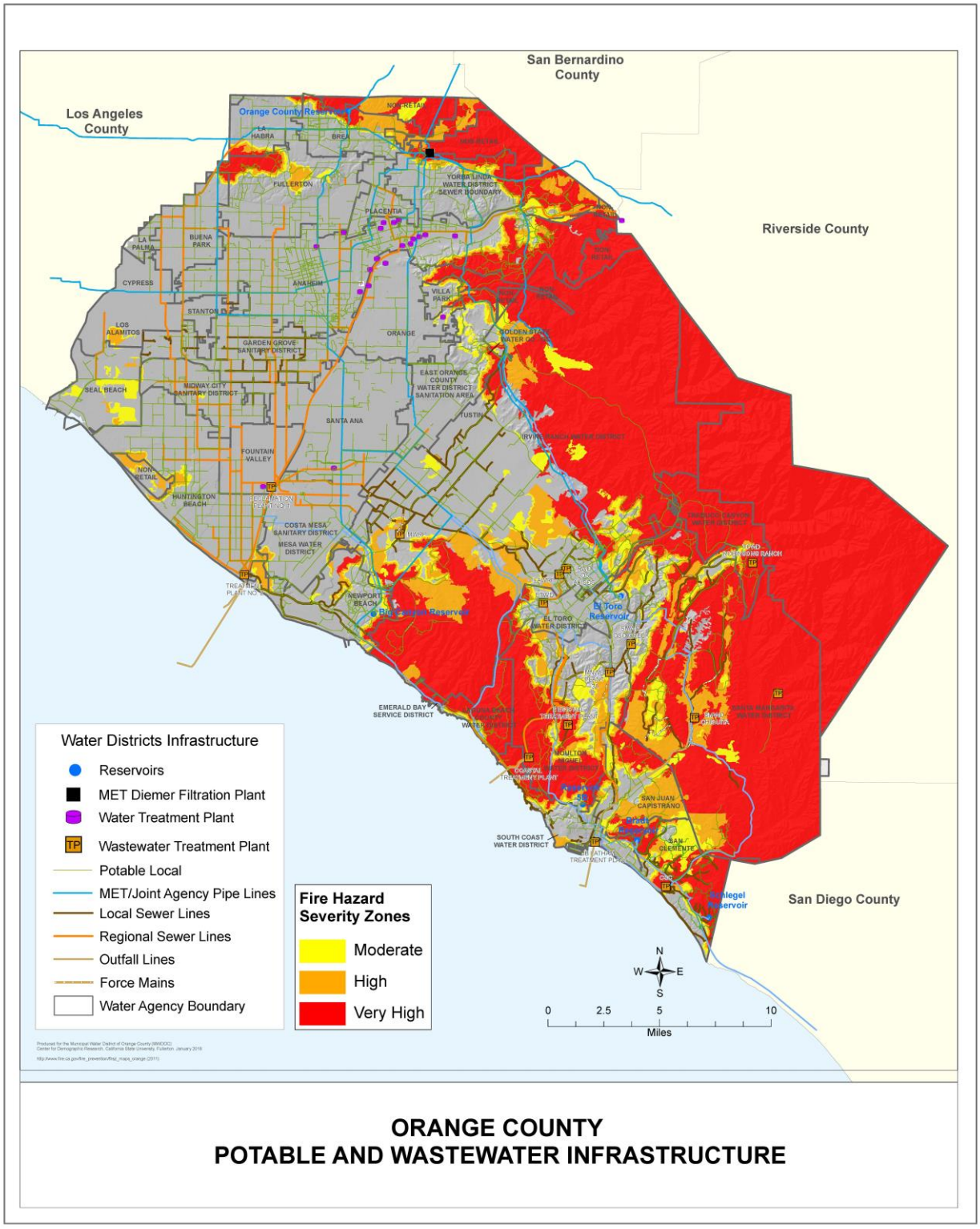
3.2.12.3 Location/Geographic Extent

Cal Fire prepares fire hazard severity maps including mapping areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), define the application of various mitigation strategies and influence how people construct buildings and protect property to reduce risk associated with wildland fires. According to Figure 3-12, the southern and eastern portions of the County are located within High and Very High Fire Severity Zones.

3.2.12.4 Magnitude/Severity

California experiences large, destructive wildland fires almost every year and Orange County is no exception. Wildland fires have occurred within the County, particularly in the fall, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem is wildland fire during Santa Ana wind conditions. These conditions have been further exacerbated by more recent drought conditions. Drought causes fuels (both live and dead vegetation) to dry out and become more flammable increasing the probability of ignition along with the rate of fire spread. If drought continues for an extended period, the number of days with elevated probability of ignition and fire spread increases, raising the risk of widespread burning. The combination of drought conditions, need to maintain water fire flow and the potential for power failure due to Santa Ana wind conditions can impact the magnitude and severity of fires within the planning area.

Figure 3-12
Fire Hazard Severity Zones



The magnitude/severity of a wildfire would be dependent upon the location and conditions (e.g., Santa Ana winds) in place at the time. The Fire Hazard Severity Zone maps prepared by Cal Fire (refer to Figure 3-12) identify the extent and severity of the fire hazard zones within the County. Although a fire could start and/or extend beyond these areas, they identify the areas of severity so that measures can be identified to mitigate the rate of spread and reduce the potential intensity of uncontrolled fires that threaten to destroy resources, life, or property.

3.2.12.5 Probability of Future Occurrences

Wildfires are a regular feature of many of California's ecosystems, and will continue to be in the future. Since the northern, eastern, and southern portion of the County are considered wildland/urban interface areas, the County has a higher probability of wildfire risks in those communities and surrounding areas. The specific chance of wildfire in the County's wildland/urban interface is not known, but the general vulnerability of the area to fires means that there is a reasonable possibility such an event will occur. According to the Planning Team and based on conditions experienced within the last several years, the probability of the County experiencing wildfires is highly likely – near 100% probability in the next year or happens every year.

3.2.13 Human-Caused Hazards

3.2.13.1 Description (Nature) of the Hazard

Human-caused hazards are distinct from natural hazards in that they result directly from the actions of people. Two types of human-caused hazards include: non-malicious and malicious. Non-malicious hazards refer to incidents that can arise from human activities such as the manufacturing, storage, transport, and use of hazardous materials, which include toxic chemicals, radioactive materials, and infectious substances. Non-malicious hazards are assumed to be accidental and their consequences unintended. Malicious, on the other hand, encompasses intentional and criminal acts involving weapons of mass destruction (WMD) or conventional weapons. WMD can involve the deployment of biological, chemical, nuclear, and radiological weapons with the result of affecting a significant percentage of the population either directly or indirectly. Conventional weapons and techniques include the use of arson, incendiary explosives, armed attacks, intentional hazardous materials release, and cyber-terrorism (attack via computer). Typically, conventional weapons have a very specific target and are limited in scope and affect.

Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. The State of California defines a hazardous material as a substance that is toxic, ignitable or flammable, or reactive and/or corrosive. An extremely hazardous material is defined as a substance that shows high acute or chronic toxicity, carcinogenicity, bio-accumulative properties, persistence in the environment, or is water reactive (California Code of Regulations, Title 22). "Hazardous waste," a subset of hazardous materials, is material that is to be abandoned, discarded, or recycled, and includes chemical, radioactive, and bio-hazardous waste (including medical waste). An accidental hazardous material release can occur wherever hazardous materials are manufactured, stored, transported, or used. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas. With respect to water or wastewater systems, concerns arise regarding exposure to these materials via contact or ingestion of drinking water and or discharge of contaminated water into the ocean where exposure to the marine environment and public would be of concern.

NON-MALICIOUS HAZARDS

Non-malicious hazards can occur because of human carelessness, technological failure, and natural hazards. When caused by natural hazards, these incidents are known as secondary hazards, whereas intentional acts are terrorism. Hazardous materials releases, depending on the substance involved and type of release, can directly cause injuries and death and contaminate air, water, and soils. While the probability of a major release at any facility or at any point along a known transportation corridor is relatively low, the consequences of releases of these materials can be very serious.

The most common sources of contamination to water supply systems are naturally occurring chemicals and minerals (i.e., arsenic, radon, and uranium), local land use practices (i.e., fertilizers and pesticides), manufacturing processes, sewer overflows, and malfunctioning wastewater treatment systems (i.e., nearby septic systems). Although these contaminants present an environmental and human health risk concern, the EPA holds regulations in place to ensure water supply systems do not contain elevated levels of contaminants.

Some hazardous materials also present a radiation risk. Radiation is any form of energy propagated as rays, waves or energetic particles that travel through the air or a material medium. Radioactive materials (e.g., uranium, plutonium, radium, and thorium) are composed of unstable atoms. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. The process by which an atom changes from an unstable state to a more stable state by emitting radiation is called radioactive decay or radioactivity.

Radiological materials have many uses including:

- Use by doctors to detect and treat serious diseases,
- Use by educational institutions and companies for research,
- Use by the military to power large ships and submarines, and
- Use as a critical base material to help produce the commercial electrical power that is generated by a nuclear power plant.

Radioactive materials, if handled improperly, or radiation accidentally released into the environment, can be dangerous because of the harmful effects of certain types of radiation on the human body and the human environment. The longer a person is exposed to radiation and the closer the person is to the radiation source, the greater the risk. Although radiation cannot be detected by the senses, scientists can easily detect it with sophisticated instruments that can detect even the smallest levels of radiation. Under extreme circumstances, an accident or intentional explosion involving radiological materials can cause very serious problems. Consequences may include death, severe health risks to the public, damage to the environment, and extraordinary loss of, or damage to, property.

TERRORISM

Following several serious international and domestic terrorist incidents since the early 2000s, citizens across the United States have paid increased attention to the potential for deliberate, harmful terrorist actions by individuals or groups with political, social, cultural, and religious motives. There is no single, universally accepted definition of terrorism, and it can be interpreted in a variety of ways. However, terrorism is defined in the Code of Federal Regulations as "…the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR, Section 0.85). The Federal Bureau of

Investigation further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences. Terrorists can utilize a wide variety of agents and delivery systems.
Water supplies and infrastructure, such as dams, in Orange County are considered as potential terrorist targets. The weapon most likely used could include explosives with the goal of collapsing the dam. Such an event would result in a dam failure and an inundation event with little or no warning. The potential of using other types of weapons such as chemical or biological are considered low due to the large amount of material that would be required to contaminate the water system. This scenario would only apply to those dams where the reservoirs are used for drinking water.

Another very significant concern is cyber terrorism. All of Orange County's water utilities utilize Supervisory Control and Data Acquisition systems (SCADA), which operate over telecommunication lines and/or radio systems. These systems are vulnerable to hacking and leave utilities open to malicious acts.

3.2.13.2 History/Past Occurrences

HAZARDOUS MATERIAL RELEASES

Numerous facilities in Orange County generate hazardous wastes in addition to storing and using large numbers of hazardous materials. Although the scale is usually small, emergencies involving the release of these substances can occur daily at both fixed sites and on the County's streets and roadways. Facilities that use, manufacture, or store hazardous materials in California must comply with several state and federal regulations. The Superfund Amendments and Reauthorization Act (SARA Title III), which was enacted in 1986 as a legislative response to airborne releases of methyl isocyanides at Union Carbide plants in Bhopal, India and in Institute, West Virginia. SARA Title III, also known as the Emergency Planning and Community-Right-To-Know Act (EPCRA), directs businesses that handle, store or manufacture hazardous materials in specified amounts to develop emergency response plans and report releases of toxic chemicals. Additionally, Section 312 of Title III requires businesses to submit an annual inventory report of hazardous materials to a state-administering utility. The California legislature passed Assembly Bill 2185 in 1987, incorporating the provisions of SARA Title III into a state program. The community right-to-know requirements keep communities abreast of the presence and release of hazardous wastes at individual facilities.

Additional information about the chemicals handled by manufacturing or processing facilities is contained in the U.S. EPA's Toxic Release Inventory (TRI) database. The TRI is a publicly available EPA database that contains information on toxic chemical emissions and waste management activities reported by certain industry groups as well as federal facilities. This inventory was established under EPCRA and expanded by the Pollution Prevention Act of 1990. Facilities that exceed threshold emissions levels must report TRI information to the U.S. EPA, the federal enforcement agency for SARA Title III.

Over the past several decades industrial activities have contaminated Orange County's North Basin, which provides much of the water used in 22 Orange County cities, including parts of Fullerton, Anaheim, and Placentia. Over five square miles of contaminants, mostly volatile organic compounds (VOCs), have migrated through the soils and are now leaching into the underlying groundwater. These VOCs have impacted nearby water supply wells causing four of them to be taken out of service. The Orange County Water District (OCWD), under EPA oversight, is currently conducting an interim remedial investigation and feasibility study to determine the extent of groundwater contamination.

Chemical air emissions, surface water discharges, underground injections, and releases to land are considered chemical releases. The release of a biological agent capable of causing illness in people is considered an infectious release. The only known release of radiological agents into the air in the County was the result of an accident at San Onofre Nuclear Generating Station (SONGS). In 1981, an accidental "ignition" of hydrogen gases in a holding tank of the SONGS caused an explosion which bent the bolts of an inspection hatch on the tank, allowing radioactive gases in the tank to escape into a radioactive waste room. From there, the radioactive material was released into the atmosphere. The plant was shut down for several weeks following the event (W.I.S.E. Vol.3 No.4 p.18). This incident occurred during the plant's operation of its Unit 1 generator, which has since been decommissioned. No serious injuries occurred.

On February 3, 2001, another accident occurred at SONGS when a circuit breaker fault caused a fire that resulted in a loss of offsite power. Published reports suggest that rolling blackouts during the same week in California were partially due to the shutdown of the SONGS reactors in response to the 3-hour fire. Although no radiation was released, and no nuclear safety issues were involved, the federal Nuclear Regulatory Commission sent a Special Inspection Team to the plant site to investigate the accident.

In June 2013, SONGs permanently closed after faulty replacement steam generators were installed at the nuclear facility. SONGS is currently undergoing the process to decontaminate and dismantle the nuclear facility. As of August 2017, a court settlement requires the operators of SONGS, Southern California Edison (SCE), to relocate the 3.55 million pounds of nuclear waste to another facility. Among the possible sites is the Palo Verde Nuclear Generating Station in Arizona, located approximately 330 miles away. Transportation of nuclear waste poses an environmental and human health risk concern if radiation is released into the environment.

TERRORISM

While Orange County has not experienced any high-profile attacks by groups or individuals associated with international terrorist organizations, Orange County has several groups for advisory notification, investigation, and analysis of terrorist events and activities. These groups include:

- *Orange County Joint Terrorism Task Force (OCJTTF):* The OCJTFF was formed by the Orange County Sheriff's Department teamed with the FBI and other local police agencies. The OCJTTF is one of sixty-six JTTF's across the United States and the 3rd largest in the nation. Team members are tasked with collecting, analyzing, and sharing critical information and intelligence involving matters related to any terrorism investigation occurring in or affecting the Orange County area.

- *Orange County Private Sector Terrorism Response Group (PSTRG):* The PSTRG was formed in December 2001 to create a private sector partnership with the Terrorism Early Warning Group to effectively address private sector safety, incident management, employee education and public health consequences of potential attacks on the critical infrastructure within Orange County. Two large groups involved with PSTRG are the Orange County Business Council, of which 80% of the major businesses in Orange County are members, and TechNet, a consortium of 28 high-tech firms. The objectives of the PSTRG include physical resource sharing, information exchange, virtual reach-back capabilities, and subject/industry matter experts cross-utilization. The PSTRG is an instrument which allows the Sheriff's Department to maximize all resources and prepare community members for the potential of terrorism and recovery in its aftermath.

- *Orange County Intelligence Assessment Center (OCIAC):* The OCIAC was built on the foundation established by the Orange County Sheriff Department's Terrorism Early Warning Group (TEWG) from 2001 to 2007 and is an Operational Area asset governed by the Orange County Chiefs and Sheriff's Association (OCCSA). The OCIAC is a proactive multi-agency, multi-discipline collaborative which provides comprehensive analysis, intelligence, timely information sharing, and infrastructure protection. Within the OCIAC, the Critical Infrastructure Protection Unit uses a multi-disciplinary team comprised of law enforcement, fire, medical, and private sector experts to conduct vulnerability assessments, provide relevant security updates, and training resources to our public and private sector partners in a combined effort to protect our county's assets against terrorist attack, criminal activity, and natural disasters.

- *Law Enforcement Mutual Aid:* Orange County law enforcement has long recognized the need for standardization and uniformity of organization and response on the part of public safety providers involved in major multi-discipline and multi-jurisdictional incidents. The collaborative efforts of Orange County law enforcement leaders over the past 53 years have forged a collective voice in mutual assistance and mutual aid. All major components tasked with public safety (law, fire, health, emergency management) are actively involved in developing emergency plans and insuring emergency preparedness.

3.2.13.3 Location/Geographic Extent

Human-caused hazards may affect a specific location or multiple locations, each of which may be a disaster scene, a hazardous scene, and/or a crime scene simultaneously. An accidental hazardous materials release can occur wherever hazardous materials are manufactured, stored, transported, or used. In Orange County, a hazardous material event is most likely to occur within the County's industrial areas.

One of the special considerations in dealing with the terrorist threat is that it is difficult to predict. The Department of Homeland Security's National Planning Scenario identifies the possible terrorist strike locations it views as most plausible; places at risk include cities that have economic and symbolic value, places with hazardous facilities, and areas where large groups of people congregate, such as an office building, sports arena, or amusement park. As such, Anaheim (Disneyland, Angels Stadium, Honda Center), Buena Park (Knott's Berry Farm), and San Clemente (SONGS) are viewed as potential targets.

3.2.13.4 Magnitude/Severity

Human-caused hazards have the potential to directly impact water and wastewater systems. A hazardous material spill could be localized and depending upon when the spill is identified and addressed, may be contained with limited to no impact on water supplies and systems. However, there is the potential for a hazardous material spill to severely impact water supplies due to groundwater intrusion and direct contamination of a water source. The magnitude and severity of the hazard would be highly dependent upon the type of hazardous material spill, location, and the extent to which the hazardous material extends into the water system. Similarly, an act of terrorism could cause a significant impact to water and wastewater systems depending upon the type of event and whether it occurs at a primary source or is focused to a specific area or system. Human-caused hazards can have a direct impact on water supplies and the ability to provide water services to communities, potentially resulting in significant health and safety issues.

3.2.13.5 Probability of Future Occurrences

According to the Governor's Office of Emergency Services, hazardous materials have been released approximately 250 times to the environment between the years of 2006 and 2017 in Orange County. Thus, the probability of future contamination to the environment is likely. However, human consumption of contaminated groundwater is unlikely due to the constant monitoring of over 700 wells across Orange County.[24]

Because of the dynamic nature of the terrorist threat and the open nature of California society, all jurisdictions within California are vulnerable to terrorist attack. One must know the minds and capabilities of various terrorists and terrorist groups; these are characteristics terrorist organizations strive to conceal. Because all terrorists are not the same, the calculation is even more difficult. From the perspective of hazard mitigation, the most often used weapon of terrorists is bombs and the greatest potential for loss is from WMDs.

3.2.14 Power Outage

3.2.14.1 Description (Nature) of the Hazard

A power outage typically occurs during a natural hazard such as extreme weather conditions, earthquakes, flood, fire or severe winds. An outage can result in damaged power equipment or equipment failures and can affect multiple counties for hours. This type of event can range from a moderate event to a catastrophic regional event that may threaten human life, safety, and health, or interferences with vital services. An outage may occur as a secondary effect of another hazard, or as the result of construction, an accident, or terrorism. Severe winds and flood can bring down trees and tree limbs onto power lines. And these types of events can cause serious safety hazards to the public and emergency responders.

3.2.14.2 History/Past Occurrences

Orange County has experienced many power outages in the past. There have been small to moderate incidents, and several extreme incidents that have lasted hours in certain areas. Power outages are most commonly seen in Southern California when Santa Ana wind conditions occur.

One of the most severe events, referred to as the 2011 Southwest Blackout, took place in September 2011. This event affected southern Orange County, San Diego-Tijuana area, Imperial Valley, Mexicali Valley, Coachella Valley, and parts of Arizona. The incident is known to have been an 11-minute system disturbance which led to cascading outages and 2.7 million customers left without power, some for up to 12 hours. The hardest hit areas of San Diego-Tijuana, experienced street gridlock due to loss of traffic signals, school and businesses closing, flights and public transportation delays, and water and sewage pumping station power loss.

In 2013, a blackout resulted in approximately 123,000 homes and businesses losing power for several hours. Faulty circuits affected people in a number of Orange County communities including Mission Viejo, Laguna Niguel, Ladera Ranch, Coto De Caza, Ortega, San Clemente, Talega, San Juan Capistrano, Dana Point, and Capistrano Beach.

[24] Orange County Water District Groundwater Management Plan, 2015 Update, June 17, 2015.

3.2.14.3 Location/Geographic Extent

A power outage can cause impacts at the local level and potentially the regional level. As seen from previous occurrences, a severe outage can easily impact several counties at a time. All jurisdictions within the planning area have the potential to be impacted should an event occur; either directly or indirectly. Highly developed communities may see more outage occurrences if a heat wave should occur, due to the number of cooling systems running at once. Water and wastewater facilities with backup generators or alternate power sources are less likely to experience severe losses or disruption.

3.2.14.4 Magnitude/Severity

A power outage has the potential to directly impact water and wastewater systems. Disruption of water utilities and systems often requires notification of the public and businesses to curtail usage, boil available water, use bottled water, etc. Firefighting capabilities may also be impacted if an outage causes disruption to water supplies. In areas where telephone service is provided by above-ground lines that share poles with electrical distribution lines, telecommunications providers may not be able to make repairs to the telephone system until electrical utilities restore power lines to a safe condition. This could impact response times to a water or wastewater incident. The impacts of electric utility disruptions are felt most significantly by southern California communities during the summer months due to cooling demands from higher heat. Any extended electric disruption can also lead to local economic losses when computers, lighting, refrigeration, gas pumps, and other equipment are without power during business hours. A severe power outage also can cause cascading impacts such as transportation incidents, civil unrest, and disease. The magnitude/severity of a power outage would be the same for all jurisdictions within the planning area.

3.2.14.5 Probability of Future Occurrences

Power outages are a normal part of life and are unpredictable; they happen for many reasons and can be expected to continue in the future. Water and wastewater systems are most susceptible to failure during extreme weather conditions, fires, and earthquake events. Regional power outages can threaten human life, particularly when outages affect water supply, hospitals, and other healthcare facilities. As both population and climate variability increase across southern California, and put more pressure on aging distribution systems, it is likely that power outage events will continue to occur. Due to the nature and extent of power outages, the probability for future occurrences would be the same for all jurisdictions in the planning area.

3.3 VULNERABILITY ASSESSMENT

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, condition, contents and the economic value of its functions. A vulnerability analysis predicts the extent of injury and damage on the existing and future built environment that may result from a hazard event of a given intensity in a given area. Due to the interrelatedness of water and wastewater infrastructure and the role each have in public health and safety, vulnerabilities in one community are often related to vulnerabilities in another. Indirect effects can be much more widespread and damaging than direct effects. For example, damage to a major water utility line could result in significant inconveniences and business disruption that would far exceed the cost of repairing the utility line.

The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to hazards and estimates potential losses. This section focuses on the risks to the planning area; data for each of the MAs was also evaluated and is included here and in the Jurisdictional Annexes.

3.3.1 Asset Inventory

Hazards that occur in Orange County can impact critical facilities located throughout the County. For this Plan update, a critical facility is defined as public infrastructure used to provide potable water to the public and maintain wastewater services, necessary to maintain public health and safety. Critical facilities associated with potable water services located within the planning area include: wells, water storage tanks, reservoirs with dams, water treatment plants, pump stations, pressure reducing stations, emergency interties, service connections, pipelines, and administrative buildings and utility yards; refer to Table 3-13, *Summary Assets*, at the end of this section. Critical facilities associated with wastewater services located within the planning area include: wastewater treatment plants, lift stations, pipelines, and administrative buildings and utility yards (Table 3-13).

3.3.2 Estimating Potential Exposure and Losses

Orange County covers 948 square miles with several different climate patterns and types of terrain, from the coast to the mountains, which allows for several hazards to affect various parts of the County, as described above. Due to the vast area, a hazard event could impact a single jurisdiction or multiple jurisdictions.

Updated mapping of water and wastewater infrastructure was prepared in anticipation of the Plan update. As part of the Plan update, the infrastructure mapping was overlaid with hazards having a physical geographic location to estimate exposure to water and wastewater infrastructure. Hazard areas and infrastructure overlays were conducted for wildfires, flooding, fault rupture, earthquakes, liquefaction, landslides, and tsunamis; refer also to the Jurisdictional Annexes. Hazards and infrastructure overlays were not conducted for the remaining hazards because data for these hazards was either not available or is not geographically distinct. Many of these hazards, such as drought, power outage, and high winds/Santa Ana winds affect the entire planning area; therefore, all water and wastewater infrastructure could be potentially susceptible to damage from them. For these hazards, quantitative analyses were not performed. Vulnerability assessments associated with these hazards is based on historic incidents and the knowledge that water and wastewater experts have of their critical facilities and the susceptibility of those facilities to these hazards.

For water and wastewater infrastructure pipelines, the length of exposure/impact is given in miles. Other critical facilities are identified by facility/structure type. Exposure characterizes the value of facilities/structures within the hazard zone and is shown as estimated exposure based on the overlay of the hazard on the critical facilities which are assigned a cost of replacement for each type of facility/structure exposed. These replacement costs for the critical facilities were identified by each MA. The loss or exposure value is then determined with the assumption that the given facility/structure is destroyed (worst case scenario), which is not always the case in hazard events. This assumption was valuable in the planning process, so that the total potential damage value was identified when determining capabilities and mitigation measures for each MA.

Table 3-12, *Unit Replacement Costs of Facilities*, provides average replacement costs used for critical facilities and infrastructure listed in all subsequent exposure/loss tables.

Table 3-13 provides the total inventory for the critical facilities and infrastructure by jurisdiction. Estimated exposure for critical infrastructure by MA is provided in the Jurisdiction Annexes. Table 3-14, *Planning Area Critical Facilities and Infrastructure Exposure Costs by Hazard*, provides a summary of exposure for the planning area by hazard. The costs identified reflect cost of replacement in a worst-case scenario (defined as the highest cost submitted from among all the MAs in the study process, excluding the regional facilities, as this would overstate the local costs). For example, Garden Grove may have identified a cost of $3 million to replace a well and Buena Park may identify a cost of $3.5 million to replace a well; however, $3.5 million would be used as the replacement cost for all wells within the planning area. This methodology was used for consistency across the planning area and selection of the highest cost helps assure that appropriate costs are considered when requesting grants. For any detailed proposals submitted to FEMA, actual costs for mitigation and detailed estimates of the benefits of the mitigation measure will be prepared and submitted. The costs included herein provide a relative measure of the impacts of the various hazards.

Table 3-12
Unit Replacement Costs of Facilities $1,000's[(1)]

Abbreviation	Name	Replacement Cost ($1,000's)
WST	Water Storage Tank	$20,000
RES	Reservoir (with a dam)	$50,000
WTP	Water Treatment Plant (Diemer Filtration Plant)	$350,000
WTP	Water Treatment Plant by retail agency	$10,000
PS	Pump Station (South County Pump Station)	$35,000
PS	Retail Water Agency Pump Station	$8,000
PRS	Pressure Reducing Station (MET facility)	$52,000
PRS	Pressure Reducing Station for retail agency	$2,000
EIT	Emergency Interties	$2,000
SC	Service Connector	$3,000
ADM	Administration (large administration building)	$8,000
LS	Wastewater Pump Station/Lift Station by OCSD/SOCWA	$4,000
LS	Wastewater Pump Station/Lift Station by retail agency	$5,000
WWTP	Wastewater Water Treatment Plant	$30,000
WELL	Well	$5,000
PP	Power Plant (MET Yorba Linda Power Plant)	$12,000

(1) Based on the highest cost for typical facility from among the MAs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

For additional detail on exposure of facilities by MA, refer to the Jurisdictional Annexes. The Jurisdiction Annexes include a discussion of hazards and vulnerabilities specific to each MA, a discussion of their capabilities to address these losses, and identifies the actions to help mitigate damage to their infrastructure against hazards identified in the risk assessment.

3.3.3 Land Use and Development Trends/Changes in Development

The MAs provide water and wastewater services to majority of the County, which has a population of almost 3.2 million people. Depending upon the hazard and its magnitude and duration, a considerable

number of people and businesses could be impacted. Of primary concern would be a hazard that results in the loss of water supply and wastewater services to the planning area. As discussed previously, a hazard could result in direct physical damage to water/wastewater infrastructure, as well as indirect damage resulting from business disruption.

Although Orange County is urbanized and predominately built out, the Southern California Association of Governments (SCAG) projects continued population, employment, and housing growth into 2040. The County of Orange and its incorporated cities maintain General Plans, which identify the planned growth and development for their respective jurisdictions. The planning area includes a wide variety of residential and non-residential land uses. Water and wastewater service providers will continue to work with the communities they serve to identify service needs, including the construction, expansion, or modification of water and wastewater infrastructure. The construction of new facilities or infrastructure will be completed in coordination with these communities to ensure compliance with appropriate codes and regulations, including consideration of potential hazards.

Population growth and development in the County has increased since 2012. According to the Department of Finance, the population for the County was 3,083,962 in 2012. As of January 1, 2018, the population is 3,221,103, a growth of 4.4 percent since 2012. Along with population growth has come an increase in development, increasing demands on water and wastewater infrastructure. Many Orange County cities have seen shifts in development toward higher-density residential and mixed-use development projects in response to the demand for housing.

Due to the highly developed nature of the County along with the presence of natural hazards throughout the area such as earthquakes, liquefaction, flood risk, and wildfires, development and population growth has continued to occur within areas of risk. Recent drought conditions have placed greater emphasis on the ability for new development to be served by water supplies and planning for prolonged drought conditions. Water and wastewater agencies continue to coordinate with the County, cities, and each other to meet the demands of the respective communities they serve while also strengthening regional and local infrastructure and overall reliability in the event of a hazard. Agencies and the District have modified their infrastructure to include EOC's and water infrastructure, to mitigate potential threats.

3.3.4 Vulnerable Populations

Water supplies for safe drinking, sanitation, and hygiene are relied upon by the entire population. However, there are populations within the MA service areas that would be considered more vulnerable in the event of a hazard that affects water and wastewater infrastructure. These populations include those that are reliant on others for their wellbeing, such as young children, individuals with disabilities, individuals' dependent on medical equipment, and individuals with impaired mobility, as well as people with low socioeconomic levels. Vulnerable populations are more significantly impacted in the event of a hazard.

3.4 SUMMARY OF VULNERABILITY

Due to the nature of water and wastewater infrastructure and its location throughout Orange County, there is some form of infrastructure that intersects with a hazard area. Table 3-14 identifies the infrastructure that intersects with hazards that have a specific geographic area (e.g., fire hazard, liquefaction, etc.); however, the entire MA service area also intersects with hazards that are not geographically specific (e.g., drought, power outage). The variety of hazards and the varying magnitude and probability of occurrence make it challenging to assess the hazards that pose the greatest risk to the MAs. The potential losses vary greatly depending upon the hazard and resulting impact to infrastructure. The challenge is further magnified by the potential health and economic impacts that could occur in the event water supplies are disrupted.

Table 3-13
Summary Assets

Member Agency	Facility/Infrastructure																									
	Existing																Future									
	Wells	Dams/Reservoirs	Water Treatment Plant	Potable Water System Pipeline (mile)	Water Storage Tank	Pump Stations	Pressure Reducing Station	Imported Water Connections	Emergency Intertie	Hydrants	Potable Service Connections	Administrative/ Office/Lab/ Maintenance Facilities	Wastewater System Pipeline (mile)	Wastewater / Water Reclamation Plant	WW Service Connections	Sewer Lift Stations	Wells	Dams/Reservoirs	Potable Water System Pipeline (mile)	Water Treatment Plant	Administrative/ Office/ Maintenance Facilities	Water Storage Tank	Pump Stations	Pressure Reducing Station	Wastewater System Pipeline (mile)	Lab
Metropolitan Water District of Orange County	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange County Water District	901	27	0	15	3	9	0	2	0	0	4	12	40	2	0	0	6	0	0	0	0	0	1	1	1	1
Orange County Sanitation District	0	0	0	0	0	0	0	0	0	0	0	1	753	2	0	19	0	0	0	0	1	0	0	0	0	0
South Orange County Wastewater Authority	0	0	0	0	0	0	0	0	0	0	0	2	25	3	0	1	0	0	0	0	0	0	0	0	0	1
Buena Park	8	0	0	225	1	1	13	4	0	2,362	19,481	2	165	0	18,900	0	1	0	0	0	0	0	1	0	0	0
El Toro Water District	0	2	0	168	5	8	19	4	12	1,900	9,871	2	114	1	8,950	11	0	0	0	0	0	0	0	0	0	0
Garden Grove	13	0	0	440	8	5	2	4	7	3,959	33,725	2	330	0	33,725	3	1	0	0	0	0	0	0	1	0	0
La Habra	3	0	1	143	4	5	49	18	5	1,807	13,703	1	125	0	13,703	0	0	0	0	0	0	0	2	0	0	0
Laguna Beach County Water District	0	0	0	135	21	11	19	3	14	893	8,488	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mesa Water District	7	0	1	317	3	2	3	3	15	3,404	24,435	1	0	0	0	0	2	0	10	0	0	0	0	0	0	0
Moulton Niguel Water District	0	0	0	655	28	23	16	9	16	7,154	55,048	2	501	0	52,259	17	0	0	2	0	1	0	0	1	10	0
Newport Beach	4	1	0	297	2	5	42	6	13	2,634	26,800	1	323	0	5,525	21	0	0	0	0	0	0	0	0	0	0
Orange	15	0	0	450	16	16	14	8	16	4,411	34,000	3	0	0	0	0	2	0	0	0	0	1	1	0	1	1
Santa Margarita Water District	0	3	0	626	34	21	25	22	4	4,250	54,254	1	630	3	57,537	19	0	2	3	0	0	22	21	25	20	0
Serrano Water District	3	1	1	43	2	5	0	2	0	370	2,350	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
South Coast Water District	1	1	1	185	13	9	25	4	19	1,522	12,551	7	151	1	16,500	14	0	0	0	0	0	0	0	0	0	0
Trabuco Canyon Water District	3	2	2	65	8	12	8	5	5	600	4,000	2	47	1	3,600	8	1	0	2	0	0	4	4	3	2	0
Westminster	10	0	0	230	2	1	0	3	4	2,672	20,515	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0
Yorba Linda Water District	11	0	0	352	14	12	42	4	10	3,981	24,998	2	313	0	23,421	2	1	0	10	0	0	2	0	0	10	0
Joint Water Systems[1]	0	2	0	94	0	0	0	1	0	0	0	0	10	0	0	0	0	0	0	2	0	0	0	0	0	0
Metropolitan	0	1	1	122	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(1) Regional water systems identified here are co-owned and managed by multiple utilities.

Table 3-14
Planning Area Critical Facilities and Infrastructure Exposure Costs by Hazard

Hazard		Infrastructure Type												Replacement Costs ($ million)[1]
		Administration Buildings	Interties (#)	Pump Stations (#)	Treatment Plants (#)	Lift Stations (#)	Pressure Control Stations (#)	Reservoirs (#)	Water Storage Tanks (#)	Wells (#)	Effluent Pipeline (miles)	Potable Pipeline (miles)	Wastewater Pipeline (miles)	
Fire Hazard Zone	Moderate	0	14	13	0	7	0	13	0	0	0.5	45.02	37.78	1,483.40
	High	0	5	6	1	0	0	13	0	1	1.0	59.03	65.8	1,729.64
	Very High	0	24	47	2	10	1	71	0	5	1.6	151.14	100.65	6,098.12
FEMA Flood Zone	100-Year	0	4	1	2	7	0	15	0	7	0.5	38.73	82.84	1,832.56
	500-Year	0	18	7	1	11	0	8	0	35	2.1	106.05	171.96	2,972.88
Alquist-Priolo Fault Zone		0	0	0	0	0	2	0	0	0	0	4.29	0.71	44.0
Ground Shaking	Moderate	0	22	31	0	2	1	50	0	0	0	86.18	52.99	3,917.36
	High	1	97	60	9	19	1	55	1	57	5.2	370.53	513.72	11,039.60
	Extreme	1	24	25	1	10	1	42	0	26	0	169.53	213.85	5,615.04
Liquefaction	Moderate	0	13	11	3	3	1	14	0	33	0	85.53	188.64	3,219.36
	High	2	25	6	3	1	0	17	1	40	0	91.48	198.47	3,538.60
	Very High	0	0	0	1	0	2	0	0	0	0	10.39	16.74	231.04
	Unknown	0	13	7	1	1	0	1	0	7	0	54.45	100.4	1,420.80
Landslide Zone		0	5	18	0	7	0	28	0	0	2.8	40.83	42.34	2,276.76
Tsunami Zone		0	0	0	1	7	0	0	0	0	0.6	6.75	7.42	163.16

(1) Based on the highest cost for typical facility from among the MAs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

SECTION 4 MITIGATION STRATEGY

Planning is the cornerstone to successful hazard mitigation efforts. Citizens, local government, and private interests with proactive policies can reduce damages and impacts associated with natural and human-caused hazards. Benefits realized by implementing hazard mitigation measures include:

- Saving lives by removing people from hazard prone situations.
- Limiting property damage by regulating development in hazard areas.
- Reducing economic impacts by minimizing outages of essential services during and after these events.
- Saving money for taxpayers by reducing the need for services during a disaster.
- Speeding disaster recovery and post-disaster relief funds.
- Demonstrating a strong commitment to the health and safety of the community.

Relocating people, institutions, and businesses from hazard prone areas saves property and lives. Removal or protection of the structures means that there is less to pay for disaster recovery or for services during an event. Having alternative service plans for essential services, such as water, protects structures from fire and allows residents and businesses to continue functioning or to restore normal functions quicker following a disaster. Post-event, recovery crews will have less to do because there will be less damage. Implementation of these measures speeds the overall recovery process.

4.1 HAZARD MITIGATION OVERVIEW

The mitigation strategy and actions were developed by the Planning Team based upon in-depth review of the vulnerabilities and capabilities described in the Plan. The mitigation actions described in the Jurisdictional Annexes represent each MA's risk-based approach for reducing and/or eliminating the potential losses as identified in Section 3.0, *Risk Assessment*.

As part of the Plan update process, the hazard mitigation goals were reviewed and refined. It was determined that the overarching mitigation goals were the same for all MAs. Therefore, one set of goals were identified for the Plan, as discussed below. If additional, jurisdiction-specific goals were identified by a MA, they are included in the Jurisdictional Annex.

MAs provided a comprehensive review of their mitigation actions to assess their ability to reduce risk and vulnerability to the jurisdiction from identified hazards. Upon review of each mitigation action, an assessment was made as to whether the mitigation action should be carried forward into the Plan update and/or be revised/modified or removed to reflect changing conditions or priorities. Mitigation actions that were deemed complete during the current plan period were identified and removed (refer to the Jurisdictional Annexes). New mitigation measures were also identified.

4.1.1 FEMA's National Flood Insurance Program

In 1968, the U.S. Congress created the National Flood Insurance Program (NFIP) to provide affordable insurance to property owners while also encouraging communities to adopt and enforce floodplain management regulations. Community participation is voluntary; however, it is required to receive certain grants and funding from FEMA. The Orange County Flood Division (OC Flood) is a participant in the program and administers the floodplains within the unincorporated areas of the County. Within the incorporated areas, Orange County cities administer their floodplains. Since the creation of NFIP, OC Flood has worked cooperatively with cities in Orange County to reduce the floodplain area by

constructing flood control facilities that provide 100-year flood protection. Such facilities typically traverse through the cities and ultimately outlet into the Pacific Ocean. All cities within Orange County are participants in the program.

REPETITIVE LOSS PROPERTIES

According to the National Flood Insurance Program (NFIP), a repetitive loss structure is an insured building that has had two or more losses of at least $1,000 each being paid under the NFIP within any 10-year period since 1978. Each MA has had zero such losses within the water utility, the water department, or wastewater department.

4.2 HAZARD MITIGATION GOALS

Mitigation goals are defined as general guidelines explaining what each jurisdiction wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing jurisdiction-wide visions. The goals and objectives identified in the previous plan were reviewed by the Planning Team. Through the Plan update process, it was determined that many of the goals identified for each MA were the similar. As a result, the following hazard mitigation goals have been identified for the Plan:

Goal 1: Minimize vulnerabilities of critical facilities and infrastructure to minimize damages and loss of life and injury to human life caused by hazards.

Goal 2: Minimize security risks to water and wastewater infrastructure.

Goal 3: Minimize interruption to water and wastewater utilities.

Goal 4: Improve public outreach, awareness, education, and preparedness for hazards in order to increase the community resilience.

Goal 5: Eliminate or minimize wastewater spills and overflows (Wastewater agencies).

Goal 6: Protect water quality and supply, critical aquatic resources and habitat to ensure a safe water supply.

Goal 7: Strengthen Emergency Response Services to insure preparedness, response, and recovery during any major or multi-hazard event.

The Plan goals guide the direction of future activities aimed at reducing risk and preventing loss from natural and human-caused hazards. The goals also serve as checkpoints as the MAs begin implementing mitigation action items. Mitigation goals do not account for implementation cost, schedule, funding sources, etc. Goals represent what each MA wants to achieve, whereas the mitigation actions provide the actions to needed to achieve the goals.

4.3 IDENTIFY AND PRIORITIZE MITIGATION ACTIONS

Mitigation actions were identified, evaluated, and prioritized by the MAs. They provide a list of activities that the MAs will use to reduce their risk of potential hazards. Some of these actions may be eligible for funding through federal and state grant programs and other funding sources as made available by the MAs

or other agencies/organizations. The mitigation actions are intended to address the comprehensive range of identified hazards for each MA; some actions may address risk reduction from multiple hazards.

A detailed list of mitigation actions for each MA is provided in the Jurisdictional Annexes. The process used by the Planning Team to identify hazard mitigation actions for this Plan included the following:

- Review of the Risk Assessment presented in Section 3.0;
- Review of the Capabilities Assessment presented for each MA in the Jurisdictional Annexes; and
- Team discussion of new concerns/issues that need to be addressed to reduced hazards to critical water/wastewater infrastructure.

The mitigation actions identify the hazard, proposed mitigation action, location/facility, local planning mechanism, risk, cost, timeframe, possible funding sources, status, and status rationale, as applicable.

MAs conducted a capabilities assessment (provided in the Jurisdictional Annexes), to identify existing local agencies, personnel, planning tools, public policy and programs, technology, and funds that have the capability to support hazard mitigation activities and strategies outlined in this Plan. To identify the capabilities, the Planning Team collaborated to identify current local capabilities and mechanisms available for reducing damage from future hazard events. The capabilities and resources were reviewed while developing the Plan update. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigations.

FEMA's STAPLEE technique was used to identify, evaluate, and prioritize mitigation actions based on existing local conditions. Using this method each MA considered the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental (STAPLEE) opportunities and constraints of implementing a mitigation action; refer to Table 4-1, *STAPLEE Review and Selection Criteria*. This process was used to help ensure that the most equitable and feasible actions would be undertaken based on each MA's unique capabilities.

In some instances, MAs revised the priorities of mitigation actions or removed mitigation actions all together. If the mitigation action was completed and no further action would be needed, the action was removed. However, in some instances it was determined that a mitigation action was no longer relevant due to technical changes or advances, a change in service conditions, or the cost associated with a mitigation that would not result in the benefits needed. Some actions that may have been considered lower in priority during the last plan update were elevated due to conditions that either allowed for the action to be prioritized, such as the potential for funding or completion of other mitigation actions that preceded them. Mitigation actions were also prioritized based on more recent experiences associated with drought conditions and wildfires. These hazards and the impact they have had throughout Orange County and the State have resulted in new requirements in how these hazards are addressed in water supply and water and wastewater infrastructure systems.

4.3.1 Hazard Mitigation Benefit-Cost Review

FEMA requires local governments/agencies to analyze the benefits and costs of a range of mitigation actions that can reduce the effects of each hazard within their communities. Benefit-cost analysis is used in hazard mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit-cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now to avoid disaster-related damages later. The analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk.

A hazard mitigation plan must demonstrate that a process was employed which emphasized a review of benefits and costs when prioritizing the mitigation actions. The benefit-cost review must be comprehensive to the extent that it can evaluate the monetary as well as the nonmonetary benefits and costs associated with each action. The benefit-cost review should at least consider the following questions:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action (e.g., which is more beneficial to protect, the fire station or the administrative building)?
- Environmentally, does it make sense to do this project for the overall community?

Table 4-1
STAPLEE Review and Selection Criteria

STAPLE/E Review	Selection Criteria
Social	• Is the proposed action socially acceptable to the jurisdiction and surrounding community? • Any equity issues involved that would mean that one segment of the jurisdiction and/or community is treated unfairly? • Will the action cause social disruption?
Technical	• Will the proposed action work? • Will it create more problems than it solves? • Does it solve a problem or only a symptom? • Is it the most useful action in light of other jurisdiction goals?
Administrative	• Can the jurisdiction implement the action? • Is there someone to coordinate and lead the effort? • Is there sufficient funding, staff, and technical support available? • Are there ongoing administrative requirements that need to be met?
Political	• Is the action politically acceptable? • Is there public support both to implement and to maintain the project?
Legal	• Is the jurisdiction authorized to implement the proposed action? • Are there legal side effects? Could the activity be construed as a taking? • Will the jurisdiction be liable for action or lack of action? • Will the activity be challenged?
Economic	• What are the costs and benefits of this action? • Do the benefits exceed the costs? • Are initial, maintenance, and administrative costs taken into account? • Has funding been secured for the proposed action? If not, what are the potential funding sources (public, nonprofit, and private)? • How will this action affect the fiscal capability of the jurisdiction? • What burden will this action place on the tax base or local economy? • What are the budget and revenue effects of this activity? • Does the action contribute to other jurisdiction goals? • What benefits will the action provide?
Environmental	• How will the action affect the environment? • Will the action need environmental regulatory approvals? • Will it meet local and state regulatory requirements? • Are endangered or threatened species likely to be affected?

These questions were used to help determine the appropriateness of mitigation actions. Benefits and costs are a primary motivation for implementing mitigation projects at water and wastewater utilities. Past disasters have shown the benefit-cost of mitigating water utilities against identifiable hazards. For example, a cold weather system that impacted most of the United States resulted in pipeline breaks across the State of California. Those ruptures primarily occurred on a specific type of pipeline that has been gradually phased out of use in California. The replacement of this type of pipeline prior to the cold front could have not only prevented the cost of pipeline breaks, but also costs related to flooding, landslides, loss of water supply, other secondary effects of the broken pipelines.

A study conducted in 2003 by the Orange County Business Council found that a 10-day 80% reduction in water to South Orange County would result in a fiscal impact of $293 million dollars to both businesses and residents alike. Longer outages during many disaster situations are probable and would be proportionally more devastating. Each affected agency would share in the economic impacts based on its mix of business and residential customers.

The final prioritization completed by each MA depended on the direct loss estimations for water/wastewater critical infrastructure along with the secondary costs associated with business loss and recovery. Much of this effort was completed with informal cost-benefit analysis based on the knowledge and expertise of the participants (many of them certified operators, water quality experts, or engineers), previous planning documents, and the concepts identified above. Those actions that did not have adequate benefits were excluded from the list of mitigation actions.

4.4 REGIONAL CONSIDERATIONS

It is envisioned that the mitigation actions for the most part will be implemented on a jurisdiction-by-jurisdiction basis. MWDOC will provide facilitation, as appropriate, of this process to help reduce duplication of efforts between jurisdictions and to spearhead coordination of initiatives and action items that could be accomplished more efficiently on a regional level. In its role as a regional planning agency, MWDOC will act as lead on water related hazard mitigation projects that are regional in nature, such as projects that cross several jurisdictional boundaries and work planned on behalf of Metropolitan. OCSD and SOCWA will take the lead on wastewater related hazard mitigation projects that are regional in nature and within their individual service areas.

The Risk Assessment (Section 3.0) and Jurisdictional Annexes indicate that each MA is susceptible to a variety of potentially serious hazards in the region. The approach to emergency planning in California has been comprehensive in its planning for and preparedness to respond to all hazards utilizing the Standardized Emergency Management System (SEMS) and a coordinated Incident Command System. A program managed by MWDOC, the Water Emergency Response Organization of Orange County (WEROC), acts as coordination point (Area Command) to support an effective emergency response to major disasters by the Orange County water and wastewater utilities. WEROC provides services that promote planning and preparedness activities for both the utilities, as well as its own Emergency Operations Center (EOC) staff. WEROC also helps maintain two turn-key EOCs. WEROC receives guidance from a steering committee, which includes representatives from Orange County water utilities, Metropolitan, the County of Orange and the California Department of Health Service's Office of Drinking Water. WEROC and its steering committee help ensure water and wastewater utilities remain current with state and national emergency response procedures and plans for potential disasters.

The Disaster Mitigation Act of 2000 requires that in addition to having emergency response and emergency preparedness documents, regions should develop and maintain a document outlining measures

that can be implemented before a hazard event occurs that would help minimize the damage to life and property. MWDOC has accepted the role of coordinating the development the Hazard Mitigation Plan as a multi-jurisdictional plan.

All hazard mitigation planning efforts within the region are the responsibility of the jurisdictions. As noted, the capabilities of the jurisdictions to perform hazard mitigation planning are detailed in the Jurisdictional Annexes.

4.4.1 Regional Fiscal Resources

One of MWDOC's primary roles in coordinating the development of the Plan is to identify and obtain grant funding for preparing and implementing certain aspects of the Plan. This is consistent with WEROC's role, as a program managed by MWDOC, for hazard mitigation and preparedness. WEROC has received grants to improve the Emergency Operations Centers and to secure water trailers for distribution of drinking water during disasters and will continue to provide guidance to the MAs with hazard mitigation project grant applications and their implementation. Additional fiscal capabilities of the jurisdictions to implement a hazard mitigation project are detailed in their individual capabilities assessments.

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SECTION 5 PLAN MAINTENANCE

This section of the Plan describes the formal process that will ensure that the Plan remains an active and relevant document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This section describes how the Member Agencies (MAs) will integrate public participation throughout the plan maintenance process. It also describes how the MAs intend to implement the Plan and incorporate the mitigation actions identified in the Plan into existing planning mechanisms and programs. The Plan's format, organized with Jurisdictional Annexes, allows the MA's to readily update sections when new data becomes available, ensuring the Plan remains current and relevant.

5.1 MONITORING, EVALUATING AND UPDATING THE PLAN

5.1.1 Plan Maintenance

MWDOC will be responsible for initiating Plan reviews and coordinating with the MAs. The internal planning teams for each jurisdiction will meet quarterly to review progress on Plan implementation. MWDOC and the MA's will meet annually, or following a hazard event as described below, to monitor the Plan's progress and implementation. This will also allow the opportunity for updates to hazards, jurisdictional goals and mitigation action items, as necessary. If needed, the MAs will coordinate with MWDOC to integrate updates into the Plan.

5.1.2 Plan Evaluation

The Plan will be evaluated by the MAs at least annually to determine the effectiveness of the Plan, and to reflect changes in land development or programs that may affect mitigation priorities. MWDOC and the Planning Team leads (or their jurisdictional representative) will also review the goals and action items to determine their relevance to changing situations in the County, as well as changes in State or Federal regulations and policy. MWDOC and MA representatives will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The MAs will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Any updates or changes necessary will be forwarded to MWDOC for inclusion in further updates to the Plan.

MWDOC, with input from the Planning Team, will create a template to guide the Planning Team in preparing a progress report. This will help to ensure consistent and accurate tracking of the Plan implementation by each of the MAs. Each MA will coordinate with their responsible departments/agencies identified for each mitigation action. These responsible departments/agencies will help to monitor and evaluate the progress made on the implementation of mitigation actions and report to the MA's Planning Team representative on a semi-annual basis. These responsible departments/agencies will be asked to assess the effectiveness of the mitigation actions and modify the mitigations actions as appropriate. The HMP Mitigation Action Progress Report worksheet will assist Planning Team representatives in reporting the status and assessing the effectiveness of the mitigation actions. The following questions will be considered in evaluating the Plan's effectiveness:

- Has the nature or magnitude of hazards affecting the planning area/jurisdiction changed?
- Are there new hazards that have the potential to impact the planning area/jurisdiction?
- Do the identified goals and actions address current and expected conditions?

- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the HMP?
- Should additional local resources be committed to address identified hazards?

Future updates to the HMP will account for any new hazard vulnerabilities, unusual circumstances, or additional information that becomes available. Issues that arise during monitoring and evaluating the HMP, which require changes to the risk assessment, mitigation strategy and other components of the Plan, will be incorporated into the next update of the HMP, described below.

5.1.3 Plan Updates

Title 44 Section 201.6(d)(3) of the Code of Federal Regulations requires that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for mitigation project grant funding. Monitoring the progress of the mitigation actions, as described above, will be on-going throughout the five-year period between the adoption of the HMP and the next update effort. The five-year cycle may be accelerated to less than five years based on the following triggers:

- A presidential disaster declaration that impacts one or more of the MAs;
- A hazard event that causes loss of life.

Should a significant hazard occur within the planning area, the HMP Planning Team will reconvene within 60 days of the disaster to review and update the HMP, as required.

MWDOC, working in conjunction with the MAs, will serve as the primary responsible agency for updates to the Plan. All MAs will be responsible to provide MWDOC with jurisdictional-level updates to the Plan when/if necessary, as described above. Every five years the updated plan will be submitted to Cal OES and FEMA for review.

The intent of the update process will be to add new planning process methods, MA profile data, hazard data and events, vulnerability analyses, mitigation actions, and goals to the adopted Plan so that the HMP will always be current and up to date. Based on the needs identified by the Planning Team, the update will, at a minimum, include the elements below:

- The update process will be convened MWDOC and a Planning Team comprised of at least one representative from each MA.

- The hazard risk assessment will be reviewed and updated using best available information and technologies on an annual basis.

- The evaluation of critical infrastructure and mapping will be updated and improved as funding becomes available.

- The mitigation actions will be reviewed and revised to account for any actions completed, deferred, or changed to account for changes in the risk assessment or new policies identified under other planning mechanisms, as appropriate.

- The draft update will be made available to appropriate agencies for comment.

- The public will be given an opportunity to comment prior to adoption.
- The governing bodies for each MA will adopted the updated HMP.

5.1.4 Adoption

Each jurisdiction is responsible for adopting the HMP. This formal adoption should take place every five years. Once the Plan had been adopted, MWDOC will be responsible for final submission to Cal OES. Cal OES will then submit the Plan to FEMA for final review and approval.

5.1.5 Implementation Through Existing Programs

The effectiveness of the nonregulatory HMP depends on the implementation of the Plan and incorporation of the outlined mitigation action items into existing plans, policies, and programs. The Plan includes a range of action items that, if implemented, would reduce loss from hazard events in the planning area. Together, the mitigation action items in the HMP provide the framework for activities that the MAs may choose to implement over the next five years. The MAs have identified the Plan's goals and prioritized jurisdiction-specific actions that will be implemented (resources permitting) through existing plans, policies, and programs.

Implementation of the Plan will be the responsibility of each MA. Successful implementation is more likely if the Plan recommendations are integrated into other plans and mechanisms, such as water and wastewater master plans, urban water management plans, general plans, municipal codes, strategic plans and capital improvement plans and budgets for each of the participating jurisdictions. Upon adoption of the Plan, the MAs can use the Plan as a baseline of information on the hazards that impact their jurisdictions. The Plan can also build upon related planning efforts and mitigation programs that are already occurring within the planning area. This will also facilitate applying for funding opportunities as they become available. Progress on implementing mitigation actions through other planning programs and mechanisms should be monitored and integrated into future updates.

By adopting a resolution approving this HMP, each MA agrees to reference and incorporate the document into their future local planning documents, codes, decisions, processes and regulations. The HMP will be reviewed and considered by each MA, as applicable plans are created or updated in the future. Upon creating or updating new plans or policies, each MA will review this HMP and consider the following:

- What hazard and/or vulnerability information should be considered and/or integrated into this plan?
- Are there opportunities for this plan to support and/or implement mitigation actions?
- What mitigation actions can and should be integrated into this plan?
- Are there other community mechanisms that mitigation can be integrated?
- Is there information from this plan or policy that can be integrated into the next HMP update?

Further, the Water Emergency Response Organization of Orange County's (WEROC) Programs Manager will establish as an annual agenda item to review and discuss incorporation of the HMP into local planning efforts and processes.

Some of the ways each MA will integrate information from this HMP into their planning mechanisms are described below.

Planning and zoning law requires all California cities to adopt a comprehensive, long-term general plan for the physical development of the city. The plans are required to address natural hazards that could impact a community. Further, recent legislation requires jurisdictions to conduct a vulnerability assessment that identifies the risks that climate change poses to the local jurisdictions. Through adoption of their General Plans and Zoning Ordinances, cities plan for the impact of natural hazards. Water and wastewater agencies also utilize City General Plans to understand natural hazards impacting the areas they serve and to identify future development and growth and the associated demands for water and wastewater services. This information informs various water and wastewater plans, such as, Capital Improvement Programs and Urban Water Management Plans. Each jurisdiction will use these plans and this HMP as complementary documents that work together to reduce the risk of natural hazards on their community.

The timing of updates to planning documents vary depending upon the document and statutory requirements. The information provided in the hazards profiles, vulnerability assessment, and the mitigation actions will be integrated directly or incorporated by reference to support and enhance goals/policies and specific actions for each MA. This will be done as the documents are updated by each jurisdiction. More specifically, upon their next General Plan updates, cities will incorporate updated hazard and vulnerability information from the HMP, including integration of mitigation actions into their goals and policies. This is typically done in part through preparation of an Existing Conditions Report or an update of existing conditions within the various General Plan elements. Through the process of updating a General Plan, goals, policies and implementation actions are reviewed and new goals, policies, and actions are created to address issues or concerns within the community, including natural hazards. Hazard information will identify the exposure of populations, land uses, and critical infrastructure from hazards. A General Plan update includes a community outreach process that allows direct input from the community on these issues and provides an opportunity to educate the public on hazards and opportunities to reduce their impact. A General Plan update also requires recommendation for adoption and/or adoption by the cities' respective Planning Commissions and City Councils, further ensuring its implementation as future projects are required to be assessed for their consistency with a General Plan prior to approval.

Similarly, updated water and wastewater plans will integrate more current hazard and vulnerability information and establish or update their framework for implementing actions identified in the HMP. Upon creating or updating any plans, water and wastewater agencies will review this HMP to ensure integration of the mitigation actions into the respective plans. This will be done as staff assesses the current plan and incorporates updated hazard information and the mitigation actions from this HMP.

The Urban Water Management and Planning Act was passed in 2010 and requires water suppliers to estimate water demands and available water supplies. Each water district has an Urban Water Management Plan (UWMP). UWMPs are required to evaluate the adequacy of water supplies including projections of 5, 10, and 20 years. These plans are also required to include water shortage contingency planning for dealing with water shortages, including a catastrophic supply interruption.

UWMPs are intended to be integrated with other urban planning requirements and management plans. Some of these plans include city and county General Plans, Water Master Plans, Recycled Water Master Plans, Integrated Resource Plans, Integrated Regional Water Management Plans, Groundwater Management Plans, Emergency Response Plans, and others. Each water district will review the HMP in coordination with preparation of UWMP updates to ensure the most current hazard information is provided and that the appropriate mitigation actions are incorporated.

Additionally, all water utilities are required to conduct Risk and Resilience Assessments (RRA) and corresponding Emergency Response Plans (ERP) in the coming year per the America's Water Infrastructure Act of 2018 (AWIA). The Risk and Resilience Assessments are similar to the hazard mitigation risk assessment process in that various risks are assessed, but typically in a more in depth manner by not just evaluating the risk, but also all potential physical and cyber components of operations and business continuity. AWIA requires water utilities to assess their facilities for all-hazard risks, but specifically calls attention to physical security, natural hazard risks, cyber security, fiscal processes security, and climate change. The corresponding Emergency Response Plan (ERP) is more similar to an overall FEMA based hazard mitigation plan, than a traditional emergency response plan for say a jurisdiction with an EOC. The ERP typically addresses possible mitigations or solutions very specific to identified risks. Both the RRA and the ERP are documents that are considered Protected Critical Infrastructure Information (PCII) due to information within the documents related to the water infrastructure. However, MA will integrate pertinent information from this mitigation plan into their updated RRA and ERPs, as well as utilize those documents to continue to update and enhance the HMP.

Wastewater agencies are also required to maintain current Sewer Master Plans, Sanitary Overflow Response Plans, and Fats, Oils, and Grease Ordinances. These plans can help to support hazard mitigation efforts, as well as shape future policy to reduce the impacts of sewer system failures.

Each MA has its own budget process, including CIPs that identify capital projects and equipment purchases. These systems provide a link between a MAs general and/or strategic plan and annual budget. As part of the annual review and update of the CIP, the mitigation actions identified in this HMP will be reviewed to determine which actions should be included within the CIP.

This HMP will be added or incorporated by reference into each MA's emergency plans (e.g., Emergency Operations Plans, Emergency Response Plans, and Emergency Evacuation Plans) as they are updated. The hazard profiles, risk assessment, and mitigation actions will be reviewed during updates to these plans. Further, mitigation actions not currently provided in the HMP will be identified for consideration as part of the HMP update.

Other opportunities for integration of this HMP include education programs and continued coordination between the MAs and other agencies. Each MA maintains a website and utilizes social media to provide updated information to its community and service area. Hazard information and opportunities for the community to reduce individual exposure to hazards will be provided. Some MAs will also provide in-person educational events and activities to further inform the community.

5.1.6 Continued Public Involvement

MWDOC is dedicated to involving the public directly in review and updates of the Plan. MWDOC and a representative from each participating jurisdiction will be responsible for monitoring, evaluating, and updating the Plan as described above. During all phases of plan maintenance, the public will have the opportunity to provide feedback.

The most current copy of the Plan will be publicized and permanently available for review on MWDOC's website at www.mwdoc.com/weroc/Hazard-Mitigation. The site will contain contact information to which people can direct their comments and concerns. All public feedback will be forwarded to the appropriate jurisdiction for review and consideration for incorporation (if deemed appropriate) into the next plan update. This information will also be forwarded to MWDOC, responsible for keeping track of public comments on the Plan. In addition, copies of the Plan will be catalogued and kept at all the appropriate agencies in the county. The existence and location of these copies will also be posted on the MWDOC website. This will provide the public an outlet for which they can express their concerns, opinions, or ideas about any updates/changes that are proposed to the Plan.

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Appendix E

MWDOC Strategic Communications Program and Plan

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
STRATEGIC COMMUNICATIONS PROGRAM AND PLAN

TABLE OF CONTENTS

INTRODUCTION

"The art of communication is the language of leadership."
~ James Humes, Author & President Reagan's Speechwriter

Strategic communication is the process of relaying specific, purposeful ideas and information to targeted audience groups in order to reach identified goals and objectives. The Municipal Water District of Orange County's (MWDOC or District) goals and objectives are identified in the District's Mission Statement:

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

MWDOC presently develops, coordinates, and delivers a substantial number of programs and services aimed at elevating stakeholders' awareness about water policy, efficient water use, and the District's role in advocating for sound policy and water reliability investments that are in the best interest of Orange County. As water is a necessary resource to all life, these efforts encourage and benefit all Orange County residents and businesses, across all demographics.

Over the past decade, there has been a significant shift in the way people receive information. The media market is overcrowded and constantly evolving. The public is bombarded minute by minute with news from their phones, televisions, computers and tablets. Traditional media has been on the decline and at the same time, digital media continues to explode. Water providers must prove themselves to be relatable, trustworthy, and essential. This is accomplished by communicating more frequently and more effectively using a wider array of tools and channels to meet the needs and interests of an extremely diverse demographic. It is important to recognize that no single communications tool or channel can fulfill all of the District's identified goals and objectives. Instead, a holistic approach should be taken, utilizing all the tools in the toolbox to create a compounding and inclusive impact.

Historically, and typical for the industry, MWDOC has maintained a modest public profile, however, the District's influence continues to grow, and MWDOC has quickly become a leading regional voice for water in the State. MWDOC's very vocal support for the Delta Conveyance Project (DCP), investments in quality water education, water use efficiency, and emergency management, as well as increased participation in state water regulations and policy has elevated the District's profile in the water industry. It has become necessary to expand communications efforts to reach people where they spend the most time - on social media and through other firmly established electronic channels.

Strategic communication is an ongoing activity where the purpose, audience, message, tools, and channels may change at any given moment, however, for the most part, the overarching goals remain the same. As a result of this, MWDOC's Strategic Communications Program and Plan must remain a living document in order to implement effective, relevant communication with timeliness and accuracy. This document serves as a blueprint, establishing a baseline understanding for how MWDOC's programs will provide information and value to its various stakeholders, partners, and employees; enhance the District's image; and, support MWDOC's mission, goals and objectives to secure long term water reliability for the region.

COMMUNICATIONS GOALS & OBJECTIVES

"The two words 'Information' and 'Communication' are often used interchangeably but they signify quite different things. 'Information' is getting out; 'Communication' is getting through."

~ Sydney J. Harris, American Journalist

The charge of the MWDOC Public Affairs Department (Department) is to elevate public awareness, garner support, and establish confidence in the District's initiatives. Additionally, the Department is tasked with providing transparent, reliable, and accurate information to the public, our partners, and our member agencies. These commitments support not only the MWDOC mission, but also an ongoing districtwide stance to be the leading regional voice for water issues throughout the State. With 28 member agencies in the District's service area - many with competing interests - and a complex, ever-changing landscape of water policy and regulation, MWDOC must utilize various communications tools and channels to reach and unify such a vast and diverse group of stakeholders and audiences.

The MWDOC Strategic Communications Program and Plan aligns the District's identified goals and objectives with the respective audiences, and outlines the appropriate communications tools and channels used to connect them all together. This living document will continue to be updated and amended as the District's goals and objectives evolve, shift, or change.

GOALS & OBJECTIVES

As defined by the Board of Directors, executive management, and the District's Mission Statement, MWDOC'S primary goals and present objectives are as follows:

GOAL #1: SECURE LONG TERM WATER RELIABILITY FOR ORANGE COUNTY AND THE REGION.

- **OBJECTIVE 1.1:** Provide recognized, effective leadership and sound representation across all MWDOC organizational roles, including at the District level, at Metropolitan Water District of Southern California (Metropolitan), as well as at the County, State, and Federal levels.

- **OBJECTIVE 1.2:** Provide leadership, water education, and outreach support towards the successful advancement and completion of the **Delta Conveyance Project (DCP)**.

- **OBJECTIVE 1.3:** Provide unwavering advocacy on behalf of the region to invest in, improve, and expand Orange County's water supply portfolio by continuing to study, evaluate, and recommend opportunities identified in the **Orange County Water Reliability Study.**

GOAL #2: EXAMINE, DEVELOP, AND IMPLEMENT SOUND POLICIES AND PROGRAMS THAT SUPPORT ORANGE COUNTY WATER INVESTMENTS, AND PROVIDE RECOGNIZED VALUE TO THE REGION.

- **OBJECTIVE 2.1:** Provide unbiased analysis of water reliability programs, projects, and accompanying policies that affect Orange County, and to identify and ensure implementation of cost efficient solutions for the region.

- **OBJECTIVE 2.2:** Be the trusted, leading voice for the region on water reliability, water policy, efficient water use, water education, and emergency preparedness and response.

- **OBJECTIVE 2.3:** Educate, inform, and involve Orange County stakeholders and California civic, business, education, and community leaders of today and tomorrow.

GOAL #3: PROVIDE EFFECTIVE COMMUNICATION AND ADVOCACY PROMOTING MWDOC PROGRAMS, POSITIONS, AND SERVICES.

- **OBJECTIVE 3.1** Expand and refine communications efforts to ensure stakeholders, partners, employees, and other decision makers have the information and education they need to make judicious decisions regarding water-saving opportunities and best practices, as well as pending policy matters that affect Orange County.

- **OBJECTIVE 3.2:** Grow and improve MWDOC's traditional and electronic media presence to establish trust and credibility in the District's programs, positions, and activities.

- **OBJECTIVE 3.3:** Define and enhance the District's brand identity.

This award winning Strategic Communications Program and Plan articulates the process of communicating the value of the aforementioned goals and objectives to the District's identified audience members who may *or may not* be engaged in MWDOC's programs or activities.

TARGET AUDIENCES

"To effectively communicate, we must realize that we are all different in the way we perceive the world and use this understanding as a guide in our communication with others."

~ Tony Robbins, Author & Entrepreneur

The ability to understand MWDOC's identified audience groups makes it possible to logically align messaging with the appropriate communications tools and channels to reach the District's identified goals and objectives. There are many ways to categorize MWDOC's audience groups and determine which tools and channels the District can use to best connect with those groups. These categories may include demographics, geography, employer, behavior, and attitudes, to name a few.

Accordingly, the Department has identified several key audience groups (See Appendix A). This by no means is a complete list since our business is water, and every person on the planet needs, and uses it. Water is an essential resource for all life, and for the success and sustainability for all societies regardless of how identified audience groups are categorized.

SAMPLE PERSONAS FOR TARGET AUDIENCES

TARGET AUDIENCES

Student K-6th Grade

Curious, Impressionable, Enthusiastic, Imaginative, Adaptive

Goals & Objectives
- Goal #2

Activities & Partnerships
- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Messages
- Message #1-#5
- Message #8-#10
- Message #17-#19

Channels
- Ricky Raindrop
- Community events
- Boy/Girl Scouts Program
- Choice School Programs

OC Elected Official

Ambitious, Engaged, Traditional, Invested, Informed

Goals & Objectives
- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships
- Elected Officials Forum
- ACC-OC
- Metropolitan & Member Agencies
- OCBC
- SoCal Water Committee
- SWRCB
- UWI
- AMWA
- ACWA
- AWWA

Messages
- Message #1-#5
- Message #8-#9
- Message #11-#14
- Message #17

Channels
- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Inspection Trips
- D.C. Luncheon
- Water Policy Forum
- O.C. Water Summit
- Speaker presentations

MESSAGING AND TACTICS

"Many attempts to communicate are nullified by saying too much."

~ Robert K. Greenleaf, Author

Modern day society is exposed to thousands of bits of information each day. The barrage of messages received through billboards, television, radio ads, as well as print media, email, and text notifications, has given many people a sense of anxiety from information saturation to overload. To be effective, the District must start by stripping out the unnecessary complexities. Messaging needs to be purposeful, simple, clear, concise, and consistent.

Messaging guidelines:

- Before engaging any audience group, be clear about what the District is trying to accomplish.
- Determine what the intended audience needs, wants, and cares about, then get to the point.
- Use words and language that the audience easily understands and can relate to. Be careful not to include industry jargon, technical terms, or excessive detail.
- Use an active voice and clearly define the call to action.

Messages also must be consistent in order to effectively engage audience groups in the District's programs and activities. Important messages become more memorable through repetition. Consistency should be practiced across all District organizational roles as it is vital to the effectiveness of MWDOC's communications efforts and can prevent confusion or misunderstanding.

MESSAGES:

1. Nearly half of all Orange County water is imported from hundreds of miles away AND local water supply sources meet only about half of what Orange County needs.
    a. Protecting our water supply is everyone's responsibility.
    b. Using water more efficiently is everyone's responsibility.
    c. We can all do our part to protect and secure Orange County's water supply for generations to come.
2. Your tap water is clean, safe, and reliable.
3. Providing a healthy, dependable supply of water is our highest priority.
4. Water is our most precious natural resource.
5. Water is life.
6. Less water, more savings.
7. MWDOC can help you save WATER, TIME, and MONEY.
8. Orange County IS Water Smart / OC IS Water Smart (Hook / Lead: Did You Know? / Hashtag: #OCisWaterSmart).
9. We're in this together.
10. Save together.
11. Orange County's primary water source from Northern California is at risk.
12. California (Orange County) needs the **Delta Conveyance Project (DCP) -** the most sound, economical, and environmentally sustainable solution for the region.
13. Climate change, droughts, and other natural disasters will happen. Californians need to invest in a variety of reliable water sources.

14. MWDOC's **Orange County Water Reliability Study** identifies the best water infrastructure projects available to the region based on reliability and value. Through MWDOC's water use efficiency programs and incentives, Orange County saves more than 17.1 billion gallons of water each year.
15. MWDOC has been educating Orange County students about the importance and value of water for nearly five decades through the MWDOC Choice School Programs.
16. Through strong leadership and sound representation, MWDOC works diligently to secure a dependable water future for all of Orange County.
17. Water industry jobs provide steady, long-term careers that ultimately contribute to the welfare of workers, their families, and to the health of the state's economy.
18. MWDOC is committed to educating and encouraging water leaders of today and tomorrow.

While strategy provides the path towards reaching an end goal, tactics define the specific actions taken along the way. Tactics have a definite beginning and end, and are more about the planning and detailed components of a plan.

Some tactics can be utilized to accomplish several, if not all objectives in some cases, however **Tactics** identified for each of the primary MWDOC GOAL objectives are as follows:

OBJECTIVE 1.1 Tactics:

- Maintain a steady, clear, accurate voice throughout the organization by ensuring that all outreach materials both traditional and digital are reviewed and updated frequently.
- Participate in one-on-one and group conversations or meetings with decision makers and partners, and provide informational materials and guidance whenever appropriate.
- Engage stakeholders, partners, and member agency representatives across all MWDOC organizational roles in order to ensure the District is providing needed and necessary support and advocacy.
- Discover common ground and identify opportunities to partner with other organizations to advance the District's goals, objectives, and initiatives.

OBJECTIVE 1.2 Tactics:

- Identify opportunities to keep **DCP** at the forefront of messaging, such as earned media, social media, print media, and other effective forms of communication.
- Identify leading voices in **DCP** as MWDOC Water Policy Forum & Dinner and OC Water Summit speakers.
- Invite speakers from both sides of the **DCP** to participate as Inspection Trip presenters.
- Provide briefing papers, hands-on activities, and presentations to educator groups, teachers, and students to integrate water supply sources and **DCP** into classroom lessons where appropriate.

OBJECTIVE 1.3 Tactics:

- Work with member agencies and partners to educate and advocate for the completion of local projects deemed most valuable by the **Orange County Water Reliability Study.**
- Produce collateral and content such as briefing papers, media kits, and videos highlighting the **Orange County Water Reliability Study** for stakeholders including elected officials, member agencies, as well as traditional and social media audiences.

OBJECTIVE 2.1 Tactics:

- Host a learning workshop targeting leaders from member agencies; include a messaging component for attendees.

OBJECTIVE 2.2 Tactics:

- Present a MWDOC Water Policy Forum & Dinner ***Speakers Series*** each fiscal year and secure top-level expert speakers to discuss timely, relevant water related topics with Orange County stakeholders and leaders.
- Develop messaging that amplifies MWDOC's opposition to any potential legislation that imposes a "public goods charge" "water user fee", or "water tax" on public water agencies or their ratepayers.
- Assume leadership roles where possible at the local, County, and State levels in all areas of expertise and District focus.
- Provide comprehensive tool kits to stakeholders, partners, and member agencies that support and promote water-centric programs, activities, and campaigns, offering direction for implementation and ensuring a unified message.
- Provide hands-on water education activities to Orange County K-12 teachers that enhance and extend classroom lessons.
- Administer the Water Energy Education Alliance that strengthens career pathways and builds and bolsters technical training programs for Southern California students.
- Administer a water-centric K-12 MWDOC Choice School Program for Orange County students that enhance their ability to become responsible environmental stewards
- Support and advance environmental literacy, giving students the knowledge and understanding they need to create ecologically sound, economically prosperous, and equitable communities.

OBJECTIVE 3.1 Tactics:

- Provide stakeholders with valuable resources such as the OC Water 101 Booklet (volume 1) and other MWDOC collateral (briefing papers).
- Integrate District partners and their target audiences (i.e. ACCOC, OCBC, and others) into Inspection Trips and Policy Dinners.
- Provide briefing papers, hands-on activities, and focused presentations where appropriate.
- Utilize all communications tools and channels to engage and inform identified audience groups.

OBJECTIVE 3.2 Tactics:

- Cultivate relationships with traditional media (Newspaper Editorial Boards, Radio and Television News outlets) to maintain a steady voice on water issues, and utilize Social Media to maximize the reach of earned media opportunities and events.
- Evaluate and amend where necessary all current communications platforms and tools to ensure the District is utilizing the most effective and contemporary systems.

OBJECTIVE 3.3 Tactics:

- Apply approved Logo and Brand Identity Guidelines to all MWDOC outreach materials and platforms, activities, programs, and events.
- Promote districtwide buy-in by implementing the MWDOC Logo and Brand Identity Guide.

COMMUNICATIONS TOOLS AND CHANNELS

"If you have an important point to make, don't try to be subtle or clever. Use a pile driver. Hit the point once. Then come back and hit it again. Then hit it a third time- a tremendous whack."

~ Winston Churchill, British Politician, Army Officer & Author

Most of the District's audience groups will already have preconceived notions about who MWDOC is based on past or current collaborations, our website structure and social media content, as well as any interaction with our communications materials including articles, print materials, and news media. To successfully reach these individuals with our intended messages, MWDOC must utilize the tried-and-true tools and resources that are readily available, and strategically place the messages where they can easily be found.

As a guiding reference, the MWDOC Public Affairs Department has defined communications tools, activities, and channels, and identified how MWDOC currently utilizes each of these resources to effectively reach the goals and objectives of the District.

A communications tool is the partnership or activity used to interface with an identified audience to achieve goals and objectives. Some examples include:

- **Partnerships -** *Successful partnerships are developed through an understanding of each other's specific needs to reach identified goals and objectives. Partners typically see a reward involved with coming together and are able to offer each other a choice of tools, services, and solutions to meet those needs. Exceptional partnerships act as a catalyst for those involved to grow and prosper.*

  MWDOC's RECOGNIZED PARTNERS*:

  - MWDOC member agencies
  - Metropolitan and its member agencies
  - Department of Water Resources (DWR)
  - State Water Resources Control Board (SWRCB)
  - Media
  - Technical Consultants
  - School Program Contractors
  - Educators
  - Boy Scouts/Girl Scouts Organizations
  - Association of California Cities – Orange County (ACC-OC)
  - Orange County Business Council (OCBC)
  - Association of California Water Agencies (ACWA)
  - American Water Works Association (AWWA)
  - Association of Metropolitan Water Agencies (AMWA)
  - Council for Environmental and Economic Balance (CEEB)
  - Urban Water Institute (UWI)
  - So Cal Water Committee
  - Wyland Foundation

- Bolsa Chica Conservancy
- Orange County Coastkeepers
- UCCE Master Gardeners
- Orange County Department of Education (OCDE)
- OC STEM
- California Environmental Literacy Initiative (CAELI)
- California Environmental Education Foundation (CEEF)
- Orange County and Pacific West Association of Realtors (OCAR) and (PWR)
- Other Contractors

*This is by no means an exhaustive list, but gives an indication of the many partners of the District.

- **Activities-** An activity is a planned course of action taken in order to achieve a specific aim. Activities have a distinct beginning and end and usually contain several tasks within them that once completed, conclude the activity. Examples of District activities:

  - Annual Campaigns
    - MWDOC Water Awareness Poster Contest
    - Fix-a-Leak Week
    - Irrigation Week
    - Smart Irrigation Month
    - Wyland National Mayor's Challenge for Water Conservation
    - Imagine A Day Without Water
    - Emergency Preparedness Month
    - Garden Smart campaign, and more
  - Workgroup Meetings
  - D.C. Luncheon
  - Water Energy Education Alliance (WEEA) Leadership Roundtable meetings
  - Surveys
  - Water saving programs and incentives

- **A Communications Channel** is the medium through which a message is sent to its intended receiver. The basic channels are visual, written, spoken, or electronic. Examples of District communications channels:

  - **Word of mouth**
  - **Speaker presentations**
  - **Trainings**
  - **Conferences/Meetings**
    - Elected Officials Forum
    - Water Policy Forum
    - Orange County Water Summit
  - **Community Events**
  - **Print media**
    - News stories/News Releases

- Newsletters
- Briefing papers/Talking points
- Media kits
- Written correspondence
- Introduction to Water booklet (Volumes)
- Flyers/Signage/Brochures
- Promotional giveaways
- Door hangers/Bill inserts
- Consumer Confidence Reports (CCRs)

- **Electronic media**
  - Social Media
  - Email blasts
  - Radio
  - Television
- **District Programs**
  - Choice School Programs
  - Scouts Programs
  - WEEA
  - Inspection Trip Program
  - WEROC
- **Ricky Raindrop**

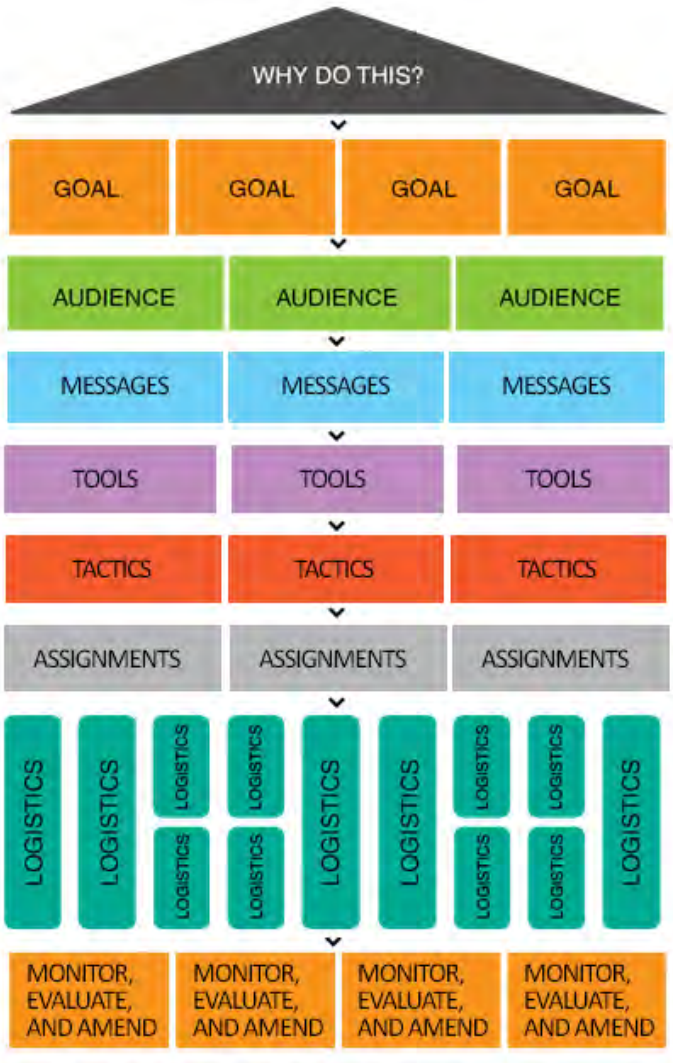
IMPLEMENTATION, ASSIGNMENTS, AND SCHEDULES

"Individual commitment to a group effort – that is what makes a team work, a company work, a society work, a civilization work."

~ Vince Lombardi, American Football Player & Coach

Public sector organizations shoulder a unique responsibility to be transparent, accountable, and have a positive impact on the community. A carefully developed and executed communications plan can establish trust and credibility in the District's programs and activities for our stakeholders, partners, audience members, and employees. This holds especially true in the water industry which is often vulnerable to changes in the political climate.

To effectively reach MWDOC's identified goals and objectives, each of the District's programs and activities must include *basic strategic targets* such as goals, intended audiences, messages, and tools. To ensure the benefit or value received is worth the time, money, talent, and effort expended by the District and its staff, every task, project, or program should start with the question "Why are we doing this?" In turn, all strategic targets should include an *implementation plan* which identifies tactics and logistics, and eventually, active monitoring, evaluation, and amending.



Assignments are essential to maintaining productivity and accountability as well as collectively accomplishing the goals of a project. The MWDOC Public Affairs Department has developed a Programs and Responsibility flowchart which breaks down the Department's primary roles and assignments by team member (See Appendix B).

Additionally, the MWDOC Public Affairs Department has developed a series of logistical checklists to efficiently plan, implement, and control the flow of information for each program and activity, and will continue to do so as new activities and programs are developed. Furthermore, the Department uses robust program management software tools such as Asana and CoSchedule to stay in touch with impending deadlines and to keep everything, including assignments and checklists, organized and in one place.

IMPLEMENTATION, ASSIGNMENTS, AND SCHEDULES

	Federal or State Elected Officials	Legislative Staffers	Orange County Elected Officials	Business Community Leaders	Environmental Organization Leaders	Community Organization Leaders	Water Industry Professionals	Landscape Contractor	Media	Educators	Students K - 6th	Students 7th-12th	College Students	Orange County Residents	Emergency Manager	Human Resources
GOALS																
Goal #1	X	X	X		X		X		X	X						
Goal #2	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Goal #3	X		X	X	X	X	X	X	X	X			X	X	X	X
MESSAGES																
Message #1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #2	X	X	X	X	X	X			X	X	X	X	X	X	X	
Message #3	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Message #4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #5	X		X	X	X	X	X			X	X	X	X	X		
Message #6				X				X					X	X		
Message #7				X		X		X					X	X		
Message #8	X		X	X	X	X	X	X		X	X	X	X	X	X	
Message #9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Message #10	X			X	X	X	X	X		X	X	X	X	X		
Message #11	X	X	X	X	X		X		X	X			X	X	X	
Message #12	X	X	X	X	X		X		X	X			X	X	X	
Message #13	X	X	X	X	X		X		X	X			X	X	X	
Message #14		X	X		X		X		X	X			X	X	X	
Message #15				X	X	X	X	X	X	X			X	X		
Message #16							X			X				X		
Message #17	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Message #18		X		X		X	X			X	X	X	X	X		X
Message #19	X	X		X	X	X	X			X	X	X	X	X		X
COMMUNICATIONS TOOLS AND CHANNELS																
Partnerships	X	X	X	X	X	X	X	X		X	X	X	X	X		X
Annual Campaigns	X	X	X	X	X	X	X		X	X	X	X	X	X		
Surveys	X	X	X	X	X		X	X		X				X	X	X
Word of Mouth	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Speaker Presentations	X	X	X	X	X	X	X		X	X	X	X			X	
Trainings							X	X		X				X	X	X
Conferences/Meetings	X	X	X	X	X	X	X		X	X					X	X
Community Events	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Print Media	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Electronic Media	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
District Programs	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Ricky Raindrop									X	X	X	X		X		
Virtual Platforms	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X

MONITOR, EVALUATE, AND AMEND

"Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted."

~ Albert Einstein, Theoretical Physicist

The effectiveness of the MWDOC Strategic Communications Program and Plan depends on a large variety of factors including technological advancements or changes, the rise and fall of audience engagement, current news or media concentration, political changes in leadership and focus, and even the weather.

There are a significant number of Key Performance Indicators (KPI), metrics and measurements that the MWDOC Public Affairs Department currently uses. Some of the most common include:

- Constant Contact activity reports- email marketing for surveys, events, newsletters, and news release distribution (results per activity)
    - Open rate
    - Click rate
    - Registration rate
        - Includes financial indicators
    - Responses
- Website (Google) Analytics
    - Return Visitor and First Visitor metrics
    - Web traffic and Search Engine Optimization (SEO) including landing pages and time spent on specific pages
    - Click through rate
    - Page views per session
    - Referral traffic
    - Content downloads
    - Use of forms such as newsletter, interest lists, and mailing list sign ups
- Social Media Dashboard Analytics (Facebook, Twitter, Instagram)
    - Followers
    - Likes/Fans
    - Post engagements
    - Content sharing
    - Sentiments
    - Link clicks
    - Inbound messages
    - Ad campaign performance
    - Ranking
- Verbal and Written Feedback
    - Phone calls
    - Email and written correspondence
    - Public comment at meetings

Program and activity evaluation is constant, and through this evaluation process the District's messaging and activities continue to be shaped and refined. Additionally, the tools mentioned here will remain relevant and useful no matter how the goals and objectives or messaging changes.

MWDOC BRAND

"Your brand is what people say about you when you're not in the room."

~ Jeff Bezos, American Technology Entrepreneur, Founder, Chairman, & CEO of Amazon

Many organizations downplay the value of branding because they view themselves as a business, not a brand. However, branding is a critical step to achieving success in communications, creating meaningful interactions, and establishing credibility. Branding is the sum of all the impressions an audience has of an organization. This is based on the interactions they have had with employees and Board members, as well as with the communications tools and channels that are used to reach them. Each of these interactions tells a story to the audience. For example, if materials are presented in a clean, organized, skillful, and contemporary fashion, the audience associates those materials with sophistication, expertise, and trustworthiness. The most important thing is to set expectations for the experience that the audience will have each time they interact with the brand, making it instantly recognizable. People need to identify with, and understand what information comes to them and from whom. How an audience perceives the brand will ultimately determine how successful an organization's efforts are. If an organization does not create and establish their own brand, their audience and competitors will do it for them.

Decades ago, branding was simply labeled a visual representation of an organization - a name, slogan, logo, or combination of all three. Today, it is understood that these elements, while extremely powerful and important, are just one piece of the puzzle. A brand is far more encompassing—it defines an organization's identity. Some of the benefits gained by strengthening the MWDOC brand include:

- **Builds trust and establishes credibility** – Credibility is at the heart of any successful outreach effort. Maintaining a consistent message demonstrates expertise, professionalism, and experience. Brand credibility is established by:
    - Non-verbal identifiers such as a logo or graphic materials
    - Verbal or written communications through marketing efforts
    - The organization's mission statement
    - Delivering expertise regularly through all identified channels
    - Consistently providing valuable information and resources

- **Fosters loyalty** – Once trust has been established, loyalty will soon follow. People who are loyal to a brand continue to support that organization in good times and bad, share positive messages, and introduce new audience groups to the organization.

- **Increased recognition or brand awareness** – One measurement of brand success is if an organization can be identified simply by its attributes such as the logo, tagline, or materials packaging. Brand familiarity can influence decisions when an audience must differentiate between messages that contain conflicting information. People are more likely to trust a brand they recognize.

- **Supports marketing and outreach efforts** – A brand links the name, logo, print materials, online presence, and professional services together bringing a united, clear, consistent message to all audience groups, and across all channels.

- **Extends range of influence** – Consistent branding is a powerful tool that has the potential to reach a large amount of people across a wide variety of channels including online, offline, mobile, and niche markets.

- **Motivates employees** – To build a strong brand, it is essential to have brand ambassadors – individuals, both internal and external, who are engaged, connected, and committed to the organization's activities and priorities. One of the most powerful, and more frequently overlooked brand assets is an organization's workforce. Employees spend a great deal of time at work, and as a result, form solid opinions about their employer. A contemporary, clean, consistent, and well-respected brand can institute a sense of pride, and can help inspire strong, internal brand ambassadors.

A strategic and thoughtfully developed brand should become the backbone of an organization's identity. It is a powerful communications tool which, when utilized correctly, will enable the District to build and establish credibility, as well as present an overall positive experience for identified audience groups. The MWDOC Public Affairs Department has developed the MWDOC Logo and Brand Identity Guidelines as a living document that will continue to grow and evolve along with the District (See Appendix C). The Department's consistent branding efforts align with the MWDOC Strategic Communications Program and Plan goals and objectives to successfully maintain and continue to enhance a brand presence throughout the Orange County region.

Federal or State Elected Official

Ambassador, Busy, Engaged, Educated, Driven

Goals & Objectives
- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships
- ACWA
- OCBC
- SoCal Water Committee
- SWRCB
- Metropolitan & Member Agencies
- Media
- D.C. Luncheon

Messages
- Message #1-5
- Message #8-13
- Message #17
- Message #19

Channels
- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Water Policy Forum
- O.C. Water Summit
- Elected Officials Forum
- Inspection Trips

Legislative Staffer

Political Emphasis, Educated, Involved, Ambitious, Adaptable

Goals & Objectives
- Goal #1
- Goal #2

Activities & Partnerships
- MWDOC Member Agencies
- ACC-OC
- Surveys
- D.C. Luncheon

Messages
- Message #1-4
- Message #9
- Message #11-14
- Message #17-19

Channels
- Introduction to Water Booklet
- Briefing papers
- Social media
- Virtual platforms
- Inspection Trips
- Water Policy Forum
- O.C. Water Summit
- Elected Officials Forum

OC Elected Official

Ambitious, Engaged, Traditional, Invested, Informed

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- Elected Officials Forum
- ACC-OC
- Metropolitan & Member Agencies
- OCBC
- SoCal Water Committee
- SWRCB
- UWI
- AMWA
- ACWA
- AWWA

Messages

- Message #1-#5
- Message #8-#9
- Message #11-#14
- Message #17

Channels

- Introduction to Water Booklet
- Briefing papers
- Written correspondence
- Virtual platforms
- Inspection Trips
- D.C. Luncheon
- Water Policy Forum
- O.C. Water Summit
- Speaker presentations

Water Industry Professional

Authority, Steward, Knowledgeable, Focused, Forward-thinking

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- Water-saving programs & incentives
- MWDOC Member Agencies
- Boy/Girl Scouts Organization
- Surveys
- Annual campaigns
- SWRCB
- AWWA
- UWI
- ACWA
- So Cal Water Committee

Messages

- Message #1
- Message #3-#5
- Message #8-#19

Channels

- Trainings and Workgroup Meetings
- Print media
- Electronic media
- CCRs
- Virtual platforms
- Community events
- District Programs
- Conferences and Meetings

Media

Persistent, Proactive, Inquisitive, Adventurous, Resilient

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- Annual campaigns
- All identified partners if newsworthy

Messages

- Message #1-#4
- Message #9
- Message #11-#15
- Message #17

Channels

- Print media
- Electronic media
- Word of mouth
- Virtual platforms
- Water Policy Forum
- O.C. Water Summit
- Inspection Trips
- Ricky Raindrop

Business Community Leader

Influential, Resourceful, Accomplished, Motivated, Active

Goals & Objectives

- Goal #2
- Goal #3

Activities & Partnerships

- OCAR
- OCBC
- ACC-OC
- Imagine a Day Without Water
- Garden Smart campaign

Messages

- Messages #1-13
- Messages #15
- Messages #17-19

Channels

- Social media
- Flyers/Signage/Brochures
- Speaker presentations
- Door Hangers/Bill Inserts
- Surveys
- Word of mouth
- Virtual platforms
- WEEA
- Inspection Trips
- O.C. Water Summit
- Water Policy Forum

Community Organization Leader

Purposeful, Dynamic, Trustworthy, Dedicated, Economical

Goals & Objectives

- Goal #2
- Goal #3

Activities & Partnerships

- Boy/Girl Scouts Organizations
- Inspection Trips
- OCAR
- Water-saving programs & incentives
- Orange County Coastkeeper
- CAELI
- UCCE Master Gardeners
- Imagine a Day Without Water
- Garden Smart campaign
- Wyland National Mayor's Challenge for Water Conservation

Messages

- Message #1-5
- Message #7-10
- Message #15
- Message #17-19

Channels

- Social media
- Flyers/Signage/Brochures
- Speaker presentations
- Door Hangers/Bill Inserts
- Virtual platforms
- Word of mouth
- News stories
- Newsletters
- Briefing papers
- CCRs

Environmental Community Leader

Service-oriented, Passionate, Invested, Motivated, Aware

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- Orange County Coastkeeper
- Bolsa Chica Conservancy
- CAELI
- Imagine a Day Without Water
- Wyland National Mayor's Challenge for Water Conservation

Messages

- Message #1-5
- Message #8-15
- Message #17
- Message #19

Channels

- Social media
- Surveys
- Speaker presentations
- Water Policy Forum
- Briefing papers
- CCRs
- Virtual platforms
- Community events
- Inspection Trips

Emergency Manager

Organized, Persuasive, Responsible, Driven, Decisive

Goals & Objectives

- Goal #2
- Goal #3

Messages

- Message #1-4
- Message #8-9
- Message #11-14
- Message #17

Activities & Partnerships

- Surveys
- DWR
- Technical consultants
- ACWA
- Other contractors
- Imagine a Day Without Water
- Emergency Preparedness Month
- MWDOC Member Agencies

Channels

- Speaker presentations
- Electronic media
- Trainings
- Conferences
- Virtual platforms
- Community events
- WEROC

Landscape Contractor

Expert, Thrifty, Creative, Hands-on, Detail-oriented

Goals & Objectives

- Goal #3

Messages

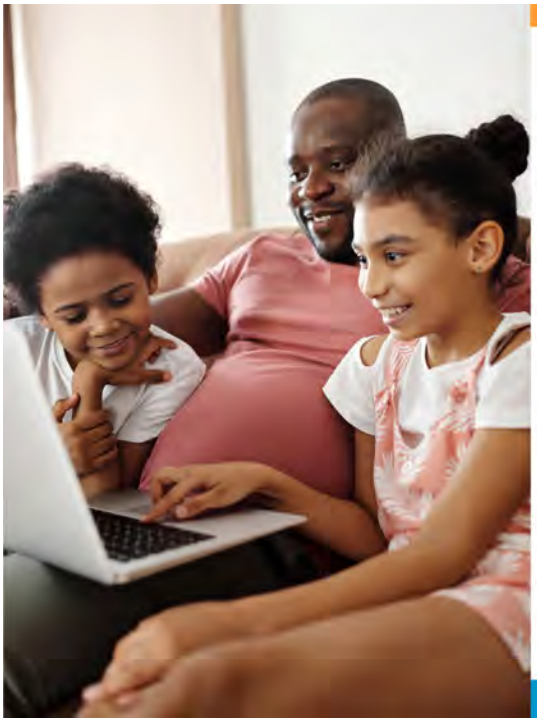
- Message #1
- Message #4
- Message #6-10
- Message #15

Activities & Partnerships

- MWDOC Member agencies
- OCAR
- Wyland Foundation
- UCCE Master Gardeners
- Smart Irrigation Month
- Irrigation Week
- Garden Smart campaign

Channels

- Flyers/Signage/Brochures
- Door Hangers/Bill Inserts
- Social media
- Trainings
- Virtual platforms



OC Residents

Diverse, Penny-wise, Family focused, Casual, Industrious

Goals & Objectives

- Goal #2
- Goal #3

Activities & Partnerships

- MWDOC Member Agencies
- Annual campaigns
- Water-saving programs & incentives
- Orange County Coastkeeper
- UCCE Master Gardeners
- OCDE
- CAELI
- OC STEM
- Boy/Girl Scouts Organizations

Messages

- Message #1-19

Channels

- Electronic media
- Surveys
- District Programs
- Word of mouth
- Door Hangers/Bill Inserts
- CCRs
- Promotional items
- Virtual platforms
- Community events

College Student

Independent, Perceptive, Receptive, Social, Frugal

Goals & Objectives

- Goal #2
- Goal #3

Activities & Partnerships

- Educators
- Surveys
- Bolsa Chica Conservancy
- Orange County Coastkeeper
- CAELI
- Imagine a Day Without Water
- Wyland National Mayor's Challenge for Water Conservation

Messages

- Messages #1-15
- Messages #17-19

Channels

- Social media
- Word of mouth
- Print media
- Electronic media
- Virtual platforms
- Community events

Student 7-12th Grade

Opinionated, Vulnerable, Eager, Trendy, Utopian

Goals & Objectives

- Goal #2

Activities & Partnerships

- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Messages

- Message #1-#5
- Message #8-#15
- Message #17-#19

Channels

- Ricky Raindrop
- Community events
- Boy/Girl Scouts Programs
- MWDOC Choice School Programs
- Speaker presentations
- WEEA

Student K-6th Grade

Curious, Impressionable, Enthusiastic, Imaginative, Adaptive

Goals & Objectives

- Goal #2

Activities & Partnerships

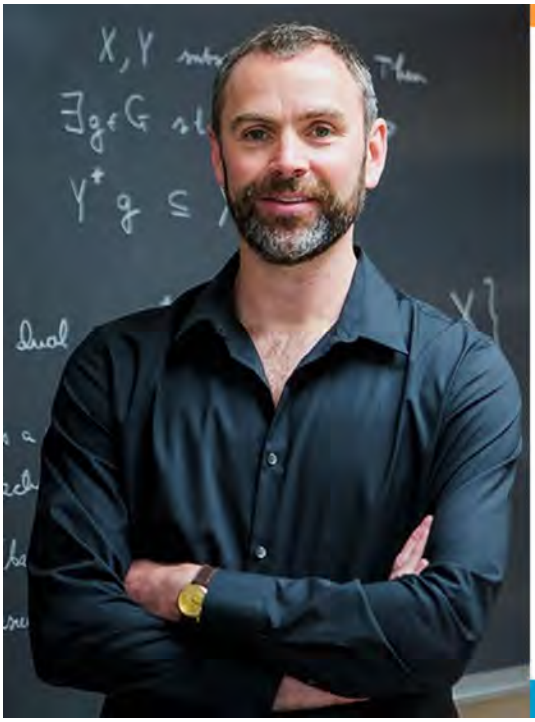
- Boy/Girl Scouts Organization
- Educators
- OCDE
- OC STEM
- CAELI
- Wyland Foundation
- MWDOC Water Awareness Poster Contest

Messages

- Message #1-#5
- Message #8-#10
- Message #17-#19

Channels

- Ricky Raindrop
- Community events
- Boy/Girl Scouts Program
- Choice School Programs



Educators

Intellectual, Industrious, Influential, Inventive, Innovative

Goals & Objectives

- Goal #1
- Goal #2
- Goal #3

Activities & Partnerships

- OCDC
- OC STEM
- CAELI
- School Program Contractor
- Imagine a Day Without Water
- MWDOC Water Awareness Poster Contest
- Wyland National Mayor's Challenge for Water Conservation

Messages

- Message #1-5
- Message #8-19

Channels

- Briefing papers
- Virtual platforms
- Trainings
- Word of mouth
- WEEA
- Boy/Girl Scouts Programs
- MWDOC Choice School Programs
- Introduction to Water Booklet
- Ricky Raindrop

APPENDIX B

Public Affairs Team Programs/Responsibilities

#P Digital Strategic Communications Consultant & Video Production

Damon Micalizzi
PA Director

- Board Liaison and Support
- Executive Management Team
- Communications Advisor
- Strategic Communications Forecasting and Planning
- Member Agency Support
- Media Relations and District Spokesperson
- Influencer Partnerships
- Interdepartmental Liaison
- Interagency Relationship Development
- Editorial Content Development
- News Releases
- OC Water Summit

Tiffany Baca
PA Manager

- Daily Program, Staff, and Project Management
- Evaluate, Refine, and Advance Existing Programs
- New Program Development
- Establish, Maintain, and Grow Strategic Partnerships
- Strategic Message Development
- Leader, Water Energy Education Alliance (WEEA)
- Develop and Advance Education Program Initiatives
- News Releases / Media Relations
- Website Management
- Social Media Oversight
- Brand Manager
- Public Affairs Workgroup

Sarah Wilson
PA Specialist

- Member Agency and Board Support
- Choice School Programs Coordination and Oversight
- Scouts Programs Oversight
- Public Outreach
- Press Kit Development
- Marketing Material Development
- Graphic Support
- Water Policy Dinners & Special Event Coordination
- eCurrents Newsletter
- Editorial Content Development
- News Releases
- Community Event Oversight

Bryce Roberto
PA Coordinator

- Member Agency and Board Support
- Inspection Trips Program Coordination
- Public Outreach
- Boy Scouts Program Coordination
- Social Media Content Development
- Marketing Material Development
- Graphic Support
- Briefing Papers/ Fact Sheets Maintenance
- Research Projects Including Event Speaker Recommendations
- Consumer Confidence Reports

Traci Muldoon
PA Assistant

- Member Agency Support
- PA Department Support
- Registration Special Events
- Social Media Content Development
- Marketing Material Development
- Graphic Support
- Poster Contest Coordination
- Community Event Coordination & Participation
- Editorial Calendar
- Research Projects
- Press Clips
- Promotional Items

Katie Vincent
Education Programs Assistant

- Water Energy Education Alliance (WEEA) Program Support
- Research Projects Related to Career Technical Education (CTE)
- Identify, Secure, and Coordinate Grant and Sponsorship Funding
- Identify and Secure WEEA Meeting Speakers
- Provide Presentations on Workforce Development and CTE
- Coordinate with Educators, Workforce Development Entities, and Industry on CTE
- Marketing Material Development Specific to WEEA
- Other Duties as Assigned

Municipal Water District of Orange County

Logo and Brand Identity Guidelines

Updated 06.29.2018

Brand Implementation

MWDOC

Introduction

Guidelines for Brand Identity and Logo Usage

This logo and brand identity resource will provide guidelines for using the Municipal Water District of Orange County (MWDOC) logo and will introduce the color, typeface, and brand voice that should be used across all MWDOC communications. The elements described in this guide are a fundamental part of how others recognize and relate to MWDOC and these standards have been established to ensure the brand remains consistent in appearance, sound, and feel. While this resource covers most basic applications and instances of the MWDOC brand and use of the logo, it cannot anticipate all possible scenarios.

Any logo or brand identity issues not covered in this guide must be referred to:

MWDOC Public Affairs
Attn: Tiffany Baca
(714) 593.5013
tbaca@Mwdoc.com
18700 Ward Street
Fountain Valley, CA 92708

Color Palette

Use these values when referring to color options

The MWDOC brand and logo color palette was selected to project a modern, clean look while remaining true to the brand's historic color background. The basic, primary colors orange, green, and blue have been used in MWDOC's visual communications since 1971.

The colors shown on the opposite page should be incorporated into all MWDOC branded materials. Spot, process, and web color equivalents have been provided as reference in order to ensure consistency.

It is important to note that it is impossible to foretell what differences will occur between every printed and digital application of these selected colors. There are countless factors in which the appearance of any color may vary. To ensure the best result, always default to this guide, or when producing print or electronic materials through a selected vendor, consult a professional graphic designer or professional printer.

Typeface

Simple. Legible. Clean.

All variations of the MWDOC logo use only one font, **Franklin Gothic Demi**. This font style was selected for it's simplicity and legibility, and also because it is included as a default font style with any Microsoft Office installation. The goal with all of the selected typeface across the MWDOC brand is to keep it clean and simple.

That said, when producing materials with text, the typeface used should be consistent with the brand image. Typeface to be used in instances that require text are: **Franklin Gothic Demi, Franklin Gothic Medium, Franklin Gothic Book**, **Calibri**, **Calibri Light, Arial,** and in certain cases, **English**. The typeface referenced here should be used for all internal and public documents, stationery, outreach materials, promotional items, and correspondence.

(Franklin Gothic Demi)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(Franklin Gothic Medium)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(Franklin Gothic Book)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(Calibri)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(Calibri Light)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(Arial)

Municipal Water District of Orange County

1234567890!@#$%^&*()

(English)

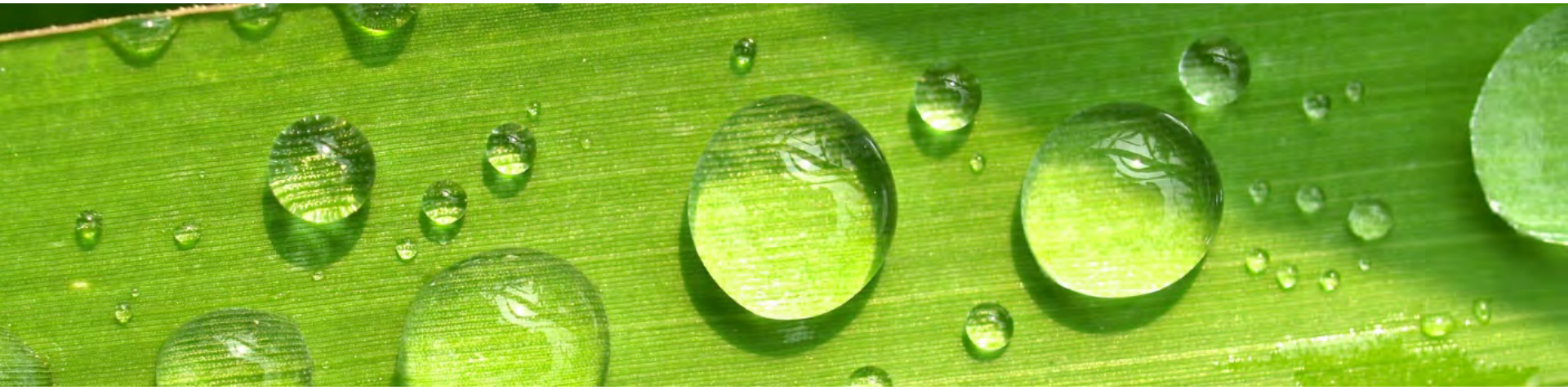
Municipal Water District of Orange County

1234567890!@#$%^&()*

Brand Voice and Messaging

Purposeful, consistent expression through words

The brand voice consists of both **messaging** and **tone**. These two aspects come together to create an effective strategy when speaking to the public. It is important to create clear, consistent messaging that reflects the MWDOC brand personality. The brand message is simply MWDOC's mission statement. All roads lead back to the mission statement. The tone is how you are communicating the message.



Brand Message

Have a plan – Have a goal

To create effective messaging, is important to tell a story from start to finish. Clarity and consistency are key. Always have a goal when preparing messages for both internal and external audiences. Define what you are trying to achieve. Plan key messages and action points before creating content to avoid including technical jargon and fluff where it is not needed. If your message requires the use of technical language and/or acronyms, spell it out in clear language for your audience. Avoid colloquialisms. Stick to the point, and be as succinct as possible.

The Lead

Introduction and main point(s)
Who, What, When, Where, Why

The Body

Evidence, background, primary details that support The Lead

The Tail

Least important information; details for those most interested

Brand Tone

Everything we write should be thoughtful, interesting, and human

In order to communicate effectively, you have to know who your audience is and present your message in a way that they understand and respond to. Essentially, each time you communicate with an audience, you need to tailor your message in order to engage them. Your voice is your voice, but you take on different tones depending on who you are speaking to - Elected Official vs Typical Homeowner, Education Partner vs School Children, or describing an event vs giving instructions. You may have to stretch or adapt your tone to fit the audience or platform. The tone that should be used to communicate the brand effectively should always be:

PHOTOGRAPHY

BRANDING






PHOTOGRAPHY

BRANDING

When choosing photographs for presentations, outreach, and promotional materials, select simple, clean imagery that aligns with the MWDOC brand. Whenever possible, use professional stock images that are clean and crisp. To assist with this, the MWDOC Public Affairs Department has put together a selection of presentation images that have been saved in the Shared O drive under Presentation Images.

Logo Design

The conceptual background

The original MWDOC logo was adopted in 1971 and since that time, has represented the organization throughout Southern California's water industry. The MWDOC logo became a recognized symbol of water resource planning, advocacy, and reliability for Orange County. When preparing the design for the new logo, it became very clear that the organization's history and reputation needed to be acknowledged by maintaining several key brand elements.

Staying true to the history of the MWDOC brand, colors in the original logo design, orange, green and blue, were maintained.

The water element was reintroduced in the new MWDOC logo design in a revitalized, modern way. The cool, water-blue-colored leaf was placed in the forefront of the design to symbolize water as MWDOC's primary focus.

There are hundreds of water agencies that serve California, and it can be difficult to differentiate which agency serves who. Through the use of color, a subtle statement is made by clearly separating MWD and OC.

Since 1971, the orange has been a primary element of the MWDOC brand, and it made sense to keep it. MWDOC serves and advocates on behalf of 2.3 million Orange County residents.

The font that was selected for the refreshed MWDOC logo is nearly the same weight as the font in the original logo design. However, the new design has cleaner lines with defined space between the letters, which will make it easier to read on embroidered materials.

Logo Usage and Guidelines

Always use approved artwork

The MWDOC logo acts as the primary visual component of the MWDOC brand. Therefore, it is critical to maintain the integrity of the logo and to be consistent with its usage. Never recreate, modify, or distort the MWDOC logo in any way, and always ensure you are using the correct logo artwork for the application or occasion. If for some reason another variation is needed outside of the scope defined in this guide, refer to the Public Affairs Department representative listed on page 3.

The distinct use of color helps to define MWDOC's brand identity. The MWDOC logo was developed to be most impactful in a four-color format. Although the four-color version is preferred and should be used whenever possible, black, white, and blue versions are available for secondary use in one-color media.

Logo Variations

Approved designs

The MWDOC logo was created with three approved versions, as shown on the right. These versions allow for flexibility to optimize the logo's visual presence across multiple applications and should not be altered.

The official logo consists of the MWDOC icon and acronym and should be considered the default choice for all applications. The secondary logo consists of the MWDOC icon and the full name "Municipal Water District of Orange County" and should be used in less formal applications or when the organization name is unknown or necessary. The third logo option includes the MWDOC icon and the official MWDOC website url. This option should be used in promotional applications only or in instances where it is critical to direct others to the official MWDOC website. A gradient version for all three logos is available for use only where you have flexibility to be more artistic or expressive.

Official MWDOC logo (Acronym only)

Promotional version referencing the website

Secondary MWDOC logo

All three approved versions include a gradient option

Logo Configuration

Size relationship among the MWDOC logo elements and clearance area

The illustration below indicates the correct size relationship and configuration among the logo elements. These elements, their relative sizes, and their placement relative to each other must never be altered or modified.

Clearance area is the minimum distance allowed between the logo and any other element (graphic, type, or edge of page). This helps ensure legibility and enhances recognition. The clearance area around all four sides of the MWDOC logo must never be less than the height of the uppercase “M” in the official version of the logo. This is known as the “cap-height.”

Minimum Size

Maintain a minimum size for logo recognition

To ensure legibility of all versions of the MWDOC logo, a minimum size must be maintained at all times. All color and gradient variations of the **official logo** must not be displayed in any Microsoft Office program in a size smaller than 0.6 inches in height and 0.65 in width as shown in the example on the right.

All color and gradient variations of the **secondary logo** must not be displayed in any Microsoft Office program in a size smaller than 0.7 inches in height and 1.34 inches in width, as shown in the example on the right.

All color and gradient variations of the **MWDOC .com logo** must not be displayed in any Microsoft Office program in a size smaller than 0.6 inches in height and 0.88 inches in width, as shown in the example on the right.

The objective is to maintain legibility. If you cannot read the text, the logo is too small and needs to be resized.

Official version (Acronym only)
No smaller than 0.6 inches in height and 0.65 inches in width

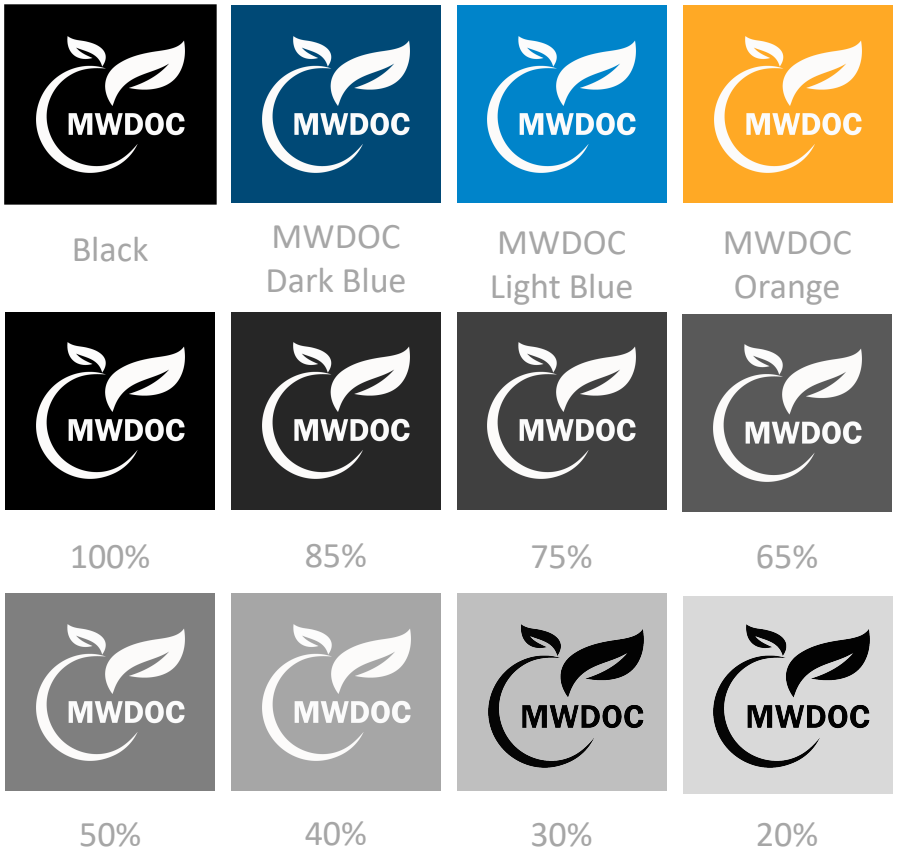
Secondary logo (full text)
No smaller than 0.7 inches in height and 1.34 inches in width

.com logo
No smaller than 0.6 inches in height and 0.88 inches in width

Reverse Treatment

When to use the black and white MWDOC logo

A reversed (white) version of the MWDOC logo can be reproduced on a black or dark colored background. In one-color applications, sufficient contrast should be maintained by using the reverse logo on tonal values of 40% black or darker and a one-color black version of the logo on tonal values of lighter than 40%. If the MWDOC logo is superimposed upon or reversed out of a photograph, it should always be placed in an area that offers a consistent background and provides sufficient contrast.



Incorrect Usage

Examples of common mistakes

In an attempt to prevent common mistakes when using the MWDOC logo, several examples of incorrect uses are displayed here for reference. These variations are representative, however, and are not all inclusive. Please refer to the overall standards throughout this guide when considering any form of reproduction or application of the MWDOC logo.

Before using any questionable variation of the logo, refer to the Public Affairs Department representative listed on page 3.

Do not change brand colors. Use the official color specification detailed in this guide.

Do not stretch, alter, or skew the logo. Resizing must be proportionate.

Do not rotate or flip the logo.

Do not reconfigure the logo elements.

Do not remove any of the logo elements.

Do not use the acronym element without the icon.

Do not crop the logo.

Do not modify the logo colors even if they look similar. Use the official color specification detailed in this guide.

Do not place the logo on top of a busy background.

Do not make the logo transparent.

Do not place the logo on top of a white box to make the logo legible, unless that box is part of an overall design.

Do not place the logo on a low-contrast or similar colored background if the logo elements are not clearly identifiable.

Logo on Low-Contrast or Similar Colored Background

Rule of thumb, refer to the Public Affairs representative on page 3

One of the most common issues with any logo placement is the unavoidable instance where the logo will be displayed on a low-contrast or similar colored background. One example of this is when you must use someone else's template for a presentation. The easiest fix is to select the white one-color logo option. However, when the best representation of the brand is to display the logo in full color, there are a few alternatives. The first is to select the full color option with MWD in white text. Another is to add a drop shadow (from the Microsoft shape options, shadow offset center option) to the logo which makes it pop out from the background. The last and least preferable option is to place a white stroke or outline around the logo. As mentioned in the introduction text, it is impossible to predict all scenarios or background variations that might come up. The rule of thumb is when in doubt, seek assistance from the Public Affairs representative on page 3 of this guide.

White stroke and drop shadow alternatives

MWD white text

THANK YOU

Thank you for supporting this significant milestone for our agency and for helping build the MWDOC brand. If you have any questions, please contact the Public Affairs representative referenced on page 3 of this guide.

Appendix F

Notice of Public Hearing

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
P.O. Box 20895
Fountain Valley, CA 92728-0895

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Fax: (714) 964-9389
www.mwdoc.com

February 24, 2021

Michael Moore
Assistant General Manager, Water Services
Anaheim Public Utilities
Anaheim West Tower, 201 South Anaheim Blvd.
Anaheim, CA 92805

Subject: MWDOC 2020 Urban Water Management Plan Update

The Municipal Water District of Orange County (MWDOC) is in the process of preparing and updating its 2020 Urban Water Management Plan (UWMP) in compliance with the Urban Water Management Planning Act and the Water Conservation Act of 2009, commonly referred to as SBX7-7. An update of MWDOC's UWMP is required every five (5) years.

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Sincerely,

Harvey De La Torre
Assistant General Manager

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Fountain Valley, California 92708

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February 24, 2021

Tony Olmos
Public Works Director
City of Brea
1 Civic Center Circle
Brea, CA 92821

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

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February 24, 2021

Nabil Henein
Director of Public Works/City Engineer
City of Buena Park
6650 Beach Boulevard
Buena Park, CA 90621

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

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February 24, 2021

Hyejin Lee
Director of Public Works/City Engineer
City of Fountain Valley
10200 Slater Avenue
Fountain Valley, CA 92708

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

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February 24, 2021

Meg McWade
Director of Public Works
City of Fullerton
303 W. Commonwalth Ave.
Fullerton, CA 92832

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

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February 24, 2021

William Murray
Director of Public Works
City of Garden Grove
13802 Newhope Street
Garden Grove, CA 92840

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

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Fountain Valley, California 92708

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February 24, 2021

Tom Herbel
Director of Public Works
City of Huntington Beach
2000 Main Street
Huntington Beach, ca 92648

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
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Fountain Valley, California 92708

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Fountain Valley, CA 92728-0895

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February 24, 2021

Elias Saykali
Director of Public Works
City of La Habra
P.O. Box 337
La Habra, CA 90633-0337

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

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Assistant General Manager

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February 24, 2021

Mike Belknap
Public Works & Community Services Director
City of La Palma
7821 Walker Street
La Palma, CA 90623

Subject: MWDOC 2020 Urban Water Management Plan Update

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Assistant General Manager

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February 24, 2021

Mark Vukojevick
Utilities Director
City of Newport Beach
P.O. Box 1768
Newport Beach, CA 92660

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Christopher Cash
Director of Public Works
City of Orange
P.O. Box 449
Orange, CA 92886

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Tom Bonigutt
Public Works Director
City of San Clemente
910 Calle Negocio, Suite 100
San Clemente, CA 92672

Subject: MWDOC 2020 Urban Water Management Plan Update

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Assistant General Manager

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Fountain Valley, California 92708

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February 24, 2021

Thomas Toman
Director of Public Works
City of San Juan Capistrano
32450 Paseo Adelanto
San Juan Capistrano, CA 92675

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

Street Address:
18700 Ward Street
Fountain Valley, California 92708

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February 24, 2021

Nabil Saba
Acting Public Works Director
City of Santa Ana
P.O. Box 1988, M-24
Santa Ana, CA 92702

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Steve Myrter
Director of Public Works
City of Seal Beach
211 8th Street
Seal Beach, CA 90740

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Douglas Stack
Director of Public Works
City of Tustin
300 Centennial Way
Tustin, CA 92780

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Marwan Youssef
Director of Public Works
City of Westminster
8200 Westminster Boulevard
Westminster, CA 92683

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

David Youngblood
General Manager
East Orange County Water District
185 North McPherson Road
Orange, CA 92869-3720

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Dennis Cafferty
General Manager
El Toro Water District
24251 Los Alisos Boulevard
Lake Forest, CA 92630

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Michael Dunbar
General Manager
Emerald Bay Service District
600 Emerald Bay
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Ken Vecchiarelli
General Manager, Orange County
Golden State Water Company
2283 E. Via Burton
Anaheim, CA 92806

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Paul Cook
General Manager
Irvine Ranch Water District
P.O. Box 57000
Irvine, CA 92618

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Keith Van Der Maaten
General Manager
Laguna Beach County Water District
P.O. Box 987
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Paul Shoenberger, PE
General Manager
Mesa Water
1965 Placentia Avenue
Costa Mesa, CA 92627

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Joone Lopez
General Manager
Moulton Niguel Water District
P.O. Box 30203
Laguna Hills, CA 92607-0203

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Michael Markus
General Manager
Orange County Water District
P.O Box 8300
Fountain Valley, CA 92708

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
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February 24, 2021

Daniel Ferons
General Manager
Santa Margarita Water District
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Jerry Vilander, Jr.
General Manager
Serrano Water District
18021 East Lincoln Street
Villa Park, CA 92861-6446

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Rick Shintaku
General Manager
South Coast Water District
31592 West Street
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Fernando Paludi
General Manager
Trabuco Canyon Water District
32003 Dove Canyon Drive
Trabuco Canyon, CA 92679

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Brett Barbre
General Manager
Yorba Linda Water District
1717 East Miraloma Avenue
Placentia, CA 92870

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

James Treadaway
Public Works Director
Orange County
601 North Ross Street
Santa Ana, ca 92701

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Shaun Pelletier
Public Works Director
City of Aliso Viejo
12 Journey Suite 100
Aliso Viejo, CA 92656

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Raja Sethuraman
Director of Public Services
City of Costa Mesa
77 Fair Drive
Costa Mesa, CA 92626

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Doug Dancs
Public Works Director
City of Cypress
5275 Orange Avenue
Cypress, CA 90630

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Matt Sinacori
Public Works Director
City of Dana Point
33282 Golden Lantern
Dana Point, CA 92629

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark Steuer
Public Works Director
City of Irvine
1 Civic Center Plaza
Irvine, CA 92606

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark McAvoy
Public Works Director
City of Laguna Beach
505 Forest Avenue
Laguna Beach, CA 92651

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Ken Reynolds
Public Works Director
City of laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: MWDOC 2020 Urban Water Management Plan Update

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Sincerely,

Harvey De La Torre
Assistant General Manager

Street Address:
18700 Ward Street
Fountain Valley, California 92708

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February 24, 2021

Jacki Scott
Public Works Director
City of Laguna Niguel
30111 Crown Valley Parkway
Laguna Niguel, CA 92677

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Akram Hindiyeh
City Engineer
City of Laguna Woods
24264 El Toro Road
Laguna Woods, CA 92637

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Thomas Wheeler
Public Works Director
City of Lake Forest
100 Civic Center Dr.
Lake Forest, CA 92630

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Chris kelley
City Engineer
City of Los Alamitos
3191 Katella Avenue
Los Alimitos, CA 90720

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mark Chagnon
Public Works Director
City of Mission Viejo
200 Civic Center
Mission Viejo, CA 92691

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Luis Estevez
Public Works Director
City of Placentia
401 E Chapman Avenue
Placentia, CA 92870

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Brendan Dugan
Public Works Director
City of Rancho Santa Margarita
22112 El Paseo
Rancho Santa Margarita, CA 92688

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Allan Rigg
Public Works Director
City of Stanton
7800 Katella Avenue
Stanton, CA 90680

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Mike Knowles
Public Works Director
City of Villa Park
17855 Santiago Boulevard
Villa Park, CA 92861

Subject: MWDOC 2020 Urban Water Management Plan Update

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February 24, 2021

Jamie Lai
Public Works Director
City of Yorba Linda
4845 Casa Loma Avenue
Yorba Linda, CA 92886

Subject: MWDOC 2020 Urban Water Management Plan Update

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Harvey De La Torre
Assistant General Manager

Appendix G

Adopted WSCP Resolution (Pending)

Arcadis U.S., Inc.
2240 S. County Trail, Suite 5
East Greenwich
Rhode Island 02818
Phone: 401 738 3887
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