



**2020**

**URBAN WATER  
MANAGEMENT PLAN**

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## ABBREVIATIONS

2015 Plan	2015 Urban Water Management Plan
2020 Plan	2020 Urban Water Management Plan
AB	Assembly Bill
AAC	All-American Canal
Act	Urban Water Management Planning Act
AF	acre-feet
AF/YR	acre-feet per year
BMPs	Best Management Practices (Water Conservation)
CALFED	CALFED Bay-Delta Program
CC	Coachella Canal
CEQA	California Environmental Quality Act
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System
CVWD	Coachella Valley Water District
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
DBP	Disinfection Byproduct
DCP	Drought Contingency Plan
District	Vista Irrigation District
DMM	Demand Management Measures
DMP	Drought Management Plan
DPH	Department of Public Health
DRA	Drought Risk Assessment
DWA	Desert Water Agency
DWR	Department of Water Resources (State of California)
EWPCF	Encina Wastewater Pollution Control Facility
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ESP	Emergency Storage Project
ETo	Evapotranspiration
FY	Fiscal Year
GPCD	gallons per capita per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HAB	Harmful Algal Bloom
IAWP	Interim Agricultural Water Program
ICP	Integrated Contingency Plan
ICS	Intentionally Created Surplus
IID	Imperial Irrigation District
lb/day	pounds per day

M&I	municipal & industrial
MAF	million acre-feet
MAF/YR	million acre-feet per year
MCL	California Maximum Contaminant Level
Metropolitan	Metropolitan Water District of Southern California
mg/l	milligrams per liter
MGD	million gallons per day
MOU	Memorandum of Understanding - Urban Water Conservation in CA
NCWA	North County Water Agencies
pCi/l	picrouries per liter
PSAWR	Permanent Special Agricultural Water Rate
QSA	Quantification Settlement Agreement
Reclamation	United States Department of the Interior, Bureau of Reclamation
RO	reverse osmosis
ROD	Record of Decision
SANDAG	San Diego Association of Governments
SB	Senate Bill
SBX 7-7	Senate Bill X7-7
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SEMS	Standardized Emergency Management System
Settlement Act	San Luis Rey Indian Water Rights Settlement Act
Settlement Agreement	San Luis Rey Indian Water Rights Settlement Agreement
SGMA	Sustainable Groundwater Management Act
Splash Lab	Splash Lab Mobile Science Lab
State Board	State Water Resources Control Board
SWA	Source Water Assessment
SWRP	Shadowridge Water Reclamation Plant
SWP	State Water Project
TCP	trichloropropane
TDS	total dissolved solids
UWMP	Urban Water Management Plan
µg/l	micrograms per liter
VID	Vista Irrigation District
Warner Basin	Warner Valley Groundwater Basin
Water Authority	San Diego County Water Authority
WC	California Water Code
WRMP	Water Reclamation Master Plan
WSAP	Water Supply Allocation Plan
WSCP	Water Shortage Contingency Plan
WSDRP	Water Shortage and Drought Response Plan
WSRP	Water Supply Response Program
WTP	Water Treatment Plant

## **EXECUTIVE SUMMARY**

Vista Irrigation District (District) has prepared its 2020 Urban Water Management Plan (2020 Plan) in accordance and compliance with the Urban Water Management Planning Act (UWMP Act). The District's 2020 Plan serves as the long-term planning document that will help to ensure a reliable water supply for the District. This Executive Summary satisfies the requirement of California Water Code Section 10630.5 to include a simple, lay description of information necessary to provide a general understanding of the 2020 Plan, including a description of District water supplies, challenges ahead, and strategies for managing reliability risks.

### **1. CHAPTER 1 – INTRODUCTION AND OVERVIEW**

The California Water Code requires all urban water suppliers in the state serving more than 3,000 customers to prepare urban water management plans and update them every five years. The District provides water service to roughly 135,000 people through 28,900 accounts in the City of Vista, and portions of the cities of San Marcos, Escondido, Oceanside, and unincorporated areas of the County of San Diego.

The Water Code requires urban water suppliers, such as the District, to analyze the reliability of water supplies to meet water use demands in a single-dry year and over an extended drought period of five years or longer, and prepare a plan to address water shortages. The 2020 Plan outlines the District's strategies to manage reliability through 2045.

### **2. CHAPTER 2 – PLAN PREPARATION**

While the 2020 Plan includes specific information about its water supplies, the District also relies on the Urban Water Management Plans (UWMPs or Plans) submitted by its water wholesalers, the San Diego County Water Authority (Water Authority) and the Metropolitan Water District of Southern California (Metropolitan), and includes details on their supplies that contribute to the reliability of supplies for the District.

The District coordinated the preparation of its 2020 Plan with the Water Authority and additional appropriate local agencies, including other water suppliers and public agencies. In accordance with the Act, the District notified cities and the county within its service area 60 days prior to holding a public hearing that it was preparing a 2020 Plan.

Information reported in the 2020 Plan is on a fiscal year (FY) basis (beginning July 1 and ending June 30) and using acre-feet (AF) as its unit of measure.

### **3. SYSTEM DESCRIPTION**

Chapter 3 provides an overview of the District, including climatic, social and demographic characteristics of the service area. Chapter 3 also outlines the District's relationships with water

wholesalers and other local water agencies, and the sources of information used in water supply planning management.

#### **4. SYSTEM WATER USE**

Chapter 4 outlines the District's system water use. The District is considered a potable water supplier only for purposes of the 2020 Plan, does not own and maintain a recycled water distribution system and does not have recycled water demand. Water use in the District's service area falls into two classes of service, municipal and industrial (residential and non-residential) and agriculture. Municipal and industrial uses currently constitute approximately 95 percent of the District's water consumption.

Information on past and current water use by sector, system water losses, water use for lower income households, future water savings, as well as projected water use demands by sector are covered in Chapter 4. The District collaborated with the Water Authority on the baseline demand forecast to determine projected demands used in the 2020 Plan as well as the estimated future water saving quantities.

The Act requires that urban water suppliers consider climate change in their water use and supply projections for their long-term water service reliability assessments. Sections 7.3 and 7.4 address climate variations on projected supplies and demands under climate change conditions, and anticipated regulatory changes.

#### **5. BASELINE AND TARGETS**

In November 2009, the State of California enacted Senate Bill X7-7 (SBX 7-7) that mandated retail urban water agencies within the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020 (referred to as "20 X 2020") and interim savings of 10 percent by 2015. Chapter 5 includes the District's baseline daily per capita water use, 2015 interim urban water use target, 2020 urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data.

#### **6. SYSTEM SUPPLIES**

Chapter 6 contains documentation on the existing and planned water supplies being developed by the District and its wholesale water suppliers, the Water Authority and Metropolitan. Specific documentation verifying Water Authority and Metropolitan supplies can be found in their respective urban water management plans.

The District currently has a several water sources including both purchased (which includes imported and desalinated seawater) and local water supplies. Purchased water supplies are conveyed to the District by Metropolitan and/or the Water Authority and may be derived from sources developed by either agency.

Historically, the Water Authority has relied on imported water supplies purchased from Metropolitan to meet the needs of its 24 member agencies. Metropolitan's supplies come from two primary sources, the State Water Project (SWP) and the Colorado River. After experiencing severe shortages from Metropolitan during the 1987–1992 drought, the Water Authority began aggressively pursuing actions to diversify the region's supply sources, which now includes desalinated seawater. Information about each water supply is contained in this section and was taken from the Water Authority's 2020 Plan.

The District's local water supply is managed as a surface water source from Lake Henshaw and the San Luis Rey River; however, the District augments the natural runoff into Lake Henshaw with groundwater that is pumped into the lake from the Warner Valley Groundwater Basin.

Water quality of District water supplies is also described in Chapter 6.

## **7. WATER SUPPLY RELIABILITY**

Chapter 7 of the 2020 Plan examines the District's water supplies, water uses and the resulting water supply reliability. The Act requires that an urban water supplier include, as part of its plan, an assessment of the reliability of its water supply. The assessment must compare the total projected water use with the expected supply over the next 25 years in five-year increments. The reliability assessment is required for normal, single-dry and multiple-dry water years. This Plan projects reliability for the next 25 years.

Also included in Chapter 7 is the District's Drought Risk Assessment (DRA). The Act requires a DRA, which assesses water supply reliability under a severe drought period lasting for the next five consecutive years from 2021 to 2025. The Act requires that urban water suppliers now include the consideration of climate change in their water use and supply projections for their long-term water service reliability assessments. The DRA in Section 7.4 considers historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions and anticipated regulatory changes.

## **8. WATER SHORTAGE CONTINGENCY PLANNING**

Water shortage contingency planning is a strategic planning process that the District utilizes to prepare for and respond to water shortages. A water shortage, when water supply available is insufficient to meet the normally expected customer water use, may occur due to a number of reasons, such as water supply quality changes, climate change, drought and/or catastrophic events. The District's WSRP, also referred to as a Water Shortage Contingency Plan (WSCP), provides a water supply availability assessment and six structured steps designed to respond to actual conditions. Such planning and preparation will help the District maintain reliable supplies and reduce the impacts of planned and unplanned supply interruptions.

Water Code Section 10632 requires the District to prepare and adopt a standalone WSCP as part of the 2020 Plan. The WSCP is required to plan for a greater than 50% supply shortage. Chapter 8 outlines the District's assessment and planning process. A copy of the District's WSRP, formally adopted by the District Board of Directors on June 16, 2021, is in Appendix D.

## **9. DEMAND MANAGEMENT MEASURES**

Water conservation is an integral part of the District's plan to meet future water demands. Chapter 9 includes information on the District's Demand Management Measures (DMMs) as required by Water Code Section 10631. The District's water conservation program began in 1981, and today relies on a combination of water-use efficiency and conservation program based efforts to meet its conservation goals. These efforts include the active enforcement of mandatory water-use efficiency practices, conservation based water rate structure, residential and commercial device rebates, investments in public education and outreach and an active program to manage distribution system loss.

## **10. PLAN ADOPTION, SUBMITTAL AND IMPLEMENTATION**

Chapter 10 outlines how the District solicited and received public comments on the draft 2020 Plan as well as how the 2020 Plan was formally adopted. In accordance with the Act, the District held a public hearing to adopt the 2020 Plan. The District notified the public, cities and the county within its service area 60 days prior to the public hearing that its Plan was being updated and made copies of the draft 2020 Plan available for public review prior to the public hearing. The District Board of Directors held a public hearing on June 16, 2021 at 9:00 AM and adopted the 2020 Plan as well as the District's WSRP.

## **CHAPTER 1 INTRODUCTION AND OVERVIEW**

### **1.1 CALIFORNIA URBAN WATER MANAGEMENT PLANNING ACT**

The California Water Code requires all urban water suppliers in the state to prepare urban water management plans and update them every five years. These plans satisfy the requirements of the Urban Water Management Planning Act of 1984 (Act), including amendments that have been made to the Act. Sections 10610 through 10657 of the California Water Code detail the information that must be included in these plans, as well as who must file them. Appendix A contains the text of the Act.

Since 2015, a number of changes have been made to the Act. Amendments include requirements for water suppliers to analyze the reliability of its water supplies to meet its water use demands over an extended drought period, prepare a drought risk assessment and specifically address seismic risk and include a lay description of water service reliability. The following is a summary of significant changes in the Act that have occurred since the Vista Irrigation District (District) prepared its 2015 Urban Water Management Plan (2015 Plan):

- Water Code Sections 10631(b) and 10635 modified the dry-year water reliability planning from a “multi-year” timeframe to a “drought lasting at least five years” designation. This statutory change requires an urban water supplier to analyze the reliability of its water supplies to meet its water use over an extended drought period.
- Water Code Sections 10612 and 10635 created a new requirement for drought planning in part because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change. The Drought Risk Assessment (DRA) requires a urban water supplier to assess supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years.
- Water Code Section 10632.5 requires urban water suppliers to address seismic risk to various water system facilities and to have a mitigation plan (see Chapter 8). An important aspect of this provision is the intersection of water supply infrastructure planning with a county or regional hazard mitigation plan.
- Water Code Section 10632 et seq. was modified by the legislature in 2018 to require plans to include a Water Shortage Contingency Plan (WSCP) with specific elements. The WSCP is a document that provides an urban water supplier with an action plan for a drought or catastrophic water supply shortage. Although the new requirements are more prescriptive than previous versions, many of these elements have long been included in WSCPs.

- Water Code Section 10630.5 includes a new statutory requirement for urban water suppliers to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks.
- Water Code Sections 10631.2(a)(1) - (7) provides for an urban water supplier to include specific energy-intensity information, including, but not limited to, an estimate of the amount of energy used to extract or divert water supplies.

In addition, Department of Water Resources (DWR) will consider whether the urban water supplier has submitted an updated plan when determining eligibility for funds made available pursuant to any program administered by the department (Water Code Section 10631.5).

## **1.2 SENATE BILL 7 OF THE SEVENTH EXTRAORDINARY SESSION**

In addition to changes in the Act, the California Legislature passed Senate Bill 7 of the Seventh Extraordinary Session (SBX 7-7) on November 10, 2009. The law sought to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. The measure required urban retail water suppliers to develop urban water use targets to help meet the 20 percent goal by 2020 and an interim goal of 10 percent by 2015.

The bill included reporting requirements in both the 2015 Plan and the 2020 Urban Water Management Plan (2020 Plan). Specifically, urban retail water suppliers must include in their urban water management plans the following information from its target setting process: (1) baseline daily per capita water use; (2) urban water use target; (3) interim urban water use target; and (4) compliance daily per capita water use. An urban retail water supplier may update its 2020 target in its 2015 Plan. Appendix A also contains the text of SBX 7-7.

The District addresses the reporting requirements as well as actions taken to achieve the urban per capita water use target pursuant to SBX 7-7 in Chapter 9, Demand Management Measures, of its 2020 Plan.

## **1.3 SENATE BILLS 610 AND 221**

Water Code Sections 10910 through 10914 and Government Code Sections 65867.5, 66455.3 and 66473.7 (commonly referred to as Senate Bill 610 and Senate Bill 221) amended state law to improve the link between information on water supply availability and certain land use decisions made by cities and counties. Senate Bill (SB) 610 requires that the water purveyor of the public water system prepare a water supply assessment to be included in the environmental documentation of certain large proposed projects. SB 221 requires affirmative written verification from the water purveyor of the public water system that sufficient water supplies are available for certain large residential subdivisions of property prior to approval of a tentative map.



Chapter 6, System Supplies, of the District’s 2020 Plan contains documentation on the existing and planned water supplies being developed by the District and its wholesale water suppliers, San Diego County Water Authority (Water Authority) and Metropolitan Water District of Southern California (Metropolitan). Specific documentation verifying Water Authority and Metropolitan supplies can be found in their respective plans.

#### **1.4 SENATE BILL 606 AND ASSEMBLY BILL 1668**

In 2018, new conservation legislation was signed into law. SB 606 and Assembly Bill (AB) 1668 created a framework that directed DWR and the State Water Resources Control Board (State Board) to develop and adopt long-term water efficiency targets to exceed 20 x 2020 water savings by 2027. Each retail urban water supplier across the state will have a water use target based on efficiency standards for indoor residential water use, landscape irrigation and water loss. These targets are currently being developed and projected to be adopted in 2022. The District will be required to meet demand targets by 2027 or face penalties set by the State Board. The District is collaborating with the Water Authority and other member agencies on the Water Authority’s efforts to work with state agencies to develop targets.

#### **1.5 WATER SUPPLY MANAGEMENT POLICY**

The District’s water supply management policy can best be described by its mission statement; “The mission of the Vista Irrigation District is to manage available resources to meet the present and future water needs of our service area by providing a reliable supply of high quality water in an environmentally and economically responsible manner...” This means implementing water supply management programs, such as conjunctive use and conservation, to maximize the use of available local resources and minimize the District’s need to receive imported water. Below is a discussion of supply management programs used by the District.

##### Conjunctive Use Program

The District first employed the practice of conjunctive use in 1954 when it drilled 38 wells in the Warner Basin to supplement its local surface water supply, Lake Henshaw. Today, the District has 12 production wells that pump from depths of 150 to 350 feet, depending on rainfall and length and extent of pumping operations. The District’s operational procedure is to use its surface water supply when available and conserve its groundwater for dry years when run-off is minimal and surface supplies are reduced.

In dry years, groundwater is pumped from the wellfield into Lake Henshaw and released from the lake as needed. In wet years, the surface water supply is used and pumping operations cease, permitting the basin to recharge and groundwater levels to rise. Thus, the groundwater basin can act as a water bank, allowing deposits in wet years and withdrawals in dry years.

### Groundwater Program

The District does not participate in any groundwater storage (other than natural run-off percolation) or replenishment programs due to the remote location of its surface water supply. However, as described in the above section, the District's management of the Warner Basin ensures that groundwater is available as a supplemental supply source during dry periods.

In September 2014, the Sustainable Groundwater Management Act (SGMA) was signed into law. The law provides new tools and authorities for local agencies to manage groundwater resources within their jurisdiction to achieve a sustainable use of those resources within a 20-year implementation period. While SGMA provides specific mandates only for those groundwater basins deemed by the State to be "medium" or "high" priority groundwater basins, the law encourages the formation of "Groundwater Sustainability Agencies" (GSAs) and the preparation of "Groundwater Sustainability Plans" (GSPs) for all groundwater basins, even those deemed "low" and "very low" priority basins.

DWR has classified the Warner Basin as a "very low" priority basin; however, the Warner Basin represents a significant water source for the District. Therefore, the District is further investigating groundwater resources in the Warner Basin and evaluating various groundwater management strategies.

### Water Conservation Program

The District started its water conservation program in 1981. As drought gripped California in the early 1990's, water purveyors, including the District, increased their water conservation efforts to reduce demand. Over the years, these programs have been successful in managing water demand as populations grew.

The District's population served has increased by 42% from 1990 to 2020 (94,526 to 134,588). However, water received for delivery to its customers has remained relatively constant. Water received for delivery has averaged 20,277 acre-feet per year (AF/YR) over this period which is less than water received for delivery in 1990 (22,530 AF/YR).

The District and other Water Authority member agencies partnered with Metropolitan and/or the Water Authority to offer conservation programs to their customers in the early 1990's. Since that time, the Water Authority and its member agencies have jointly funded programs (public education and financial incentives) that benefit the region as a whole. Examples include residential and commercial, industrial and institutional (CII) voucher/rebate programs, water surveys, professional and homeowner landscape classes, and landscape assistance programs.

### Recycled Water Program

Wastewater collection, treatment and disposal services within the District's boundaries are provided by the Vista Sanitation District, Buena Sanitation District and Vallecitos Water District. The District was the distributor of recycled water produced by the City of Vista (Buena Sanitation District) at the Shadowridge Water Reclamation Plant (SWRP). The District distributed up to 300 acre-feet (AF) per year of recycled water to the Shadowridge Golf Course when the SWRP was operational. The City of Vista suspended operation of the SWRP in December 2003 due to high production costs. The District currently does not supply recycled water in the District service area and has no plans to do so during the time-period covered in the 2020 Plan.

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## **CHAPTER 2 PLAN PREPARATION**

### **2.1 BASIS FOR PREPARING A PLAN**

The Act requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 AF of water annually to prepare and adopt, in accordance with prescribed requirements, an urban water management plan. The Act requires each urban water supplier to prepare a plan that describes and evaluates reasonable and practical water uses, recycled water and conservation activities. These plans must be filed with DWR at least once every five years, or before December 31, in years ending in five and zero.<sup>1</sup>

As defined in the Act, the District is an urban water supplier as it provides water for municipal purposes to more than 3,000 customers and supplies more than 3,000 AF annually. In 2020, the District served 28,879 municipal connections and supplied 16,416 AF of water to its customers.

### **2.2 PLANNING AND COMPLIANCE**

The District's 2020 Plan reports solely on its service area. However, the District does rely on plans submitted by its wholesalers, the Water Authority and Metropolitan, to provide details on imported supplies necessary to meet future demands within its service area. Coordination with said agencies is discussed below and reflected in information contained in the 2020 Plan.

### **2.3 FISCAL YEAR AND UNITS OF MEASURE**

The District is reporting as retailer, on a fiscal year (FY) basis (beginning July 1 and ending June 30) and using AF as its unit of measure.

### **2.4 COORDINATION AND OUTREACH**

#### **2.4.1 Wholesale and Retail Coordination**

To demonstrate the District's water supply reliability over the next 25 years, the 2020 Plan quantifies existing and projected local and imported supplies necessary to meet future retail demands within the District's service area. While the 2020 Plan includes specific information on District's supplies, the plans submitted by its wholesalers, the Water Authority and Metropolitan, will provide details on their respective supplies that contribute to the reliability of supplies for the District.

Reasonable consistency among the plans of water wholesalers, Metropolitan and the Water Authority, and their member agencies' plans is important to identify the projected supplies available to meet

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<sup>1</sup> Water Code Section 10621(f) changed the deadline for water suppliers to submit their 2020 UWMPs that are now due to DWR by July 1, 2021.

regional demands. Over the past year, the District staff has actively participated in member agency work group meetings coordinated by the Water Authority. District staff, along with the other member agencies' personnel, have reviewed and provided input on data that was used to update the Water Authority's 2020 Plan. The District has also been given the opportunity to provide input on the Water Authority's draft 2020 Plan during various stages of its development. The coordination efforts ensured that the region's and member agencies' plans were developed using the most up to date information available, making the documents a solid basis for regional and local water management planning.

## 2.4.2 Coordination with Other Agencies and the Community

The District coordinated the preparation of its 2020 Plan with appropriate local agencies, including other water suppliers and relevant public agencies, to the extent practicable. In accordance with the Act, the District notified cities and the county within its service area 60 days prior to the public hearing that it was preparing a 2020 Plan. The draft 2020 Plan was made available for public review on the District's website and in hardcopy at its office. Copies of the draft 2020 Plan were made available to agencies listed in Table 2-1 as well as the Vista Chamber of Commerce and South Vista Communities (a non-profit community organization). Please refer to Table 2-1 for additional information on the District's coordination process.

TABLE 2-1: COORDINATION WITH OTHER AGENCIES							
Agencies	Participated in UWMP Development	Commented on the Draft	Attended Public Meetings	Contacted for Assistance	Received Copy of the Draft	Sent Notice of Intention to Adopt	Not Involved/ No Information
<i>Metropolitan Water District of Southern California</i>					✓	✓	
<i>San Diego County Water Authority</i>	✓			✓	✓	✓	
<i>City of Vista</i>	✓			✓	✓	✓	
<i>City of Escondido</i>					✓	✓	
<i>City of Oceanside</i>					✓	✓	
<i>City of San Marcos</i>					✓	✓	
<i>County of San Diego</i>					✓	✓	
<i>Encina Wastewater Authority</i>					✓	✓	
<i>State Water Resources Control Board, District 14</i>					✓	✓	
<i>Vista Unified School District</i>					✓	✓	

## **2.5 DWR CHECKLIST, STANDARDIZED TABLES AND SBX 7-7 VERIFICATION FORM**

DWR prepared a checklist of items based on the Act that must be addressed in an agency's plan. This checklist allows an agency to identify where in its plan it has addressed each item. The District has completed the checklist, referencing the sections and page numbers included in the 2020 Plan. The completed checklist along with required standardized tables and SBX 7-7 verification form are included in Appendix C.

## **CHAPTER 3 SYSTEM DESCRIPTION**

### **3.1 FORMATION AND PURPOSE**

The District was formed in 1923 pursuant to Section 20500, et. seq., of the California Water Code. The District, through the Bueno Colorado Municipal Water District, joined the Water Authority and Metropolitan in 1954 to acquire the right to purchase and distribute imported water throughout its service area. On November 23, 1993, the Bueno Colorado Municipal Water District was dissolved and reorganized into the District. The District then became a member agency of the Water Authority.

### **3.2 SERVICE AREA**

The District covers an area of approximately 21,200 acres as shown on Figure 3-1. The service area includes the City of Vista and portions of the cities of Escondido, Oceanside, and San Marcos, and unincorporated areas of San Diego County. The District is responsible for the operation and maintenance of all its water supply and distribution facilities.

All water delivered by the District is filtered and includes water purchased from the Water Authority and local water from the District's Lake Henshaw facilities. The District has major storage and water treatment facilities. Groundwater at Lake Henshaw is used to supplement the local water supply whenever surface runoff is insufficient to produce adequate supplies of local water. Wastewater collection, transmission, treatment and disposal services to developed areas within District boundaries are provided by other agencies not associated with the District.

#### **3.2.1 Relationship to Other Water Agencies**

##### Bueno Colorado Municipal Water District

The Bueno Colorado Municipal Water District was formed in 1954 and generally encompassed those lands that today make up the District and the Vallecitos Water District (formerly the San Marcos County Water District). Bueno Colorado was formed primarily to act as the member agency of Water Authority and to wholesale water to the District and the Vallecitos Water District.

In 1980, the Vallecitos Water District detached from Bueno Colorado Municipal Water District, leaving only the District and several non-coterminous parcels inside the resulting Bueno Colorado Municipal Water District. Bueno Colorado Municipal Water District neither owned nor operated any water facilities. On November 23, 1993, the Bueno Colorado Municipal Water District was officially dissolved and the District took over all of the remaining rights and responsibilities of the agency. All property within Bueno Colorado Municipal Water District was annexed to either the District or an appropriate adjacent water service agency.



### San Diego County Water Authority

The Water Authority was organized on June 9, 1944, under the County Water Authority Act for the express purpose of importing Colorado River water into San Diego County.

Imported water, now a combination of Colorado River Water and State Project Water (SWP), and desalinated seawater produced at the Claude “Bud” Lewis Carlsbad Desalination Plant are sold wholesale to the 24 member agencies of the Water Authority. The member agencies are autonomous, and their city councils or boards of directors set local policies and water pricing structures. Each member agency may appoint at least one representative (based on assessed valuation) to the Water Authority Board of Directors.

The District is one of 24 member agencies of the Water Authority. Member agency status entitles the District to directly purchase water for its needs from the Water Authority to ensure, to the best of its ability, that adequate amounts of water will be available to satisfy future water requirements. A map of the Water Authority, which also shows the position of the District within the Water Authority’s boundaries, is included as Figure 3-2.

Over half of the water distributed by the Water Authority is purchased from Metropolitan and/or conveyed through its infrastructure into Water Authority pipelines just south of the San Diego County/Riverside County boundary. The Water Authority annexed to Metropolitan in 1946 and is now represented on the Metropolitan Board by four directors. The Water Authority is the largest of the 26 member agencies of Metropolitan and currently purchases approximately 6% of the total Metropolitan water supply.

### Metropolitan Water District of Southern California

Metropolitan was created by a vote of the people in 1928 following the passage of the Metropolitan Water District Act by the California Legislature to provide supplemental water for cities and communities on the south coastal plain of California.

Since its formation, Metropolitan has grown to include 26 member agencies (including the Water Authority), as shown on Figure 3-3, and currently covers an area which includes all or portions of Ventura, Los Angeles, Orange, Riverside, San Bernardino and San Diego counties. Acting as a water wholesaler, Metropolitan supplies water to an estimated 19.2 million people within its service area.

FIGURE 3-1: VISTA IRRIGATION DISTRICT SERVICE AREA MAP



**FIGURE 3-2: SAN DIEGO COUNTY WATER AUTHORITY SERVICE AREA MAP**

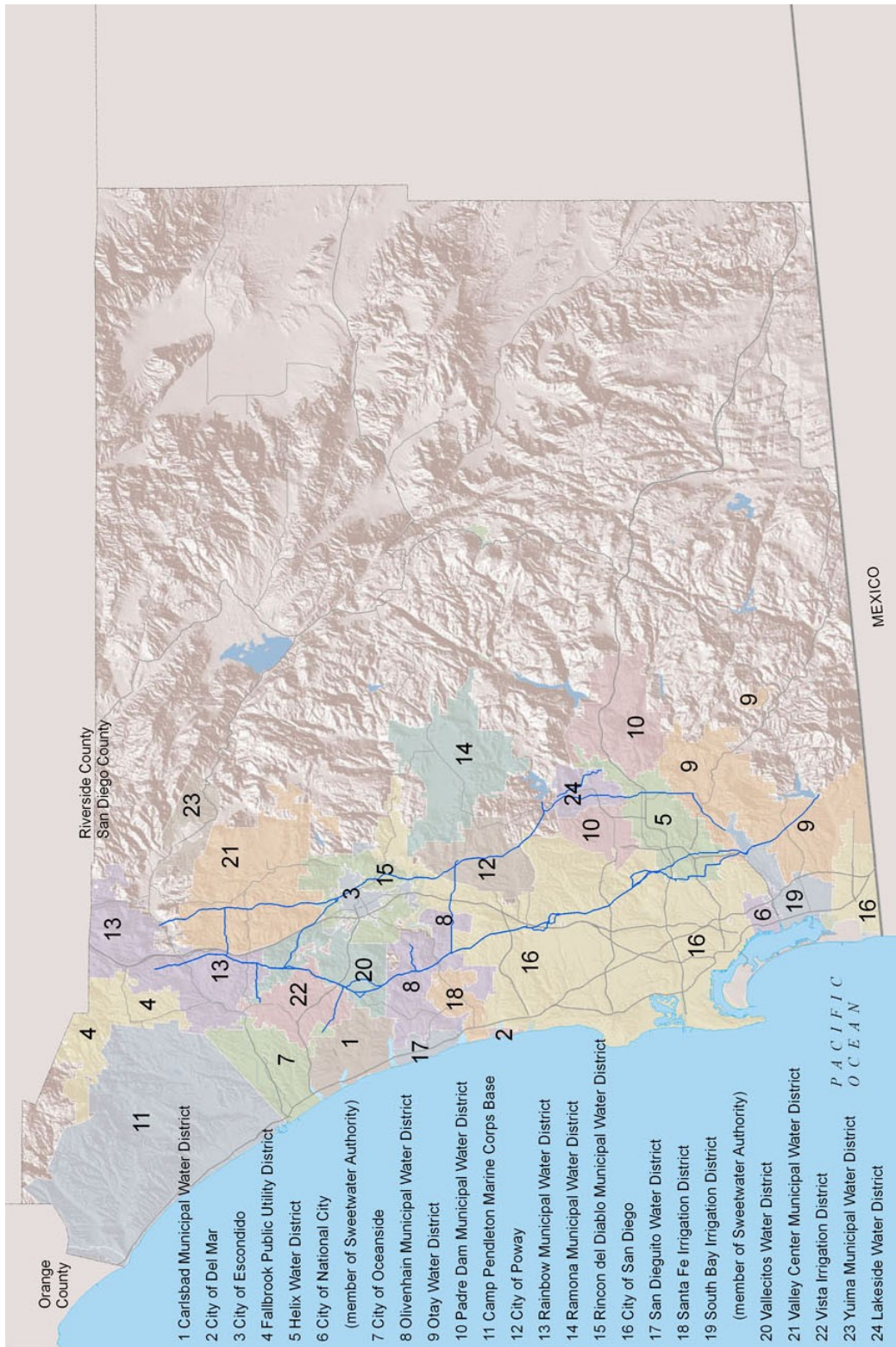
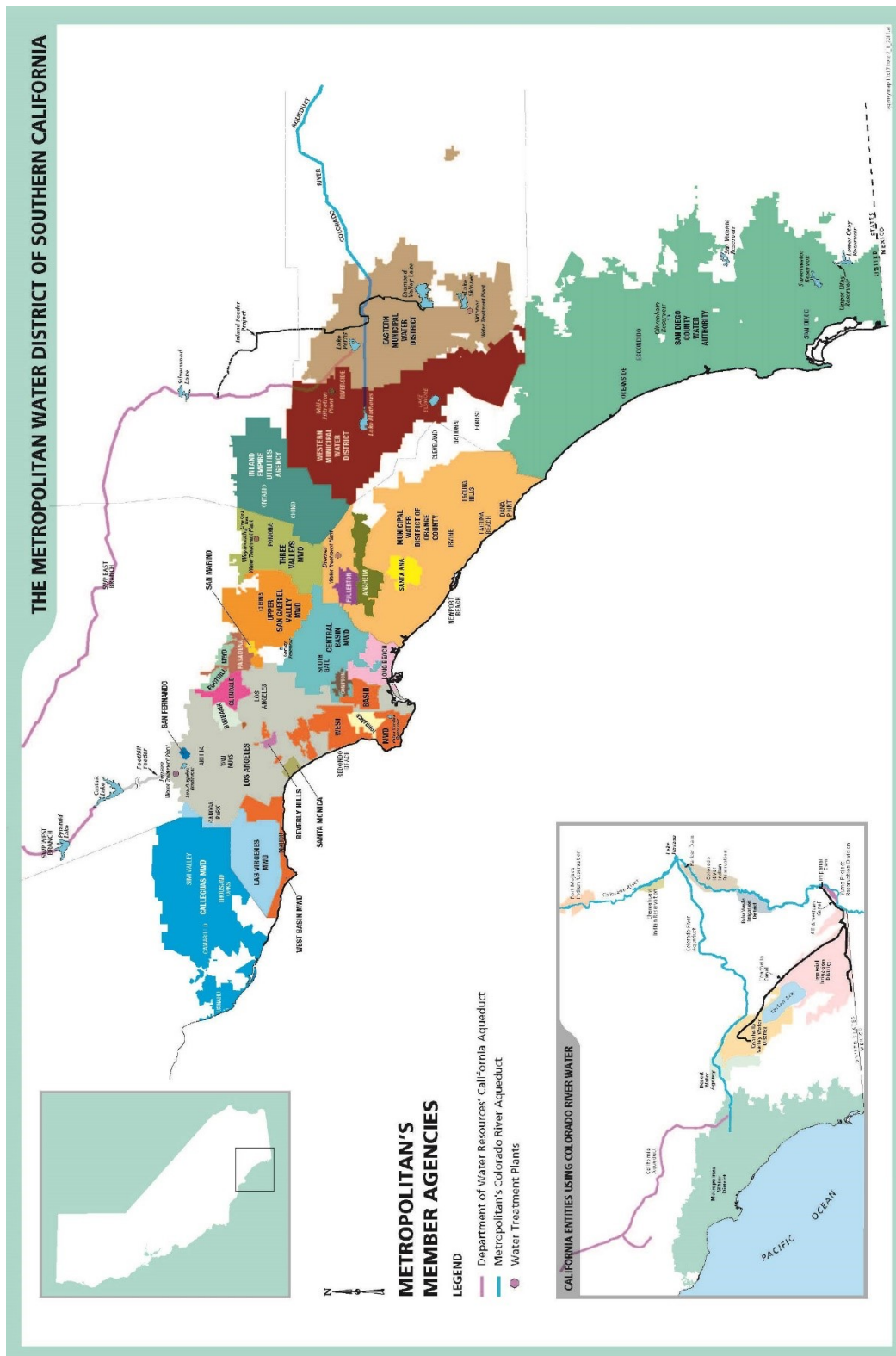


FIGURE 3-3: METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA SERVICE AREA MAP





### 3.2.2 Service Area Climate

Climatic conditions within the service area are characteristically Mediterranean with mild temperatures year round. More than 80% of the region's rainfall occurs in the period between November through March. Average annual rainfall in Vista is approximately 13 inches per year. At Lake Henshaw, which is 25 miles inland from the District's service area and the local source of 30% of the District's water supply, the average annual rainfall is about 25 inches per year. Table 3-2 contains detailed information regarding the climate for the District's service area and local water supply.

TABLE 3-1: CLIMATE						
	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly ETo	2.44	2.54	4.78	5.36	4.60	6.24
Average Rainfall (Inches) Vista	2.76	2.55	2.24	1.05	0.22	0.11
Average Rainfall (Inches) Lake Henshaw	5.23	5.93	4.05	1.71	0.61	0.11
Average Daily Maximum Temperature (Fahrenheit) Vista	67.4	67.8	68.2	70.8	72.9	76.3
Average Daily Minimum Temperature (Fahrenheit) Vista	44.0	45.0	46.3	48.5	53.5	56.6
Average Daily Maximum Temperature (Fahrenheit) Lake Henshaw	63.3	64.4	59.0	67.9	81.1	83.6
Average Daily Minimum Temperature (Fahrenheit) Lake Henshaw	29.8	30.2	36.2	41.7	45.2	47.7

<b>TABLE 3-1: CLIMATE (Continued)</b>							
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly ET <sub>0</sub>	5.95	6.17	5.04	3.74	2.94	2.00	51.80
Average Rainfall (Inches) Vista	0.06	0.07	0.25	0.54	1.40	1.83	13.09
Average Rainfall (Inches) Lake Henshaw	0.18	0.31	0.45	0.95	1.81	3.69	25.05
Average Maximum Temperature (Fahrenheit) Vista	81.3	83.0	82.2	77.9	72.3	67.4	74.0
Average Minimum Temperature (Fahrenheit) Vista	60.3	61.6	60.0	55.0	48.3	44.0	51.9
Average Maximum Temperature (Fahrenheit) Lake Henshaw	92.5	97.0	94.5	85.0	70.1	63.3	76.8
Average Minimum Temperature (Fahrenheit) Lake Henshaw	49.2	55.1	48.6	40.5	33.0	27.5	40.4

Sources: *California Irrigation Management Information System (CIMIS), Station 153  
Western Regional Climate Center, Vista (049378) and Henshaw Dam (043914)*

### 3.2.3 Service Area Population

According to the SANDAG Series 14 Growth Forecast, ver. 17, the region’s population will grow at a steady rate. Based on projections presented in SANDAG’s Series 14 Growth Forecast, ver. 17, the population in the District’s service area is expected to increase from 134,588 in 2020 to 156,613 by 2045, a 16% increase. Table 3-1 shows the population projections for the District from 2020 to 2045.

<b>TABLE 3-2: POPULATION – CURRENT AND PROJECTED</b>						
	2020	2025	2030	2035	2040	2045
Service Area Population	134,588	140,804	145,523	150,215	155,335	156,613

### 3.4.2 Social, Economic, and Demographic Factors

Water Code Section 10631 requires water suppliers to describe the District service area and include other social, economic and demographic factors affecting the District’s water supply management planning. The District generally uses various

<b>TABLE 3-3: DISTRICT DEMOGRAPHICS</b>					
	2025	2030	2035	2040	2045
<b>Population</b>	<b>140,804</b>	<b>145,523</b>	<b>150,215</b>	<b>155,335</b>	<b>156,613</b>
Single Family	69,434	70,508	72,104	73,126	73,284
Multi-Family	59,295	63,094	66,255	70,476	71,545
Mobile Home	9,588	9,434	9,369	9,246	9,297
Group Quarters	2,487	2,487	2,487	2,487	2,487
SF Housing Units	25,865	26,962	28,293	29,154	29,497
MF Housing Units	17,214	18,988	20,769	22,441	22,509
Mobile Home Units	3,294	3,294	3,294	3,294	3,294
<b>Total Non-Ag Employment Counts</b>	<b>46,551</b>	<b>47,587</b>	<b>48,993</b>	<b>50,247</b>	<b>51,184</b>
Construction	5,053	5,118	5,209	5,282	5,351
Manufacturing	9,072	9,138	9,229	9,304	9,385
Wholesale Trade	3,396	3,420	3,446	3,465	3,483
Retail Trade	5,045	5,007	5,154	5,274	5,382
Transportation, Warehousing, Utilities	612	614	618	623	627
Information	289	304	310	320	328
Finance and Real Estate	1,056	1,118	1,177	1,213	1,257
Professional and Business Services	4,145	4,369	4,628	4,882	4,998
Education and Health Services	4,924	5,047	5,201	5,358	5,477
Leisure and Hospitality	3,312	3,479	3,661	3,834	3,973
Other Services	1,135	1,169	1,212	1,241	1,259
Government	5,337	5,499	5,704	5,896	6,031
Self Employed and Domestic	3,175	3,305	3,444	3,555	3,633
Agricultural Employment Counts	2,025	2,031	2,039	2,049	2,049
Median Household Income	\$ 58,785	\$ 59,836	\$ 61,294	\$ 62,130	\$ 63,366

SANDAG, Series 14 Growth Forecast (version 17)

### 3.3 LAND USE WITHIN SERVICE AREA

Water Code Section 10631(a) requires water suppliers to include current and projected land uses within the existing service area affecting the District’s water management planning. Local and regional agencies have adopted planning documents that designate the allowable types of land uses within their jurisdiction. The District’s boundary encompasses property within the City of Vista, the City of San Marcos, and the County of San Diego. Each of these agencies has adopted a General Plan document that is subsequently incorporated into a regional planning database that is periodically updated. The following documents and land use data were used for the District’s Potable Water Master Plan:

- SANDAG Series 13: 2050 Regional Growth Forecast
- City of Vista Downtown Specific Plan, dated September 2015

For more detailed information on projected water use by sector and the land use and planning documents that guided such analysis see Section 4.3.



## **CHAPTER 4 – SYSTEM WATER USE**

Water use in the District’s service area falls into two classes, municipal and industrial (residential and non-residential) and agriculture. Municipal and industrial uses currently constitute approximately 95 percent of the District’s water consumption. The remaining five percent is attributable to agricultural water use, primarily for irrigation of groves and nursery products. This Chapter describes the District’s current and projected water use.

### **4.1 NON-POTABLE VERSUS POTABLE WATER USE**

Potable water uses are served by an urban water supplier’s potable water sources that comply with Title 23 Drinking Water Standards. Non-potable water uses are served by the urban water supplier’s non-potable water sources such as recycled water, remediated groundwater, or even untreated surface of groundwater water supplies.

For purposes of this 2020 Plan, the District is considered a potable water supplier. While the District does have its own local groundwater pumping and surface water supplies, these source waters are purified to a potable level through Title 23 treatment prior to reaching any customers. Therefore, this Chapter only addresses potable water, and any references to “water” are assumed to be potable.

### **4.2 PAST AND CURRENT WATER USE BY SECTOR**

Past and current water use for the District was evaluated by examining the monthly metered water deliveries during each fiscal year. Every metered account is coded according to the water use type that it serves. The total demands are then totaled for each use type. Previous years’ water deliveries can be found in the annual water audits reported to the DWR using the American Water Works Association Free Water Audit Software version 5.0.

The District provided an average of 13.6 million gallons per day of potable water to residential, commercial, industrial, institutional, landscape irrigation and agricultural uses in fiscal year 2020. It should be noted that this average demand figure does not include water consumption for fire lines, construction meters, or other end delivery facilities that are typically unbilled uses such as fire hydrant testing or system flushing.

The District serves a predominantly residential community, where nearly two-thirds of the water use is from single-family, mobile home and multi-family residential. Table 4-1 shows current (FY 2020) demands within the District’s service area by water use type (in units of AF). Each of these use types is further explained in the following subsections.

Table 4-1: Demands for Potable Water - Actual			
Use Type	2020 Actual Use		
	Additional Description	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	7,614
Multi-Family		Drinking Water	2,775
Commercial		Drinking Water	1,103
Industrial		Drinking Water	520
Institutional/Governmental		Drinking Water	276
Landscape		Drinking Water	1,834
Groundwater recharge <sup>1</sup>			-
Saline water intrusion barrier <sup>1</sup>			-
Agricultural irrigation <sup>2</sup>		Drinking Water	743
Sales/Transfers/Exchanges to other agencies <sup>3</sup>			-
Losses	Real and Apparent Losses	Drinking Water	1,121
Other	Mobile Homes	Drinking Water	377
Other	Billed Unmetered	Drinking Water	10
Other	Unbilled Metered	Drinking Water	2
Other	Unbilled Unmetered	Drinking Water	41
<b>TOTAL</b>			<b>16,416</b>
<p>NOTES:</p> <p><sup>1</sup>The District does not currently replenish groundwater supplies or inject water into freshwater aquifers to prevent intrusion of saltwater.</p> <p><sup>2</sup>Agricultural irrigation includes single accounts that provide water for agricultural as well as domestic use. All accounts and deliveries for agricultural-domestic use are assigned to this use type.</p> <p><sup>3</sup>The District does not wholesale water to other agencies. All exchanges of potable water with other agencies are tracked by the District's wholesale agency, the Water Authority, and demands are allocated to each agency accordingly.</p>			

#### 4.2.1 Single Family Residential

The single-family residential use type includes lots with freestanding buildings containing one dwelling unit. A detached secondary dwelling unit may also occupy the lot. Single-family homes account for 46 percent of total annual water deliveries. They tend to have more people living in

the household and more landscaping per home. They also are more likely to have water-saving fixtures and appliances in the home.

#### **4.2.2 Multi-Family Residential**

The multi-family residential use type includes several units contained within one building or several buildings within one complex. Multi-family homes account for only 17 percent of total annual water deliveries despite the fact that they account for over 40 percent of housing stock within the District. This is due to their tendency to house fewer people than single-family units and have less landscaping per capita.

#### **4.2.3 Commercial**

The commercial sector has a complex mix of customers ranging from markets, restaurants and antique stores to multi-story office buildings and regional shopping centers. This land use type accounts for 6.7 percent of total annual water delivered to the District's distribution system.

#### **4.2.4 Industrial**

The industrial sector typically involves the manufacturing and processing of materials, but can also include water users engaged in research and development. In the District's service area, this land use type is primarily centered on light manufacturing and accounts for 3.2 percent of total annual water deliveries.

#### **4.2.5 Institutional and Governmental**

The District has a stable institutional and governmental sector consisting of local government, schools and a public hospital. It also includes a major courthouse, churches and nonprofit research institutions. This land use type accounts for 1.7 percent of total annual water delivered to the District's distribution system.

#### **4.2.6 Landscape**

The District tracks landscape usage through meters dedicated strictly to irrigation for multi-family, commercial, industrial, institutional and governmental properties. These meters do not serve domestic water demands or water for agricultural uses; said demands are served and tracked through separate dedicated meters. This land use type accounts for over 11 percent of total annual water delivered to the District's distribution system.

#### **4.2.7 Groundwater Recharge and Saline Water Intrusion Barriers**

Groundwater recharge includes the managed and intentional replenishment of natural groundwater supplies using man-made conveyances such as infiltration basins or injection wells.

Saline water intrusion barriers include the injection of water into a freshwater aquifer to prevent the intrusion of saltwater. As noted in Table 4-1, the District does not currently replenish groundwater supplies or inject water into freshwater aquifers to prevent intrusion of saltwater, and therefore no demand is assigned to these use types.

#### **4.2.8 Agricultural Use**

Climatic conditions within the District's service area, which are traditionally Mediterranean with mild temperatures year round, provide an ideal climate to grow a number of crops. The primary crops grown are avocados, citrus and nursery products. Some livestock and local fresh market crops are produced within the District's service area. Agriculture uses currently account for 4.5 percent of total annual water deliveries. Note that this percentage also includes combined agricultural and domestic meter accounts. However, as shown in Table 4-2, agricultural water demand is projected to gradually decrease over the next twenty-five years due to urbanization and better separation between agricultural and domestic uses.

#### **4.2.9 Sales, Transfers and Exchanges to Other Agencies**

The District does not sell water to other agencies. The District maintains distribution inter-ties with its neighboring water agencies. During local water supply interruptions, whether planned due to maintenance or unplanned due to an emergency, the agencies cooperatively transfer water between them for distribution to affected customers. As noted in Table 4-1, all exchanges of potable water with other agencies are tracked by the District's wholesale agency, the Water Authority, and demands are allocated to each agency accordingly.

#### **4.2.10 Distribution System Losses**

Distribution system losses include real and apparent losses that are reported to DWR annually using the American Water Works Association Free Water Audit Software version 5.0. Real losses can include pipeline breaks and leaks, losses due to vandalism, and losses due to accidents (i.e. car crashes involving fire hydrants) where the District is not able to recoup damages. Apparent losses can include unauthorized usages (i.e. water theft), customer metering inaccuracies and systematic data handling errors. In 2020, system and billing losses account for approximately 6.8 percent of the total annual water delivered to its distribution system.

#### **4.2.11 Mobile Homes**

The mobile home land use type includes those developments that contain manufactured living units. They comprise approximately 7 percent of the housing stock within the District service area. They tend to have minimal landscaping and thus account for only 2.3 percent of total annual water deliveries.

#### **4.2.12 Billed Unmetered, Unbilled Metered and Unbilled Unmetered**

Billed unmetered uses can include reimbursement from damage claims (i.e. car crashes involving fire hydrants). Unbilled metered usage can include the District's own water usage at its headquarters or facilities, and fire department usage for training or hydrant flushing. Unbilled unmetered uses can include District reservoir washout activities where water volume use is estimated. Overall, these types of authorized consumption account for a very small fraction (approximately 0.3 percent) of the total annual water delivered to the District's distribution system.

#### **4.3 PROJECTED WATER USE BY SECTOR**

Table 4-2 shows projected demands per use type for the District's service area through 2045. The projected water use is based on and is consistent with the Water Authority's demand forecast for the District. As stated in the Water Authority's 2020 Plan, SANDAG's Series 14 Regional Growth Forecast was used to forecast water demands for years 2025, 2030, 2035, 2040 and 2045, ensuring there is a link between local jurisdictions' general plans and projected water demands. More specifically:

- The District's 2020 Plan utilized SANDAG Series 14 population projections to estimate 5-year single-family, multi-family and mobile home demand increases.
- The District's 2020 Plan utilized SANDAG Series 14 non-agricultural employment counts to estimate 5-year commercial, industrial, institutional and governmental demand increases.
- Landscape irrigation includes both residential and Commercial, Industrial and Institutional (CII) uses; therefore, the District's 2020 Plan utilized an average of the SANDAG Series 14 population projections and total non-agricultural employment counts to estimate these 5-year increases.
- The District's 2020 Plan utilized SANDAG Series 14 total agricultural demand forecast to estimate 5-year agricultural demand increases.
- For apparent and real loss estimates, the District expects to meet the proposed water loss performance standard established for the District by the State Board.

Table 4-2: Use for Potable Water - Projected						
Use Type	Additional Description	Projected Water Use				
		2025	2030	2035	2040	2045
Single Family		8,840	9,284	9,600	9,858	10,083
Multi-Family		3,230	3,558	3,777	4,069	4,215
Commercial		1,283	1,360	1,425	1,490	1,555
Industrial		606	630	644	658	678
Institutional/Governmental		321	341	357	374	390
Landscape		2,135	2,275	2,371	2,474	2,558
Groundwater recharge <sup>1</sup>		N/A	N/A	N/A	N/A	N/A
Saline water intrusion barrier <sup>1</sup>		N/A	N/A	N/A	N/A	N/A
Agricultural irrigation		435	412	390	387	385
Sales/Transfers/Exchanges <sup>2</sup>		N/A	N/A	N/A	N/A	N/A
Losses	Real and Apparent Losses	1,220	1,260	1,300	1,345	1,355
Other Potable	Mobile Homes	437	445	446	446	457
Other Non-Potable		N/A	N/A	N/A	N/A	N/A
Other	Billed Unmetered	10	10	10	10	10
Other	Unbilled Metered	2	2	2	2	2
Other	Unbilled Unmetered	40	40	40	40	40
<b>TOTAL</b>		<b>18,559</b>	<b>19,617</b>	<b>20,362</b>	<b>21,153</b>	<b>21,728</b>
<p>NOTES:</p> <p><sup>1</sup>The District does not currently replenish groundwater supplies or inject water into freshwater aquifers to prevent intrusion of saltwater.</p> <p><sup>2</sup>The District does not wholesale water to other agencies. All exchanges of potable water with other agencies are tracked by the District's wholesale agency, the Water Authority, and demands are allocated to each agency accordingly.</p>						

As discussed in Section 4.1, the District is considered a potable water supplier only. The District does not own and maintain a recycled water distribution system and does not have recycled water demand. Therefore, gross water use is completely potable and is illustrated in Table 4-3.

Table 4-3: Total Gross Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045
Potable Water, Raw, Other Non-potable <i>From Tables 4-1 and 4-2</i>	16,416	18,559	19,617	20,362	21,153	21,728
Recycled Water Demand <i>From Table 6-4</i>	0	0	0	0	0	0
<b>TOTAL WATER USE</b>	16,416	18,559	19,617	20,362	21,153	21,728

#### 4.4 DISTRIBUTION SYSTEMS WATER LOSSES

Section 10631(d)(3) of the California Water Code requires that urban water suppliers report their distribution system loss for each of the five years preceding their UWMP update. Table 4-4 shows unaccounted for real and apparent water losses for the 12-month water loss reporting periods over the previous five years.

As discussed in Section 4.2.10, real losses can include pipeline breaks and leaks, losses due to vandalism, and losses due to accidents (i.e. car crashes involving fire hydrants) where the District is not able to recoup damages. Apparent losses can include unauthorized usages (i.e. water theft), customer metering inaccuracies and systematic data handling errors.

Table 4-4: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date	Volume of Water Loss*
07/2015	772
07/2016	1,824
07/2017	1,024
07/2018	718
07/2019	1,121
<i>* Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.</i>	

#### 4.5 WATER USE FOR LOWER INCOME HOUSEHOLDS

As required by the Act, the District has included water use projections for low-income households as defined by the Act. The District is a regional provider of water, servicing four cities and unincorporated areas of the County of San Diego. Therefore, SANDAG’s regional housing needs assessment was used to calculate projected low-income household water needs based upon the area served by the District in each jurisdiction. Using SANDAG’s projections, the District’s projected low-income housing units needed is 992 units by 2020. The estimated residential per unit water demand is 0.24\* AF/unit/YR and, 238 AF/YR is needed to supply these projected lower income housing units. Water demands for these units are included in future water demand projections for single and multi-family homes listed in Table 4-2.

*\* In FY 2020, there were 42,970 housing units in the District’s service territory. The total water demand of these units was 10,371 AF (SF+MF+MH)*

#### 4.6 ESTIMATED FUTURE WATER SAVINGS

The Act requires urban water suppliers to account for water savings estimates in their projected water demands, where available. Based on DWR’s 2020 Plan Guidebook, the Water Authority developed estimated water savings (passive and active, which are described in more detail below) for each of its member agencies, including the District, using the Alliance for Water Efficiency Water Conservation Tracking Tool. The District has incorporated estimated water savings in their projected future demands shown in Table 4-2. The District’s Water Supply Response Program details efficient water use practices in order to further the conservation of water. Table 4-5 confirms the following:

1. That future water savings are included in demand projections for the District’s service area through 2045, and
2. That lower income residential demands are included in the future demand projections given in Table 4-2.

Table 4-5: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections?	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Section 4.6
Are Lower Income Residential Demands Included In Projections?	Yes



The District collaborated with the Water Authority on the baseline demand forecast utilized in the 2020 Plan as well as the estimated future water saving quantities (resulting from implementation of the District’s Water Supply Response Program) used to generate the projected water uses discussed in Section 4.3. Table 4-6 shows estimated future water savings from the baseline demand forecast. Subtracting the water savings from the baseline demands yields the net total water demands utilized in Table 4-2.

<b>Table 4-6: Estimated Future Water Savings On Baseline Demands</b>					
	2025	2030	2035	2040	2045
Baseline Demand Forecast	20,958	21,715	22,529	23,379	23,864
Estimated Future Water Savings	2,399	2,098	2,167	2,226	2,136
<b>Net Total Water Demands</b>	<b>18,559</b>	<b>19,617</b>	<b>20,362</b>	<b>21,153</b>	<b>21,728</b>

#### 4.7 CLIMATE CHANGE CONSIDERATIONS

The Act requires that urban water suppliers consider climate change in their water use and supply projections for their long-term water service reliability assessments. The Drought Risk Assessment in Section 7.4 considers historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, and anticipated regulatory changes.

Water demand can be highly variable with climate. Drought and higher temperatures can lead to increases in water use, while wet periods and colder temperatures can lead to decreased water use. For example, FY 2018 was one of the driest and warmest years on record in the County. Rainfall totaled 3.40 inches at Lindbergh Field, which represents only 33 percent of average annual rainfall for the area. The District’s authorized water consumption for FY 2018 was 16,995 AF. By comparison, the following fiscal years were slightly wetter than normal. Rainfall totaled 12.84 inches and 13.72 inches at Lindbergh Field in FYs 2019 and 2020, respectively, which represent 124 percent and 133 percent of average annual rainfall for the area. The District’s authorized water consumption was 15,331 AF for FY 2019 and 15,277 AF for FY 2020. These demands are approximately 10 percent less than FY 2018 demands.

Section 7.3 details single and multiple dry year assessments on the District’s projected water demands due to climate variation. In summary, the District projects that hot and dry weather (absent mandatory water use restrictions) may generate 10 percent greater demands than during normal years, as demonstrated by the impacts on demands during FY 2018 discussed above.

The District also anticipates that regulatory changes will have an impact on water demands. The State Board is in the process of establishing water-use efficiency regulations that will establish water use targets for urban water suppliers. In developing its regulations, the State Board has drafted real water loss performance standards for all suppliers. As of December 1, 2020, the District's proposed standard is 23.6 gallons per connection per day. The District expects to meet the proposed water loss performance standard established by the State Board. As such, the projected real and apparent water loss projections shown in Table 4-2 assume compliance with this standard.

## CHAPTER 5 BASELINE AND TARGETS

### 5.1 BASELINE DAILY PER CAPITA WATER USE

SBX 7-7 was enacted to require retail urban water agencies within the state to achieve a 20 percent reduction in urban per capita water use by December 31, 2020 (referred to as “20 X 2020”) and interim savings of ten percent by 2015. As required by Water Code Section 10608.2, this subsection includes the District’s baseline daily per capita water use, urban water use target, interim and final urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates, including references to supporting data. The District’s baseline and target daily per capita water use figures were developed individually, and in accordance with Methodologies for Calculating Baseline and Compliance Per Capita Water Use developed by DWR. A copy of the Methodologies for Calculating Baseline and Compliance Per Capita Water Use is included in Appendix A.

#### 5.1.1 Ten-Year Baseline Period

Since the District did not deliver any recycled water in 2008, its baseline per capita water use is based on gross average water use over a continuous 10-year period beginning June 1, 1995 and ending June 30, 2005. Water Authority invoices and Escondido-Vista WTP monthly reports for FYs 1996 through 2005 were used to derive total water deliveries. The population estimates for FYs 1996 through 2005 are based on data from SANDAG.

Table 5-1 shows the District’s base period ranges. Table 5-2 shows the calculations of the District’s baseline daily per capita water use figure. The baseline daily per capita water use for the District is 175 gallons per capita per day (GPCD).

TABLE 5-1: BASE PERIOD RANGES			
Base	Parameter	Value	Units
	2008 Water Deliveries	23,525	AF
	2008 Total Volume of Recycled Water Delivered	0	AF
10- to 15-Year Base Period	2008 Recycled Water as a Percent of Total Deliveries	0	Percent
	Number of Years in Base Period	10	Years
	Year Beginning Base Period Range	1996	
	Year Ending Base Period Range	2005	
	Number of Years in Base Period	5	Years
5-year Base Period	Year Beginning Base Period Range	2004	
	Year Ending Base Period Range	2008	

<b>TABLE 5-2: BASELINE DAILY PER CAPITA WATER USE – 10-YEAR GPCD</b>				
Sequence Year	Year	Gross Water Use (AF)	Population	GPCD
1	1996	21,629	105,399	183
2	1997	21,767	107,415	181
3	1998	19,357	109,470	158
4	1999	21,477	111,564	172
5	2000	23,927	113,704	188
6	2001	22,220	117,535	169
7	2002	23,783	118,568	179
8	2003	22,770	119,750	170
9	2004	24,779	120,258	184
10	2005	22,398	120,053	167
<b>10-Year GPCD</b>				<b>175</b>

### 5.1.2 Five-Year Baseline Period

As required by state law, the District is required to confirm that its target is no less than five percent of the baseline daily per capita water use. To confirm its compliance with this requirement, the District must calculate its gross average water use, reported in GPCD, over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

The District’s five-year baseline per capita water use is based on gross average water use over a continuous five-year period beginning June 1, 2003 and ending June 30, 2008. The data sources referenced in the calculation of the 10-year baseline per capita water use (Water Authority invoices, Escondido-Vista WTP monthly reports and SANDAG population estimates) were also used to calculate the 5-year baseline per capita water use. Table 5-3 shows five-year baseline period.

<b>TABLE 5-3: BASELINE DAILY PER CAPITA WATER USE – 5-YEAR GPCD</b>				
Sequence Year	Year	Gross Water Use (AF)	Population	GPCD
1	2004	24,779	120,258	184
2	2005	22,398	120,053	167
3	2006	23,349	120,207	173
4	2007	24,030	120,443	178
5	2008	23,525	121,491	173
<b>5-Year GPCD</b>				<b>175</b>
<b>95% of 5-Year GPCD</b>				<b>166</b>

### 5.1.3 Urban Water Use Target

According to SBX 7-7, urban water suppliers must set a year 2020 “urban water use target” and a year 2015 “interim water use target” using one of four methods: (1) 80 Percent of Baseline Water Use; (2) Sum of Performance Standards Applied to Water Use Categories; (3) 95 Percent of the State Hydrologic Region Target (142 GPCD for the South Coast Region); or (4) Savings by Water Use Type. Each of the methods is described below.

Method 1 – 80 Percent of Baseline Water Use: This method sets a target at 80 percent of the 10-year baseline. This value must be less than 95 percent of the 5-year baseline.

Method 2 – Performance Standards Applied to Water Use Categories: Method 2 calculates a target by summing performance standards applied to indoor residential, landscaped, and CII water use. The indoor residential target is set at 55 GPCD. The CII target is a 10 percent reduction in use. The landscaped water use target is set using standards of the Model Ordinance as set forth in Chapter 2.7 of Division 2 of Title 23 of the State of California Code of Regulations. This requires estimating the landscaped area for each parcel in the service area. This can be accomplished with field measurements, landscape plans, remote sensing, aerial or satellite imaging, or, for parcels less than one-half acre in size, a sampling of a group of similar parcels can be applied to the group.

Method 3 - 95 Percent of the State Hydrologic Region Target: These regional targets are contained in DWR’s “20x2020 Water Conservation Plan” dated February 2010. DWR divides the state into ten hydrologic regions and San Diego County falls within Region 4, “South Coast.” DWR calculated a 2005 baseline for the region of 180 GPCD; with a 20 percent reduction, the target would be 144 GPCD. DWR’s statewide target was calculated at 154 GPCD. Considering the region’s variance from the statewide target, and extra savings accumulated from high 29 performing regions (Regions 1-3), DWR assigned Region 4 a target of 149 GPCD, a 5 GPCD reduction from the state target of 154 GPCD. Based on Method 3, the Region 4 target is then ninety-five percent of the 149, or 142 GPCD.

Method 4 – Savings by Water Use Type: In Urban Water Use Target Method 4 (hereinafter, “Method 4”), DWR breaks the potential savings into four categories, 1) Indoor Residential, 2) Metering, 3) CII, and 4) Landscaping plus Water Loss. Indoor residential savings can be calculated by tabulating the number of water-efficient toilets, showerheads, and washers that have been installed in the supplier’s service area, estimating the percent saturation, and the water use savings. As an alternative, the indoor savings can be set at a default value of 15 GPCD. Metering savings address those agencies that have unmetered connections, which generally does not apply in the Water Authority’s service area. A reduction of 10 percent is applied to CII use and 20 percent is applied to landscape and water loss. Because landscaping water use is difficult to estimate, DWR calculates a combined landscape and water loss value as follows:

The Baseline is: 70 GPCD (indoor per capita water use) - CII water use in GPCD= Landscape/Water Loss. The target is then: Baseline - Indoor Residential Savings - Metering Savings - CII Reduction - Landscape/Water Loss Reduction = Target. This target must be less than the 5-year baseline value.

The District selected Method 3 as its reporting method for complying with SBX 7-7. Method 3 was adopted as part of the public hearing process for the District’s draft 2020 Plan. Method 3 was utilized for purposes of determining the District’s interim and urban water use targets.

Since the SBX 7-7 target (142 GPCD) is less than 95% of the 5-year GPCD (166 GPCD), no adjustment to the SBX 7-7 target is required.

#### 5.1.4 Interim Water Use Target

The District’s interim water use target for 2015 was 158 GPCD. Table 5-4 shows the District’s base period ranges as well as the 2015 Interim Target and Confirmed 2020 Target.

TABLE 5-4: BASELINES AND TARGETS SUMMARY					
Baseline Period	Start Year	End Year	Average GPCD	2015 Interim Target	2020 Confirmed Target
10 Year	1996	2005	175	158	142
5 Year	2004	2008	175	-	-

#### 5.2 2020 COMPLIANCE DAILY PER CAPITA WATER USE

The District’s actual GPCD for 2020 is 109, which is 33 GPCD under its 2020 Confirmed Target. As shown in Table 5-5, the District achieved its targeted reduction for 2020 and is in compliance with SBX 7-7.

TABLE 5-5: 2020 COMPLIANCE			
Year	Gross Water Use (AF)	Population	GPCD
2020	16,416	134,588	109
	<b>2020 Target</b>		<b>142</b>

#### 5.3 WATER USE REDUCTION PLAN

In an effort to meet its water use reduction goals, the District plans to implement the water conservation programs and policies presented in Chapter 9, Demand Management Measures.

#### **5.4 POTENTIAL ECONOMIC IMPACTS**

The District's current urban per capita water use is below its SBX 7-7 target for 2020. The District will continue to implement the water conservation programs and policies described in Chapter 9, Demand Management Measures, in anticipation of the future water use objectives associated with AB 1668 and SB 606. It is unknown if new water conservation program expenses will be needed to meet the requirements of AB 1668 and SB 606

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## **CHAPTER 6 – SYSTEM SUPPLIES**

The District currently has several water sources including both purchased and local water supplies. Purchased water supplies are conveyed to the District by Metropolitan and/or the Water Authority and may be derived from sources developed by either of those two agencies or through the auspices of the United States Department of the Interior, Bureau of Reclamation (Reclamation). Local water supply is managed as a surface water source from Lake Henshaw and the San Luis Rey River; the District augments the natural runoff into Lake Henshaw with groundwater that is pumped into the lake from the Warner Valley Groundwater Basin. Future increases in District water demands will be supplied from the Water Authority. Over half of the Water Authority’s water supply is either purchased from and/or conveyed by Metropolitan. Due to the District’s reliance on these two agencies, this Plan includes information on the current and planned water supplies of Metropolitan and Water Authority.

The District is a public agency member of the Water Authority. The Water Authority is a public agency member of Metropolitan. The statutory relationships between the Water Authority and its member agencies, and Metropolitan and its member agencies, respectively, establish the scope of the District’s entitlements to water from those sources. The water furnished to the District by Reclamation is provided under the authority of the San Luis Rey Indian Water Rights Settlement Act (Settlement Act, Public Law 100-675, as amended), and the various agreements pertaining to the disposition and conveyance of that water.

### **6.1 WATER SUPPLY ANALYSIS OVERVIEW**

Historically, the Water Authority has relied on imported water supplies purchased from Metropolitan to meet the needs of its 24 member agencies. Metropolitan’s supplies come from two primary sources, the SWP and the Colorado River. After experiencing severe shortages from Metropolitan during the 1987–1992 drought, the Water Authority began aggressively pursuing actions to diversify the region’s supply sources. Information about each water supply is contained in this section and was taken from the Water Authority’s 2020 Plan. Detailed documentation verifying the Water Authority and Metropolitan’s water supplies can be found each agency’s 2020 Plan.

#### **6.1.1 Imported Water Supplies from Metropolitan**

##### Colorado River

Metropolitan was formed to import water from the Colorado River. During the 1930s, Metropolitan built the Colorado River Aqueduct (CRA) to convey this water. Metropolitan’s member agencies received the first deliveries in 1941. The aqueduct is more than 240 miles long, beginning at Lake Havasu on the Arizona/California border and ending at Lake Mathews in Riverside County. The aqueduct has capacity to deliver up to 1.3 million acre-feet per year (MAF/YR).

Before 1964, Metropolitan had a firm annual allocation of 1.212 million acre-feet (MAF) of Colorado River water through contracts with the U.S. Department of the Interior, which was enough to keep Metropolitan's aqueduct full. However, as a result of the U.S. Supreme Court decision in *Arizona vs. California*, Metropolitan's firm supply fell to 550,000 AF. Due to growth in demand from other states and drought conditions, since 2003, Metropolitan's deliveries have been limited to the base apportionment plus water resulting from unused apportionment water by other Colorado River water users, transfer programs resulting from conservation with senior water right holders, storage volumes from Lake Mead, and interstate water banking. The execution of the 2003 Quantification Settlement Agreement (QSA) set up mechanisms for California Colorado water users to manage demands within its apportionment and to conserve and transfer water between willing buyers and sellers.

Water availability from the Colorado River is governed by a system of priorities and water rights that have been established over many years. The Colorado River Lower Basin states (California, Arizona, and Nevada) have an annual apportionment of 7.5 MAF of water divided as follows: (1) California, 4.4 MAF; (2) Arizona, 2.8 MAF; and (3) Nevada, 300,000 AF. The 1931 Seven Party Agreement established California's priorities for water with the first three priorities, totaling 3.85 MAF, going to agricultural agencies and the fourth priority (550,000 AF) going to Metropolitan. Additional water must come from surplus water from unused allocations within California or from other Lower Basin states.

In 2019, Drought Contingency Plans (DCP) were executed for the Upper and Lower Colorado River Basins to reduce the risk of Lake Powell and Lake Mead declining below critical elevations through 2026. The Lower Basin Drought Contingency Plan (Lower Basin DCP; Reclamation, 2019) requires California, Arizona, and Nevada to store defined volumes of water in Lake Mead at specified lake levels. California would begin making contributions if Lake Mead's elevation drops below 1,045 feet. Depending on the lake's elevation, California's Lower Basin DCP contributions range from 200,000 to 350,000 AFY, with Metropolitan responsible for 93%. As of August 2020, the 5-year projections of the likelihood of shortage and Lower Basin DCP triggers indicate it is unlikely Lake Mead will reach a level that requires contributions from California through 2025. Through the DCP, Metropolitan has the ability to deliver water stored as Intentionally Created Surplus (ICS) at Lake Mead elevations below 1,075 feet. As of January 2021, Metropolitan had approximately 1.3 MAF of ICS water stored in Lake Mead. The Lower Basin DCP expires in 2026. New operating agreements will be negotiated in the coming years that will govern shortage criteria and cutbacks beyond 2026.

Metropolitan currently has a firm supply from of 550,000 AF. Faced with continuing dry hydrologic challenges and increasing demands, Metropolitan has relied on its land fallowing, storage and exchange programs on the river to increase its Colorado River supplies. With the 2003 QSA and related agreements among the Imperial Irrigation District (IID), the Coachella Valley Water District (CVWD), State of California, Department of Interior, Metropolitan and the Water Authority in place, a plan was formalized on how California will implement water transfers and supply programs that allow California to live within the state's 4.4 MAF basic annual apportionment of Colorado River water. Since then, Metropolitan has relied on cooperative

transfer programs and storage programs to increase its Colorado River water deliveries beyond its firm supply.

### State Water Project

Metropolitan's other water source, the SWP, is owned by the State of California and operated by DWR. The project stretches more than 600 miles, from Lake Oroville in the north to Lake Perris in the south. Water is stored at Lake Oroville and released when needed into the Feather River, which flows into the Sacramento River and to the Sacramento-San Joaquin River Delta. In the north Delta, water is pumped into the North Bay Aqueduct for delivery to Napa and Solano counties. In the south Delta, water is diverted into the SWP's Banks Pumping Plant, where it is lifted into the 444 mile-long California Aqueduct. Some of this water flows into the South Bay Aqueduct to serve areas in Alameda and Santa Clara counties. The remainder flows southward to cities and farms in central and southern California. In the winter, when demands are lower, water is stored at the San Luis Reservoir located south of the Delta.

The reliability of SWP supplies is limited by both the level of SWP supply development and pumping restrictions due to state and federal environmental regulations and hydrology. When approved by the voters in the 1960s, the SWP was planned to deliver 4.2 MAF to 32 contracting agencies. Subsequent contract amendments reduced total contracted deliveries to 4.13 MAF and the number of contracting agencies to 29. Metropolitan's contracted entitlement is 1,911,500 AF. Metropolitan's original long-term water supply contract for 2,011,500 AF was amended as part of the 2003 QSA. Effective in 2005, the amendment resulted in an exchange agreement among CVWD, Desert Water Agency (DWA), and Metropolitan. The exchange agreement provides for the transfer of 88,100 AF of Metropolitan's Table A amounts to CVWD and 11,900 AF of Metropolitan's Table A amounts to DWA.

When voters approved construction of the SWP in 1960, state planners did not expect the full amount of contracted water to be needed for at least the first 20 years of the project. As a result, the planners anticipated that the facilities needed to produce the full contracted amount would be constructed over time as demands on the system increased. However, decisions about these additional facilities were repeatedly deferred as public attitudes and environmental regulations changed and costs increased. New state and federal environmental laws put some potential water supply sources off limits to development. More stringent water quality standards adopted by the State Board to protect the San Francisco Bay/Sacramento-San Joaquin River Delta have reduced the amount of water available for diversion. Environmental challenges to the SWP operations also resulted in the issuance of new biological opinions, which led to pumping restrictions that further reduced SWP exports. At the same time, California's population and water demand continued to grow.

Metropolitan's SSWP supplies are projected using DWR's *2019 State Water Project Delivery Capability Report* (DWR, 2019a). This report presents current DWR estimates of the amount of water deliveries under current 2019 conditions and under projected conditions over the next 20

years. In the *2019 State Water Project Delivery Capability Report*, delivery estimates for the SWP under 2019 conditions, with existing conveyance and low outflow, as a percentage of Table A amounts for Metropolitan, are 7% under single dry-year conditions (equivalent to 134,000 AF) and 58% under long-term normal conditions (equivalent to 1,100,000 AF).

To address supply needs under dry, below-normal conditions caused by dry hydrologic conditions and regulatory restrictions, Metropolitan developed additional supplies from Central Valley storage and transfer programs. From 2025 through 2045, Metropolitan’s final draft 2020 Plan estimates that the SWP’s current programs, which include transfers and storage withdrawals, will be capable of serving to Metropolitan between:

- 1,831,000 AF and 1,838,000 AF in a normal year;
- 660,000 AF and 675,000 AF in a single dry-year; and
- 761,000 AF and 766,000 AF under multiple dry-year hydrology.

In developing its supply capabilities, Metropolitan does not assume the implementation of the Delta Conveyance Project. Metropolitan also assumed near-term actions that would provide annual SWP Table A supplies of 1,095,000 AF in normal years.

#### Storage Management Programs

Metropolitan relies on water in storage to augment imported supplies. It manages its storage portfolio by storing water during excess supply years to meet the region's needs when Metropolitan’s imported water supplies are insufficient to meet annual needs, or if imported water facilities are damaged during a seismic event or other emergency. The amount of water in Metropolitan's storage influences the likelihood that Metropolitan will have adequate supplies to meet projected demands, as well as whether and to what degree it will implement its Water Supply Allocation Plan (WSAP). The principles that guide the management of supply and storage are based on the framework established in Metropolitan’s Water Surplus and Drought Management Plan (Metropolitan, 1999). Currently, Metropolitan has several storage programs in operation that provide flexibility to meet delivery requirements. The storage accounts include groundwater and surface storage programs and facilities within and outside of Metropolitan's service area. Metropolitan's dry-year storage portfolio has the potential to store more than 5 MAF. Metropolitan’s dry-year storage was at its highest level—3.2 MAF—at the end of calendar year 2020. Although Metropolitan currently employs its WSAP to allocate supplies, the imposition of the WSAP does not supersede a member agency’s preferential right to Metropolitan water. A member agency can always choose to exercise its preferential right to Metropolitan water rather than follow the WSAP allocation.

From 2025 through 2045, Metropolitan's final draft 2020 Plan indicates that the in-region storage supplies and programs target for “current programs” will be capable of producing between 875,000 AF and 880,000 AF in a normal year; 875,000 AF and 880,000 AF in a single dry-year; and 192,000 AF and 199,000 AF under multiple dry-year hydrology.

Metropolitan’s ability to utilize its water storage reserves depends on the actual amount of water in storage, facility limitations, the location of the storage, and “take” or “exchange” limits of various storage/exchange programs. Table 6-1 shows Water Authority’s projected deliveries from Metropolitan for 2020 through 2045.

<b>TABLE 6-1: PROJECTED IMPORTED WATER DELIVERIES FROM METROPOLITAN TO WATER AUTHORITY (Normal Year - AF/YR)</b>				
2025	2030	2035	2040	2045
351,864	350,446	358,228	363,300	367,785

Source: San Diego County Water Authority 2020 Urban Water Management Plan.

### 6.1.2 Water Authority – IID Water Conservation and Transfer Agreement

On April 29, 1998, Water Authority signed a historic agreement with IID for the long-term transfer of conserved Colorado River water to San Diego County. The Water Authority-IID Water Conservation and Transfer Agreement (Transfer Agreement) is the largest agriculture-to-urban water transfer in United States history; Colorado River water, which is conserved by Imperial Valley farmers, is transferred to Water Authority for use in the County.

On October 10, 2003, Water Authority and IID executed an amendment to the original 1998 Transfer Agreement. This amendment modified certain aspects of the 1998 Agreement to be consistent with the terms and conditions of the QSA and related agreements. It also modified other aspects of the agreement to lessen the environmental impacts of the transfer of conserved water. The amendment was expressly contingent on the approval and implementation of the QSA, which was also executed on October 10, 2003.

On November 5, 2003, IID filed a complaint in Imperial County Superior Court seeking validation of 13 contracts associated with the Transfer Agreement and the QSA. Imperial County and various private parties filed additional suits in Superior Court, alleging violations of the California Environmental Quality Act (CEQA), the California Water Code, and other laws related to the approval of the QSA, the water transfer, and related agreements. The lawsuits were coordinated for trial. The IID, CVWD, Metropolitan, the Water Authority, and state are defending these suits and coordinating to seek validation of the contracts. In January 2010, a California Superior Court judge ruled that the QSA and 11 related agreements were invalid, because one of the agreements created an open-ended financial obligation for the state, in violation of California’s constitution.

The QSA parties appealed this decision, and a stay of the trial court judgment was issued during the appeal. In December 2011, California’s Third District Court of Appeal reversed the lower court ruling that invalidated the Transfer Agreement and QSA. The appeals court remanded several issues to the trial court, including questions about whether the QSA was properly processed

under CEQA. In July 2013, a Sacramento Superior Court judge entered a final judgment validating the QSA and rejecting all of the remaining legal challenges. The judge affirmed all of the contested actions, including the adequacy of the environmental documents prepared by IID. In May 2015, the state Court of Appeal issued a ruling that dismissed all remaining appeals.

Deliveries into San Diego County from the transfer began in 2003 with an initial transfer of 10,000 AF. The Water Authority received increasing amounts of transfer water each year, according to a water delivery schedule contained in the transfer agreement. In 2019, the Water Authority received 192,500 AF of water, which includes 2,500 AF of early transfer water. The quantities are scheduled at 205,000 AF in 2021 and 202,500 AF in 2022; the quantities will then remain fixed at 200,000 AF for the duration of the Transfer Agreement. A cumulative 10,000 AF of additional water called early transfer water is included from 2019 through 2021 (i.e. 2,500 AF in 2019; 5,000 AF in 2020; and 2,500 AF in 2021) per the Transfer Agreement. The initial term of the Transfer Agreement is 45 years, with a provision that either agency may extend the agreement for an additional 30-year term.

During dry years, when water availability is low, the conserved water will be transferred under IID’s Colorado River rights, which are among the most senior in the Lower Colorado River Basin. Without the protection of these rights, the Water Authority could suffer delivery cutbacks.

Based on the terms and conditions in the Transfer Agreement, Table 6-2 shows the anticipated delivery schedule of the conserved transfer water in 5-year increments. There is adequate documentation to demonstrate the availability of this supply, and therefore, the supply yields shown in Table 6-2 will be included in the reliability analysis found in Section 7 of this Plan.

<b>TABLE 6-2: PROJECTED WATER AUTHORITY – IID TRANSFER SUPPLIES (Normal Year - AF/YR)</b>				
2025	2030	2035	2040	2045
200,000	200,000	200,000	200,000	200,000

Source: San Diego County Water Authority 2020 Urban Water Management Plan.

### **6.1.3 Water Authority - All-American and Coachella Canal Lining Projects**

As part of the QSA and related contracts, the Water Authority contracted for 77,700 AF/YR of conserved water from projects that lined portions of the All American Canal (AAC) and Coachella Canal (CC). The projects reduced the loss of water that occurred through seepage, and the conserved water is delivered to the Water Authority. This conserved water will provide the San Diego region with an additional 8.5 MAF over the 110-year life of the agreement.

The CC lining project began in November 2004 and was completed in 2006. Deliveries of conserved water to the Water Authority began in 2007. The project constructed a 37-mile

parallel canal adjacent to the CC. The AAC lining project was begun in 2005 and was completed in 2010. The lining project constructed a concrete-lined canal parallel to 24 miles of the existing AAC from Pilot Knob to Drop 3.

The AAC lining project will yield 67,700 AF of Colorado River water per year available for allocation to the Water Authority and San Luis Rey Indian Water Rights Settlement Parties. The CC lining project will yield 26,000 AF of Colorado River water each year available for allocation. The 2003 Allocation Agreement provides for 16,000 AF/YR of conserved canal lining water to be allocated to the San Luis Rey Indian Water Rights Settlement Parties, as discussed in Section 6.1.6 below. The remaining amount (i.e., 77,700 AF/YR) is to be available to the Water Authority each year. The Water Authority will also receive any remaining portion of an available 4,850 AF/YR that is not needed for designated environmental purposes associated with the CC lining project. Under the existing agreements, annual canal lining supplies are delivered in equal monthly installments. According to the Allocation Agreement, IID has call rights to a portion (5,000 AF/YR) of the conserved water upon termination of the QSA for the remainder of the 110 years of the Allocation Agreement and upon satisfying certain conditions.

Table 6-3 shows the anticipated delivery schedule of conserved supplies from the canal lining projects in five-year increments. Adequate documentation exists to demonstrate the availability of this supply, and therefore, the reliability analysis found in Section 7 of this Plan will include the supply yields shown in Table 6-3 as part of the total supply numbers.

<b>TABLE 6-3: WATER AUTHORITY PROJECTED SUPPLY FROM CANAL LINING PROJECTS (Normal Year - AF/YR)</b>					
Water Supply Sources	2025	2030	2035	2040	2045
CC Lining Project	21,500	22,500	22,500	22,500	22,500
AAC Lining Project	56,200	56,200	56,200	56,200	56,200
Total	77,700	78,700	78,700	78,700	78,700

Source: San Diego County Water Authority 2020 Urban Water Management Plan.

#### **6.1.4 Water Authority - Carlsbad Seawater Desalination Plant**

Development of seawater desalination in the County will assist the region in diversifying its water resources, reduce dependence on imported supplies, and provide a new drought-proof, locally treated water supply. The Carlsbad Desalination Project is a fully-permitted seawater desalination plant and conveyance pipeline developed by Poseidon, a private investor-owned company that develops water and wastewater infrastructure. The Carlsbad Desalination Project, located at the Encina Power Station in Carlsbad, began commercial operation on December 23, 2015 and provides a highly reliable local supply of up to 56,000 AF/YR for the region.

As a result of the forthcoming Encina Power Station decommissioning and termination of the once-through cooling water system and seawater intake pumps, the Carlsbad Desalination Plant is transitioning from co-located operations with the Encina Power Station to permanent stand-alone operations. Recent changes to the existing intake and discharge operations include a direct lagoon intake and fish-friendly pumps; it will also include future construction of new 1 mm screens for seawater process water or brine dilution water. In addition, there is the potential to increase annual average production capacity of the Carlsbad Desalination Plant to 61,600 AF as an adaptive management supply (subject to future supply conditions and future Water Authority Board action). The potential 5,600 AF increment of additional seawater desalination supply from the Carlsbad Desalination Plant could be placed into service prior to 2025.

Table 6-4 shows the estimated annual yield in 5-year increments. Adequate documentation exists to demonstrate the availability of this potential supply in the future, and therefore, the reliability analysis in Section 7 of this Plan will include the supply yields shown in Table 6-4 as part of the total supply numbers.

<b>TABLE 6-4: WATER AUTHORITY PROJECTED SEAWATER DESALINATION SUPPLY (Normal Year - AF/YR)</b>				
2025	2030	2035	2040	2045
50,000	50,000	50,000	50,000	50,000

Source: San Diego County Water Authority 2020 Urban Water Management Plan.

### 6.1.5 Reclamation – Supplemental Water

Under the terms of the San Luis Rey Indian Water Rights Settlement Act (Settlement Act, Public Law 100-675, as amended), 16,000 AF/YR of water conserved from the lining of the AAC and its Coachella Branch shall be furnished by Reclamation for the benefit of the San Luis Rey Settlement Parties (Settlement Parties consist of the Bands – the La Jolla, Rincon, San Pasqual, Pauma, and Pala Bands of Mission Indians – and the Local Entities – the City of Escondido and the District) (Supplemental Water). Through agreements completed in conjunction with the QSA, Metropolitan and the Water Authority have agreed to wheel Supplemental Water to the Settlement Parties. The San Luis Rey Indian Water Rights Settlement Agreement (Settlement Agreement) and related contracts became effective on May 17, 2017. Since that time, Supplemental Water has been delivered to the Settlement Parties per the terms of the Settlement Agreement. The Settlement Act and Settlement Agreement are perpetual instruments, and the Supplemental Water shares a high priority for allocation from the Colorado River, along with IID and ahead of Metropolitan and the Water Authority, per the terms of the California Seven Party Agreement of 1931. Per the Settlement Act, Supplemental Water may only be used by the Bands on their reservations or by the Local Entities in their service areas.



Under the terms of the Settlement Agreement, the Bands are responsible for any costs associated with procuring or wheeling Supplemental Water and have the right to:

- Use any or all of the Supplemental Water on their reservations;
- Exchange a portion of Supplemental Water for an equal volume of Local Water (ground and surface water originating in the San Luis Rey River basin) furnished by the Local Entities; and
- Sell any Supplemental Water that is surplus to their needs to the Local Entities (Surplus Supplemental Water).

The Local Entities are obligated to purchase any Surplus Supplemental Water offered by the Bands to offset any other source of supply they may have. To the extent possible, the Local Entities each receive equal amounts of Supplemental Water within their respective service areas. As there is 16,000 AF of Supplemental Water delivered to the Settlement Parties each year, the maximum amount of Supplemental Water received by the District in any calendar year would be 8,000 AF.

Presently, the only Band using an increment of Supplemental Water on their reservation is the San Pasqual Band of Mission Indians, wheeling Supplemental Water through the Valley Center Municipal Water District. The San Pasqual Band estimates their Supplemental Water usage for the foreseeable future to be about 200 AF/YR, therefore the net delivery of Supplemental Water to the District is estimated to be 7,900 AF/YR. Over time, the Bands may develop additional uses of Supplemental Water on their reservations, thereby reducing the amount of Supplemental Water delivered to the Local Entities, but this eventuality is not forecast to occur within the time period considered in this Plan.

## **6.2 GROUNDWATER**

In 2018, the District prepared an assessment of the Warner Basin aquifer and concluded that the District could extract up to 9,100 AF/YR of groundwater from the aquifer on a sustainable long-term basis. This groundwater is pumped into Lake Henshaw for storage and subsequent delivery to the District, the City of Escondido and the Rincon Band of Indians. Because the pumped groundwater is stored in an open reservoir where it blends with surface run-off, it is reported as surface water production. Approximately 40 percent of the groundwater production is distributed for District use, 40 percent is distributed to the City of Escondido, and 20 percent is distributed to the Rincon Band under the terms of the Settlement Agreement. The wellfield is comprised of 12 wells with groundwater levels ranging from 150 to 350 feet below surface, depending on hydrology and pumping history. The water quality is within the standards set for acceptable drinking water by the federal government and State Board.

### **6.2.1 Basin Description**

The Warner Valley groundwater basin (Warner Basin) comprises 24,000 acres and is one of 515 alluvial groundwater basins and sub-basins recognized by the State and described in DWR Bulletin 118.

Over the last 50 years, the District has commissioned several studies of its local water supplies, which have also evaluated the characteristics of the Warner Basin. These studies have each had different objectives, utilizing different hydrogeologic assumptions, and benefiting from different historical data sets. A 2002 study estimates that the total usable Warner Basin aquifer storage is about 400,000 AF, only about 150,000 AF of active storage volume is located in the aquifer where extraction is feasible using currently operating District wells.

### **6.2.2 Groundwater Management**

The District has 12 production wells that pump from depths of 150 to 350 feet, depending on rainfall and length and extent of pumping operations. The District's operational procedure is to preferentially use surface water runoff when available and conserve groundwater for dry years when surface runoff is inadequate to meet Local Water production objectives.

In dry years, groundwater is pumped from the well field into Lake Henshaw and released as needed. In wet years, surface water runoff is adequate to meet supply objectives and pumping operations cease, permitting the basin to recharge and groundwater levels to rise. This conjunctive use of groundwater and surface water runoff allows for the most efficient long-term sustainable yield from the local water system.

In September 2014, the SGMA was signed into law. The law provides new tools and authorities for local agencies to manage groundwater resources within their jurisdiction to achieve a sustainable use of those resources within a 20-year implementation period. While SGMA provides specific mandates only for those groundwater basins deemed by the State to be "medium" or "high" priority groundwater basins, the law encourages the formation of GSAs and the preparation of "GSPs for all groundwater basins, even those deemed "low" and "very low" priority basins.

While DWR has classified the Warner Basin as a "very low" priority basin, it represents a significant water source for the District. The District is not presently considering the formation of a GSA in the Warner Basin, but may choose to employ this groundwater management tool in the future.

### **6.2.3 Overdraft Conditions**

The Warner Basin aquifer has not been adjudicated nor has it been identified as being in overdraft, as indicated by its classification as a "very low" priority basin as described in the previous section.

### 6.2.4 Historical Groundwater Pumping

The District studies indicate that it has about 150,000 AF of usable storage. Since 1960, the District’s average groundwater production has been 6,950 AF/YR. The last five years of total groundwater production is summarized in Table 6-5.

<b>TABLE 6-5: HISTORICAL GROUNDWATER PRODUCTION (AF/YR)</b> (Non-Potable)					
	2016	2017	2018	2019	2020
Production	7,177	3,993	2,640	3,843	751

### 6.3 SURFACE WATER

In 1946, the District purchased the Warner Ranch, which included Henshaw Dam and Lake Henshaw. Lake Henshaw was the District's sole supply of water until the formation of the Bueno Colorado Municipal Water District in 1954. Since that time, approximately 30% of the District's supply of water has come from Lake Henshaw and 70% from Water Authority. Table 3-3 shows the amount of water received from both sources from FY 1990-91 through FY 2019-20.

Lake Henshaw is a 51,832 AF capacity water supply reservoir located on the San Luis Rey River, about 25 miles east of the District service area; incidental recreational opportunities, including camping, fishing, boating and seasonal waterfowl hunting, are managed by a concessionaire under contract with the District. The 200 square mile watershed is largely undeveloped and consists of a mix of grassland, chaparral, and oak and coniferous forests. About one third of the watershed is owned by the District and is managed to protect water quality. The undeveloped character of the watershed and the District’s management activities contribute to the high quality of this local water supply.

Both natural run-off developed above Lake Henshaw and groundwater pumped from the Warner Basin are held as surface water in Lake Henshaw. The water is delivered to the District, City of Escondido, and Rincon Band of Indians under terms of several governing contracts. While the amount of water delivered to each party is dependent on annual hydrologic conditions, the average local water delivery to the District since 1960, including groundwater production and surface water run-off, is 6,132 AF/YR.

The District has resolved the longstanding dispute over the use of the waters of the San Luis Rey River with the implementation of the Settlement Agreement and related agreements, which became effective on May 17, 2017. This agreement among the United States of America, La Jolla, Rincon, San Pasqual, Pauma, and Pala Bands of Mission Indians, San Luis Rey Indian Water Authority, City of Escondido, and the District secures the long-term rights of the Settlement Parties, including the District, to divert and use the water of the San Luis Rey River and the Warner Basin. While the Settlement Agreement preserves much of the status quo regarding the use of

local water, the District estimates that the long-term yield of local water for the District will be modestly reduced to about 5,000 AF/YR. Table 6-6 shows current and projected local surface water supply deliveries in five-year increments.

<b>TABLE 6-6: PROJECTED LOCAL SURFACE WATER SUPPLY (Normal Year - AF/YR)</b>				
2020	2025	2030	2035	2040
3,860	5,000	5,000	5,000	5,000

## **6.4 STORMWATER**

The District does not have a stormwater recovery system; however, it works with the City of Vista to minimize irrigation run-off, thus lessening the burden that this source puts on the stormwater system.

## **6.5 WASTEWATER AND RECYCLED WATER**

### **6.5.1 Recycled Water Coordination**

The District Board of Directors approved a Water Reclamation Master Plan (WRMP) in August 1995. The goal was to reduce potable water demand within the District’s service area by providing recycled water to certain targeted customers. Upon implementing the recommended phases of the WRMP approximately 2,200 AF of recycled water could be available for distribution within the District on an annual basis. This would require significant investments in treatment, storage and distribution infrastructure by the City of Vista and the Buena Sanitation District. Currently, there is no recycled water being delivered to customers in the District’s service area.

During the development of the WRMP, agencies that provide wastewater service within the District’s jurisdictional boundaries, as well as the Water Authority, were contacted to obtain information about existing and planned reclamation infrastructure and to identify a potential market for recycled water. Several of the agencies provide both water and wastewater services. The following agencies were contacted and provided data and other information during the development of the WRMP and received copies of the WRMP: City of Vista/Buena Sanitation District (wastewater), City of Oceanside (water and wastewater), Encina Wastewater Authority (wastewater), the Water Authority (water wholesaler) and Vallecitos Water District (water and wastewater).

The Water Authority completed a Regional Recycled Water System Study in March 2002, which found that there is an imbalance in the geographic locations of the recycled water sources and market. The Study did note that a regional system could be created by incorporating existing

Water Authority facilities into other local agencies' future recycled water system expansions, thereby linking recycled water production facilities with markets.

In June 2010, the District joined the Olivenhain Municipal Water District, Carlsbad Municipal Water District, Vallecitos Water District, Santa Fe Irrigation District, City of Oceanside, Leucadia Wastewater District, City of Escondido, Rincon Del Diablo Municipal Water District and the San Elijo Joint Powers Authority (North San Diego Water Reuse Coalition) to investigate the expanded use of recycled water within north County. In 2013, the Coalition had an engineering report prepared that analyzed existing and proposed recycled water facilities and evaluated each of the participating agencies ability to interconnect and maximize the use of recycled water within their combined service areas. The report identified a potential recycled water demand of 1,840 AFY (including the Shadowridge Golf Course) and considered using the SWRF failsafe outfall as a conduit for delivering recycled water from the City of Carlsbad to the District. The long-term potential recycled water demand was estimated to be over 3,000 AFY. The facilities required included significant investment in pipeline facilities to reach the proposed recycled water customers.

The Shadowridge Golf Course recently drilled a groundwater well on their property and removed turf in order to reduce its demand on potable water, which negatively impacted the economic feasibility of the project. The District subsequently agreed to allow transfer of Round 2 Proposition 84 construction grant funding for this proposed project to the City of Oceanside. At this time, there is no foreseeable plans to move forward on any recycled water projects.

### **6.5.2 Wastewater Collection, Treatment and Disposal**

#### City of Vista Wastewater Collection System

The City of Vista's wastewater collection system includes approximately 229 miles of public sewer mains and trunks ranging in size from 6 to 42 inches in diameter and one pump station serving about 16,000 parcels. The Vista system conveys an annual average flow of 5.4 MGD. The cities of Vista and Carlsbad share ownership of an interceptor sewer, which routes sewage over 7 miles through two pump stations and force mains to the Encina Water Pollution Control Facility (EWPCF).

#### Buena Sanitation District Collection System

The Buena Sanitation District wastewater collection system, which is operated and maintained by the City of Vista, is comprised of 106 miles of public sewer mains and trunks ranging in size from 4 to 30 inches in diameter and one pump station serving over 5,300 parcels. The Buena system conveys an annual average flow of just over 1.9 MGD. Sewer collected by the Buena system flows about 5.5 miles through one pump station to the EWPCF.

### Shadowridge Water Reclamation Plant

The SWRF was built in 1986 to provide wastewater treatment for the Shadowridge development and recycled water service for golf course irrigation. The facility was owned Buena Sanitation District/City of Vista. In August 1995, the District approved a Water Reclamation Master Plan, with a goal of reducing potable water demand by providing recycled water to certain targeted customers. The WRMP identified approximately 2,200 AF of recycled water demand that could be available for distribution within the District's service area on an annual basis. This plan required significant investments in treatment, storage and distribution infrastructure by the City of Vista and the Buena Sanitation District, and was never implemented.

In 2003, the SWRF was decommissioned as treatment capacity became available at Encina, and it was no longer financially feasible to operate the SWRF. Currently, there is no recycled water being delivered to customers in the District's service area and no foreseeable plans to do so within the period covered by the 2020 Plan.

### Distribution System

California Water Code Sections 13555.2 and 13555.3 enacted in 1992 encourage new developments in areas where recycled water is available, or planned to be available, to provide separate plumbing systems to accommodate the use of recycled water. Any California community with more than 3,000 customer connections is required to comply with this code section. The District has encouraged developers to install dual plumbing systems since 1992. However, developers have not been required to install dual pipeline since recycled water supplies are limited and the stability of the recycled water source in Vista is uncertain.

### Encina Water Pollution Control Facility

Encina Wastewater Authority manages wastewater collection and treatment for the City of Vista and other north county cities and special districts. Currently, all of the wastewater from the City of Vista (excluding storm water run-off), is conveyed to and treated at the EWPCF. The facility is located on the Pacific coast in the City of Carlsbad approximately 7 miles west of the District's service area.

EWPCF, designed with an ocean outfall for wastewater disposal, began treating countywide wastewater in 1965. EWPCF has a treatment capacity of 36 MGD. Wastewater is treated to secondary standards, which means that the entire volume of wastewater that is processed at the facility has the potential to be used as recycled water.

Tables 6-7 and 6-8 summarize the collection, treatment, use and disposal of wastewater within the District.

<b>TABLE 6-7: WASTEWATER COLLECTED AND TREATED (AF/DAY)</b>						
	2020	2025	2030	2035	2040	2045
Wastewater Collected in Service Area	23.6	24.3	25.0	25.8	26.7	27.4
Wastewater Treated in Service Area	0	0	0	0	0	0
Quantity that Meets Recycled Water Standard	0	0	0	0	0	0

Source: City of Vista

<b>TABLE 6-8: DISPOSAL OF WASTEWATER (NON-RECYCLED) (AF/DAY)</b>							
Method of Disposal	Treatment Level	2020	2025	2030	2035	2040	2045
Ocean Outfall	Secondary	23.6	24.3	25.0	25.8	26.7	27.4

Source: City of Vista

### 6.5.3 Recycled Water System

In its 2015 Plan, the District anticipated distributing no recycled water annually (2020 - 2040) to the Shadowridge Golf Course. As projected, the District has not distributed any recycled water to the golf course and does not anticipate distributing any recycled water annually during the period covered by the 2020 Plan (2025 – 2045). The golf course is currently using well water for irrigation purposes.

### 6.5.4 Recycled Water Beneficial Uses

At this time, it does not appear that any recycled water will be distributed during the period covered by the 2020 Plan, unless it becomes economically feasible to re-commission the SWRP and the Buena Sanitation District/City of Vista begins treating wastewater at the facility once again, or the District is able to purchase and transport recycled water from a neighboring agency so it can be delivered to the golf course via its existing distribution system. Due to the uncertainty of a recycled water source, it is assumed that no recycled water will be supplied within the District through 2045. The District will continue to support and participate in regional efforts to implement recycled water projects, which may provide a source of recycled water to its service area in the future.

### **6.5.5 Actions to Encourage and Optimize Future Recycled Water Use**

With the SWRP decommissioned, the District does not have the ability to deliver any recycled water to customers. Due to the uncertainty of any recycled water source and the uncertainty whether a regional recycled water project would bring another source into its service area, the District has not pursued ways to distribute recycled water to potential customers. It is unlikely that additional recycled water will be distributed during the period covered by this Plan.

Once recycled water is available for distribution, the District could use one or a combination of the following incentives to encourage customers to convert to recycled water use:

- Pay for the design of customer retrofits.
- Establish a grant program to pay for the retrofit, based on the size of the facility and the volume of recycled water to be used.
- Establish a 0% interest loan program for retrofits. The customer would pay potable rates until the loan is paid off.
- Establish an incentive program whereby the customer would receive a credit towards their loan repayment for every acre-foot of recycled water used that offsets current potable water use.
- Establish a low interest loan program for retrofits with a five or 10-year pay back.
- The customer could pay for on-site retrofits, and the District could pay for the distribution main, service connection, water meters, signage, and the labels at the controllers.
- Offer new users a 20% rate discount for three years.
- “Guarantee” recycled water supply reliability (excluding disaster conditions).
- Initiate a public education campaign regarding the safety and reliability of recycled water.

As previously stated, the District continues to work to find a way to re-commission the SWRP or find another source of recycled water. If financial resources become available to perform the necessary upgrades to re-start the plant and/or another source of recycled water becomes available, the District would be able to initially supply an estimated annual amount of 300 AF to the golf course. Additional deliveries would be contingent on the SWRP capacity, recycled water customers, distribution system expansion and other regional facilities that may become available.

### **6.6 DESALINATED WATER OPPORTUNITIES**

As stated in the Act, an UWMP shall describe opportunities for the development of desalinated water, including but not limited to, ocean water, brackish water and groundwater, as a long-term supply. By virtue of its location, the District does not have an opportunity to develop its own desalination project. However, as a member agency of the Water Authority, the District receives desalinated seawater from the regional desalination facility in Carlsbad. Subsection 6.1.4 provides more detailed information on the Water Authority’s desalination efforts.



## **6.7 EXCHANGES OR TRANSFERS**

The District currently has water system inter-ties with four of its neighboring water retailing agencies, Vallecitos Water District, Rincon del Diablo Municipal Water District, the City of Escondido and the City of Oceanside. These inter-ties are for the purpose of transferring limited amounts of water between agencies during emergencies and short-term planned or unanticipated water system outages.

As described in subsection 6.1.2, the Water Authority has engaged in a transfer with the IID. Under this agreement, water conserved by IID will be transported by Metropolitan through the CRA and delivered to the Water Authority.

## **6.8 FUTURE WATER SUPPLY PROJECTS**

As described in subsection 6.5 of this Plan, the decision to move forward with re-commissioning the SWRP did not advance. Therefore, it is assumed that no recycled water would be supplied from this project during the period covered by this Plan.

As documented in this Plan, the District will rely on the Water Authority to supply a growing percentage of future water demands. The Water Authority and Metropolitan are pursuing projects to diversify and enhance their supplies. Due to the reliance on these two agencies, the District's 2020 Plan contains information on the current and future water supply projects of Metropolitan and the Water Authority. Section 6.1, Purchased or Imported Water, describes future water supply projects and programs for both agencies, and Chapter 7, Water Supply Assessment Reliability, provides summary information on each agency's supply reliability. Details regarding the Water Authority's and Metropolitan's future water supply projects and programs and supply reliability can be found in each agency's 2020 Plan.

## **6.9 SUMMARY OF EXISTING AND PLANNED SOURCES OF WATER**

The District plans to use its local water supply, as described in detail in this subsection, in conjunction with water received from the Water Authority to meet demands in its services area. If the District delivers its local water supply as projected and the Water Authority and Metropolitan's supplies are developed as planned, no shortages are anticipated within the District's service area in a normal year.

Table 6-9 provides total quantities of current and planned water supplies for the District in a normal year (NOTE: The quantities shown in the table below assume the implementation and achievement of SBX 7-7 conservation goals).

**TABLE 6-9: CURRENT AND PLANNED WATER SUPPLIES  
(Normal Year - AF/YR)**

Water Supply Sources	2020	2025	2030	2035	2040	2045
Purchased from Water Authority	3,136	5,659	6,717	7,462	8,253	8,828
Provided by Reclamation	9,195	7,900	7,900	7,900	7,900	7,900
VID surface water diversions	3,860	5,000	5,000	5,000	5,000	5,000
VID produced groundwater	-	-	-	-	-	-
Recycled Water	0	0	0	0	0	0
<b>Total</b>	<b>16,416</b>	<b>18,559</b>	<b>19,617</b>	<b>20,362</b>	<b>21,153</b>	<b>21,728</b>

## 6.10 WATER QUALITY

The Act requires that the 2020 Plan include information, to the extent practicable, on the quality of existing supply sources and the manner in which water quality affects water management strategies and supply reliability. This section summarizes water quality issues associated with supplies serving the District. Information on imported and regional water supplies was taken from the Water Authority’s 2020 Plan.

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to customers. However, source water of poor quality will make it increasingly expensive and difficult to meet those standards.

### 6.10.1 Colorado River

The Colorado River is the primary source of the Water Authority’s imported water supply. High salinity levels, uranium, and perchlorate contamination represent the primary areas of concern with the quality of Colorado River supplies. Managing the watershed of the Colorado River has been the most effective method for controlling these elements of concern.

#### Salinity

Salts in the Colorado River System are indigenous and pervasive, mostly resulting from saline sediments in the basin that were deposited in prehistoric marine environments. They are easily eroded, dissolved, and transported into the river system. Agricultural development and water diversions over the past 50 years increase the already high naturally occurring levels of total dissolved solids (TDS).

Water imported via the CRA has a TDS averaging approximately 650 milligrams per liter (mg/l) during normal water years. During the high water flows of 1983-1986, salinity levels in the CRA dropped to a historic low of 525 mg/l. However, during the 1987-1990 drought, higher salinity levels returned. During an extreme drought, CRA supplies could exceed 900 mg/l. High TDS in water supplies leads to high TDS in wastewater, which lowers the usefulness of the water and increases the cost of

recycled water. In addition to the link between water supply and water quality, high levels of TDS in water supplies can damage water delivery systems and home appliances. During 2010 through 2014, the TDS levels in Lake Havasu and Lake Mathews ranged from 570 to 640 mg/l. These lakes contain 100 percent Colorado River water.

To reduce the effects of high TDS levels on water supply reliability, Metropolitan approved the Salinity Management Policy in April 1999. One of the policy goals is to blend Colorado River supplies with lower-salinity water from the SWP to achieve delivered water salinity levels less than 500 mg/l TDS. Since 1976, the TDS levels in Metropolitan's Colorado River supply have had an average concentration of 630 mg/l. In addition, to foster interstate cooperation on this issue, the seven basin states formed the Colorado River Basin Salinity Control Forum. To lower TDS levels in Colorado River supplies, the Forum develops programs designed to prevent a portion of the abundant salt supply from moving into the river system. The Colorado River Basin Salinity Control Program targets the interception and control of non-point sources, such as surface runoff, as well as wastewater and saline hot springs.

#### Perchlorate

Perchlorate was first detected in Colorado River water in June 1997 and was traced to the Las Vegas Wash. The source of contamination was found to be emanating from two chemical manufacturing facilities in Henderson, Nevada (Metropolitan, 2021). The Nevada Division of Environmental Protection manages a comprehensive groundwater remediation program in the Henderson area. The amount of perchlorate loading into the Las Vegas Wash has been reduced from over 1,000 pounds per day (lbs/day) prior to treatment to 50-90 lbs/day since early 2007, more than a 90 percent reduction of the perchlorate loading into the Colorado River system. As a result of aggressive cleanup efforts, perchlorate in the Colorado River water at Lake Havasu has decreased significantly from a peak of 9 micrograms per liter ( $\mu\text{g/L}$ ) in May 1998 to typically less than 2  $\mu\text{g/L}$  since June 2006 (as compared to the California Maximum Contaminant Level (MCL) of 6  $\mu\text{g/L}$ ).

#### Uranium

Naturally, occurring uranium has always been present in Colorado River water and has always been under the California MCL of 20 picocuries per liter (pCi/l). The risks to water quality have primarily come from upstream mining in Moab, Utah and other potential mining sites in the west. Currently, the U.S. Department of Energy is working to remove and through September 2020, has disposed of approximately 10.9 million tons of mine tailings annually, which will improve groundwater quality on the Colorado River watershed near Moab. Completion of this cleanup is anticipated in FY 2034 (U.S Department of Energy, 2020). Current levels at Metropolitan's intake water have ranged from 1 to 6 pCi/L and are well below the MCL. Potential future risks include new mining operations and expansion of nuclear fuel production should they be in proximity to the Colorado River. In January 2012, a 20-year moratorium on new uranium mining claims went into effect. Despite challenges, this moratorium remains in place (Metropolitan, 2021)

### Nutrients

The Colorado River system has historically been low in nutrients, but with population growth in the watershed nutrients are still a concern. Metropolitan is involved with upstream entities along the lower Colorado River to enhance wastewater management to control nutrient loading, especially phosphorus. The Colorado River's low nutrient level has been important for blending with SWP water to reduce the nutrient level delivered to retail agencies.

### Arsenic

Arsenic is another naturally occurring element monitored by drinking water agencies. Arsenic concentrations in Metropolitan's Colorado River source water have ranged from 2.2 to 2.8 µg/L. Increasing coagulant doses at water treatment plants can reduce arsenic concentrations for retail deliveries.

### Chromium-6

Metropolitan has actively monitored Colorado River water for chromium-6. Most monitoring results have been below the detection limit for reporting, but when detected, levels range from 0.03 to 0.085 µg/L (Metropolitan, 2021). Between 1951 and 1985, Pacific Gas & Electric Company used chromium-6 as an anticorrosion agent for cooling towers at a gas compressor station located along the Colorado River near Topock, Arizona (DTSC, 2020). This is a toxic cleanup site. Chromium-6 monitoring results from the Colorado River upstream and downstream of this site have been below the detection limit for reporting.

### **6.10.2 State Water Project**

The quality of SWP water as a drinking water source is affected by a number of factors, most notably seawater intrusion and agricultural drainage from peat soil islands in the Delta. SWP water contains relatively high levels of bromide and total organic carbon, two elements that are of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form disinfection by-products that are strictly regulated under the federal Safe Drinking Water Act (SDWA). Wastewater discharges from cities and towns surrounding the Delta also add salts and pathogens to Delta water, influencing its suitability for drinking and recycling.

The 2000 Record of Decision (ROD) adopted by the CALFED Bay-Delta Program (CALFED) states that either CALFED will achieve water quality targets at Clifton Court Forebay and drinking water intakes in the south and central Delta, or it will achieve an "equivalent level of public health protection using a cost-effective combination of alternative source waters, source control, and treatment technologies."

Actions to protect Delta fisheries have exacerbated existing water quality problems by forcing the SWP to shift its diversions from the springtime to the fall, when salinity and bromide levels are higher. Closure of the Delta Cross-Channel gates to protect migrating fish has also degraded SWP water quality by reducing the flow of higher quality Sacramento River water to the SWP pumps at critical times.

This can result in increased salinity and bromide concentrations in water delivered to Southern California. The Delta Plan (Delta Stewardship Council, 2013) includes policies and recommendations to achieve “coequal goals,” which means the two goals of providing more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. In 2016, Reclamation and DWR developed the California WaterFix, a twin-tunnel solution focused on conveyance and ecosystem improvements to significantly reduce reverse flows and fish species impacts associated with the existing south Delta intakes. In 2019, Governor Newsom directed state agencies to proceed with modernizing Delta infrastructure with a single-tunnel project (as part of a water resilience portfolio approach). DWR is currently proposing construction of a new, single-tunnel Delta Conveyance Project with intakes in the north Delta. By moving the intakes upstream, the project intends to improve water quality in the Delta and allow for increased deliveries in wet years. The Delta Conveyance Project is currently envisioned to include two new intakes along the Sacramento River, a tunnel to work as a dual facility with the existing Delta waterway to transfer water to the existing state and federal pumping facilities, and environmental mitigation in compliance with state and federal environmental laws. DWR is preparing the environmental document for the project; a draft is expected in 2022 and a final document is expected in 2023. Project permitting is expected to be complete in 2024. This project will require broad support and funding commitments to implement.

The water quality issues are shown below in order of their magnitude for this supply.

#### Total Organic Carbon and Bromide

A key water quality issue for the SWP is disinfection byproducts (DBPs), particularly from total organic carbon (TOC) and bromide. TOC and bromide are naturally occurring in water, but concentrations increase several-fold in SWP supplies due to agricultural runoff and seawater intrusion as water moves through the Delta. TOC and bromide form DBPs, a water quality concern, when treated with disinfectants such as chlorine. Some DBPs have been identified and are regulated under SDWA; others are not yet identified. Existing levels of bromide and TOC in Delta water supplies may present challenges for water utilities when complying with regulations. Metropolitan has been in compliance with DBP regulations since they became effective. Treating water to DBP standards is accomplished by different methods:

- The Metropolitan treatment plants serving the San Diego region have upgraded to the use of ozone as a primary disinfectant to treat challenging water sources, such as SWP supply, and they continue to meet DBP standards.

- Some local treatment plants use chlorine dioxide as a primary disinfectant to reduce DBP formation.
- Blending of SWP source water with Colorado River water also reduces precursors and DBP formation.

### Nutrients

SSWP supplies have significantly higher nutrient levels than Colorado River supplies. Elevated levels of nutrients can increase nuisance algal and aquatic weed growth, affecting taste and odor in product water and potentially reducing filter run times at water treatment plants. Nutrient-rich soils in the Delta, agricultural runoff, and wastewater discharges are primary sources of nutrient loading in the SWP water supply. Water agencies receiving Delta water have been engaged in efforts to minimize the effects of nutrient loading from Delta wastewater plants. Sacramento Regional County Sanitation District, the primary wastewater discharger to the Sacramento River, launched treatment plant upgrades in 2015 to comply with its 2010 discharge requirements for ammonia and nitrate removal. Completion of upgrades is expected by 2023. In 2014, the City of Stockton Wastewater Treatment Plant, a significant discharger to the San Joaquin River, was issued waste discharge requirements with more stringent nitrogen limits. This plant is undergoing upgrades that are expected to be complete by 2024.

During drought, low flows, increased temperatures, and increased nutrient concentrations can increase algal blooms, which then produce algal toxins. Of particular concern is microcystins, a harmful species of cyanobacteria. DWR increases application of copper compounds to control algae and aquatic weed growth during drought. Consumer taste and odor complaints due to Delta nutrients depend on the blend of imported water delivered through Metropolitan. Metropolitan developed a comprehensive program to monitor and manage algae in its source water reservoirs and to provide early warning of algae-related problems, taste, and odor events. This is an area where increased monitoring, response and oversight, and proactive management of reservoir water quality will ensure a safe water supply. Although current nutrient loading is a concern with potential cost implications, there should be no impact on availability of water supplies to Metropolitan given its monitoring program and response actions. Metropolitan's source water protection program will continue to focus on preventing future increases in nutrient loading resulting from urban and agricultural sources.

### Salinity

Water supplies from the SWP have significantly lower TDS concentrations than the Colorado River, averaging 250 mg/L in water supplied through the East Branch and 325 mg/L through the West Branch. Because of this lower salinity, Metropolitan blends SWP water with high-salinity CRA water to reduce salinity in delivered water. However, both supply and TDS concentrations in SWP water can vary significantly in response to hydrologic conditions in the Sacramento–San Joaquin watersheds. Potential salinity intrusion in the Delta due to sea-level rise as a result of climate change could also present a risk for increased TDS concentrations in SWP supplies.

TDS concentrations in State Water Project water can also vary widely over short periods of time. These variations reflect seasonal and tidal flow patterns, and they pose an additional problem for blending as a management tool to lower TDS concentrations in CRA supply. For example, during the 1977 drought, the salinity of SWP water reaching Metropolitan increased to 430 mg/L, and supplies became limited. During this same event, water salinity at Metropolitan's Harvey O. Banks Pumping Plant exceeded 700 mg/L. Under similar circumstances, Metropolitan's 500 mg/L salinity objectives could only be achieved by reducing imported water from the CRA. Thus, it may not be possible to maintain both salinity standards and water supply reliability unless salinity levels of source supplies can be reduced.

TDS objectives are included in Article 19 of the SWP Water Service Contract, which specifies a ten-year average of 220 mg/L and a maximum monthly average of 440 mg/L. Because these objectives have not yet been met, the State, Metropolitan, and other agencies are coordinating to implement programs aimed at reducing salinity in Delta supplies. These programs include modification of agricultural drainage and development of comprehensive basin plans. Gates and channel barriers have also been placed in strategic locations in the Delta to reduce salt transportation from seawater. In May 2015, a temporary rock barrier was installed in False River to help limit salt intrusion from the San Francisco Bay into the central Delta during the recent drought emergency. The Delta Conveyance Project is designed to reduce salinity in SWP supplies by diverting a greater percentage of flows from the lower salinity Sacramento River (Metropolitan, 2021).

### Arsenic

Between 2010 and 2020, arsenic concentrations in SWP water have ranged from non-detect to 4.8 µg/L. Increasing coagulant doses at WTPs can reduce arsenic levels for retail deliveries. Some of Metropolitan's SWP groundwater storage programs appear to be vulnerable to arsenic contamination; as a result, Metropolitan has had to restrict flow from one program to limit arsenic increases in the SWP and an arsenic treatment facility was developed by one of Metropolitan's groundwater partners, which has increased groundwater supply costs. Non-project deliveries of groundwater to the California Aqueduct increase during drought periods. Although groundwater being pumped into the aqueduct contains arsenic in concentrations above the MCL, arsenic in blended water remains below the MCL. The intent of the blending is to manage inflows so that the arsenic concentrations do not exceed 10.0 µg/L. Arsenic levels in Metropolitan's water treatment plant effluents ranged from non-detect to 3.3 µg/L between 2010 and June 2020 (Metropolitan, 2021).

### 1, 2, 3-Trichloropropane

Trichloropropane (TCP) is a human-made carcinogenic chemical that has contaminated groundwater throughout the state, primarily in the Central Valley. In December 2017, the State Board established an MCL of 0.005 µg/L. There have been no TCP detections in Metropolitan's source water, but some of Metropolitan's groundwater storage programs in the Central Valley

that can move water into the SWP's California Aqueduct have been affected. After detection of TCP above the MCL in groundwater wells of the Arvin-Edison Water Storage District, Metropolitan has temporarily suspended operation of this program until water quality concerns can be further evaluated and managed. The levels of TCP detected in Metropolitan's other Central Valley groundwater storage programs are much lower and impact fewer groundwater wells. Metropolitan is evaluating the effects of TCP on the return capability of those programs (Metropolitan, 2021).

### **6.10.3 Surface Water**

The region's water quality is influenced by a variety of factors depending on its source. As stated above, water from the Colorado River and from Northern California are vulnerable to a number of contributors to water quality degradation. Regional surface and groundwater are primarily vulnerable to increasing urbanization in the watershed, agriculture, recreational uses, wildlife, and fires.

Surface water protection is fundamentally important to all of California. The State Board requires large utilities delivering surface water to complete a watershed sanitary survey every five years to examine possible sources of drinking water contamination. The survey includes suggestions on how to protect water quality at the source.

In 2016, the District, in conjunction with the City of Escondido, prepared a watershed sanitary survey (which includes a source water assessment) for the local watershed. The survey assessed activities that had the potential to influence the quality of water delivered from Lake Henshaw, Dixon Lake and Lake Wohlford. While the survey identified a number of activities that have the potential to adversely affect water quality, including residential septic facilities, highway run-off, and agricultural and recreational activities, no contaminants from these activities have been detected in the local water supply. An updated survey is currently being prepared.

The United States Environmental Protection Agency (EPA) also requires utilities to complete a Source Water Assessment (SWA). Information collected in SWAs is used to evaluate the vulnerability of water sources to contamination and any changes in potential sources of contamination to help determine if more protection measures are needed. EPA requires utilities to complete a SWA that uses information collected in the sanitary surveys.

Metropolitan completed its SWA of its Colorado River and SWP supplies in December 2002. According to the assessment, Colorado River supplies are considered most vulnerable to impacts from recreation, urban/storm water run-off, increasing urbanization in the watershed and wastewater. SWP supplies are most vulnerable to contamination from urban/storm water run-off, wildlife, agriculture, recreation and wastewater. Metropolitan also completed watershed sanitary surveys of its source water supplies from the Colorado River in 2015 and the SWP in 2016.



In the past, regional surface water quality has been considered good to excellent. Water quality can vary with imported water inflows and surface water contamination. Surface water protection is considered a key element in regional water quality. Currently, the most significant water quality issue that affects the public is algae blooms, which can create taste and odor problems, or generate algal toxins. Algae blooms are typically caused by runoff containing nutrients and build-up of those nutrients in local reservoirs.

Harmful algal blooms (HABs) observed in Lake Henshaw in 2020 prevented normal water deliveries. The District and the City of Escondido have retained a consultant to prepare a Harmful Algal Bloom Management and Mitigation Plan for Lake Henshaw and Lake Wohlford. This effort is ongoing.

#### **6.10.4 Groundwater**

Groundwater is pumped from the Warner Ranch wellfield through a series of open channels and siphons to Lake Henshaw, where it becomes part of the surface water supply. Like surface water, the groundwater quality in the Warner Basin has the potential of being affected by urbanization in the watershed, agriculture and recreation. While the 2016 Watershed Sanitary Survey identified a number of activities, including, but not limited to, highway run-off, agricultural operations and recreation, that have the potential to adversely impact the groundwater quality in the Warner Basin, no contaminants from these activities have been detected in the local water supply.

#### **6.10.5 Recycled Water**

Water quality, as it pertains to high salinity supplies, is a significant implementation issue for recycled water projects. High TDS source water poses a special problem for water recycling facilities because conventional treatment processes are designed to remove suspended particles, but not dissolved particles. TDS removal, or demineralization, requires an advanced treatment process, which can increase project costs significantly.

Residential use of water typically adds 200 to 300 mg/l of TDS to the wastewater stream. Self-regenerating water softeners can add another pound of salt per day per unit. Infiltration of brackish groundwater into sewer lines can also cause an increase in TDS. If an area receives a water supply with TDS of more than 700 mg/l, and residents add 300 mg/l or more through normal use, the recycling facility will produce recycled water with a TDS concentration of 1,000 mg/l or higher. In general, TDS concentrations over 1,000 mg/l become problematic for irrigation and industrial reuse customers. This problem greatly limits the potential uses and marketability of recycled water, particularly for agricultural purposes, because certain crops and nursery stock are sensitive to irrigation water with TDS levels exceeding 1,000 mg/l.

### 6.10.6 Seawater Desalination

From July 2019 to June 2020, feedwater salinity for the Carlsbad Desalination Plant had a TDS concentration average of approximately 37,000 mg/L and ranged from 25,000 to 44,000 mg/L. To address TDS concentrations at these high levels, the desalination facility uses a reverse osmosis membrane treatment process to reduce TDS to less than 350 mg/L (i.e., an average of about 200 mg/L from July 2019 to June 2020), resulting in approximately 99% removal of TDS and a water supply that meets drinking water standards. Desalinated water from the Carlsbad Desalination Plant is blended with other Water Authority treated water supplies at the Twin Oaks Valley WTP. TDS concentration in the blend water will vary seasonally depending on imported water blends from Metropolitan (i.e., the blended percent of SWP vs. CRA water). Only one member agency, Vallecitos Water District, has a connection directly to the Carlsbad Desalination Plant pipeline delivering completely desalinated seawater, 100%.

Most other agencies who purchase treated water from the Water Authority can receive some percentage of desalinated water with the exception of connections north of the Valley Center Pipeline on the First Aqueduct and connections north of the Metropolitan connection point on the Second Aqueduct. The blend of desalinated water depends on system operations and water demands, and can vary throughout the day, month, or seasonally.

Prior to the reverse osmosis process, feedwater from the Pacific Ocean is pretreated to remove suspended solids, including organic material. The reverse osmosis process then removes dissolved solids. Next, product water is post-treated to prevent corrosion in the distribution system and improve the aesthetic quality of the water. This process generally involves adding alkalinity to the treated water. The final step, a disinfection process, provides a disinfection residual in the treated water.

A single-pass reverse osmosis process of seawater generally results in about 50% recovery of treated water. The remaining 50% is discharged as concentrate, with about twice the salinity of the original feedwater. The concentrate is diluted to avoid negative impacts to the marine environment from the elevated salinity levels prior to discharge.

## **CHAPTER 7 WATER SUPPLY RELIABILITY**

The Act requires that an urban water supplier include, as part of its plan, an assessment of the reliability of its water supply. The assessment must compare the total projected water use with the expected supply over the next 20 years or 25 years in five-year increments. The reliability assessment is required for normal, single-dry and multiple-dry water years. The 2020 Plan projects reliability for the next 25 years. This section presents a summary of water supplies and demands within the District's service area as well as an assessment of water supply reliability.

### **7.1 CONSTRAINTS ON WATER SOURCES**

The Act requires that every urban water supplier include, as part of its plan, an assessment of the reliability of its water supply and the vulnerability of the supply to seasonal or climatic shortages. The Act also requires that for any water source that may not be available at a consistent level of use, given specific legal, environmental or water quality factors, the agency must describe, to the extent practicable, plans to replace that source with alternative sources or water demand management measures.

As described in Sections 6.2 and 6.3 local water production is developed from both groundwater and surface water sources, which are managed conjunctively to minimize the need for imported water supplies. The production available from this system is highly variable and is dependent on hydrologic conditions within the 200 square mile watershed of the upper San Luis Rey River. This local supply variability is influenced by many factors, including climactic conditions such as El Nino, the Pacific Decadal Oscillation and jet stream variations.

As described in Section 6.10.3, HABs in Lake Henshaw have limited availability of local water in the latter half of 2020 (FY 2021). HABs occurrence is influenced by many factors, including nutrient availability and water temperature. While the District and City of Escondido are developing plans to manage and mitigate for HABs in the local water system, the longterm effectiveness of those plans is unknown. Hence, HABs must be considered as a possible constraint on the future availability of local water production.

Further, the reliability of local water is subject to the integrity of the transmission infrastructure necessary to deliver it to the District's service area. After release from Henshaw Dam, local water travels in the streambed of the San Luis Rey River for about ten miles where it is diverted into the Escondido Canal. This structure, originally built in the 1890's and expanded in the 1920's, extends about 14 miles along the remote contours of steeply sloped hillsides with limited accessibility. At the end of the Escondido Canal, local water is delivered to Lake Wohlford. Water is released from Lake Wohlford through the Bear Valley power plant and several miles of pipeline before it is pumped to the headworks of the City of Escondido-Vista WTP. Water treated here is released into the 11.25 mile long Vista Flume for delivery to the District's service area.

The Escondido Canal is the most vulnerable link of this transmission system. In October 2003, the Paradise Fire burned 80% of the canal alignment, denuding slopes adjacent to it. The winters of 2004 and 2005 produced considerable siltation and erosion along the canal, with the result that significantly reduced local water deliveries were made despite the abundant availability of local water in 2005.

As described in Section 6.3, while the Settlement Agreement has secured the District's right to the continued production of local water, the terms of the Settlement Agreement make less local water available to the District in dry years. The Settlement Agreement also diminishes the District's independence of action to address certain matters, like HABs in Lake Henshaw. While the Settlement Agreement removes the legal uncertainty previously attached to local water, it degrades the reliability of that supply for the future.

While the Settlement Agreement may reduce the reliability of local water, it enhances the reliability of imported water for the District (see Section 6.1.6). Under the terms of the Settlement Agreement, Reclamation will cause an estimated 7,900 AF/YR of Supplemental Water to be delivered from the Colorado River to the District, this water having third priority for allocations from the Colorado River, above the priority for both Metropolitan (fourth priority) and the Water Authority (fifth priority). Hence, the Supplemental Water portion of the District's imported water portfolio may be relatively immune from a shortage declaration on the Colorado River, but the enhanced reliability of Supplemental Water may only be meaningful to the District if the Governor of California does not exercise emergency powers to mandate across-the-board reductions in water deliveries by the State's retail water purveyors.

To the extent that local water and Supplemental Water supplies are insufficient to meet its total water needs for any given year, the District relies on Water Authority supplies to make up the difference. Based on information contained in the Water Authority's 2020 Plan, it is anticipated that the Water Authority will be able to meet the District's increased demands during a single-dry water year and multiple-dry water year scenarios. Summary information regarding the reliability and vulnerability of the Water Authority's and Metropolitan's water supplies is contained Section 6.1, and more detailed information can be found in each agency's 2020 plan.

Table 7-1 shows the basis of water year assessment for single-dry and multiple-dry year supplies expected to be available compared to those supplies in an average year. "Average Year" hydrology, as used in this 2020 Plan, was taken as calendar year 2020. This information serves as the basis for the normal water year assessment, single dry water year assessment and consecutive dry year assessment.

Table 7-1: Basis of Water Year Data			
Year Type	Base Year <i>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020</i>	Available Supplies if Year Type Repeats	
		<input type="checkbox"/>	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
		<input checked="" type="checkbox"/>	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	2020		100%
Single-Dry Year	2025		110%
Consecutive Dry Years 1st Year	2025		110%
Consecutive Dry Years 2nd Year	2026		110%
Consecutive Dry Years 3rd Year	2027		110%
Consecutive Dry Years 4th Year	2028		110%
Consecutive Dry Years 5th Year	2029		110%
Consecutive Dry Years 6th Year	2030		110%
NOTES: None			

## 7.2 NORMAL WATER YEAR ASSESSMENT

If Water Authority, Metropolitan and District supplies are developed as planned and SBX 7-7 conservation targets are achieved, no shortages are anticipated within the District’s service area in a normal year through 2045. Table 7-2 shows a normal assessment year’s supply and demand comparison. Note that supply totals do not exceed demand totals because the District will only order as much imported water from its wholesaler – the Water Authority – that it requires to meet its demands. The District does not have reservoir volume available to store significant amounts of potable water on an annual basis.

Table 7-2: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals <i>(from Table 6-9)</i>	18,559	19,617	20,362	21,153	21,728
Demand totals <i>(from Table 4-3)</i>	18,559	19,617	20,362	21,153	21,728
Difference	0	0	0	0	0
NOTES: None					

### 7.3 DRY WATER YEAR ASSESSMENT

In addition to a normal year assessment, the Act requires an assessment to compare supply and demand under single-dry year and multiple-dry water years of the next 20 or 25 years in five-year increments. Table 7-3 shows the single dry-year assessment. The projections are based on the District’s local supply available in 2020 and information developed by the Water Authority and Metropolitan. The Water Authority’s existing and planned supplies from the IID transfer, canal lining projects and seawater desalination projects are considered “drought resilient” supplies as discussed in Section 4 of its 2020 Plan.

As discussed in Section 4.7, the District projects that hot and dry weather (absent mandatory water use restrictions) may generate 10 percent greater demands than during normal years, as demonstrated by the impacts on demands during FFY 2018. This percentage was utilized to calculate single-dry and multiple-dry year demands shown in Tables 7-3 and 7-4.

If Metropolitan, the Water Authority and the District’s water supplies are maintained and developed as planned, along with achievement of the additional conservation target, no shortages are anticipated within the Water Authority’s service area in a single dry-year through 2045. The District will use local water resources whenever possible; however, if there is a shortfall, the District will rely on the Water Authority supplies.

<b>Table 7-3: Single Dry Year Supply and Demand Comparison</b>					
	2025	2030	2035	2040	2045
Supply totals	20,415	21,579	22,398	23,268	23,900
Demand totals	20,415	21,579	22,398	23,268	23,900
Difference	0	0	0	0	0
NOTES: None					

In accordance with the Act, Table 7-4 illustrates multiple-dry water year assessments in five-year increments. The District surface water projections are reflective of supplies available during years 2014 through 2018. The Water Authority supplies consist of the yield from the IID transfer, canal lining projects and Carlsbad Seawater Desalination project as well as imported water from Metropolitan. As discussed below, the Water Authority may utilize carryover storage to supplement the aforementioned supplies.

For the multi-dry year reliability analysis, the conservative planning assumption is that Metropolitan will be allocating supplies to its member agencies. As a result, some level of shortage could be potentially experienced under certain circumstances. When shortages occur, the Water Authority will use carryover storage, as discussed in Section 9.3 of its 2020 Plan. The Water Authority has invested in carryover storage supply capacity, which can be utilized in dry-years to improve reliability. Carryover storage includes both in-region surface water storage at San Vicente Reservoir

and out-of-region groundwater storage in California’s central valley. These verifiable dry-year storage supplies are described in Section 11 of the Water Authority’s 2020 Plan.

If Metropolitan, the Water Authority and the District’s water supplies are maintained and developed as planned, along with achievement of the additional conservation target, no shortages are anticipated within the Water Authority’s service area in multiple dry-year events through 2045. The District will use local water resources and Supplemental Water provided by Reclamation whenever possible; however, if there is a shortfall, the District will rely on the Water Authority supplies.

Theoretically, in years where shortages may still occur after the utilization of carryover storage, additional regional shortage management measures, consistent with the Water Authority’s WSCP would be taken to fill the shortfall. These measures could include securing dry-year water transfers and/or the implementation of voluntary or mandatory water use restrictions.

Table 7-4: Multiple Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045
First year	Supply totals	20,415	21,579	22,398	23,268	23,900
	Demand totals	20,415	21,579	22,398	23,268	23,900
	Difference	0	0	0	0	0
Second year	Supply totals	20,648	21,743	22,572	23,394	24,029
	Demand totals	20,648	21,743	22,572	23,394	24,029
	Difference	0	0	0	0	0
Third year	Supply totals	20,881	21,907	22,746	23,521	24,158
	Demand totals	20,881	21,907	22,746	23,521	24,158
	Difference	0	0	0	0	0
Fourth year	Supply totals	21,113	22,070	22,920	23,647	24,287
	Demand totals	21,113	22,070	22,920	23,647	24,287
	Difference	0	0	0	0	0
Fifth year	Supply totals	21,346	22,234	23,094	23,774	24,416
	Demand totals	21,346	22,234	23,094	23,774	24,416
	Difference	0	0	0	0	0
Sixth year	Supply totals	21,579	22,398	23,268	23,900	24,545
	Demand totals	21,579	22,398	23,268	23,900	24,545
	Difference	0	0	0	0	0

#### 7.4 DROUGHT RISK ASSESSMENT

The Act requires that every urban water supplier include, as part of its UWMP, a DRA for its water service to its customers as part of information considered in developing the demand

management measures and water supply projects and programs to be included in the UWMP. California Water Code Section 10612 requires that the DRA evaluation be based on the five driest consecutive years on record. In addition, California Water Code Section 10635 requires that the analysis include consideration for plausible changes in climate, regulations, and other locally applicable criteria.

As discussed in Section 4.7, the District projects that drought weather (absent mandatory water use restrictions) may generate 10 percent greater demands than during normal years, as demonstrated by the impacts on demands during FY 2018. This percentage was utilized to calculate the gross water use shown in Table 7-5 for years 2021 through 2025.

The District's water supply portfolio consists of three sources, local water, Supplemental Water furnished by Reclamation, and water procured by the Water Authority. The reliability of local water is considered low – as discussed in Section 7.1, it is subject to many constraints, including hydrologic variability, wildland fire vulnerability, HABs and infrastructure limitations. Historically, local water production has been highly variable. Supplemental Water is considered highly reliable. As described in Section 6.1.5, Supplemental Water is furnished by Reclamation for the benefit of the Settlement Parties, and it enjoys a high priority for allocation from the Colorado River. It is subject to the infrastructure vulnerabilities of the CRA system and the conveyance facilities of both Metropolitan and the Water Authority, but these systems have been historically reliable. Finally, the Water Authorities' water supply is also considered highly reliable. It consists of a diverse portfolio of drought tolerant supplies and with multiple contingencies to offset system vulnerabilities.

This DRA will use the five driest consecutive years of local supply historically available combined with the Water Authority's assessment of imported supplies available during a five-year drought. The historical period used in the analysis to represent the five driest consecutive year period for local water are years 2014 through 2018. Section 9.6 of the Water Authority's 2020 Plan shows that the Water Authority anticipates a remaining surplus supply for years 2021 through 2025 in its 2025 DRA.

If this DRA were to anticipate a water supply shortage, the District would anticipate utilizing actions outlined in its Water Supply Response Program (WSRP also referenced as the WSCP) in Chapter 8 to reduce demands to remedy the shortfall. These actions include increasing its water supply response level to meet the shortfall, prohibitions and penalties for certain consumptions, and emergency price tiering.

The results of this DRA are shown in Table 7-5 below. Based on the analysis shown in Table 7-5, the District projects having sufficient water supplies available to meet gross water demands in all five years and therefore, actions under the WSRP are not required.



<b>Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)</b>	
<b>2021</b>	<b>Total</b>
Gross Water Use	18,529
Total Supplies	18,529
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0.0%
<b>2022</b>	<b>Total</b>
Gross Water Use [Use Worksheet]	19,000
Total Supplies [Supply Worksheet]	19,000
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0.0%
<b>2023</b>	<b>Total</b>
Gross Water Use [Use Worksheet]	19,472
Total Supplies [Supply Worksheet]	19,472
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0.0%
<b>2024</b>	<b>Total</b>
Gross Water Use [Use Worksheet]	19,944
Total Supplies [Supply Worksheet]	19,944
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0.0%

<b>Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b) (Cont.)</b>	
<b>2025</b>	<b>Total</b>
Gross Water Use [Use Worksheet]	20,415
Total Supplies [Supply Worksheet]	20,415
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0.0%

## **CHAPTER 8 WATER SHORTAGE CONTINGENCY PLANNING**

The Act requires that urban water suppliers conduct a water supply reliability analysis and update existing water shortage contingency plans to include new statutory requirements as part of their 2020 Plan. This section contains the District's analysis, which is based on its WSRP (Appendix D) and ERP.

Additionally, this section includes a discussion on specific actions the District will take to address supply shortages due to a catastrophe, drought, or other situations. As the District relies on the Water Authority for water supplies, this section also highlights elements of the Water Authority's WSCP, including actions to be taken in response to various water shortage levels and the Water Authority's process to perform an annual water supply and demand assessment.

### **8.1 WATER SUPPLY RELIABILITY ANALYSIS**

The District's updated Potable Water Master Plan (April 2018) provides a comprehensive review of the District's potable water supply and distribution system and includes a structured program that identifies system improvements necessary to meet existing and future demand conditions. The District's internal water supply reliability analysis is guided by a thorough condition assessment of existing facilities and a calibrated hydraulic model that accurately reflects the current distribution system demands and operating parameters.

However, as a secondary system, the District primarily relies on regional water wholesalers, Metropolitan and the Water Authority, for annual and long-term water supply planning and demand assessments. The Water Authority creates and updates a variety of long-term planning documents by coordinating with other agencies, including the District, to estimate future water demands and identify necessary facilities and supplies to meet these demands. Water Authority planning efforts are designed to address member agency needs, regulatory requirements, environmental goals, regional emergencies, and other factors. The Water Authority, in cooperation with the District and other local water suppliers, relies on the following planning documents:

- Aqueduct Operating Plan
- Business Plan
- Climate Action Plan
- Emergency Preparedness Plan
- Integrated Regional Water Management Plan
- Long-Range Financing Plan
- Model Drought Ordinance
- Regional Water Facilities Master Plan
- Water Shortage Contingency Plan
- Urban Water Management Plan

The District works with the Water Authority to determine supply availability and plans accordingly. In the event of a water shortage, the Water Authority and the District will implement measures identified in each agencies Water Shortage Contingency Plan.

## **8.2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES**

The District maintains capacity rights from two sources, local raw water treated at the Escondido-Vista WTP located at Lake Dixon and purchased water from multiple treated water connections along the Water Authority's aqueducts. The District utilizes local water resources whenever possible; however, if there is a shortfall, the District relies on Water Authority supplies.

The District's local water production is developed from both groundwater and surface water sources, which are managed conjunctively to minimize the need for imported water supplies. The District's local water supply reliability is highly variable and influenced by many factors, including climactic conditions and the integrity of the transmission infrastructure necessary to deliver it to the District's service area.

As described in Section 6.3, while the Settlement Agreement has secured the District's right to the continued production of local water, the terms of the Settlement Agreement make less local water available to the District in dry years.

As detailed in Section 7, when local water supplies are insufficient to meet the District's total water needs for any given year, the District relies on Water Authority supplies to make up the difference. Based on information contained in the Water Authority's 2020 Plan, it is anticipated that the Water Authority will be able to meet the District's increased demands during a single-dry water year and multiple-dry water year scenarios. If Water Authority, Metropolitan and District supplies are developed as planned and SBX 7-7 conservation targets are achieved, no shortages are anticipated within the District's service area in a normal year through 2045.

As discussed in Section 4.7, the District projects that drought conditions (absent mandatory water use restrictions) may generate 10 percent greater demands than during normal years. In the event the DRA were to anticipate a water supply shortage, the District would anticipate utilizing actions outlined in its Water Supply Response Program (WSRP) to reduce demands to remedy the shortfall. These actions include increasing its water supply response level to meet the shortfall and implementing prohibitions and penalties on certain consumptive uses and emergency price tiering. However, based on the DRA, the District projects having sufficient water supplies available to meet gross water demands during five consecutive dry years.

### **8.2.1 Water Authority Water Shortage and Drought Response Plan**

In 2006, the Water Authority Board of Directors adopted the Water Shortage and Drought Response Plan (WSDRP) to serve as a comprehensive plan in the event that the region faced supply shortages due to drought or other water shortage conditions. To ensure that the Water

Authority and its member agencies continued to proactively plan for future water supply shortages in a manner consistent with anticipated legislation, the Water Authority revised its WSDRP and renamed it the Water Shortage Contingency Plan (Water Authority WSCP) in 2017. The revisions were consistent with the long-term framework contained in DWR’s *Making Water Conservation a California Way of Life*, Implementing Executive Order B-37-16, and with the provisions later codified in the Water Code in 2018 through the passage of SB 606 and AB 1668; additional background information can be found in Sections 2 and 3 of the Water Authority’s WSCP.

The Water Authority WSCP was developed in coordination with its member agencies, including the District, to provide a balanced, flexible, systematic approach to identifying regional actions necessary to reduce the impacts from shortages. It includes all aspects of drought planning, from steps to avoid rationing, to drought response stages, allocation methodology, pricing, tracking actual reductions in water use, and a communication strategy. Multiple actions are identified to manage shortage situations, including both supply augmentation measures and demand reductions up to 50 percent in water supply. Extraordinary conservation savings is an essential component of meeting the need for water in a time when available supplies are limited.

The Water Authority WSCP is organized into three stages: voluntary supply management, supply enhancement, and mandatory cutbacks including a supply allocation methodology. These stages are summarized in the Potential Response Level Triggers in Table 8-1.

TABLE 8-1: WATER AUTHORITY POTENTIAL RESPONSE LEVEL TRIGGERS		
Regional Water Shortage Response – M&I Demand Reduction Level		Scenarios (As Documented in Water Authority Reliability Analysis)
Voluntary <sup>1</sup>	Level 1 – Up to 10%	<ul style="list-style-type: none"> <li>Likelihood of potential core supply shortage in the near-term</li> </ul>
Mandatory	Level 2 – Up to 20%	<ul style="list-style-type: none"> <li>Shortage in core supplies, but mitigate through carryover storage reserves</li> </ul>
	Level 3 – Up to 30%	
	Level 4 – Up to 40%	<ul style="list-style-type: none"> <li>Water Authority core supplies are not adequate to meet member agency demands</li> <li>Supply augmentation (i.e., utilize storage reserves and/or dry-year transfers)</li> </ul>
	Level 5 – Up to 50%	
	Level 6 – Above 50%	
Catastrophic Emergency		<ul style="list-style-type: none"> <li>Occurs when a disaster, such as an earthquake or other emergency event, results in insufficient available water to meet the region’s needs or eliminates access to imported water supplies</li> </ul>

The District's WSRP (Appendix D) contains levels and corresponding actions that will assist the District in meeting conservation targets. Specific water conservation measures implemented during each level are described in Table 8.3.

### **8.2.2 Water Authority Allocation Methodology**

In the event of mandatory supply cutbacks from Metropolitan, the Water Authority WSCP includes a municipal and industrial (M&I) allocation methodology to determine how the Water Authority's available supplies will be equitably allocated to its member agencies. The M&I allocation methodology applies to those customers paying the M&I rate, including residential, commercial, and industrial customers. During an allocation, the actual reduction in member agency deliveries is determined through a comparison of the member agency's monthly meter reads and the allocation target for the member agency. This tracking information is then provided in monthly progress reports to the Water Authority's board of directors. The complete allocation methodology can be found in Section 8 of the Water Authority WSCP.

The Water Authority administers the M&I allocation methodology following the procedures and policies contained in the Water Authority's Resolution Establishing Procedures and Policies for Administration of the Water Shortage Contingency Plan Water Supply Allocation Methodology. Water Authority staff are required to report monthly to the Water Authority Board and member agency managers on how agency deliveries are tracking compared to their allocation target.

## **8.3 DISTRICT WATER SHORTAGE CONTINGENCY PLAN**

The District's WSRP, also referred to as the WSCP, describes six potable water supply conditions (levels) under which its customers must take specific actions to reduce quantities of water used. The six levels are shown in Table 8-2. The specific actions required under each level can be found in Sections 4 through 9 of the WSRP, included in Appendix D.

**TABLE 8-2: DISTRICT WATER SUPPLY RESPONSE LEVELS**

Level	Percent Supply Reduction	Water Supply Condition
1	10% or Less	Level 1 applies at all times unless the District Board of Directors has declared another level, per the procedures set forth in the WSRP.
2	10% to 20%	Level 2 may be declared when 1) the Water Authority notifies member agencies that due to cutbacks caused by drought or other supply reductions, a consumer demand reduction is required in order to have sufficient supplies available to meet anticipated demands; 2) when a consumer demand reduction is required by a regulatory agency; or 3) when other conditions exist that require a consumer demand reduction.
3	20% to 30%	Level 3 may be declared when 1) the Water Authority notifies member agencies that due to increasing cutbacks caused by drought or other reduction in supplies, a serious water shortage condition exists that requires extensive consumer demand reductions in order to have sufficient supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require a serious consumer demand reduction.
4	30% to 40%	Level 4 may be declared when 1) the Water Authority Board of Directors declares a water shortage emergency pursuant to CA Water Code (WC) § 350 and notifies member agencies that Level 4 requires an water shortage demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require a serious consumer demand reduction. <b>Water conservation measures implemented in Level 4 have the ability to achieve a water reduction consistent with a 40% reduction in water supply (WC § 10632(e)).</b>
5	40% to 50%	Level 5 applies under the following conditions: 1) the Water Authority Board of Directors declares a water shortage emergency pursuant to California WC § 350 and notifies member agencies that Level 5 requires an emergency water demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require the Board of Directors to declare a water shortage emergency <b>Water conservation measures implemented in Level 5 have the ability to achieve a reduction consistent with a 50% reduction in water supply (WC § 10632(e)).</b>
6	More than 50%	Level 6 condition applies when the Water Authority Board of Directors declares a water shortage emergency pursuant to CA WC § 350 and notifies member agencies that Level 6 requires a demand reduction of more than 50% in order for the District to have maximum supplies available to meet anticipated demands. The District shall declare a Drought Emergency pursuant to CA WC § 350. <b>Water conservation measures implemented in Level 6 have the ability to achieve a reduction consistent with a 50% reduction in water supply (WC § 10632(e)).</b>

## **8.4 SHORTAGE RESPONSE ACTIONS**

The Act requires that urban water suppliers align shortage response actions with shortage levels identified in the WSCP.

### **8.4.1 Demand Reduction**

Water conservation is an integral part of the District's plan to meet future water demands. The District relies on a combination of water efficiency based efforts to meet its conservation goals. These include the active enforcement of mandatory water-use efficiency practices; a conservation based rate structure, water efficiency rebates, investments in public education and outreach, and an active program to manage distribution system real loss. The District's demand management measures are outlined in detail in Chapter 9.

### **8.4.2 Supply Augmentation**

The District has no independent plans to augment its current water supplies, which include local surface water, Reclamation and purchased water. As a secondary system, the District will rely on the comprehensive contingency plans developed by its regional wholesalers, Metropolitan and the Water Authority.

### **8.4.3 Operation Changes**

During shortage conditions, operations may be affected by supply augmentation or demand reduction responses. For example, the District may temporarily alter the flow and routing of water through its system to more effectively distribute available supply across the service area, defer or expedite planned capital improvement projects, and implement improved monitoring, and/or alter groundwater pumping operations at the District's well fields.

### **8.4.4 Additional Mandatory Restrictions**

In addition to specifying prohibitions against water waste, the District's Water Supply Response Program includes methods (many of them the same as prohibitions identified in Table 8-5) for reducing water use when mandatory cutbacks are required. It is anticipated that by implementing the prohibitions and consumption reduction methods identified in the WSRP, the targeted reduction levels for each water supply response level can be achieved. Table 8-3 lists key consumption reduction methods used in each drought response level. A combination of these methods will be used to meet the higher consumption reduction levels.



**TABLE 8-3: CONSUMPTION REDUCTION METHODS**

Consumption Reduction Method	Level When Method Takes Effect <sup>1</sup>	Projected Reduction
Water Use Restrictions (e.g. stop washing down paved surfaces, eliminate irrigation run-off, repair leaks within specified time-period)	1	0%
Residential and commercial landscape irrigation limited to established watering timeframes	1	0%
Limit residential and commercial landscape irrigation to assigned days	2	Up to 20%
Stop watering ornamental turf in public street medians	2	Up to 20%
No new potable water service; no new temporary (constructions meters) or permanent water meters	3	Up to 30%
Water allocations may be implemented for individual properties	3	Up to 30%
Commercial landscape irrigation prohibitions	4	Up to 40%
Residential landscape irrigation prohibitions	5	Up to 50%
All irrigation prohibited at General Manager's discretion	6	50% or higher

*1 Level 1 of the District WSRP is mandatory to ensure water-use efficiency is practiced at all times.*

#### **8.4.5 Emergency Response Plan**

The District uses its Emergency Response Plan (ERP), based on the Standard Emergency Management Systems (SEMS) guidelines, and, if necessary, Water Supply Response Program, in responding to natural disasters and other events that interrupt potable water service to its customers.

The District ERP is consistent with provisions in the County ERP. The District ERP contains procedures for the distribution of potable water in a disaster; these procedures are consistent with guidelines prepared by the California State Office of Emergency Services.

The County ERP recommends the following: (1) the purchase of water purification equipment; (2) purchase of standby generators and auxiliary pumps; and (3) construction of emergency water conveyance and supply storage facilities. Because of the need for additional emergency water storage, the Water Authority has been constructing countywide emergency supply storage facilities. In addition, specific water-critical customers (such as hospitals, nursing facilities, and schools) have been identified. Likely potable water distribution sites have been pinpointed. Standby procurement documents have been developed for emergency bulk purchases of bottled water. Treatment stations, when operating, are inspected daily. When not in operation, treatment stations, pumping plants and storage distribution reservoirs are monitored through the District's Supervisory Control and Data Acquisition (SCADA) system with level, intrusion and other operating alarms. Computers monitor these systems 24 hours a day, seven days a week.

The District recognizes the importance of the Best Management Practices (BMP) in reducing water demand and will continue implementing conservation programs in an emergency. In addition, the District will increase media attention to the water supply situation during a shortage and will step up public water education programs, encourage property owners to apply for a landscape and interior water use survey and continue to advertise the importance of customers installing water efficient plumbing fixtures and appliances. Table 8-6 summarizes the actions that the District has taken to prepare itself for responding to various natural or man-made disasters.

<b>TABLE 8-4: PREPARATION ACTIONS FOR CATASTROPHE</b>	
<b>Possible Catastrophe</b>	<b>Summary of Actions</b>
Regional Power Outage	Preparation of ERP and WSRP; staff training and exercises; procurement of standby generators and auxiliary pumps; identification of key water-critical customers; public agency and media contact list; alternative communication system; implementation of SCADA to monitor treatment stations, pumping plants and storage distribution reservoirs; short-term exchange and transfer agreements with neighboring water agencies and mutual assistance agreements.
Natural Disasters - Earthquake, Flood and Storms	Preparation of ERP and WSRP; staff training and exercises; procurement of standby generators and auxiliary pumps; standby procurement documents for the emergency purchase of bottled water and other equipment and supplies; identification of key water-critical customers; public agency and media contact list; alternative communication systems; implementation of SCADA to monitor treatment stations, pumping plants and storage distribution reservoirs; short-term exchange and transfer agreements with neighboring water agencies and mutual assistance agreements. Additionally, The Water Authority's Integrated Contingency Plan (ICP) and Emergency Storage Project (ESP) were developed to protect public health and safety and to prevent or limit economic damage that could occur from a severe shortage of water supplies.
Imported Water Supply Failure	Preparation of ERP and WSRP; staff training and exercises; procurement of standby generators and auxiliary pumps; identification of key water-critical customers; public agency and media contact list; implementation of SCADA to monitor treatment stations, pumping plants and storage distribution reservoirs; short-term exchange and transfer agreements with neighboring water agencies and mutual assistance agreements.
Contamination	Preparation of ERP and WSRP; staff training and exercises; procurement of standby generators and auxiliary pumps; standby procurement documents for the emergency purchase of bottled water and other equipment and supplies; identification of key water-critical customers; public agency and media contact list; alternative communication systems; implementation of SCADA to monitor treatment stations, pumping plants and storage distribution reservoirs; short-term exchange and transfer agreements with neighboring water agencies and mutual assistance agreements.
Structural Failure – Storage Facilities and Pump Stations	Preparation of ERP and WSRP; staff training and exercises; procurement of standby generators and auxiliary pumps; standby procurement documents for the emergency purchase of bottled water and other equipment and supplies; identification of key water-critical customers; public agency and media contact list; alternative communication systems; implementation of SCADA to monitor treatment stations, pumping plants and storage distribution reservoirs; short-term exchange and transfer agreements with neighboring water agencies and mutual assistance agreements.

#### **8.4.6 Seismic Risk Assessment and Mitigation Plan**

The Act requires that urban water suppliers include a seismic risk assessment and mitigation plan to assess the vulnerability of the water system and mitigate such vulnerabilities. The San Diego County Multi-Jurisdictional Hazard Mitigation Plan (October 2017) is included as an attachment in Appendix F.

#### **8.4.7 Shortage Response Action Effectiveness**

On a monthly basis, the District staff generate reporting on water supply and demands for the General Manager and Board of Directors review. These monthly analyses provide key information for the District to manage resources to meet a range of estimated demands and adjust to changing conditions throughout the year. This data is used to measure the effectiveness of any water shortage contingency stage that may be implemented. As stages of water shortage are declared, the District will follow implementation of those stages and continue to monitor water demand levels. The District Board of Directors reserves its right to undertake future actions in support of water conservation as authorized by law, including but not limited to declaration of a water shortage emergency.

### **8.5 COMMUNICATION PROTOCOLS**

The Act requires that urban water suppliers identify communication protocols and procedures to inform customers, the public and government entities of any current or predicted water shortages and associated response actions. The District has had a long-standing conservation and outreach program. The District uses a range of printed and electronic materials and other outreach activities to raise awareness of conservation measures available to customers. The District provides water efficiency messaging in newsletters (printed and electronic), water bill messages, on-hold recordings, announcements on the District's website homepage and articles and news releases in local publications to keep the public, constituents and elected officials up-to-date on District activities. Additionally, the District actively participates in community events to promote water use efficiency and provides presentations to community groups.

Additionally, District communications and water conservation staff attend the Joint Public Information and Conservation Coordinators monthly meeting hosted by the Water Authority for all member agencies. Coordinated regional messaging on water efficiency topics, drought declarations and demand management measures are a long-running practice between the Water Authority and member agencies.

Communication during a supply shortage incident is critical to relay information to employees, response partners and critical customers. During a catastrophic event that interrupts potable water service to District customers, the District will follow communication procedures outlined in the District's ERP.

## 8.6 COMPLIANCE AND ENFORCEMENT

The District’s WSRP (Exhibit D) prohibits various types of water use practices when certain water supply conditions exist. The table below list examples of prohibitions against specific water use practices during specified water supply conditions.

TABLE 8-5: MANDATORY PROHIBITIONS	
Examples of Prohibitions	Level when Prohibition becomes Mandatory
Water leaving property as a result of irrigating or failure to repair known leaks	1
Spraying hard surfaces during irrigation	1
Surface irrigation during mid-day hours	1
Watering landscapes 48 hours after it rains	1
Washing down paved surfaces (except to alleviate fire or sanitation hazards)	1
Washing a vehicle with a hose without an automatic shut-off valve	1
Operation of any ornamental fountain without a circulating pump	1
Failure to repair a leak within 48 hours	1
Limit residential and commercial irrigation to assigned days	2
Limit irrigation of landscape on a construction project to established time frames	2
Restrictions on filling/re-filling pools, ornamental lakes and ponds	3
Restrictions on special water features	3
Washing vehicles except at a commercial carwashes that use re-circulated water	3
Stop all commercial landscape irrigation (with specific exceptions)	4
Repair all leaks within 24 hours	4
Stop all residential landscape irrigation (with specific exceptions)	5
Stop all landscape irrigation at General Manager’s discretion	6

Any customer violating any provision of the District’s WSRP receives a written warning for the first violation. Subsequent violations (within a “12-month moving year”) result in penalties ranging from the assessment of water conservation fees to discontinuance of service. Below is a

summary of the actions and corresponding fees associated with violating any provision of the WSRP. It is important to note that fees and charges are adjusted periodically so the amounts shown in the table are subject to change and have been included for reference purposes only.

- First Violation – Warning
- Second Violation - \$221 water conservation fee
- Third Violation - \$442 water conservation fee
- Subsequent Violations - \$662 water conservation fee; at the Board’s discretion, installation of a flow restrictor (\$295 – 1” or smaller meter; \$552 – 1 ½ ” and 2” meters) or discontinuance of service.

**NOTE:** The water conservation fees and other charges shown above are assessed for violations during the implementation of all levels of the WSRP.

## 8.7 LEGAL AUTHORITIES

This section describes the legal authorities that empower the District to implement and enforce its shortage response actions. The District was organized in 1923 under the Irrigation District Law. California Water Code Section 22075 gives the District the statutory authority to “[d]o any act necessary to furnish sufficient water in the district for any beneficial use,” among other powers. Additionally, Article 10, Section 2 of the California Constitution declares that waters of the State are to be put to beneficial use and that waste, unreasonable use, or unreasonable method of use of water be prevented and that water be conserved for the public welfare.

The District also has authority under the California Water Code to implement supply shortage programs. (Cal. Water Code, Sections 350-359, 375-378.) For example, Section 375(a) of the Water Code provides:

*Notwithstanding any other provision of the law, any public entity which supplies water at retail or wholesale for the benefit of persons within the service area or area of jurisdiction of the public entity may, by ordinance or resolution adopted by a majority of the members of the governing body after holding a public hearing upon notice and making appropriate findings of necessity for the adoption of a water conservation program, adopt and enforce a water conservation program to reduce the quantity of water used by those persons for the purpose of conserving the water supplies of the public entity.*

Cal. Water Code, Section 375(a). Water Code Section 375(b) also provides the authority for pricing to encourage water conservation.

*With regard to water delivered for other than agricultural uses, the ordinance or resolution may specifically require the installation of water-saving devices that are designed to reduce water consumption. The ordinance or resolution may also encourage water conservation through rate structure design.*

The District's Board of Directors has also formalized various policies and rules to implement a WSRP to address shortage conditions. The District's most current WCSP provides a standardized methodology for allocating supplies during times of shortage. Below is a list of Resolutions and Ordinances formally adopted by the District Board of Directors to implement policies to promote conservation and enforce shortage response actions (most recent to oldest):

- Resolution No. 21-XX Resolution of the Board of Directors of the Vista Irrigation District Amending the District's Water Supply Response Program (June xx, 2021).
- Resolution No. 15-21 Resolution of the Board of Directors of the Vista Irrigation District Amending the District's Water Supply Response Program (May 27, 2015).
- Resolution No. 11-19 amending the District's Drought Response Conservation Program and renaming it the Water Supply Response Program (June 1, 2011)
- Resolution No. 09-50 amending the Drought Response Conservation Program (October 7, 2009)
- Resolution No. 09-11 adopting the Drought Response Conservation Program with amendments to Section 10.0 (February 4 2009)
- Resolution No. 08-36 adopting a Drought Response Conservation Program (September 3, 2008)
- Ordinance No. 01-01 An Ordinance of the Vista Irrigation District Consolidating All Previous Conservation Related Ordinances and Resolutions and Establishing An Adjustable Block Rate Water Fee Structure (January 3, 2001)
- Ordinance No. 91-2 An Ordinance of the Vista Irrigation District Finding the Necessity for and Amending Its Water Conservation Program (July 31, 1999)
- Ordinance No. 087-1 An Ordinance of the Vista Irrigation District Finding the Necessity for and Adopting a Water Conservation Program (August 19, 1987)

## **8.8 FINANCIAL CONSEQUENCES OF WATER SHORTAGE CONTINGENCY PLAN**

The District has taken several steps to reduce revenue and expense impacts resulting from water shortages. The District has implemented a three-tiered water rate structure to encourage water use efficiency and conservation during normal and shortage conditions (see Section 9.2.3 for more details regarding the tiered rate structure).

The District has a Working Capital Reserve that was established to cover operating revenue and expense variances, including reduced water sales. In the event of a prolonged drought and mandatory water use reductions, funds from this reserve could be used to help offset a severe

increase in the water rate as a result of decreased water sales. If necessary, the District could also use funds from its Capital Improvement Reserve to stabilize rates.

Due to large fluctuations in the production of local water due climatic change or operational conditions, the District is constantly exposed to large swings in the availability of local water and the need purchase higher-cost water. In June 2005, the District Board created the Water Purchase Stabilization Reserve (Stabilization Reserve) to accumulate the necessary funding during wet years to help offset the financial burden sustained during dry years. In wet years when local water production is in excess of its historical average, the Stabilization Reserve is funded by transferring the value of the excess local water. In years that local water production is less than the historical average, a transfer of funds equal to the current cost of purchasing raw imported water would be made from the Reserve in order to avoid an increase in water rates.

### 8.9 MONITORING AND REPORTING

Under normal water supply conditions, potable water production figures are recorded daily, and totals are reported to the General Manager and staff on a weekly basis and to the Board of Directors on a monthly basis. During shortages, production figures are reported to the General Manager daily. Other data, such as reservoir levels and system pressures, is also reviewed to monitor progress in achieving required reductions. SCADA real-time data (monitor production and distribution, system pressures and reservoir levels) and individual water meter reads are all used by the District to measure water use reductions. Table 8-6 summarizes the mechanism used by the District to monitor water use reductions.

TABLE 8-6: WATER USE MONITORING MECHANISMS	
Mechanism for Determining Actual Reductions	Type and Quality of Data Expected
Monitor daily production and distribution records	SCADA real-time data
Monitor system pressures – peak demand periods	SCADA real-time data
Monitor reservoir levels – peak demand periods	SCADA real-time data

### 8.10 WATER SHORTAGE CONTINGENCY PLAN REFINEMENT PROCEDURES

Monitoring and reporting key water use metrics is fundamental to water supply planning and management. Monitoring is also essential to ensure that the response actions are achieving their intended water use reduction purposes, or if improvements or new actions need to be considered. The District will monitor and report on implementation of its WSRP and make adjustments as necessary.

### 8.11 PLAN ADOPTION, SUBMITTAL AND AVAILABILITY

The District solicited and received public comments on the draft 2020 Plan and WSRP. In accordance with the Act, the District held a public hearing to adopt the 2020 Plan and WSRP. The

District notified the public, cities and the county within its service area 60 days prior to the public hearing and made copies of the draft plan and WSCP available for public review. The District Board of Directors held a public hearing on June 16, 2021 at 9:00 AM and formally adopted the 2020 Plan and WSRP, which is included in Appendix D.

To adopt or amend the District's WSRP, the District will complete the following steps:

- Notice of public hearing notifying the cities, counties, and the general public 60 days prior. The public hearing must be noticed in a local newspaper for two successive weeks (14 calendar days), at least two times, with at least five days between publication dates, as prescribed in Government Code section 6066. This notice must include time and place of hearing, as well as the location where the plan is available for public inspection.
- The public hearing may take place at the same meeting as the adoption hearing of the governing board. If the District chooses to combine these meetings, the agenda must include the public hearing as an agenda item.
- Submit to DWR for review and make the WSRP available for the public on the District website.



## **CHAPTER 9 DEMAND MANAGEMENT MEASURES**

Water conservation is an integral part of the District's plan to meet future water demands as well as the requirements of SBX 7-7 and future water-use efficiency regulations. Included in this chapter is information on the District's Demand Management Measures (DMMs) as required by Water Code Section 10631.

### **9.1 Vista Irrigation District Conservation Program**

The District started its water conservation program in 1981. Early program efforts were oriented toward a long-term public information program and cooperation with the regional water conservation programs of the Water Authority. The District recognizes water conservation as a priority in its water use planning. The long-term goal of the District's water conservation program is to achieve maximum efficiency for various beneficial water uses. Specific objectives of the District's conservation policy are the elimination of wasteful or inefficient practices in water use, the continued development and dissemination of information on both current and potential water conservation practices, and the on-going implementation of conservation practices.

The District's water conservation program is based on the District doing what it is most suited to accomplish within its service area. As such, the District pursues water conservation activities that are specific and local in nature while leaving the large-scale and regional water conservation programs to the appropriate regional water purveyor.

### **9.2 EXISTING DEMAND MANAGEMENT MEASURES FOR RETAIL SUPPLIERS**

The District relies on a combination of water efficiency based efforts to meet its conservation goals. These include the active enforcement of mandatory water-use efficiency practices; a conservation based rate structure, water efficiency rebates, investments in public education and outreach, and an active program to manage distribution system real loss.

#### **9.2.1 Water Waste Prevention Ordinances**

The District adopted Ordinance No. 90-01 in 1990 that prohibited wasteful practices, such as gutter flooding, sidewalk and driveway washing, etc. The ordinance, which was updated in 2001 and 2002, was repealed and ultimately replaced by Resolution No. 15-21, also known as the Water Supply Response Program (Appendix D). Non-compliance with provisions of the WSRP is enforced through a violation process, which is detailed in Section 9 of the resolution.

Since 1990, the District has issued over 1,600 warning/violation notices. Water used in violation of the WSRP may result in the assessment of a Water Conservation Fee. The District enforces water use restrictions identified in each WSRP level.

The cities of Escondido, Oceanside, San Marcos and Vista and County operate under their own water efficient landscape ordinance or under the State of California’s model water landscape efficient ordinance approved on July 15, 2015.

### 9.2.2 Metering

The District meters all of its service connections.

### 9.2.3 Conservation Pricing

The District has implemented a three-tiered water rate structure to encourage water-use efficiency and conservation during normal and shortage conditions. The District only imposes the Tier 3 water rate during times of water delivery cutbacks by the Water Authority. When no water delivery cutbacks are imposed by the Water Authority, Tier 3 water use is billed at the Tier 2 water rate.

The District’s three-tiered water rate structure is based on meter size and applied to all customer classes. The tier thresholds for each meter size are different; however, the cost per unit (748 gallons) in each tier remains the same. Table 9-1 shows the relationship between meter size and the monthly allotment in each tier as well as the current cost per unit. It is important to note that water rates are adjusted periodically so the amounts shown in the table are subject to change and have been included for reference purposes only.

TABLE 9-1: TIERED WATER RATE SHCEDULE			
Meter Size	Tier 1 - \$4.35/unit	Tier 2 - \$4.89/unit	Tier 3 - \$4.89/unit
5/8"	0-7	8-42	43+
¾" & ¾"X1"	0-10	11-60	61+
1"	0-25	26-150	151+
1 ½"	0-50	51-300	300+
2"	0-80	81-480	481+
3"	0-160	161-960	961+
4"	0-250	251-1,500	1,501+
6"	0-500	501-3,000	3,000+
8"	0-800	801-4,800	4,801+
10"	0-1,150	1,151-6,900	6,901+

### 9.2.4 Public Education and Outreach

The District utilizes a multi-pronged approach to public relations and community outreach. The District runs its own internal outreach and education programs and works with its water wholesalers when appropriate. Public education and outreach are integral to the District to meet its water conservation goals.

### Vista Irrigation District Customer Communication

The District communicates to its customers through its website, bill messages, newsletters, news releases, annual reports and direct mailers. The District's website ([www.vidwater.org](http://www.vidwater.org)) is where customers can find water saving tips, information about conservation programs, and links to regional water conservation programs. Bill messages include promotion of conservation programs and water saving tips. The District's newsletter, *Reflections*, includes water conservation information and promotes District conservation programs.

### Water Awareness Calendar Contest

The District participates in the North County Water Agencies (NCWA) Water Awareness Poster Contest, which is an art and education program for fourth graders. Each member agency of the NCWA operates its own contest within its service territory. Students living in or attending school within the District's service territory are eligible to enter. In-class presentations are offered by the District as part of the contest program. Fourth graders may enter the contest by drawing a picture that is representative of the contest's theme. The theme in 2020 was "Love Water, Save Water". The contest entries are then judged by District staff who select the first, second, and third place winners. The artwork of the top three entries are then used to create a page in the following year's calendar.

### WaterSmart Landscape Contest

The WaterSmart Landscape Contest (Landscape Contest) is a regional contest for homeowners. The District offers a prize of a \$250 gift card to its winner. The Landscape Contest is promoted regionally; however, each agency manages its Landscape Contest individually and determines its winners. Entries are judged on six criteria: overall attractiveness, appropriate plant selection, design, appropriate maintenance and efficient methods of irrigation. The goal of the Landscape Contest is to promote water-wise landscaping by providing local examples. Contest winners are featured on the Landscape Contest's website at [www.landscapecontest.com](http://www.landscapecontest.com).

### Scholarship Contest

The District holds an annual scholarship contest for high school seniors that live or go to school within its service area. The purpose of the scholarship program is to increase student knowledge and awareness of water related issues affecting the District and its customers. Students who compete for a scholarship must complete an essay related to a water-use efficiency topic. Winners of the scholarship contest are recognized at a Board meeting and local high school graduation ceremonies. Additionally, a news release is sent to local publications announcing the winners.

### Speaker's Bureau

The District offers a Speaker's Bureau to provide information to the public regarding a variety of topics, including water-use efficiency. Customers or groups can schedule a presentation by a District representative on topics related to the District.

### WaterSmart Homeowner Landscape Training

In partnership with the Water Authority, the District promotes a suite of homeowner landscape training programs; these include online and in person workshops. Traditionally, the District hosts two homeowner landscape training workshops per year, one in the spring and one in the fall. These workshops walk homeowners through the steps to achieve a WaterSmart landscape. Steps include; identification of their landscape target, creation of a plot plan, an evaluation of their site, soil analysis, landscape design, and irrigation retrofit and maintenance. For customers who want additional training, the WaterSmart Landscape Makeover Series provides homeowners a more in depth overview and basic skills necessary for the successful conversion of a traditional turf grass yard into a WaterSmart landscape. This four part series is promoted by the District and offered at various sites throughout the region.

### Splash Lab Mobile Science Lab

The District sponsors four Splash Lab Mobile Science Lab (Splash Lab) visits to elementary schools in the District's service territory. The Splash Lab is a program developed and maintained by the San Diego County Office of Education and is available to fourth through eighth grade students for a fee. Students perform water chemistry experiments and learn about watersheds, where their water comes from and the importance of water-use efficiency.

### Regional Outreach and Education Programs

In addition to its internal and partnership education and outreach programs, the District also supports region-wide outreach programs offered by its two wholesalers, Metropolitan and the Water Authority.

## **9.2.5 Programs to Assess and Manage Distribution System Real Loss**

In 1995, the District established the Main Replacement Program, an ongoing program to replace aging water mains throughout the distribution system. The goal of the Main Replacement Program is to replace pipelines before they reach the end of their useful life and become a maintenance liability and to replace pipelines due to street realignments and/or improvements. As of February 2020, more than 35 miles of pipe have been replaced, ranging in size from 2 inches to 20 inches.

In 2020, the District created the Opportunity-Based Pipeline Condition Assessment Program (Assessment Program), to complement the Main Replacement Program. The Assessment Program will begin collecting and testing pipeline field samples when there is an opportunity from other activities (e.g., during valve replacements, leak and break response, service installations, new pipeline tie-ins, etc.). The field samples will be analyzed to assess the integrity of the pipeline. The insights gathered by the field-testing will increase the confidence level that the District is replacing the right pipeline at the right time and provide insight into whether additional investment levels in the Main Replacement Program may be warranted in the future.

### **9.2.6 Water Conservation Program Coordination and Staffing Support**

The District employs one full time Water Conservation Specialist; duties performed by the position include enforcing District water-use efficiency practices contained in Resolution 21-XX , developing and supporting water-use efficiency policy and programs, compliance with state regulations and dissemination of water-use efficiency and conservation program information to District customers.

### **9.2.7 Other Demand Management Measures**

To assist customers with reducing their water consumption, the District offers financial incentives for residential customers to replace their older water using devices with new, more water efficient models. Additionally, customers can get rebates on new products and technologies to reduce their water consumption, such as a smart leak detector. CII customers are also eligible to receive rebates on a range of water efficient devices (e.g. commercial high-efficiency toilets, cooling tower conductivity controllers, etc.).

Both residential and CII customers are eligible for rebates to remove existing turf and replace it with water efficient landscaping. Combined, District customers removed nearly a half a million square feet of turf during the five years associated with this plan update.

#### Metropolitan's SocalWaterSmart Rebate Program

The SocalWaterSmart regional residential program offers rebates for qualifying indoor and outdoor products including high-efficiency clothes washers, premium high efficiency toilets, weather based irrigation controllers, rotating sprinkler nozzles, rain barrels and cisterns, and soil moisture sensors. Rebates are also available for customers who remove turf grass and replace it with a sustainable landscape. Over the past five years, District customers received over 1,100 rebates including 298 for high efficiency clothes washers and 882 for rain barrels.

The SocalWaterSmart regional CII program offers rebates to replace select older inefficient devices with water efficient devices. CII customers are also eligible for turf removal rebates. District CII customers installed nearly 1,900 rotating nozzles using this program.

### WaterSmart Checkups

In partnership with the Water Authority, the District offers its customers WaterSmart Checkups to assist both residential and commercial customers to identify water saving opportunities specific to their site. Certified landscape irrigation auditors evaluate a site's landscape and irrigation system resulting in a list of recommendations provided to the customer to improve water efficiency, including plant alternatives and a proposed watering schedule. Residential sites may also receive an indoor evaluation that identifies inefficient water fixtures. The service is provided at no cost to the customer.

### WaterSmart Turf Replacement and Sustainable Landscapes Program

The Water Authority implemented two turf replacement programs; the WaterSmart Turf Replacement program, which ran from December 2012 to January 2016, and the Sustainable Landscapes Incentive Program that ran from October 2016 to June 2018. Both programs offered a monetary incentive per square foot to replace natural grass with water-wise landscaping.

### **9.3 IMPLEMENTATION OVER THE PAST FIVE YEARS**

Refer to Section 9.2.7 for a list of the DMMs implemented over the past five years by the District.

### **9.4 IMPLEMENTATION TO ACHIEVE WATER USE TARGETS**

As mentioned in Section 9.1, the District has a long history of including water conservation in water supply planning. The District will continue to utilize DMMs listed in Section 9.2.7 to meet its future water supply planning targets.

### **9.5 WATER USE OBJECTIVES (FUTURE REQUIREMENTS)**

Once the District obtains its future water use objectives the District will align its conservation management actions to consider these obligations.

**CHAPTER 10 – PLAN ADOPTION, SUBMITTAL AND IMPLEMENTATION**

**10.1 INCLUSION OF ALL 2020 DATA**

The District’s 2020 Plan includes water use and planning data for FY 2020. As such, the 2020 Plan was completed after close of FY 2020 (June 30, 2020).

**10.2 NOTICE OF PUBLIC HEARING**

**10.2.1 Notice to Cities and Counties**

In accordance with the Act, the District notified cities and the County within its service area 60 days prior to the public hearing that it was preparing a 2020 Plan. Notice of the public hearing and copies of the draft 2020 Plan were made available to cities and the County. Table 10-1 lists the cities and county that received the 60-day notice as well as the notice of public hearing. Copies of the 2020 Plan preparation and public hearing notices are included in Appendix B.

<b>TABLE 10-1: NOTIFICATION TO CITIES AND COUNTIES</b>		
<b>City/County Name</b>	<b>60 Day Notice</b>	<b>Notice of Public Hearing</b>
City of Vista	✓	✓
City of Escondido	✓	✓
City of San Marcos	✓	✓
City of Oceanside	✓	✓
County of San Diego	✓	✓

**10.2.2 Notice to the Public**

Per Water Code Section 10642, the District’s draft 2020 Plan was made available for public inspection at its office. Additionally, an electronic copy of the draft 2020 Plan was made available for review on the District’s website. The District published a notice of public hearing in the newspaper pursuant to the requirements set forth in Government Code Section 6066. A copy of the public hearing notice is included in Appendix B.

**10.3 PUBLIC HEARING AND ADOPTION**

In accordance with the Act and Government Code Section 6066, the District Board of Directors held a public hearing on June 16, 2021 at 9:00 AM and adopted the 2020 Plan following the closure of said public hearing. As stated in its public hearing notice, the District encouraged the active involvement of the diverse social, cultural, and economic elements of the population within its service area. Copies of resolution adopting the 2020 Plan and minutes from the June 16, 2021 meeting are included in Appendix B.

#### **10.4 PLAN SUBMITTAL**

Within 30 days of adoption, copies of the final 2020 Plan will be submitted to DWR electronically and a CD will be mailed to the California State Library, cities within the District's service area and the County of San Diego.

#### **10.5 PUBLIC AVAILABILITY**

Once the 2020 Plan has been submitted to DWR, it will be posted to the District's website and be made available in hardcopy at the District's office during normal business hours.

#### **10.6 PLAN IMPLEMENTATION**

The programs and policies set forth in the 2020 Plan will be implemented to assist the District in meeting conservation goals and balance available water supplies with demands.

The District plans, designs, and constructs water system facilities to meet projected ultimate demands to be placed upon the potable water system. As documented in previous plans, the District forecasts needs and plans for water supply requirements to meet projected demands at ultimate build out. The water facilities are constructed when development activities require them for adequate cost effective water service. The District continues to implement projects identified in its Potable Water Master Plan based on system demands.



## **APPENDIX A**

Urban Water Management Planning Act

Senate Bill 7 of the Seventh Extraordinary Session (SBX 7-7)  
(Water Conservation Act of 2009)

Methodologies for Calculating Baseline and Compliance per Capita  
Water Use

# Appendix A. California Water Code – Urban Water Management Planning

**This material is for informational purposes only and not to be used in place of official California Water Code (Water Code).**

This document presents updated sections of Water Code as of January 1, 2020, as compiled by DWR staff. The selection focuses on the portions of code directly relevant to preparation of the urban water management plan and contextually relevant to urban water suppliers and the Department of Water Resources (DWR). This includes the Urban Water Management Planning Act and the Sustainable Water Use and Demand Reduction (SB X7-7), and more. Further legislative information is available on the California Legislative Information website at

<https://leginfo.legislature.ca.gov/>.

The following Water Code sections are included in this appendix.

- **Sustainable Water Use and Demand Reduction (SB X7-7)  
Water Code Division 6, Part 2.55**
  - **Chapter 1. General Declarations and Policy**, Sections 10608 – 10608.8
  - **Chapter 2. Definitions**, Section 10608.12
  - **Chapter 3. Urban Retail Water Suppliers**, Sections 10608.16 – 10608.44
  - **Chapter 4. Agricultural Water Suppliers**, Section 10608.48
  - **Chapter 5. Sustainable Water Management**, Section 10608.50
  - **Chapter 6. Standardized Data Collection**, Section 10608.52
  - **Chapter 7. Funding Provisions**, Sections 10608.56 – 10608.60
  - **Chapter 8. Quantifying Agricultural Water Use Efficiency**, Section 10608.64

- **Urban Water Management Planning Act  
Water Code Division 6, Part 2.6**
  - **Chapter 1. General Declaration and Policy**, Sections 10610 – 10610.4
  - **Chapter 2. Definitions**, Sections 10611 – 10618
  - **Chapter 3. Urban Water Management Plans**
    - Article 1. General Provisions, Sections 10620 – 10621
    - Article 2. Contents of Plans, Sections 10630 – 10634
    - Article 2.5. Water Service Reliability, Section 10635
    - Article 3. Adoption and Implementation of Plans, Sections 10640 – 10645
  - **Chapter 4. Miscellaneous Provisions**, Sections 10650 – 10657

**PART 2.55. SUSTAINABLE WATER USE AND DEMAND REDUCTION  
CHAPTER 1. General Declaration and Policy [10608 – 10608.8]**

**10608.** The Legislature finds and declares all of the following:

- (a) Water is a public resource that the California Constitution protects against waste and unreasonable use.
- (b) Growing population, climate change, and the need to protect and grow California’s economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.
- (c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.
- (d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.
- (e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.
- (f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time,

providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

- (g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.
- (h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.
- (i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

**10608.4.** It is the intent of the Legislature, by the enactment of this part, to do all of the following:

- (a) Require all water suppliers to increase the efficiency of use of this essential resource.
- (b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.
- (c) Measure increased efficiency of urban water use on a per capita basis.
- (d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.
- (e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.
- (f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

- (g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.
- (h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.
- (i) Require implementation of specified efficient water management practices for agricultural water suppliers.
- (j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.
- (k) Advance regional water resources management.

**10608.8.** (a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

- (b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.
- (c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population

growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

- (d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

## **CHAPTER 2. Definitions [10608.12]**

**10608.12.** Unless the context otherwise requires, the following definitions govern the construction of this part:

- (a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.
- (b) "Base daily per capita water use" means any of the following:
  - (1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
  - (2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the

calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

- (3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.
- (c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.
- (d) "CII water use" means water used by commercial water users, industrial water users, institutional water users, and large landscape water users.
- (e) "Commercial water user" means a water user that provides or distributes a product or service.
- (f) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.
- (g) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.
- (h) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:
- (1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.
  - (2) The net volume of water that the urban retail water supplier places into long-term storage.
  - (3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.
  - (4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.
- (i) "Industrial water user" means a water user that is primarily a

manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

- (j) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.
- (k) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.
- (l) "Large landscape" means a nonresidential landscape as described in the performance measures for CII water use adopted pursuant to Section 10609.10.
- (m) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.
- (n) "Performance measures" means actions to be taken by urban retail water suppliers that will result in increased water use efficiency by CII water users. Performance measures may include, but are not limited to, educating CII water users on best management practices, conducting water use audits, and preparing water management plans. Performance measures do not include process water.
- (o) "Potable reuse" means direct potable reuse, indirect potable reuse for groundwater recharge, and reservoir water augmentation as those terms are defined in Section 13561.
- (p) "Process water" means water used by industrial water users for producing a product or product content or water used for research and development. Process water includes, but is not limited to, continuous manufacturing processes, and water used for testing, cleaning, and maintaining equipment. Water used to cool machinery or buildings used in the manufacturing process or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms, and other industrial facility units that



are integral to the manufacturing or research and development process is process water. Water used in the manufacturing process that is necessary for complying with local, state, and federal health and safety laws, and is not incidental water, is process water. Process water does not mean incidental water uses.

- (q) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050.
- (r) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:
  - (1) The capture and reuse of stormwater or rainwater.
  - (2) The use of recycled water.
  - (3) The desalination of brackish groundwater.
  - (4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.
- (s) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.
- (t) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.
- (u) "Urban water use objective" means an estimate of aggregate efficient water use for the previous year based on adopted water use efficiency standards and local service area characteristics for that year, as described in Section 10609.20.
- (v) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.
- (w) "Urban wholesale water supplier" means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

### **CHAPTER 3. Urban Retail Water Suppliers [10608.16 – 10608.44]**

**10608.16.** (a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

- (1) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

**10608.20.** (a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

- (2) It is the intent of the Legislature that the urban water use targets described in paragraph (1) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

- (1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.
- (2) The per capita daily water use that is estimated using the sum of the following performance standards:
  - (A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2017 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.
  - (B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail

water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of

subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

- (d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.
- (e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.
- (f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.
- (g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).
- (h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:
  - (A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

- (B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.
- (2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its internet website, and make written copies available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.
- (i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.
- (2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.
- (j) (1) An urban retail water supplier is granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow the use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.
- (2) An urban wholesale water supplier whose urban water management plan prepared pursuant to Part 2.6 (commencing with Section 10610) was due and not submitted in 2010 is granted an extension to July 1, 2011, to permit coordination between an urban wholesale water

supplier and urban retail water suppliers.

**10608.22.** Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

**10608.24.** (a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

- (b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.
- (c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.
- (d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:
  - (A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.
  - (B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.
  - (C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.
- (2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.
- (e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial

percentage of industrial water use in its service area may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

- (f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.
  - (2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

**10608.26.** (a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

- (1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.
  - (2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.
  - (3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.
- (b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.
- (c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the conservation of that military installation under

federal Executive Order 13514.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

**10608.28.** (a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

- (1) Through an urban wholesale water supplier.
- (2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).
- (3) Through a regional water management group as defined in Section 10537.
- (4) By an integrated regional water management funding area.
- (5) By hydrologic region.
- (6) Through other appropriate geographic scales for which computation methods have been developed by the



department.

- (b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

**10608.32.** All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

**10608.34.** (a) (1) On or before January 1, 2017, the department shall adopt rules for all of the following:

- (A) The conduct of standardized water loss audits by urban retail water suppliers in accordance with the method adopted by the American Water Works Association in the third edition of Water Audits and Loss Control Programs, Manual M36 and in the Free Water Audit Software, version 5.0.
- (B) The process for validating a water loss audit report prior to submitting the report to the department. For the purposes of this section, "validating" is a process whereby an urban retail water supplier uses a technical expert to confirm the basis of all data entries in the urban retail water supplier's water loss audit report and to appropriately characterize the quality of the reported data. The validation process shall follow the principles and terminology laid out by the American Water Works Association in the third edition of Water Audits and Loss Control Programs, Manual M36 and in the Free Water Audit Software, version 5.0. A validated water loss audit report shall include the name and technical qualifications of the person engaged for validation.
- (C) The technical qualifications required of a person to

- engage in validation, as described in subparagraph (B).
- (D) The certification requirements for a person selected by an urban retail water supplier to provide validation of its own water loss audit report.
- (E) The method of submitting a water loss audit report to the department.
- (2) The department shall update rules adopted pursuant to paragraph (1) no later than six months after the release of subsequent editions of the American Water Works Association's Water Audits and Loss Control Programs, Manual M36. Except as provided by the department, until the department adopts updated rules pursuant to this paragraph, an urban retail water supplier may rely upon a subsequent edition of the American Water Works Association's Water Audits and Loss Control Programs, Manual M36 or the Free Water Audit Software.
- (b) (1) On or before October 1 of each year until October 1, 2023, each urban retail water supplier reporting on a calendar year basis shall submit a completed and validated water loss audit report for the previous calendar year or the previous fiscal year as prescribed by the department pursuant to subdivision (a).
- (2) On or before January 1 of each year until January 1, 2024, each urban retail water supplier reporting on a fiscal year basis shall submit a completed and validated water loss audit report for the previous fiscal year as prescribed by the department pursuant to subdivision (a).
- (3) On or before January 1, 2024, and on or before January 1 of each year thereafter, each urban retail water supplier shall submit a completed and validated water loss audit report for the previous calendar year or previous fiscal year as part of the report submitted to the department pursuant to subdivision (a) of Section 10609.24 and as prescribed by the department pursuant to subdivision (a).
- (4) Water loss audit reports submitted on or before October 1, 2017, may be completed and validated with assistance as described in subdivision (c).

- (c) Using funds available for the 2016–17 fiscal year, the board shall contribute up to four hundred thousand dollars (\$400,000) towards procuring water loss audit report validation assistance for urban retail water suppliers.
- (d) Each water loss audit report submitted to the department shall be accompanied by information, in a form specified by the department, identifying steps taken in the preceding year to increase the validity of data entered into the final audit, reduce the volume of apparent losses, and reduce the volume of real losses.
- (e) At least one of the following employees of an urban retail water supplier shall attest to each water loss audit report submitted to the department:
  - (1) The chief financial officer.
  - (2) The chief engineer.
  - (3) The general manager.
- (f) The department shall deem incomplete and return to the urban retail water supplier any final water loss audit report found by the department to be incomplete, not validated, unattested, or incongruent with known characteristics of water system operations. A water supplier shall resubmit a completed water loss audit report within 90 days of an audit being returned by the department.
- (g) The department shall post all validated water loss audit reports on its internet website in a manner that allows for comparisons across water suppliers. The department shall make the validated water loss audit reports available for public viewing in a timely manner after their receipt.
- (h) Using available funds, the department shall provide technical assistance to guide urban retail water suppliers' water loss detection programs, including, but not limited to, metering techniques, pressure management techniques, condition-based assessment techniques for transmission and distribution pipelines, and utilization of portable and permanent water loss detection devices.
- (i) No earlier than January 1, 2019, and no later than July 1, 2020, the board shall adopt rules requiring urban retail water suppliers to meet performance standards for the volume of water losses. In

adopting these rules, the board shall employ full life-cycle cost accounting to evaluate the costs of meeting the performance standards. The board may consider establishing a minimum allowable water loss threshold that, if reached and maintained by an urban water supplier, would exempt the urban water supplier from further water loss reduction requirements.

**10608.35.** (a) The department, in coordination with the board, shall conduct necessary studies and investigations and make a recommendation to the Legislature, by January 1, 2020, on the feasibility of developing and enacting water loss reporting requirements for urban wholesale water suppliers.

(b) The studies and investigations shall include an evaluation of the suitability of applying the processes and requirements of Section 10608.34 to urban wholesale water suppliers.

(c) In conducting necessary studies and investigations and developing its recommendation, the department shall solicit broad public participation from stakeholders and other interested persons.

**10608.36.** Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

**10608.40.** Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

**10608.42.** (a) The department shall review the 2015 urban water management plans and report to the Legislature by July 1, 2017, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

- (b) A report to be submitted pursuant to subdivision (a) shall be submitted in compliance with Section 9795 of the Government Code.

**10608.43.** The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

- (a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.
- (b) Evaluation of water demands for manufacturing processes, goods, and cooling.
- (c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.
- (d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.
- (e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

**10608.44.** Each state agency shall reduce water use at facilities it operates to support urban retail water suppliers in meeting the target identified in

Section 10608.16.

#### **CHAPTER 4. Agricultural Water Suppliers [10608.48]**

**10608.48.** (a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

- (b) Agricultural water suppliers shall implement both of the following critical efficient management practices:
  - (1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).
  - (2) Adopt a pricing structure for water customers based at least in part on quantity delivered.
- (c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:
  - (1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.
  - (2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.
  - (3) Facilitate the financing of capital improvements for on-farm irrigation systems.
  - (4) Implement an incentive pricing structure that promotes one or more of the following goals:
    - (A) More efficient water use at the farm level.
    - (B) Conjunctive use of groundwater.
    - (C) Appropriate increase of groundwater recharge.
    - (D) Reduction in problem drainage.

- (E) Improved management of environmental resources.
  - (F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.
- (5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.
  - (6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.
  - (7) Construct and operate supplier spill and tailwater recovery systems.
  - (8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.
  - (9) Automate canal control structures.
  - (10) Facilitate or promote customer pump testing and evaluation.
  - (11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.
  - (12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:
    - (A) On-farm irrigation and drainage system evaluations.
    - (B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.
    - (C) Surface water, groundwater, and drainage water quantity and quality data.
    - (D) Agricultural water management educational programs and materials for farmers, staff, and the public.
  - (13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.
  - (14) Evaluate and improve the efficiencies of the supplier's

pumps.

- (d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.
- (e) The department shall require information about the implementation of efficient water management practices to be reported using a standardized form developed pursuant to Section 10608.52. (f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.
- (f) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.
- (g) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.



- (h) (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).
- (2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

## **CHAPTER 5. Sustainable Water Management [10608.50]**

**10608.50.** (a) The department, in consultation with the board, shall promote implementation of regional water resources management practices through increased incentives and removal of barriers consistent with state and federal law. Potential changes may include, but are not limited to, all of the following:

- (1) Revisions to the requirements for urban and agricultural water management plans.
- (2) Revisions to the requirements for integrated regional water management plans.
- (3) Revisions to the eligibility for state water management grants and loans.
- (4) Revisions to state or local permitting requirements that increase water supply opportunities, but do not weaken water quality protection under state and federal law.
- (5) Increased funding for research, feasibility studies, and project construction.
- (6) Expanding technical and educational support for local land use and water management agencies.

- (b) No later than January 1, 2011, and updated as part of the California Water Plan, the department, in consultation with the board, and with public input, shall propose new statewide targets, or review and update existing statewide targets, for regional water resources management practices, including, but not limited to, recycled water, brackish groundwater desalination, and infiltration and direct use of urban stormwater runoff.

## **CHAPTER 6. Standardized Data Collection [10608.52]**

**10608.52.** (a) The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.

- (b) At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24 and an agricultural water supplier's compliance with implementation of efficient water management practices pursuant to subdivision (a) of Section 10608.48. The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.

## **CHAPTER 7. Funding Provisions [10608.56 – 10608.60]**

**10608.56.** (a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

- (b) On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.
- (c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita

reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions. The supplier may request grant or loan funds to achieve the per capita reductions to the extent the request is consistent with the eligibility requirements applicable to the water funds.

- (d) Notwithstanding subdivision (b), the department shall determine that an agricultural water supplier is eligible for a water grant or loan even though the supplier is not implementing all of the efficient water management practices described in Section 10608.48, if the agricultural water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the efficient water management practices. The supplier may request grant or loan funds to implement the efficient water management practices to the extent the request is consistent with the eligibility requirements applicable to the water funds.
- (e) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.
- (f) The department shall not deny eligibility to an urban retail water supplier or agricultural water supplier in compliance with the requirements of this part and Part 2.8 (commencing with Section 10800), that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the requirements of this part or Part 2.8 (commencing with Section 10800).

**10608.60.** (a) It is the intent of the Legislature that funds made available by Section 75026 of the Public Resources Code should be expended, consistent with Division 43 (commencing with Section 75001) of the Public

Resources Code and upon appropriation by the Legislature, for grants to implement this part. In the allocation of funding, it is the intent of the Legislature that the department give consideration to disadvantaged communities to assist in implementing the requirements of this part.

- (b) It is the intent of the Legislature that funds made available by Section 75041 of the Public Resources Code, should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for direct expenditures to implement this part.

## **CHAPTER 8. Quantifying Agricultural Water Use Efficiency [10608.64]**

**10608.64.** The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.

## **PART 2.55. SUSTAINABLE WATER USE AND DEMAND REDUCTION [10608 – 10609.42]**

### **CHAPTER 9. Urban Water Use Objectives and Water Use Reporting [10609 – 10609.38]**

**10609.** (a) The Legislature finds and declares that this chapter establishes a method to estimate the aggregate amount of water that would have been delivered the previous year by an urban retail water supplier if all that water had been used efficiently. This estimated aggregate water use is the urban retail water supplier's urban water use objective. The method is based on water use efficiency standards and local service area characteristics for that year. By comparing the amount of water actually used in the previous year with the urban water use objective, local urban water suppliers will be in a better position to help eliminate unnecessary use of water; that is, water used in excess of that needed to accomplish the intended beneficial use.

- (b) The Legislature further finds and declares all of the following:
- (1) This chapter establishes standards and practices for the following water uses:
    - (A) Indoor residential use.
    - (B) Outdoor residential use.
    - (C) CII water use.
    - (D) Water losses.
    - (E) Other unique local uses and situations that can have a material effect on an urban water supplier's total water use.
  - (2) This chapter further does all of the following:
    - (A) Establishes a method to calculate each urban water use objective.
    - (B) Considers recycled water quality in establishing efficient irrigation standards.
    - (C) Requires the department to provide or otherwise identify data regarding the unique local conditions to support the calculation of an urban water use objective.
    - (D) Provides for the use of alternative sources of data if alternative sources are shown to be as accurate as, or more accurate than, the data provided by the department.
    - (E) Requires annual reporting of the previous year's water use with the urban water use objective.
    - (F) Provides a bonus incentive for the amount of potable recycled water used the previous year when comparing the previous year's water use with the urban water use objective, of up to 10 percent of the urban water use objective.
  - (3) This chapter requires the department and the board to solicit broad public participation from stakeholders and other interested persons in the development of the standards and the adoption of regulations pursuant to this chapter.

- (4) This chapter preserves the Legislature’s authority over long-term water use efficiency target setting and ensures appropriate legislative oversight of the implementation of this chapter by doing all of the following:
  - (A) Requiring the Legislative Analyst to conduct a review of the implementation of this chapter, including compliance with the adopted standards and regulations, accuracy of the data, use of alternate data, and other issues the Legislative Analyst deems appropriate.
  - (B) Stating legislative intent that the director of the department and the chairperson of the board appear before the appropriate Senate and Assembly policy committees to report on progress in implementing this chapter.
  - (C) Providing one-time-only authority to the department and board to adopt water use efficiency standards, except as explicitly provided in this chapter. Authorization to update the standards shall require separate legislation.
- (c) It is the intent of the Legislature that the following principles apply to the development and implementation of long-term standards and urban water use objectives:
  - (1) Local urban retail water suppliers should have primary responsibility for meeting standards-based water use targets, and they shall retain the flexibility to develop their water supply portfolios, design and implement water conservation strategies, educate their customers, and enforce their rules.
  - (2) Long-term standards and urban water use objectives should advance the state’s goals to mitigate and adapt to climate change.
  - (3) Long-term standards and urban water use objectives should acknowledge the shade, air quality, and heat-island reduction benefits provided to communities by trees through the support of water-efficient irrigation practices that keep trees healthy.

- (4) The state should identify opportunities for streamlined reporting, eliminate redundant data submissions, and incentivize open access to data collected by urban and agricultural water suppliers.

**10609.2.** (a) The board, in coordination with the department, shall adopt long-term standards for the efficient use of water pursuant to this chapter on or before June 30, 2022.

(b) Standards shall be adopted for all of the following:

- (1) Outdoor residential water use.
- (2) Outdoor irrigation of landscape areas with dedicated irrigation meters in connection with CII water use.
- (3) A volume for water loss.

(c) When adopting the standards under this section, the board shall consider the policies of this chapter and the proposed efficiency standards' effects on local wastewater management, developed and natural parklands, and urban tree health. The standards and potential effects shall be identified by May 30, 2022. The board shall allow for public comment on potential effects identified by the board under this subdivision.

(d) The long-term standards shall be set at a level designed so that the water use objectives, together with other demands excluded from the long-term standards such as CII indoor water use and CII outdoor water use not connected to a dedicated landscape meter, would exceed the statewide conservation targets required pursuant to Chapter 3 (commencing with Section 10608.16).

(e) The board, in coordination with the department, shall adopt by regulation variances recommended by the department pursuant to Section 10609.14 and guidelines and methodologies pertaining to the calculation of an urban retail water supplier's urban water use objective recommended by the department pursuant to Section 10609.16.

**10609.4.** (a) (1) Until January 1, 2025, the standard for indoor residential water use shall be 55 gallons per capita daily.

(2) Beginning January 1, 2025, and until January 1, 2030, the

standard for indoor residential water use shall be the greater of 52.5 gallons per capita daily or a standard recommended pursuant to subdivision (b).

(3) Beginning January 1, 2030, the standard for indoor residential water use shall be the greater of 50 gallons per capita daily or a standard recommended pursuant to subdivision (b).

(b) (1) The department, in coordination with the board, shall conduct necessary studies and investigations and may jointly recommend to the Legislature a standard for indoor residential water use that more appropriately reflects best practices for indoor residential water use than the standard described in subdivision (a). A report on the results of the studies and investigations shall be made to the chairpersons of the relevant policy committees of each house of the Legislature by January 1, 2021, and shall include information necessary to support the recommended standard, if there is one. The studies and investigations shall also include an analysis of the benefits and impacts of how the changing standard for indoor residential water use will impact water and wastewater management, including potable water usage, wastewater, recycling and reuse systems, infrastructure, operations, and supplies.

(2) The studies, investigations, and report described in paragraph (1) shall include collaboration with, and input from, a broad group of stakeholders, including, but not limited to, environmental groups, experts in indoor plumbing, and water, wastewater, and recycled water agencies.

**10609.6.** (a) (1) The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, standards for outdoor residential use for adoption by the board in accordance with this chapter.

(2) (A) The standards shall incorporate the principles of the model water efficient landscape ordinance adopted by the department pursuant to the Water Conservation in Landscaping Act (Article 10.8 (commencing with Section 65591) of Chapter 3 of Division 1 of Title 7 of the Government Code).

(B) The standards shall apply to irrigable lands.



- (C) The standards shall include provisions for swimming pools, spas, and other water features. Ornamental water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, shall be analyzed separately from swimming pools and spas.
- (b) The department shall, by January 1, 2021, provide each urban retail water supplier with data regarding the area of residential irrigable lands in a manner that can reasonably be applied to the standards adopted pursuant to this section.
- (c) The department shall not recommend standards pursuant to this section until it has conducted pilot projects or studies, or some combination of the two, to ensure that the data provided to local agencies are reasonably accurate for the data's intended uses, taking into consideration California's diverse landscapes and community characteristics.

**10609.8.** (a) The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, standards for outdoor irrigation of landscape areas with dedicated irrigation meters or other means of calculating outdoor irrigation use in connection with CII water use for adoption by the board in accordance with this chapter.

- (b) The standards shall incorporate the principles of the model water efficient landscape ordinance adopted by the department pursuant to the Water Conservation in Landscaping Act (Article 10.8 (commencing with Section 65591) of Chapter 3 of Division 1 of Title 7 of the Government Code).
- (c) The standards shall include an exclusion for water for commercial agricultural use meeting the definition of subdivision (b) of Section 51201 of the Government Code.

**10609.9.** For purposes of Sections 10609.6 and 10609.8, "principles of the model water efficient landscape ordinance" means those provisions of the model water efficient landscape ordinance applicable to the establishment or determination of the amount of water necessary to efficiently irrigate both new and existing landscapes. These provisions include, but are not limited to, all of the following:

- (a) Evapotranspiration adjustment factors, as applicable.
- (b) Landscape area.
- (c) Maximum applied water allowance.
- (d) Reference evapotranspiration.
- (e) Special landscape areas, including provisions governing evapotranspiration adjustment factors for different types of water used for irrigating the landscape.

**10609.10.** (a) The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, performance measures for CII water use for adoption by the board in accordance with this chapter.

- (b) Prior to recommending performance measures for CII water use, the department shall solicit broad public participation from stakeholders and other interested persons relating to all of the following:
  - (1) Recommendations for a CII water use classification system for California that address significant uses of water.
  - (2) Recommendations for setting minimum size thresholds for converting mixed CII meters to dedicated irrigation meters, and evaluation of, and recommendations for, technologies that could be used in lieu of requiring dedicated irrigation meters.
  - (3) Recommendations for CII water use best management practices, which may include, but are not limited to, water audits and water management plans for those CII customers that exceed a recommended size, volume of water use, or other threshold.
- (c) Recommendations of appropriate performance measures for CII water use shall be consistent with the October 21, 2013, report to the Legislature by the Commercial, Industrial, and Institutional Task Force entitled "Water Use Best Management Practices," including the technical and financial feasibility recommendations provided in that report, and shall support the economic productivity of California's commercial, industrial, and institutional sectors.

- (d) (1) The board, in coordination with the department, shall adopt performance measures for CII water use on or before June 30, 2022.

- (a) Each urban retail water supplier shall implement the performance measures adopted by the board pursuant to paragraph (1).

**10609.12.** The standards for water loss for urban retail water suppliers shall be the standards adopted by the board pursuant to subdivision (i) of Section 10608.34.

**10609.14.** (a) The department, in coordination with the board, shall conduct necessary studies and investigations and, no later than October 1, 2021, recommend for adoption by the board in accordance with this chapter appropriate variances for unique uses that can have a material effect on an urban retail water supplier's urban water use objective.

- (b) Appropriate variances may include, but are not limited to, allowances for the following:

- (1) Significant use of evaporative coolers.
- (2) Significant populations of horses and other livestock.
- (3) Significant fluctuations in seasonal populations.
- (4) Significant landscaped areas irrigated with recycled water having high levels of total dissolved solids.
- (5) Significant use of water for soil compaction and dust control.
- (6) Significant use of water to supplement ponds and lakes to sustain wildlife.
- (7) Significant use of water to irrigate vegetation for fire protection.
- (8) Significant use of water for commercial or noncommercial agricultural use.

- (c) The department, in recommending variances for adoption by the board, shall also recommend a threshold of significance for each recommended variance.

- (d) Before including any specific variance in calculating an urban retail water supplier's water use objective, the urban retail water supplier shall request and receive approval by the board for the inclusion of that variance.

- (e) The board shall post on its Internet Web site all of the following:

- (1) A list of all urban retail water suppliers with approved variances.
- (2) The specific variance or variances approved for each urban retail water supplier.
- (3) The data supporting approval of each variance.

**10609.15.** To help streamline water data reporting, the department and the board shall do all of the following:

- (a) Identify urban water reporting requirements shared by both agencies, and post on each agency's Internet Web site how the data is used for planning, regulatory, or other purposes.
- (b) Analyze opportunities for more efficient publication of urban water reporting requirements within each agency, and analyze how each agency can integrate various data sets in a publicly accessible location, identify priority actions, and implement priority actions identified in the analysis.
- (c) Make appropriate data pertaining to the urban water reporting requirements that are collected by either agency available to the public according to the principles and requirements of the Open and Transparent Water Data Act (Part 4.9 (commencing with Section 12400)).

**10609.16.** The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, guidelines and methodologies for the board to adopt that identify how an urban retail water supplier calculates its urban water use objective. The guidelines and methodologies shall address, as necessary, all of the following:

- (a) Determining the irrigable lands within the urban retail water supplier's service area.
- (b) Updating and revising methodologies described pursuant to subparagraph (A) of paragraph (1) of subdivision (h) of Section 10608.20, as appropriate, including methodologies for calculating the population in an urban retail water supplier's service area.
- (c) Using landscape area data provided by the department or alternative data.

- (d) Incorporating precipitation data and climate data into estimates of a urban retail water supplier's outdoor irrigation budget for its urban water use objective.
- (e) Estimating changes in outdoor landscape area and population, and calculating the urban water use objective, for years when updated landscape imagery is not available from the department.
- (f) Determining acceptable levels of accuracy for the supporting data, the urban water use objective, and compliance with the urban water use objective.

**10609.18.** The department and the board shall solicit broad public participation from stakeholders and other interested persons in the development of the standards and the adoption of regulations pursuant to this chapter. The board shall hold at least one public meeting before taking any action on any standard or variance recommended by the department.

**10609.20.** (a) Each urban retail water supplier shall calculate its urban water use objective no later than January 1, 2024, and by January 1 every year thereafter.

- (b) The calculation shall be based on the urban retail water supplier's water use conditions for the previous calendar or fiscal year.
- (c) Each urban water supplier's urban water use objective shall be composed of the sum of the following:
  - (1) Aggregate estimated efficient indoor residential water use.
  - (2) Aggregate estimated efficient outdoor residential water use.
  - (3) Aggregate estimated efficient outdoor irrigation of landscape areas with dedicated irrigation meters or equivalent technology in connection with CII water use.
  - (4) Aggregate estimated efficient water losses.
  - (5) Aggregate estimated water use in accordance with variances, as appropriate.
- (d) (1) An urban retail water supplier that delivers water from a groundwater basin, reservoir, or other source that is augmented by potable reuse water may adjust its urban water use objective by a bonus incentive calculated pursuant to this subdivision.

- (2) The water use objective bonus incentive shall be the volume of its potable reuse delivered to residential water users and to landscape areas with dedicated irrigation meters in connection with CII water use, on an acre-foot basis.
- (3) The bonus incentive pursuant to paragraph (1) shall be limited in accordance with one of the following:
  - (A) The bonus incentive shall not exceed 15 percent of the urban water supplier's water use objective for any potable reuse water produced at an existing facility.
  - (B) The bonus incentive shall not exceed 10 percent of the urban water supplier's water use objective for any potable reuse water produced at any facility that is not an existing facility.
- (4) For purposes of this subdivision, "existing facility" means a facility that meets all of the following:
  - (A) The facility has a certified environmental impact report, mitigated negative declaration, or negative declaration on or before January 1, 2019.
  - (B) The facility begins producing and delivering potable reuse water on or before January 1, 2022.
  - (C) The facility uses microfiltration and reverse osmosis technologies to produce the potable reuse water.
- (e)
  - (1) The calculation of the urban water use objective shall be made using landscape area and other data provided by the department and pursuant to the standards, guidelines, and methodologies adopted by the board. The department shall provide data to the urban water supplier at a level of detail sufficient to allow the urban water supplier to verify its accuracy at the parcel level.
  - (2) Notwithstanding paragraph (1), an urban retail water supplier may use alternative data in calculating the urban water use objective if the supplier demonstrates to the department that the alternative data are equivalent, or superior, in quality and accuracy to the data provided by the department. The department may provide technical assistance to an urban retail water supplier in evaluating whether the alternative data are appropriate for use in calculating the supplier's urban water use objective.

**10609.21.** (a) For purposes of Section 10609.20, and notwithstanding paragraph (4) of subdivision (d) of Section 10609.20, "existing facility" also includes the North City Project, phase one of the Pure Water San Diego Program, for which an environmental impact report was certified on April 10, 2018.

(b) This section shall become operative on January 1, 2019.

**10609.22.** (a) An urban retail water supplier shall calculate its actual urban water use no later than January 1, 2024, and by January 1 every year thereafter.

(b) The calculation shall be based on the urban retail water supplier's water use for the previous calendar or fiscal year.

(c) Each urban water supplier's urban water use shall be composed of the sum of the following:

- (1) Aggregate residential water use.
- (2) Aggregate outdoor irrigation of landscape areas with dedicated irrigation meters in connection with CII water use.
- (3) Aggregate water losses.

**10609.24.** (a) An urban retail water supplier shall submit a report to the department no later than January 1, 2024, and by January 1 every year thereafter. The report shall include all of the following:

- (1) The urban water use objective calculated pursuant to Section 10609.20 along with relevant supporting data.
- (2) The actual urban water use calculated pursuant to Section 10609.22 along with relevant supporting data.
- (3) Documentation of the implementation of the performance measures for CII water use.
- (4) A description of the progress made towards meeting the urban water use objective.
- (5) The validated water loss audit report conducted pursuant to Section 10608.34.

(b) The department shall post the reports and information on its internet website.



- (c) The board may issue an information order or conservation order to, or impose civil liability on, an entity or individual for failure to submit a report required by this section.

**10609.25.** As part of the first report submitted to the department by an urban retail water supplier no later than January 1, 2024, pursuant to subdivision (a) of Section 10609.24, each urban retail water supplier shall provide a narrative that describes the water demand management measures that the supplier plans to implement to achieve its urban water use objective by January 1, 2027.

**10609.26.** (a) (1) On and after January 1, 2024, the board may issue informational orders pertaining to water production, water use, and water conservation to an urban retail water supplier that does not meet its urban water use objective required by this chapter. Informational orders are intended to obtain information on supplier activities, water production, and conservation efforts in order to identify technical assistance needs and assist urban water suppliers in meeting their urban water use objectives.

(2) In determining whether to issue an informational order, the board shall consider the degree to which the urban retail water supplier is not meeting its urban water use objective, information provided in the report required by Section 10609.24, and actions the urban retail water supplier has implemented or will implement in order to help meet the urban water use objective.

(3) The board shall share information received pursuant to this subdivision with the department.

(4) An urban water supplier may request technical assistance from the department. The technical assistance may, to the extent available, include guidance documents, tools, and data.

(b) On and after January 1, 2025, the board may issue a written notice to an urban retail water supplier that does not meet its urban water use objective required by this chapter. The written notice may warn the urban retail water supplier that it is not meeting its urban water use objective described in Section 10609.20 and is not making adequate progress in meeting the urban water use objective, and may request that the urban retail water supplier

address areas of concern in its next annual report required by Section 10609.24. In deciding whether to issue a written notice, the board may consider whether the urban retail water supplier has received an informational order, the degree to which the urban retail water supplier is not meeting its urban water use objective, information provided in the report required by Section 10609.24, and actions the urban retail water supplier has implemented or will implement in order to help meet its urban water use objective.

- (c) (1) On and after January 1, 2026, the board may issue a conservation order to an urban retail water supplier that does not meet its urban water use objective. A conservation order may consist of, but is not limited to, referral to the department for technical assistance, requirements for education and outreach, requirements for local enforcement, and other efforts to assist urban retail water suppliers in meeting their urban water use objective.
- (2) In issuing a conservation order, the board shall identify specific deficiencies in an urban retail water supplier's progress towards meeting its urban water use objective, and identify specific actions to address the deficiencies.
- (3) The board may request that the department provide an urban retail water supplier with technical assistance to support the urban retail water supplier's actions to remedy the deficiencies.
- (d) A conservation order issued in accordance with this chapter may include requiring actions intended to increase water-use efficiency, but shall not curtail or otherwise limit the exercise of a water right, nor shall it require the imposition of civil liability pursuant to Section 377.

**10609.27.** Notwithstanding Section 10609.26, the board shall not issue an information order, written notice, or conservation order pursuant to Section 10609.26 if both of the following conditions are met:

- (a) The board determines that the urban retail water supplier is not meeting its urban water use objective solely because the volume of water loss exceeds the urban retail water supplier's standard for water loss.

- (b) Pursuant to Section 10608.34, the board is taking enforcement action against the urban retail water supplier for not meeting the performance standards for the volume of water losses.

**10609.28.** The board may issue a regulation or informational order requiring a wholesale water supplier, an urban retail water supplier, or a distributor of a public water supply, as that term is used in Section 350, to provide a monthly report relating to water production, water use, or water conservation.

**10609.30.** On or before January 10, 2024, the Legislative Analyst shall provide to the appropriate policy committees of both houses of the Legislature and the public a report evaluating the implementation of the water use efficiency standards and water use reporting pursuant to this chapter. The board and the department shall provide the Legislative Analyst with the available data to complete this report.

- (a) The report shall describe all of the following:

- (1) The rate at which urban retail water users are complying with the standards, and factors that might facilitate or impede their compliance.
- (2) The accuracy of the data and estimates being used to calculate urban water use objectives.
- (3) Indications of the economic impacts, if any, of the implementation of this chapter on urban water suppliers and urban water users, including CII water users.
- (4) The frequency of use of the bonus incentive, the volume of water associated with the bonus incentive, value to urban water suppliers of the bonus incentive, and any implications of the use of the bonus incentive on water use efficiency.
- (5) The early indications of how implementing this chapter might impact the efficiency of statewide urban water use.
- (6) Recommendations, if any, for improving statewide urban water use efficiency and the standards and practices described in this chapter.
- (7) Any other issues the Legislative Analyst deems appropriate.

**10609.32.** It is the intent of the Legislature that the chairperson of the board and the director of the department appear before the appropriate policy committees of both houses of the Legislature on or around January 1, 2026, and report on the implementation of the water use efficiency standards and water use reporting pursuant to this chapter. It is the intent of the Legislature that the topics to be covered include all of the following:

- (a) The rate at which urban retail water suppliers are complying with the standards, and factors that might facilitate or impede their compliance.
- (b) What enforcement actions have been taken, if any.
- (c) The accuracy of the data and estimates being used to calculate urban water use objectives.
- (d) Indications of the economic impacts, if any, of the implementation of this chapter on urban water suppliers and urban water users, including CII water users.
- (e) The frequency of use of the bonus incentive, the volume of water associated with the bonus incentive, value to urban water suppliers of the bonus incentive, and any implications of the use of the bonus incentive on water use efficiency.
- (f) An assessment of how implementing this chapter is affecting the efficiency of statewide urban water use.

**10609.34.** Notwithstanding Section 15300.2 of Title 14 of the California Code of Regulations, an action of the board taken under this chapter shall be deemed to be a Class 8 action, within the meaning of Section 15308 of Title 14 of the California Code of Regulations, provided that the action does not involve relaxation of existing water conservation or water use standards.

**10609.36.** (a) Nothing in this chapter shall be construed to determine or alter water rights. Sections 1010 and 1011 apply to water conserved through implementation of this chapter.

- (b) Nothing in this chapter shall be construed to authorize the board to update or revise water use efficiency standards authorized by this chapter except as explicitly provided in this chapter. Authorization to update the standards beyond that explicitly provided in this chapter shall require separate legislation.

- (c) Nothing in this chapter shall be construed to limit or otherwise affect the use of recycled water as seawater barriers for groundwater salinity management.

**10609.38.** The board may waive the requirements of this chapter for a period of up to five years for any urban retail water supplier whose water deliveries are significantly affected by changes in water use as a result of damage from a disaster such as an earthquake or fire. In establishing the period of a waiver, the board shall take into consideration the breadth of the damage and the time necessary for the damaged areas to recover from the disaster.

## **PART 2.6. URBAN WATER MANAGEMENT PLANNING**

### **CHAPTER 1. General Declaration and Policy [10610 – 10610.4]**

**10610.** This part shall be known and may be cited as the "Urban Water Management Planning Act."

**10610.2.** (a) The Legislature finds and declares all of the following:

- (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
- (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate, and increasing long-term water conservation among Californians, improving water use efficiency within the state's communities and agricultural production, and strengthening local and regional drought planning are critical to California's resilience to drought and climate change.
- (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years now and into the

foreseeable future, and every urban water supplier should collaborate closely with local land-use authorities to ensure water demand forecasts are consistent with current land-use planning.

- (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
  - (6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
  - (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
  - (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
  - (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
- (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

**10610.4.** The Legislature finds and declares that it is the policy of the state as follows:

- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
- (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
- (c) Urban water suppliers shall be required to develop water management plans to achieve the efficient use of available supplies and strengthen local drought planning.

**CHAPTER 2. Definitions [10611 – 10618]**

**10611.** Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

**10611.3.** "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

**10611.5.** "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

**10612.** "Drought risk assessment" means a method that examines water shortage risks based on the driest five-year historic sequence for the agency's water supply, as described in subdivision (b) of Section 10635.

**10613.** "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

**10614.** "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

**10615.** "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

**10616.** "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

**10616.5.** "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

**10617.** "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

**10617.5.** "Water shortage contingency plan" means a document that incorporates the provisions detailed in subdivision (a) of Section 10632 and is subsequently adopted by an urban water supplier pursuant to this article.

**10618.** "Water supply and demand assessment" means a method that looks at current year and one or more dry year supplies and demands for determining water shortage risks, as described in Section 10632.1.

### **CHAPTER 3. Urban Water Management Plans**

#### **ARTICLE 1. General Provisions [10620 – 10621]**

**10620.** (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

- (b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.
- (c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.
- (d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce



preparation costs and contribute to the achievement of conservation, efficient water use, and improved local drought resilience.

- (2) Notwithstanding paragraph (1), each urban water supplier shall develop its own water shortage contingency plan, but an urban water supplier may incorporate, collaborate, and otherwise share information with other urban water suppliers or other governing entities participating in an areawide, regional, watershed, or basinwide urban water management plan, an agricultural management plan, or groundwater sustainability plan development.
  - (3) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.
- (e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.
  - (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

**10621.** (a) Each urban water supplier shall update its plan at least once every five years on or before July 1, in years ending in six and one, incorporating updated and new information from the five years preceding each update.

- (b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.
- (c) An urban water supplier regulated by the Public Utilities Commission shall include its most recent plan and water shortage

- contingency plan as part of the supplier's general rate case filings.
- (d) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).
  - (e) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.
  - (f) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

### **CHAPTER 3. Urban Water Management Plans**

#### **ARTICLE 2. Contents of Plans [10630 – 10634]**

**10630.** It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied, while accounting for impacts from climate change.

**10630.5.** Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

**10631.** A plan shall be adopted in accordance with this chapter that shall do all of the following:

- (a) Describe the service area of the supplier, including current and projected population, climate, and other social, economic, and demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available. The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including,

where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

- (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information, including all of the following:
- (1) A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.
  - (2) When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies.
  - (3) For any planned sources of water supply, a description of the measures that are being undertaken to acquire and develop those water supplies.
  - (4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information:
    - (A) The current version of any groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720), any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management for basins underlying the urban water supplier's service area.
    - (B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater.

For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For a basin that has not been adjudicated, information as to whether the department has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to coordinate with groundwater sustainability agencies or groundwater management agencies listed in subdivision (c) of Section 10723 to maintain or achieve sustainable groundwater conditions in accordance with a groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720).

- (C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
  - (D) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
- (c) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.
- (d) (1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors,

including, but not necessarily limited to, all of the following:

- (A) Single-family residential.
  - (B) Multifamily.
  - (C) Commercial.
  - (D) Industrial.
  - (E) Institutional and governmental.
  - (F) Landscape.
  - (G) Sales to other agencies.
  - (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
  - (I) Agricultural.
  - (J) Distribution system water loss.
- (2) The water use projections shall be in the same five-year increments described in subdivision (a).
- (3) (A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34.
- (B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.
- (C) In the plan due July 1, 2021, and in each update thereafter, data shall be included to show whether the urban retail water supplier met the distribution loss standards enacted by the board pursuant to Section 10608.34.
- (4) (A) Water use projections, where available, shall display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area.

- (B) To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following:
  - (i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.
  - (ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.
- (e) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
  - (1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.
    - (B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:
      - (i) Water waste prevention ordinances.
      - (ii) Metering.
      - (iii) Conservation pricing.
      - (iv) Public education and outreach.
      - (v) Programs to assess and manage distribution system real loss.
      - (vi) Water conservation program coordination and staffing support.
      - (vii) Other demand management measures that have a significant impact on water use as measured in

gallons per capita per day, including innovative measures, if implemented.

- (2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1), and a narrative description of its distribution system asset management and wholesale supplier assistance programs.
- (f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.
- (g) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.
- (h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (f). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

**10631.1.** (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

**10631.2.** (a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:

- (1) An estimate of the amount of energy used to extract or divert water supplies.
- (2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.
- (3) An estimate of the amount of energy used to treat water supplies.
- (4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.
- (5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
- (6) An estimate of the amount of energy used to place water into or withdraw from storage.
- (7) Any other energy-related information the urban water supplier deems appropriate.

(b) The department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.



- (c) The Legislature finds and declares that energy use is only one factor in water supply planning and shall not be considered independently of other factors.

**10632.** (a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:

- (1) The analysis of water supply reliability conducted pursuant to Section 10635.
- (2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:
  - (A) The written decision making process that an urban water supplier will use each year to determine its water supply reliability.
  - (B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:
    - (i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.
    - (ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.
    - (iii) Existing infrastructure capabilities and plausible constraints.
    - (iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.
    - (v) A description and quantification of each source of water supply.

- (3) (A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.
- (B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.
- (4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
- (A) Locally appropriate supply augmentation actions.
- (B) Locally appropriate demand reduction actions to adequately respond to shortages.
- (C) Locally appropriate operational changes.
- (D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.
- (E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.
- (5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:

- (A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.
  - (B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.
  - (C) Any other relevant communications.
- (6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.
- (7) (A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.
- (A) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.
  - (B) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.
- (8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:
- (A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).
  - (B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

- (C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.
- (9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.
- (10) 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.
- (b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.
- (c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

**10632.1.** An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department 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. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

**10632.2.** An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan, as identified in

subdivision (a) of Section 10632, or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1. Nothing in this section prohibits an urban water supplier from taking actions not specified in its water shortage contingency plan, if needed, without having to formally amend its urban water management plan or water shortage contingency plan.

**10632.3.** It is the intent of the Legislature that, upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions, the board defer to implementation of locally adopted water shortage contingency plans to the extent practicable.

**10632.5.** (a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

- (b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.
- (c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

**10633.** The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

- (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the

amount of wastewater collected and treated and the methods of wastewater disposal.

- (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.
- (c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.
- (d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
- (e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.
- (f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.
- (g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

**10634.** The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

**CHAPTER 3. Urban Water Management Plans****ARTICLE 2.5. Water Service Reliability [10635]**

**10635.** (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following:

- (1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.
- (2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.
- (3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.
- (4) Considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate

change conditions, anticipated regulatory changes, and other locally applicable criteria.

- (d) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.
- (e) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.
- (f) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

### **CHAPTER 3. Urban Water Management Plans**

#### **ARTICLE 3. Adoption and Implementation of Plans [10640 – 10645]**

**10640.** (a) Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

- (b) Every urban water supplier required to prepare a water shortage contingency plan shall prepare a water shortage contingency plan pursuant to Section 10632. The supplier shall likewise periodically review the water shortage contingency plan as required by paragraph (10) of subdivision (a) of Section 10632 and any amendments or changes required as a result of that review shall be adopted pursuant to this article.



**10641.** An urban water supplier required to prepare a plan or a water shortage contingency plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

**10642.** Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

**10643.** An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

**10644.** (a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its

water shortage contingency plan prepared pursuant to subdivision (a) of Section 10632 no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department.

- (c) (1) (A) Notwithstanding Section 10231.5 of the Government Code, the department shall prepare and submit to the Legislature, on or before July 1, in the years ending in seven and two, a report summarizing the status of the plans and water shortage contingency plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans and water shortage contingency plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan and water shortage contingency plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans and water shortage contingency plans submitted pursuant to this part.
- (B) The department shall prepare and submit to the board, on or before September 30 of each year, a report summarizing the submitted water supply and demand assessment results along with appropriate reported water shortage conditions and the regional and statewide analysis of water supply conditions developed by the department. As part of the report, the department shall provide a summary and, as appropriate, urban water supplier specific information regarding various shortage response actions implemented as a result of annual supplier-specific water supply and demand assessments performed pursuant to Section 10632.1.
- (C) The department shall submit the report to the Legislature for the 2015 plans by July 1, 2017, and the report to the Legislature for the 2020 plans and water shortage contingency plans by July 1, 2022.
- (2) A report to be submitted pursuant to subparagraph (A) of paragraph (1) shall be submitted in compliance with Section 9795 of the Government Code.

- (d) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

**10645.** (a) Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

- (b) Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

#### **CHAPTER 4. Miscellaneous Provisions [10650 – 10657]**

**10650.** Any actions or proceedings, other than actions by the board, to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

- (a) An action or proceeding alleging failure to adopt a plan or a water shortage contingency plan shall be commenced within 18 months after that adoption is required by this part.
- (b) Any action or proceeding alleging that a plan or water shortage contingency plan, or action taken pursuant to either, does not comply with this part shall be commenced within 90 days after filing of the plan or water shortage contingency plan or an amendment to either pursuant to Section 10644 or the taking of that action.

**10651.** In any action or proceeding to attack, review, set aside, void, or annul a plan or a water shortage contingency plan, or an action taken pursuant to either by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

**10652.** The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the

preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

**10653.** The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the board and the Public Utilities Commission, for the preparation of water management plans, water shortage contingency plans, or conservation plans; provided, that if the board or the Public Utilities Commission requires additional information concerning water conservation, drought response measures, or financial conditions to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan that complies with analogous federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

**10654.** An urban water supplier may recover in its rates the costs incurred in preparing its urban water management plan, its drought risk assessment, its water supply and demand assessment, and its water shortage contingency plan and implementing the reasonable water conservation measures included in either of the plans.

**10655.** If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

**10656.** An urban water supplier is not eligible for a water grant or loan awarded or administered by the state unless the urban water supplier complies with this part.

**10657.** The department may adopt regulations regarding the definitions of water, water use, and reporting periods, and may adopt any other regulations deemed necessary or desirable to implement this part. In developing regulations pursuant to this section, the department shall solicit broad public participation from stakeholders and other interested persons.

# **California Water Code Sustainable Water Use and Demand Reduction**

**California Water Code Division 6, Part 2.55.**

- Chapter 1. General Declarations and Policy §10608-10608.8**
- Chapter 2. Definitions §10608.12**
- Chapter 3. Urban Retail Water Suppliers §10608.16-10608.44**
- Chapter 4. Agricultural Water Suppliers §10608.48**
- Chapter 5. Sustainable Water Management §10608.50**
- Chapter 6 Standardized Data Collection §10608.52**
- Chapter 7 Funding Provisions §10608.56-10608.60**
- Chapter 8 Quantifying Agricultural Water Use Efficiency §10608.64**

## **Chapter 1. General Declarations and Policy**

### **SECTION 10608-10608.8**

10608. The Legislature finds and declares all of the following:

- (a) Water is a public resource that the California Constitution protects against waste and unreasonable use.
- (b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.
- (c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.
- (d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.
- (e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.
- (f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.
- (g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.
- (h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

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- (i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

- (a) Require all water suppliers to increase the efficiency of use of this essential resource.
- (b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.
- (c) Measure increased efficiency of urban water use on a per capita basis.
- (d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.
- (e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.
- (f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.
- (g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.
- (h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.
- (i) Require implementation of specified efficient water management practices for agricultural water suppliers.
- (j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.
- (k) Advance regional water resources management.

- 10608.8. (a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.
- (2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to



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January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

- (3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.
- (b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.
- (c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.
- (d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

## **Chapter 2 Definitions**

### **SECTION 10608.12**

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

- (a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.
- (b) "Base daily per capita water use" means any of the following:
  - (1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

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- (2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- (3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.
- (c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.
- (d) "Commercial water user" means a water user that provides or distributes a product or service.
- (e) "Compliance daily per capita water use" means the gross water use during the year of the reporting period, reported in gallons per capita per day.
- (f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.
- (g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:
  - (1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.
  - (2) The net volume of water that the urban retail water supplier places into long-term storage.
  - (3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.
  - (4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.
- (h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.
- (i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

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- (j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.
- (k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.
- (l) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.
- (m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:
  - (1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:
    - (A) Metered.
    - (B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.
    - (C) Treated to a minimum tertiary level.
    - (D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.
  - (2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.
- (n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:
  - (1) The capture and reuse of stormwater or rainwater.
  - (2) The use of recycled water.
  - (3) The desalination of brackish groundwater.

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- (4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.
- (o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.
- (p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.
- (q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.
- (r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

## **Chapter 3 Urban Retail Water Suppliers**

### SECTION 10608.16-10608.44

10608.16.(a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

- (b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20.(a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

- (2) It is the intent of the Legislature that the urban water use targets described in paragraph (1) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

- (b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

- (1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

- (2) The per capita daily water use that is estimated using the sum of the following performance standards:

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- (A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.
  - (B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.
  - (C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.
- (3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.
- (4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:
- (A) Consider climatic differences within the state.
  - (B) Consider population density differences within the state.
  - (C) Provide flexibility to communities and regions in meeting the targets.
  - (D) Consider different levels of per capita water use according to plant water needs in different regions.
  - (E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.
  - (F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.
- (c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method

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described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

- (d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.
- (e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.
- (f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.
- (g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).
- (h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:
  - (A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.
  - (B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.
- (2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.
- (i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.
- (2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the

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Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

- (j) (1) An urban retail water supplier is granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow the use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.
- (2) An urban wholesale water supplier whose urban water management plan prepared pursuant to Part 2.6 (commencing with Section 10610) was due and not submitted in 2010 is granted an extension to July 1, 2011, to permit coordination between an urban wholesale water supplier and urban retail water suppliers.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph(3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24.(a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in

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paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

- (e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.
- (f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.  
  
(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26.(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

- (1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.
  - (2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.
  - (3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.
- (b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.
- (c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the conservation of that military installation under federal Executive Order 13514.
- (d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit



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an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

- (2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28.(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

- (1) Through an urban wholesale water supplier.
- (2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).
- (3) Through a regional water management group as defined in Section 10537.
- (4) By an integrated regional water management funding area.
- (5) By hydrologic region.
- (6) Through other appropriate geographic scales for which computation methods have been developed by the department.

- (b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans

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submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42.(a) The department shall review the 2015 urban water management plans and report to the Legislature by July 1, 2017, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

(b) A report to be submitted pursuant to subdivision (a) shall be submitted in compliance with Section 9795 of the Government Code.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use at facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

## Chapter 4 Agricultural Water Suppliers

### SECTION 10608.48

10608.48.(a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

(b) Agricultural water suppliers shall implement all of the following critical efficient management practices:

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:

(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.

(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.

(3) Facilitate the financing of capital improvements for on-farm irrigation systems.

(4) Implement an incentive pricing structure that promotes one or more of the following goals:

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

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- (6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.
  - (7) Construct and operate supplier spill and tailwater recovery systems.
  - (8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.
  - (9) Automate canal control structures.
  - (10) Facilitate or promote customer pump testing and evaluation.
  - (11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.
  - (12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:
    - (A) On-farm irrigation and drainage system evaluations.
    - (B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.
    - (C) Surface water, groundwater, and drainage water quantity and quality data.
    - (D) Agricultural water management educational programs and materials for farmers, staff, and the public.
  - (13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.
  - (14) Evaluate and improve the efficiencies of the supplier's pumps.
- (d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.
  - (e) The data shall be reported using a standardized form developed pursuant to Section 10608.52.
  - (f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.

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- (g) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.
- (h) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.
- (i)
  - (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).
  - (2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

## **Chapter 5 Sustainable Water Management**

### Section 10608.50

- 10608.50.(a) The department, in consultation with the board, shall promote implementation of regional water resources management practices through increased incentives and removal of barriers consistent with state and federal law. Potential changes may include, but are not limited to, all of the following:
- (1) Revisions to the requirements for urban and agricultural water management plans.
  - (2) Revisions to the requirements for integrated regional water management plans.
  - (3) Revisions to the eligibility for state water management grants and loans.

## **Sustainable Water Use and Demand Reduction (SB X7-7)**

- (4) Revisions to state or local permitting requirements that increase water supply opportunities, but do not weaken water quality protection under state and federal law.
  - (5) Increased funding for research, feasibility studies, and project construction.
  - (6) Expanding technical and educational support for local land use and water management agencies.
- (b) No later than January 1, 2011, and updated as part of the California Water Plan, the department, in consultation with the board, and with public input, shall propose new statewide targets, or review and update existing statewide targets, for regional water resources management practices, including, but not limited to, recycled water, brackish groundwater desalination, and infiltration and direct use of urban stormwater runoff.

## **Chapter 6 Standardized Data Collection**

### SECTION 10608.52

- 10608.52.(a) The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.
- (b) At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24 and an agricultural water supplier's compliance with implementation of efficient water management practices pursuant to subdivision (a) of Section 10608.48. The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.

## **Chapter 7 Funding Provisions**

### Section 10608.56-10608.60

- 10608.56.(a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.
- (b) On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

**Sustainable Water Use and Demand Reduction (SB X7-7)**

- (c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions. The supplier may request grant or loan funds to achieve the per capita reductions to the extent the request is consistent with the eligibility requirements applicable to the water funds.
  - (d) Notwithstanding subdivision (b), the department shall determine that an agricultural water supplier is eligible for a water grant or loan even though the supplier is not implementing all of the efficient water management practices described in Section 10608.48, if the agricultural water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the efficient water management practices. The supplier may request grant or loan funds to implement the efficient water management practices to the extent the request is consistent with the eligibility requirements applicable to the water funds.
  - (e) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.
  - (f) The department shall not deny eligibility to an urban retail water supplier or agricultural water supplier in compliance with the requirements of this part and Part 2.8 (commencing with Section 10800), that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the requirements of this part or Part 2.8 (commencing with Section 10800).
- 10608.60.(a) It is the intent of the Legislature that funds made available by Section 75026 of the Public Resources Code should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for grants to implement this part. In the allocation of funding, it is the intent of the Legislature that the department give consideration to disadvantaged communities to assist in implementing the requirements of this part.
- (b) It is the intent of the Legislature that funds made available by Section 75041 of the Public Resources Code, should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for direct expenditures to implement this part.

## Chapter 8 Quantifying Agricultural Water Use Efficiency

### SECTION 10608.64

10608.64. The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.





## **Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use**

*(For the Consistent Implementation of the  
Water Conservation Act of 2009)*

February 2016

FINAL DRAFT

California Department of Water Resources  
Division of Statewide Integrated Water Management  
Water Use and Efficiency Branch

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# Introduction

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This is the third revision of the Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use. The document was first released in October 2010 and then revised in February 2011 with the addition of the Provisional Method 4 for Determining Water Use Targets as Appendix C. This revision includes Methodology 8: Criteria for Adjustments for Compliance Daily per Capita Water Use and removes the former Appendix A: Alternative Methodology for Service Area Population. Methodology 8 was not included in the earlier versions of the Methodologies as it was not required for the completion of the 2010 urban water management plans and more time was needed to thoroughly develop the methodology. The former Appendix A provided instructions for using the Census Bureau's website to calculate service area population using a person per connection approach. The Census Bureau has revised its website and the links in the former document are no longer valid. Additionally, as part of its guidance for the 2015 UWMPs, DWR has included a population mapping tool as part of the on-line urban water management plan data submittal website. The population mapping tool provides a simpler and streamlined approach to estimating service area population.

In developing Methodology 8, DWR received input and guidance from the Urban Stakeholder Committee and the weather normalization subcommittee. Nine stakeholder meetings and seven subcommittee meetings were held starting in January of 2013 to discuss the development of the methodology and other topics. In 2010, DWR held two public listening sessions, five public stakeholder meetings, and two public workshops to receive comment, input and guidance in developing the first and second versions of the methodologies.

Background documents, stakeholder meeting summaries and public comments related to the development of these methodologies are available at the Water Conservation Act of 2009 website: <http://www.water.ca.gov/wateruseefficiency/sb7/>

Or contact:

SBX7-7 Urban Water Conservation Program Manager  
Water Use and Efficiency Branch  
Department of Water Resources, 1416 Ninth Street, Sacramento CA 95814

## Background

In February 2008, Governor Arnold Schwarzenegger introduced a seven-part comprehensive plan for improving the Sacramento-San Joaquin Delta. A key component of his plan was a goal to achieve a 20 percent reduction in per capita water use statewide by the year 2020. The governor's inclusion of water conservation in the Delta plan emphasizes the importance of water conservation in reducing demand on the Delta and in reducing demand on the overall California water supply. In response to Schwarzenegger's call for statewide per capita savings, the Department of Water Resources (DWR) and the State Water Resources Control Board convened the 20x2020 Agency Team on Water Conservation. DWR released a draft 20x2020 Water Conservation Plan in April 2009 and the final 20x2020 Water Conservation Plan in February 2010. The water conservation plan developed estimates of statewide and regional baseline per capita water use and outlined recommendations to the governor on how a statewide per capita water use reduction plan could be implemented.

In November 2009, SBX7-7, The Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. The Water Conservation Act addresses both urban and agricultural water conservation. The urban provisions reflect the approach taken in the 20x2020 Water Conservation Plan. The legislation sets a goal of achieving a 20-percent statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets. The Water Conservation Act of 2009 directs DWR to develop technical methodologies and criteria to ensure the consistent implementation of the Act and to provide guidance to urban retail water suppliers in developing baseline and compliance water use. To meet the legislative directives for consistent implementation, DWR has developed and published Methodologies for Calculating Baseline and Compliance Year Per Capita Water Use.

# Overview of Methodologies, Water Use Targets, and Reporting

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The Water Conservation Act of 2009 was incorporated into Division 6 of the California Water Code, commencing with Section 10608 of Part 2.55. All quotations of the Water Code in this report are from sections added by this legislation, unless otherwise noted.

The methodologies, water use targets, and reporting apply to urban retail water suppliers that meet a threshold of number of end users or annual volume of potable water supplied. Section 10698.12 (p) defines the water suppliers affected:

*“Urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.*

This overview summarizes the process that urban retail water suppliers must follow and the options they have for complying with the legislation.

## Methodologies

The legislation specifically calls for developing seven methodologies and a set of criteria for adjusting daily per capita water use at the time compliance is required (the 2015 and 2020 compliance years) under Section 10608.20(h):

- (1) *The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:*
  - (A) *Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.*
  - (B) *Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.*

Sections 10608.20 and 10608.28 of the Water Code allow water suppliers the choice of complying individually or regionally by mutual agreement with other water suppliers or regional agencies. DWR has also developed a methodology for regional compliance.

The following methodologies are included in this report:

- Methodology 1: Gross Water Use
- Methodology 2: Service Area Population
- Methodology 3: Base Daily Per Capita Water Use

- Methodology 4: Compliance Daily Per Capita Water Use
- Methodology 5: Indoor Residential Use
- Methodology 6: Landscaped Area Water Use
- Methodology 7: Baseline Commercial, Industrial, and Institutional (CII) Water Use
- Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use
- Methodology 9: Regional Compliance

The methodologies provide specific guidance to water suppliers on how to calculate baseline, target, and compliance-year water use. Each methodology defines how its calculations are to be used, with direct reference to the applicable section of the Water Code.

Each methodology describes the calculations, data needed, and, where applicable, optional steps and alternative approaches that water suppliers may use depending on their specific circumstances.

The methodologies for indoor residential water use; landscaped area water use; and baseline CII water use (Methodologies 5, 6, and 7) apply only to urban retail water suppliers who use Method 2 (see Water Use Targets below) to set water use targets.

## Baseline Water Use

Water suppliers must define a 10- or 15-year base (or baseline) period for water use that will be used to develop their target levels of per capita water use. Water suppliers must also calculate water use for a 5-year baseline period, and use that value to determine a minimum required reduction in water use by 2020. The longer baseline period applies to a water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water. Methodology 3: Base Daily Per Capita Water Use describes the calculations.

## Water Use Targets

An urban retail water supplier, as defined above, must set a 2020 water use target and a 2015 interim target using one of four methods. Three of these are defined in Section 10608.20(a)(1), with the fourth developed by DWR by the end of 2010. The 2020 water use target will be calculated using one of the following four methods:

- Method 1: Eighty percent of the water supplier's baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and CII uses
- Method 3: Ninety-five percent of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan
- Method 4: An approach developed by DWR and reported to the Legislature in February 2011 ( included as Appendix B)

The target may need to be adjusted further to achieve a minimum reduction in water use regardless of the target method (this is explained in Methodology 3). The Water Code directs that water suppliers must compare their actual water use in 2020 with their

calculated targets to assess compliance. In addition, water suppliers will report interim compliance in 2015 as compared to an interim target (generally halfway between the baseline water use and the 2020 target level). The years 2015 and 2020 are referred to in the methodologies as compliance years. All baseline, target, and compliance-year water use estimates must be calculated and reported in gallons per capita per day (GPCD).

Water suppliers have some flexibility in setting and revising water use targets:

- A water supplier may set its water use target and comply individually, or as part of a regional alliance (see Methodology 9: Regional Compliance).
- A water supplier may revise its water use target in its 2015 urban water management plan or in an amended plan.
- A water supplier may change the method it uses to set its water use target and report it in a 2010 amended plan or in its 2015 urban water management plan. Urban water suppliers are not permitted to change target methods after they have submitted their 2015 UWMP.

## Data Reporting

DWR will collect data pertaining to urban water use targets through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through regional alliance reports.

Water suppliers that comply individually must report the following data in their urban water management plans (applicable urban water management plan dates are included in parentheses).

- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, and 2020).
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix C describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, and 2020).

Water suppliers that comply regionally must fulfill additional reporting requirements. These are described in greater detail in Methodology 9: Regional Compliance.

## Consequences if Water Supplier Does Not Meet Water Use Targets

Each urban retail water supplier, as defined above, must comply by establishing 2015 and 2020 water use targets, demonstrating that its water use is in compliance with its targets, and reporting water use baselines, targets, compliance year water use, and supporting data in its urban water management plan. Section 10608.56 (a) states that a water supplier not in compliance will not be eligible for water grants or loans that may be administered by DWR or other state agencies:

*On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.*

Two exceptions to this are allowed. Section 10608.56 (c) states that a water supplier shall be eligible for a water loan or grant if it “has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions.”

Section 10608.56 (e) states that a water supplier can also be eligible for a water loan or grant if it “has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.”

# Methodology 1: Gross Water Use

## Definition of Gross Water Use

Section 10608.12(g) of the Water Code defines “Gross Water Use” as:

*the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:*

- (1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier*
- (2) The net volume of water that the urban retail water supplier places into long term storage*
- (3) The volume of water the urban retail water supplier conveys for use by another urban water supplier*
- (4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24*

## Calculation of Gross Water Use

Gross Water Use is a measure of water supplied to the distribution system over 12 months and adjusted for changes in distribution system storage and deliveries to other water suppliers that pass through the distribution system. Recycled water deliveries are to be excluded from the calculation of Gross Water Use. Water delivered through the distribution system for agricultural use may be deducted from the calculation of Gross Water Use. Under certain conditions, industrial process water use also may be deducted from Gross Water Use.

The methodology for calculating Gross Water Use broadly follows American Water Works Association (AWWA) Manual M36 guidance for calculating Distribution System Input Volume.<sup>1</sup> Calculating Gross Water Use entails 12 basic steps, two of which are optional.<sup>2</sup>

### Step 1: Define the 12-month Calculation Period

Gross Water Use shall be calculated over a continuous 12-month period. This period can be based on the calendar year or the utility’s fiscal year.<sup>3</sup> The same 12-month period must be used in calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

<sup>1</sup>American Water Works Association, Manual of Water Supply Practices – M36: Water Audits and Loss Control Programs, 3<sup>rd</sup> Edition, 2009. M36 defines Distribution System Input Volume as the volume of water entering the distribution system to provide service to customers. It is equal to the water volume derived from the water utility’s own source waters, plus water imported or purchased, plus or minus the net change in water storage (if applicable and significant).

<sup>2</sup>AWWA Manual M36 contains several forms and worksheets that retail urban water suppliers can use to compile and organize data required to calculate Gross Water Use.

<sup>3</sup>As stipulated in paragraph (1) of subdivision (a) of Section 10608.20 of SBX7-7.

## Step 2: Delineate Distribution System Boundary

Water supply systems can be broadly subdivided between the transmission systems that convey large amounts of water to local storage reservoirs or treatment plants, and the distribution systems that supply water to residential, commercial, industrial, and public uses such as fire safety. Water distribution systems generally comprise large networks of pipes with complex branched and loop topologies with multiple flow paths to many delivery points.<sup>4</sup> In some systems, some retail customers receive water for municipal and industrial (M&I) uses directly from transmission canals and pipes, in which case the retail water supplier may treat the sections of the transmission canals and pipes delivering water to the retail M&I customers as part of its distribution system. However, transmission canals and pipelines not used for delivering water directly to retail customers should not be included as part of the distribution system.

Wherever possible, distribution system boundary limits should be defined by points of metering or measurement<sup>5</sup> of the water supply. Typical measurement locations for distribution include exit points for treatment plants, treated water reservoirs, wells feeding directly into the distribution system, and imported water entering directly into the distribution system. A schematic of a typical urban retail water supply system is shown in Figure 1; actual distribution systems may vary greatly in configuration. Therefore, each urban retail water supplier must define and delineate its distribution system for purposes of calculating Gross Water Use. The rules for defining and delineating the distribution system boundary must be applied consistently in the base period and compliance years.<sup>6</sup>

## Step 3: Compile Water Volume from Own Sources

The water supplier's own sources of supply entering the distribution system shall be identified and tallied. For systems that provide only treated water, this may consist mostly or entirely of water entering the distribution system from treatment plants (as in Figure 1). It may also include water from wells or other sources controlled by the water supplier that directly supply the distribution system (as in Figure 1).

Recycled water, as defined in subdivision (m) of Section 10608.12, directly entering the distribution system shall be excluded from the tally of own sources. Step 8 addresses how to account for recycled water indirectly entering the distribution system through potable reuse.

Measurement records for each source shall be compiled into annual volumes. AWWA's M36 manual or other appropriate references should be consulted in situations where water sources are unmetered or the water meters have not been routinely calibrated. Volumes for each source shall be reviewed and corrected for known errors that may exist in the raw

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<sup>4</sup> <http://censam.mit.edu/news/posters/whittle/1.pdf>

<sup>5</sup> Measurements of unmetered agricultural and raw water deliveries must, at a minimum, meet an accuracy standard of +/- 6% by volume, as defined in the U.S. Bureau of Reclamation, Mid-Pacific Region's "2008 Conservation and Efficiency Criteria". Metered deliveries of M&I water must meet the measurement accuracy and calibration standards described in American Water Works Association Manual M6.

<sup>6</sup> For guidance on situations in which the distribution system boundary changed during the base period, see Methodology 3: Base Daily Per Capita Water Use. For situations in which the distribution system boundary changed during the compliance period, see Methodology 4: Compliance Daily Per Capita Water Use.



measurement data. Uncorrected metered volumes shall be adjusted based on the registration accuracy of the meter, as follows:<sup>7</sup>

$$\text{metered volume correction} = \frac{\text{uncorrected metered volume}}{\text{registration accuracy expressed as a decimal}} - \text{uncorrected meter volume}$$

#### **Step 4: Compile Imported Water Volume**

Outside sources of finished water imported directly into the distribution system shall be identified and tabulated, excluding the following:

- Recycled water, as defined in subdivision (m) of Section 10608.12, imported from another water supplier
- Imported raw water passing through the urban retail water supplier's treatment plants, if that water has already been counted under Step 3 (as in Figure 1)

The raw measurement data shall be corrected for known errors in the same manner as for own source water.<sup>8</sup>

#### **Step 5: Compile Exported Water Volume**

Any water volumes sent through the distribution system to another water utility or jurisdiction shall be identified and tabulated. Recycled water, as defined in subdivision (m) of Section 10608.12, exiting the distribution system shall be excluded from the tabulation.<sup>9</sup>

Bulk water exports that do not pass through the distribution system also shall not be counted. The raw metering data shall be corrected for known errors in the same manner as for own source and imported water.

#### **Step 6: Calculate Net Change in Distribution System Storage**

If distribution system storage is greater at the end of the year than at the beginning, it indicates that water has entered the distribution system but has not been delivered to customers. This water would have been counted in Steps 3 and 4, but because it has not been delivered to customers, it must be deducted from the calculation of Gross Water Use.

Conversely, a decrease in end-of-year distribution system storage indicates that water has been drawn from storage to meet customer demands. This water would not have been counted in Steps 1 and 2, and therefore must be added to the calculation of Gross Water Use. Note that these calculations apply only to storage in the distribution system. Do not include changes in storage outside the distribution system. If the change in distribution system storage is expected to be insignificant, or if data needed to calculate the change in distribution system storage are not available, the water supplier may forgo this step.

<sup>7</sup>AWWA Manual M36 should be consulted if additional guidance on correcting raw meter data for meter registration inaccuracy is needed. Meters with errors exceeding AWWA standards should be recalibrated, repaired, or replaced.

<sup>8</sup>Generally, bulk water sale meters are routinely monitored for accuracy because they provide the basis for payment between the wholesaler and retailer.

<sup>9</sup>It is necessary to subtract recycled water exiting the system only if it was included in the tabulations of water entering the distribution system performed in Steps 3 and 4. However, the easiest way to handle recycled water directly entering the distribution system in the calculation of Gross Water Use is to exclude it entirely from each calculation step.

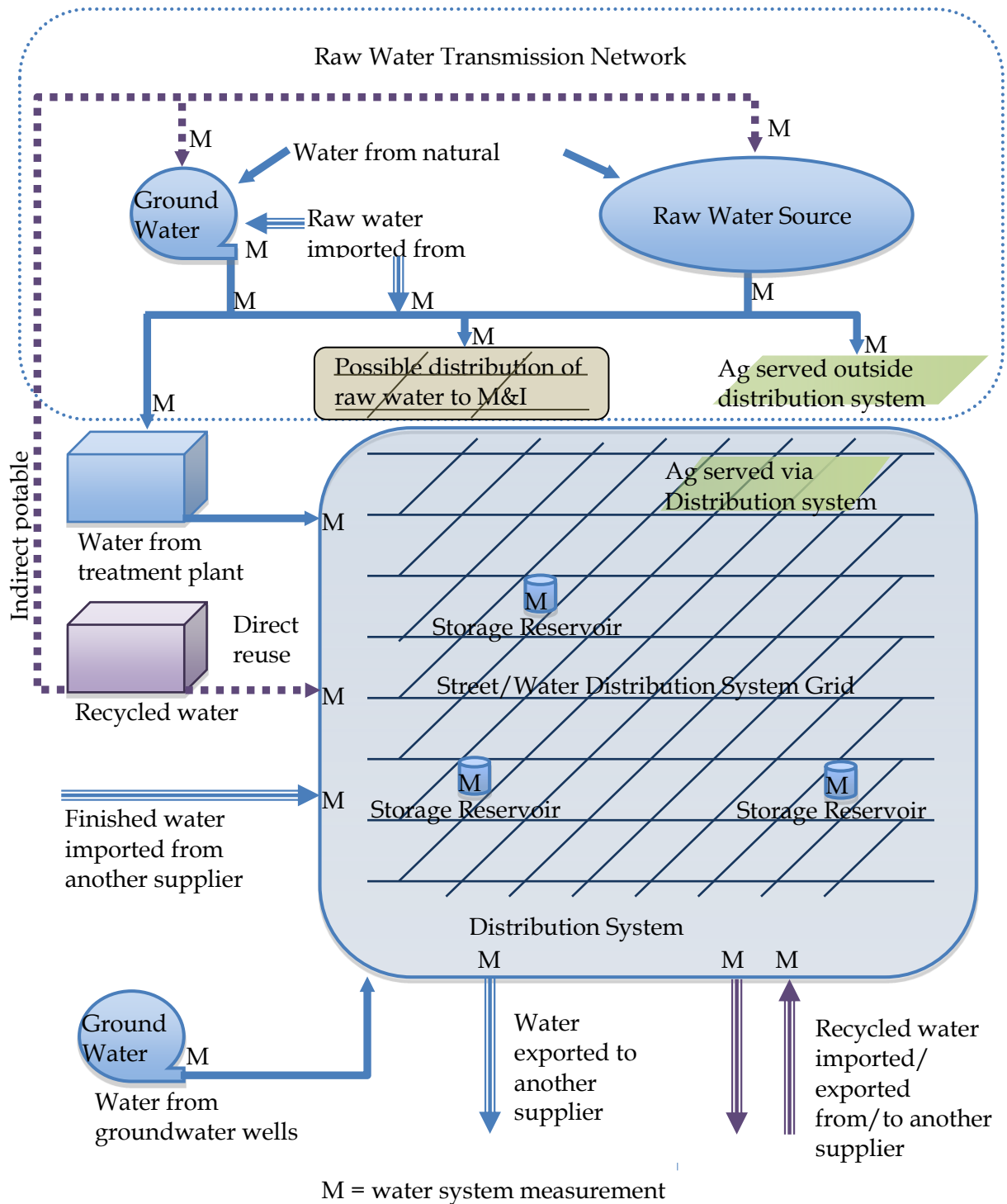


FIGURE 1 URBAN RETAIL WATER SUPPLIER SYSTEM SCHEMATIC<sup>10</sup>

<sup>10</sup>Figure 1 provides a general depiction of all of the elements that may affect the calculation of Gross Water Use. Not all of these elements may be present in a particular water system, nor is it expected that Figure 1 will accurately characterize a particular system configuration.

## Step 7: Calculate Gross Water Use before Indirect Recycled Water Use Deductions

Gross Water Use before Indirect Recycled Water Use Deductions equals the volume of water from own sources entering the distribution system determined in Step 3, plus the volume of water from imported water sources entering the distribution system determined in Step 4, less the volume of water delivered via the distribution system to other utilities determined in Step 5, less the net change in distribution system storage determined in Step 6.<sup>11</sup> Table 1 provides an example calculation.

## Step 8: Deduct Recycled Water Used for Indirect Potable Reuse from Gross Water Use

This step is necessary only if the urban retail water supplier uses recycled water (as defined in Subdivision (m) of Section 10608.12) to supplement raw surface or groundwater for indirect potable reuse. The Step 8 deduction requires the urban retail water supplier to estimate the amount of recycled water indirectly entering the distribution system through a surface or groundwater source (as in Figure 1).<sup>12</sup> This calculation requires three steps: (1) estimate the amount of recycled water used to supplement a surface reservoir source of supply, (2) estimate the amount of recycled water in extracted groundwater sources of supply, and (3) adjust these volumes for losses during transmission and treatment before the water enters the distribution system.

1. **Estimate recycled water used for surface reservoir augmentation.** The allowable deduction depends on the recycled water blend percentage in the surface reservoir water entering the potable water treatment plant. For example, if the raw surface water source is 95 percent fresh water and 5 percent recycled water, no more than 5 percent of the volume from this water source can be deducted from Gross Water Use calculated in Step 7. If the blend percentage of a surface water source is unknown, it shall be estimated based on the measured or estimated volumes of recycled water, local runoff, and imported water that entered the reservoir for the three years before the year for which Gross Water Use is being calculated. For example, if Gross Water Use is being calculated for 2005, the blend percentage is estimated by dividing the volume of recycled water that entered the reservoir by the total volume of water that entered the reservoir from 2002 through 2004.
2. **Estimate recycled water used for groundwater recharge.** Three approaches are allowed to estimate the amount of recycled water extracted from groundwater and introduced into a distribution system. Because year-to-year variations can occur in the amount of recycled water applied in a groundwater recharge operation, long-term running averages are required.

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<sup>11</sup>If the net change is negative, Gross Water Use will increase. If it is positive, Gross Water Use will decrease.

<sup>12</sup>Recycled water used for indirect potable use should only be subtracted at the time it enters the potable distribution system. It cannot be subtracted when placed into storage and again when extracted for potable use.

- a. **Monitoring data at extraction wells.** If monitoring data are available to enable determination of the percent of extracted water at each extraction well that originated as recycled water (for example, using geochemical analysis), then such data can be used to estimate the amount of recycled water entering a distribution system. To account for year-to-year variations, the credit for recycled water is a five year running monthly average percentage for each well for the preceding 60 months. For recharge projects in operation less than 60 months, a period of 60 months can be created using a combination of actual monitoring data since initiation of recharge operations and projected data. The projected data can be based on an acceptable groundwater model as described in paragraph b below or a projected average of extraction using the procedure described in paragraph c below.
- b. **Groundwater model for extraction wells.** If a groundwater model is available that has the capability of tracking the movement of recycled water from recharge operations to extraction wells and estimating the percent of extracted groundwater that originated as recycled water at each well operated by the water supplier based on actual historic data of recycled water applied at groundwater recharge operations, then such data can be used to determine the amount of recycled water entering a distribution system. The groundwater model must be calibrated and approved as part of an adjudication or other regulatory process, such as the groundwater permitting process by the California Department of Public Health or a California Regional Water Quality Control Board. To account for year-to-year variations, the credit for recycled water is a five-year running monthly average percentage at each well for the preceding 60 months. For recharge projects in operation less than 60 months, the monthly running average may be derived from the model using all months of actual recycled water applied in a recharge operation and projected recycled water amounts planned to be applied for a future period to reach a combined total of 60 months of operation.
- c. **Recharge data less in-basin losses.** Where actual extraction well monitoring data or estimated data obtained from an accepted groundwater model, as described in paragraph b above, are unavailable, an estimate can be made of extracted recycled water based on amounts of recycled water applied in recharge operations adjusted for an in-basin loss factor. The allowable deduction depends on the product of three factors:
  - i. The average annual volume of recycled water recharged into the groundwater basin for the purpose of indirect potable reuse over the 5 years before the year for which Gross Water Use is being calculated. For recharge projects in operation less than 60 months, data from all months of actual recharge operations may be combined with projected volumes of recycled water recharge to reach a combined total of 60 months of operation to calculate the average annual volume of recycled water recharged.
  - ii. A loss factor to account for water losses during recharge and extraction. If a loss factor has been developed as part of a groundwater management plan,

a basin adjudication process, or some similar regulatory process, the water supplier shall use that loss factor and provide reference to the appropriate documentation. If a loss factor has not been developed as part of a local regulatory process, the water supplier shall use a default loss factor of 10 percent.<sup>13</sup> The default loss factor of 10 percent is not applicable to groundwater recharge operations intended as seawater intrusion barriers. For seawater intrusion barriers, the loss factor will be determined on a case-by-case basis.

- iii. The volume of water pumped from the basin by the urban retail water supplier expressed as a percentage of the total volume of water pumped by all water users extracting water from the basin in the year for which Gross Water Use is being calculated.

For example, if the average annual recharge of recycled water for the five years before the year for which Gross Water Use is being calculated is 500 acre-feet (AF), the recharge loss factor is 10 percent, and the urban retail water supplier accounted for 25 percent of the volume of water pumped from the basin in the year for which Gross Water Use is being calculated, then no more than 113AF  $= (500 \times (1.0 - 0.10) \times 0.25)$  from this supply source can be deducted from Gross Water Use calculated in Step 7.

**3. Adjust for losses.** Only deduct the volume of recycled water used for indirect potable reuse that enters the distribution system from Gross Water Use calculated in Step 7.

Loss factors for transmission and treatment based on recent system audit data (or other reliable sources for estimating transmission and treatment losses) shall be applied to the estimated volumes of recycled water. For example, if the volume of recycled water before transmission and treatment is estimated to be 1,000 AF, and combined losses from transmission and treatment are estimated to be 3 percent, only 970 AF shall be deducted from Gross Water Use calculated in Step 7.

Table 2 shows an example calculation of the volume of recycled water used for indirect potable reuse based on approach 2.c above.

### **Step 9: Calculate Gross Water Use after Deducting Indirect Recycled Water Use**

This equals the volume of water determined in Step 7 less the volume of water determined in Step 8. Table 1 shows an example calculation of Gross Water Use after indirect recycled water use deductions.

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<sup>13</sup>The default value of 10 percent is based on the loss factors applied to groundwater storage in the Arvin-Edison and Semitropic Water Storage Districts. It also is consistent with the range of 0 to 15 percent loss factors applied to California water storage projects identified in the Groundwater Banking Programs Survey-Results and Summary Report prepared for the Sacramento Groundwater Authority by Kennedy/Jenks Consultants (2008). The projects they surveyed primarily used modeling and observation to determine the specific loss factor for each project.

## **Step 10 (Optional): Deduct from Gross Water Use the Volume of Water Delivered for Agricultural Use**

This step is necessary only if the urban retail water supplier has chosen to exclude from the calculation of Gross Water Use water delivered for agriculture per Section 10608.12 (g) (4).

Consideration of agricultural water use must be the same for calculations of Gross Water Use for determining Base Daily Per Capita Water Use and Compliance Daily Per Capita Water Use.

Identify and tabulate the volume of water delivered through the distribution system for agricultural water uses. Do not include deliveries that bypass the distribution system (see Figure 1 for examples of agricultural deliveries inside and outside the distribution system).

Delivery volumes shall be based on account records and meter data for connections in the distribution system used to supply water for the commercial production of agricultural crops or livestock.<sup>14</sup>

## **Step 11 (Optional): Deduct Volume of Water Delivered for Process Water Use**

This step is necessary only if the urban retail water supplier has elected to exclude process water from the calculation of Gross Water Use and the supplier is eligible to do so. An urban retail water supplier is eligible to exclude process water from the calculation of Gross Water Use only if its industrial water use comprises a substantial percentage of total water use.

[NOTE: See Appendix C for guidance on whether to include or exclude process water.]

## **Step 12: Calculate Gross Water Use after Optional Deductions**

This equals the volume of water determined in Step 9 less the volume of water determined in Steps 10 and 11. Table 1 provides an example calculation of Gross Water Use after optional deductions.

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<sup>14</sup>The standard used to identify distribution system connections supplying agricultural water uses is based on subdivision (b) of Section 535 of the California Water Code. Commercial agricultural production is defined by the U.S. Department of Agriculture and the Census Bureau as any place from which \$1,000 or more of agricultural products (crops and livestock) were sold or normally would have been sold during the year. For the purposes of calculating Gross Water Use, retail nursery water use is not considered to be an agricultural water use.

**Table 1: Example Urban Retail Water Supplier Gross Water Use Calculation**

Utility Name:	12-month period:					Volume Units:				
	1-Jan to 31-Dec					Million Gallons				
Calculation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Volume from Own Sources (raw data)	3,480.8									
Meter error adjustment (+/-)	136.9									
<b>1</b> <i>Subtotal: Corrected Volume from Own Sources</i>	<b>3,617.7</b>									
Volume from Imported Sources (raw data)	1,005.0									
Meter error adjustment (+/-)	39.5									
<b>2</b> <i>Subtotal: Corrected Volume from Imported Sources</i>	<b>1,044.5</b>									
<b>3</b> <b>Total Volume Into Dist. System = Line 1 + Line 2</b>	<b>4,662.2</b>									
Volume Exported to Other Utilities (raw data)	432.0									
Meter error adjustment (+/-)	17.3									
<b>4</b> <i>Subtotal: Corrected Volume Exported to Other Utilities</i>	<b>449.3</b>									
<b>5</b> Change in Dist. System Storage (+/-)	-8.6									
<b>6</b> <b>Gross Water Use Before Indirect Recycled Water Use Deductions = Line 3 - Line 4 - Line 5</b>	<b>4,221.5</b>									
<b>7</b> Indirect Recycled Water Use Deduction	304.3									
<b>8</b> <b>Gross Water Use After Indirect Recycled Water Use Deductions = Line 6 - Line 7</b>	<b>3,917.2</b>									
<b>9</b> <i>Water Delivered for Ag. Use (optional deduction)</i>	0.0									
<b>10</b> <i>Process Water Use (optional deduction)</i>	278.8									
<b>11</b> <b>Gross Water Use After Optional Deductions = Line 8 - Line 9 - Line 10</b>	<b>3,638.4</b>									

**Table 2: Example Calculation of Annual Deductible Volume of Indirect Recycled Water Entering Distribution System**

Surface Reservoir Augmentation			Volume Discharged from Reservoir for Distribution System Delivery	Recycled Water Blend	Recycled Water Delivered to Treatment Plant	Transmission/Treatment Loss	Transmission/Treatment Losses	Volume Entering Distribution System		
			(MG)		(MG)		(MG)	(MG)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		
					(4) x (5)			(6) x (7)		
Source 1			1,000	5%	50	3%	1.5	48.5		
Source 2			500	10%	50	3%	1.5	48.5		
<i>Subtotal Reservoir Augmentation:</i>								97		
Groundwater Recharge			5-Year Annual Average Recharge	Recharge Recovery Factor	Recycled Water Pumped from Basin	Utility Pumping as % of Basin Total	Recycled Water Pumped by Utility	Transmission/Treatment Loss	Transmission/Treatment Losses	Volume Entering Distribution System
			(MG)		(MG)		(MG)		(MG)	(MG)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		
			(2) x (3)		(4) x (5)			(6) x (7)		
Basin 1			500	90%	450	25%	113	3%	3.4	109.1
Basin 2			750	90%	675	15%	101	3%	3	
<i>Subtotal Groundwater Recharge:</i>								207.3		
<b>Deductable Volume of Indirect Recycled Water Entering Distribution System:</b>								<b>304.3</b>		

MG = million gallons



# Methodology 2: Service Area Population

## Definition of the Service Area Population

Section 10608.20(f) states:

*When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.*

The legislation directs DWR to develop consistent methodologies and criteria for determining Service Area Population.

To obtain an accurate estimate of GPCD, water suppliers must estimate population of the areas that they actually serve, which may or may not coincide with either their jurisdictional boundaries or with the boundaries of cities. Customers may be in the distribution area with a wholly private supply during the baseline and compliance years, and new areas may be annexed into a water supplier's distribution system over time. The area used for calculating Service Area Population shall be the same as the distribution system area used in Methodology 1, Gross Water Use.

Figure 2 illustrates the many different situations that may arise, with the background grid indicating the census blocks that overlap with the water supplier's service area boundary.

Examples include the following:

- The actual distribution area may cover only a portion of the jurisdictional boundary.
- Large water users that depend wholly or partially on a private groundwater supply (e.g., college campus, a military installation, a correctional facility) may exist in the distribution area. If such a user is wholly dependent on private supply, its residents should be excluded. If the user is partially dependent (for example, it uses a municipal source for indoor use and private groundwater wells for irrigation only), its residents served by the municipal source should be included. Estimation of compliance GPCD for customers that switch their irrigation to a municipal source between the baseline and compliance years is addressed in Methodology 4: Compliance Daily Per Capita Water Use.
- New customers outside the present distribution area may connect to the water supplier's distribution system in the future for various reasons.
- The water supplier's distribution system can geographically expand over time as a result of economic and population growth.

Although a water supplier may consult any or all federal, State, and local data sources to estimate population, these estimates must account for the above-mentioned complexities.

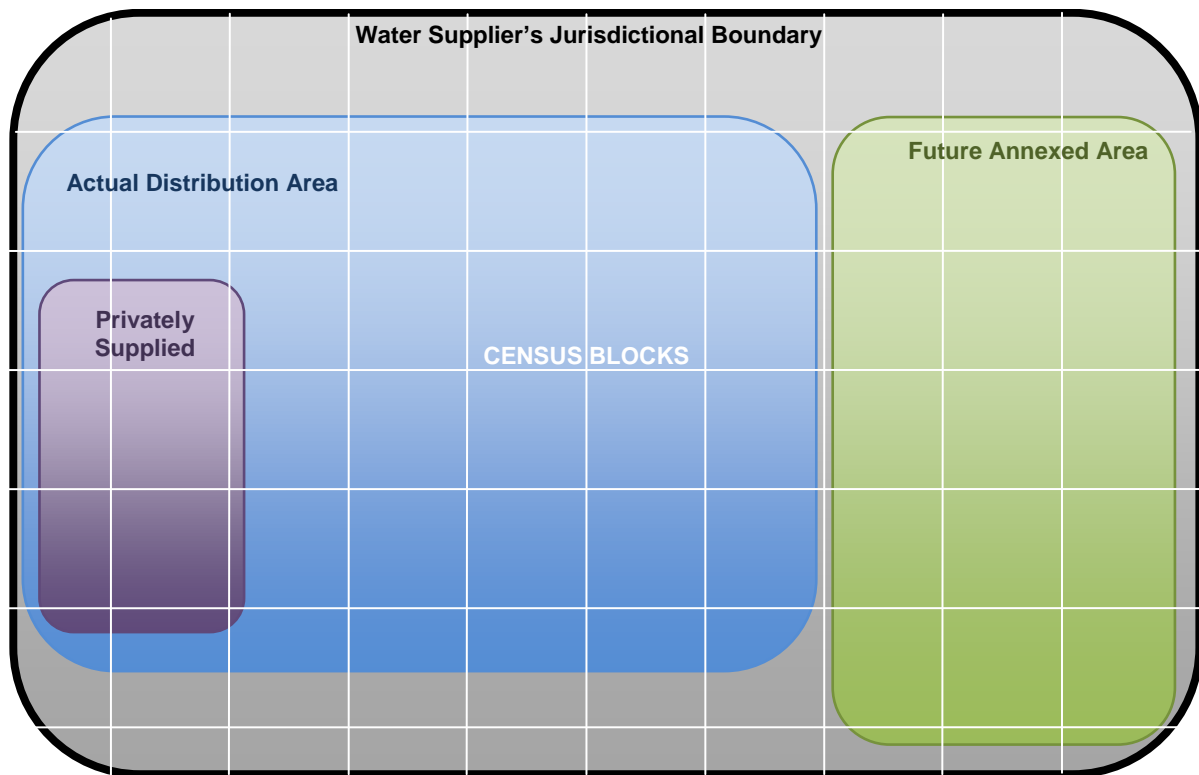


FIGURE 2 DEFINING AREA FOR POPULATION CALCULATION

## Estimating the Service Area Population

Data published by the California Department of Finance (DOF) or the U.S. Census Bureau must serve as the foundational building block for population estimates. In some instances, data published by these two sources may be directly applicable. In other instances, additional refinements may be necessary. For example, to account for distribution areas that do not match city boundaries, customers with private sources of supply, or other unique local circumstances, water suppliers may have to supplement the above sources of data with additional local data sources such as county assessor data, building permits data, and traffic analysis zone data. These refinements are acceptable as long as they are consistently applied over time, and as long as they build upon population data resources of the DOF or the U.S. Census Bureau. Suppliers in any category listed below may use the person-per-connection or person per housing unit population calculation.

Retail water suppliers will generally fall into one of the following three categories:

- Category 1: Water suppliers whose actual distribution area overlaps substantially ( $\geq 95\%$ ) with city boundaries (may be a single city or a group of cities) during baseline and compliance years
- Category 2: Water suppliers not falling in Category 1 but having an electronic geographic information system (GIS) map of their distribution area

- Category 3: Water suppliers not falling in Category 1 and lacking an electronic GIS map of their distribution area.

### **Category 1 Water Suppliers**

These water suppliers are encouraged to use population data published by the DOF's demography unit. However, population data may also be available through a water wholesaler, a local government agency, or an association of local governments. A list of associations of local governments is available through the California Association of Councils of Government (CALCOG: [www.calcog.org](http://www.calcog.org)). Many of these associations serve as census data repositories and also have GIS capabilities.

Category 1 water suppliers may use population estimates from any of these federal, state, or local agencies, as long as they clearly cite their data source, use the same source for both the baseline and compliance years, and correct these estimates for privately supplied large customers that may exist in their actual distribution area

### **Category 2 Water Suppliers**

These water suppliers have two options:

- Water suppliers that are members of an association of local governments (or a water wholesaler) that develop population estimates for its members using GIS maps of actual distribution areas and population data from the DOF or Census Bureau should use these data for the baseline and compliance years. The water suppliers should coordinate with the local government association or wholesaler to complete the task of identifying and removing large institutions with wholly private systems in their distribution area.
- Water suppliers without such membership must develop population estimates using either a per-connection or per-housing unit methodology or another equivalent method that uses data either from the DOF or the U.S. Census Bureau as its basis.

### **Category 3 Water Suppliers**

These water suppliers have the same two options as Category 2 water suppliers. The only difference is that to access the U.S. Census Bureau's population data resources, they first must identify which census blocks fall in their distribution area. This exercise can be performed manually, or the distribution area map boundary can be digitized. Category 3 water suppliers may be able to access these digitization capabilities and census-based population estimation capabilities through their local association of governments. Alternatively, they can develop population estimates using either the per-connection or per-housing unit methodology or another equivalent method that uses data from either the DOF or the U.S. Census Bureau as its basis.

### **Determining Adequacy of Current Population Estimate Methodology**

Figure 3 provides a flow chart to help water suppliers determine whether their existing population estimation methodology is adequate or must be refined. If refinement is needed, it should be coordinated with the water wholesaler or the local association of governments that currently provides population estimates. Water suppliers that currently lack access to reliable population estimates that reflect characteristics of their actual distribution areas can use a per-connection methodology.

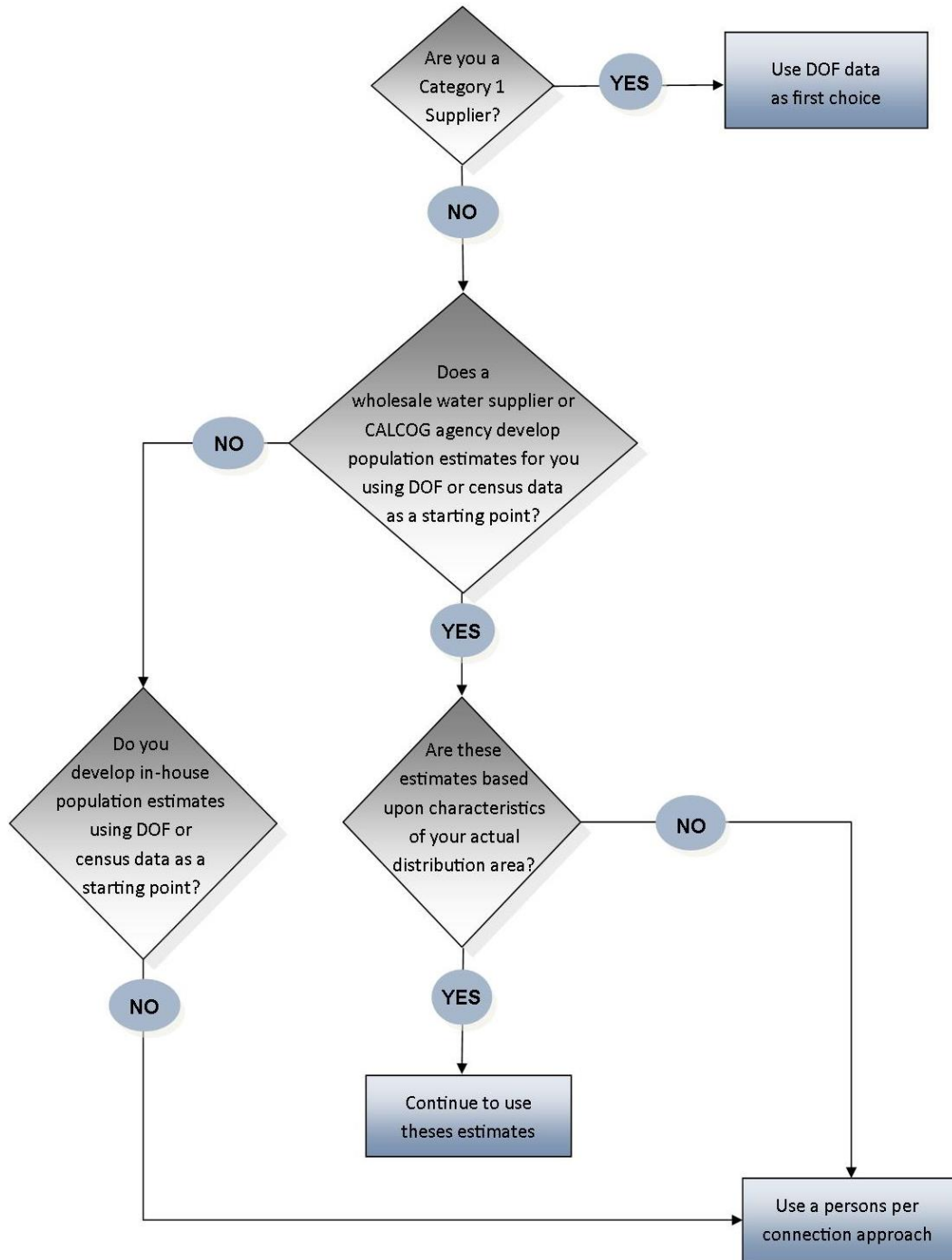
## Adjusting Population Estimates

Population increases in existing developed areas or high-density infill redevelopments are estimated annually by DOF for incorporated cities and unincorporated portions of counties. These and other sources of local data may be used to estimate population for the non-census years. For water suppliers using a person-per-connection methodology, population changes largely will be captured through the changes in counts of active connections over time.

Water suppliers may revise population estimates for baseline years between 2000 and 2010 when 2010 census information becomes available. Water suppliers who did not use 2010 Census data to calculate baseline water use in the 2010 UWMPs (final 2010 Census was released in 2012), must recalculate baseline water use using the 2000 Census and the 2010 Census for the 2015 UWMP. Service area boundaries may also contract or expand during the baseline period. The latter could occur because of annexation of previously developed areas that may have been dependent upon private groundwater wells in the past but have subsequently become part of an urban retail water supplier's system. The following list provides guidance under various annexation scenarios. Additional adjustments may be required to population estimates for events that occur between the baseline and compliance years. These issues are discussed in Methodology 4: Compliance Daily Per Capita Use.

- If a portion of the distribution area is removed during one of the baseline years, water suppliers must compute their baseline after eliminating this removed portion from all their baseline years.
- If an area was annexed before the first baseline year, or the annexation involves merger with another urban retail water supplier, no data issues arise. In the latter case, population and connections data would be available for each water supplier separately. If not, appropriate estimates should be developed and documented.
- If the area was annexed before 2000, population estimates should be developed for the annexed area using the census block and person-per-connection method, or an equivalent method.
- If the area was annexed after 2000, the water supplier will know the connection count only in the year of the annexation, not in 2000 and corresponding to the population estimate. Water suppliers may apply person-per-connection ratios developed for their pre-annexation distribution area to estimate population in the annexed area, or use other defensible techniques. For example, they could obtain county assessor data to back-cast what connection counts would have been in the annexed area in 2000 to permit scaling of census population estimates for the annexed areas to the post-annexation years. These can be further improved after 2012 once data from the 2010 census become available.

Water suppliers in other unique situations, such as those experiencing a significant change in their seasonal workforce or seasonal resident population between the baseline and compliance years, may adjust their population estimates using other techniques. The water supplier must provide documentation that the technique is based on or consistent with DOF or U.S. Census Bureau population data.



**FIGURE 3 SUGGESTED PROCESS FOR DETERMINING ADEQUACY OF SERVICE AREA POPULATION ESTIMATE METHODOLOGY**

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# Methodology 3: Base Daily Per Capita Water Use

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## Definition of Base Daily Per Capita Water Use

Base Daily Per Capita Water Use is defined as average gross water use, expressed in GPCD, for a continuous, multiyear base period. The Water Code specifies two different base periods for calculating Base Daily Per Capita Water Use under Section 10608.20 and Section 10608.22:

- The first base period is a 10- to 15-year continuous period, and is used to calculate baseline per capita water use per Section 10608.20.
- The second base period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement per Section 10608.22.

Unless the urban retail water supplier's five year Base Daily Per Capita Water Use per Section 10608.12 (b) (3) is 100 GPCD or less, Base Daily Per Capita Water Use must be calculated for both baseline periods.

## Calculation of Base Daily Per Capita Water Use

Calculating Base Daily Per Capita Water Use entails four steps:

1. Estimate Service Area Population for each year in the base period using Methodology 2.
2. Calculate Gross Water Use for each year in the base period using Methodology 1. Express Gross Water Use in gallons per day (gpd).<sup>15</sup>
3. Calculate daily per capita water use for each year in the base period. Divide Gross Water Use (determined in Step 2) by Service Area Population (determined in Step 1).
4. Calculate Base Daily Per Capita Water Use. Calculate average per capita water use by summing the values calculated in Step 3 and dividing by the number of years in the base period. The result is Base Daily Per Capita Water Use for the selected base period.

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<sup>15</sup>If Gross Water Use is expressed in million gallons per year, multiply by 1,000,000 and then divide the result by 365. If Gross Water Use is expressed in acre-feet, multiply by 325,851 and then divide the result by 365.

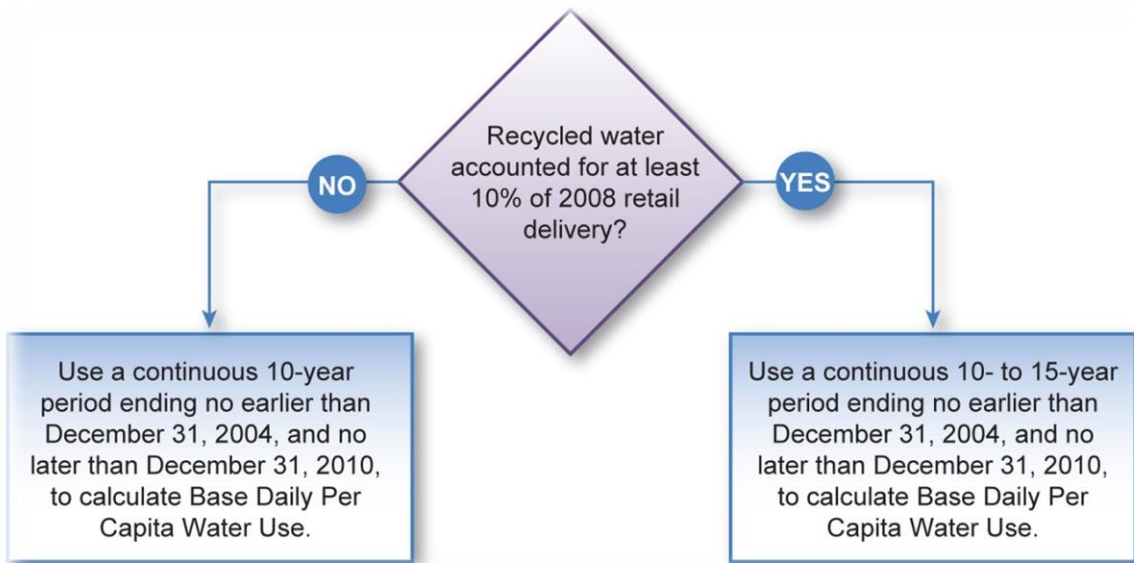


FIGURE 4 10 TO 15 YEAR BASE DAILY PER CAPITA WATER USE CALCULATIONS

## Calculating Base Daily Per Capita Water Use per Section 10608.20

Calculate Base Daily Per Capita Water Use using one of the following base periods:

- If recycled water made up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.
- If recycled water made up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

Figure 4 illustrates the procedure. If Gross Water Use and/or population are not available for the full base period, the water supplier shall calculate base daily per capita water use for the maximum number of years for which data are available. When selecting between base periods, the water supplier shall select the base period for which the most data are available.

For example, if gross water use and/or population data are not available before 1997, the water supplier shall select a base period starting in 1997.

### Distribution Area Expansion Caused by Mergers

If two or more water suppliers merged wholly, or one water supplier acquired a portion of another's service area, during a year that falls in the baseline period of the merged entity, they should derive their baseline GPCD as if they were a single entity for the entire baseline period to stay consistent with the targets and compliance GPCDs that would represent the merged entity.



## Distribution Area Contraction

If during the baseline period a previously served portion of the distribution system is removed from a water supplier's service area, the baseline GPCD shall be corrected to reflect only that portion of the service area that remained consistently supplied during the baseline and compliance years.

## Distribution Area Expansion by Annexation of Already Developed Areas<sup>16</sup>

For areas annexed during the baseline years, water suppliers can select one of two choices:

- Include these areas for baseline GPCD estimation and test compliance for the combined entity.
- Track baseline and compliance GPCDs for the annexed areas separately.

## Determining the Minimum Water Use Reduction Requirement per Section 10608.22

The following calculation is required only if the five-year baseline per capita water use per Section 10608.12 (b) (3) is greater than 100 gpcd. The calculation is used to determine whether the water supplier's 2015 and 2020 per capita water use targets meet the legislation's minimum water use reduction requirement per Section 10608.22.

The calculation entails three steps:

1. Calculate Base Daily Per Capita Water Use using a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.<sup>17</sup>
2. Multiply the result from Step 1 by 0.95. The 2020 per capita water use target cannot exceed this value (unless the water supplier's five year baseline per capita water use is 100 gpcd or less). If the 2020 target is greater than this value, reduce the target to this value.
3. Set the 2015 target to the mid-point between the 10- or 15-year baseline per capita water use and the 2020 target determined in Step 2.

As an example, suppose a water supplier has a 10-year baseline per capita water use (per Section 10608.20) of 170 GPCD, and a 5-year baseline per capita water use (per Section 10608.22) of 168 GPCD.

- The maximum allowable GPCD target in 2020 (per Section 10608.22) is  $0.95 \times 168 \text{ GPCD} = 160 \text{ GPCD}$ .
- The 2020 target under Method 1 is  $0.8 \times 170 \text{ GPCD} = 136 \text{ GPCD}$ .

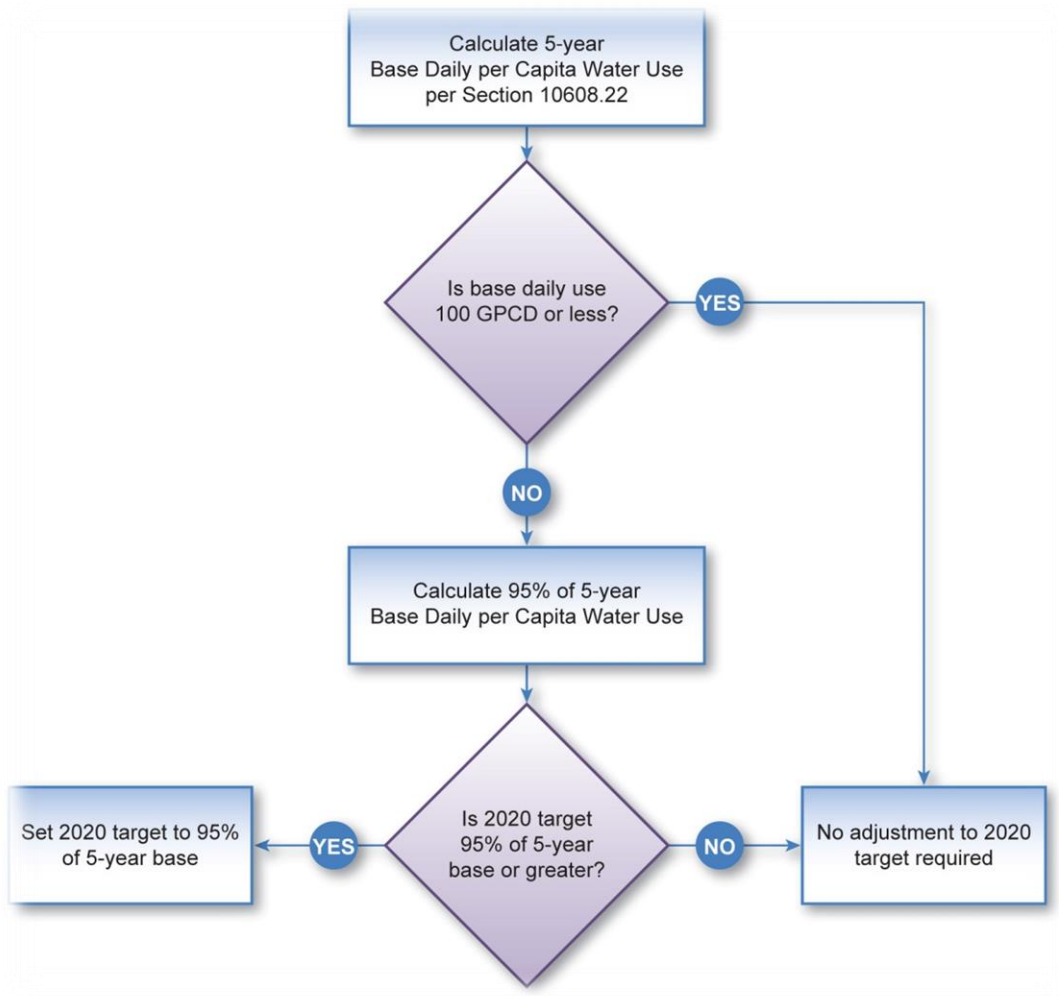
<sup>16</sup>Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time, or on other sources of water for which data are not available, and that were not previously connected to a municipal source. This is not to be confused with annexation of previously undeveloped land. No adjustment is required for the latter type of annexation, whose impact on GPCD is naturally accounted for by the estimation of base period Gross Water Use and Service Area Population.

<sup>17</sup>If 5 years of continuous data are not available, use the maximum number of years for which data are available.

Because the Method 1 target is less than 160 GPCD, no further adjustment to the 2020 target is required if Method 1 is used.

Suppose the water supplier’s 2020 target under Method 3 is 167 GPCD. Because this is greater than 160 GPCD, the target would need to be reduced to 160 GPCD if Method 3 is used.

Similarly, if a target calculated using Method 2 or 4 exceeded 160 GPCD, it would need to be reduced to 160 GPCD in order to satisfy the legislation’s minimum water use reduction requirement. Figure 5 shows how the two baseline per capita water use amounts are used to determine whether the 2020 target meets the legislation’s minimum water use reduction requirement.



**FIGURE 5 DETERMINATION OF MAXIMUM ALLOWABLE 2020 GPCD TARGET**

Tables 3 and 4 may be used to organize the information needed to calculate Base Daily Per Capita Water Use under Sections 10608.20 and 10608.22.

**Table 3: Base Daily Per Capita Water Use Calculation for Section 10608.22**

Utility Name: \_\_\_\_\_

12-month Period: \_\_\_\_\_ to \_\_\_\_\_

(1) (2) (3) (4)

Base Years*	Service Area Population	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) ÷ (2)
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
Total of Column (4):			
Divide Total by 5:			

\*Most recent year in base period must end no earlier than December 31, 2007, and no later than December 31, 2010.

**Table 4: Base Daily Per Capita Water Use Calculation for Section 10608.20**

Utility Name: \_\_\_\_\_

12-month Period: \_\_\_\_\_ to \_\_\_\_\_

(1) (2) (3) (4)

Base Years*	Service Area Population	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) ÷ (2)
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
Year 6			
Year 7			
Year 8			
Year 9			
Year 10			
Year 11			
Year 12			
Year 13			
Year 14			
Year 15			
Total of Column (4):			
Divide Total by Number of Base Years:			

\* Enter the actual year of the data in this column. The most recent year in base period must end no earlier than December 31, 2004, and no later than December 31, 2010. *The base period cannot exceed 10 years unless at least 10 percent of 2008 retail deliveries were met with recycled water.*

## Revisions to Base Daily Per Capita Water Use or Targets

A water supplier may revise its calculated Base Daily Per Capita Water Use after submitting its 2010 urban water management plan if better information becomes available. The revisions may be included in the water supplier's 2015 and subsequent plans or may be submitted as an amended plan, provided it follows the process required for amendments to such plans. If the revisions to the Base Daily Per Capita Water Use changes the water use target, the water use target must be revised as well.

In addition, a water supplier may change the method it uses to set its water use target, and report the method change and target revision in a 2010 amended plan or in its 2015 urban water management plan. Target method changes are not permitted in the 2020 plan or amended 2015 plans.

# Methodology 4: Compliance Daily Per Capita Water Use

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The following methodology addresses estimation of compliance daily per capita water use (in GPCD) in the years 2015 and 2020.

## Definition of Compliance Daily Per Capita Use

Section 10608.12(e) states:

*“Compliance daily per-capita use” means the gross water use during the final year of the reporting period, reported in gallons per capita per day.*

## Estimation of Compliance-Year GPCD

Methodology 1: Gross Water Use and Methodology 2: Service Area Population shall be used to develop the two basic components for estimating compliance-year GPCD. This section discusses adjustments to compliance-year GPCD because of changes in distribution area caused by mergers, annexation, and other scenarios that occur between the baseline and compliance years.

Adjustments are allowed in calculating compliance-year GPCD for factors described in Section 10608.24. These adjustments are discussed in Methodology 8: Criteria for Compliance-Year Adjustment.

### Distribution Area Expansion Caused by Mergers

If water suppliers merge, or one water supplier acquires a portion of another’s service area, between the baseline period and the compliance year, they have two choices:

- Test compliance separately for each service area.
- Calculate a (compliance year) population weighted average of each system’s target and determine compliance as a single entity using this weighted average.

### Distribution Area Contraction

If a previously supplied portion included in the baseline is removed from the distribution area before the compliance years, water suppliers shall re-compute their baseline GPCD after eliminating the removed portion for all baseline years.

## **Distribution Area Expansion by Annexation of Already Developed Areas<sup>18</sup>**

For areas annexed between the baseline and compliance years, a water supplier must determine Base Daily Per Capita Water Use, target water use, and compliance water use.

- Base Daily Per Capita Water Use for the annexed area shall be determined using the same baseline period as the water supplier's original service area (before the annexation). If such data are not available, the water supplier shall use a baseline period starting with the earliest year available for the annexed area and including ten years, if available. If no data exist for years before annexation, the water supplier shall use data from the year of annexation.
- Annexed areas shall be assigned a prorated target based upon the number of years between annexation and the end of 2020. For example, if a water supplier's target is based on a 20 percent reduction by 2020, and it annexes an area in 2017, this annexed area should show a 6 percent reduction in GPCD by 2020 relative to its 2017 GPCD.
- Compliance may be determined for the separate service areas (annexed and original), or for the combined service area using a (compliance year) population weighted average.

If compliance is determined separately for separate service areas, both areas must be in compliance for supplier to be in compliance.

## **Distribution Area Expansion by Annexation of Undeveloped Areas**

No special adjustment calculation is needed for areas that were undeveloped during the baseline period but which were annexed and developed between the baseline period and compliance year. The impact on GPCD is accounted for by the estimation of compliance year Gross Water Use and compliance-year population.

## **Existing Large Partial Customers Become Whole Customers**

Large customers that pump groundwater or take surface water for landscape irrigation or other uses (depending on their municipal source solely for indoor use) may switch and use only the municipal source. This change will disrupt the baseline and compliance year comparison. Two adjustments are provided below:

- If the switch occurs during the baseline years, the landscape irrigation or other use should be included in the compliance-year gross water calculation.
- If the switch occurs between the baseline and compliance years, the water associated with irrigation use switches, properly documented and subjected to the requirements of the Model Water Efficient Landscape Ordinance adopted by DWR in 2009, may be excluded from the calculation of compliance-year Gross Water Use. Otherwise, the irrigation or other use must be included in both the baseline and compliance year gross water use calculations.

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<sup>18</sup>Annexation here refers to already developed and inhabited areas that may have relied upon groundwater until this point in time and were not previously connected to a municipal source.

## **Water Supplier Subject to Urban Water Management Plan Reporting Requirements between 2010 and 2020**

Water suppliers that become subject to urban water management plan reporting requirements after 2010 also become subject to the new requirements of Section 10608 of the Water Code from the same year onward. These water suppliers are required to estimate their baseline GPCD and establish their 2020 GPCD targets using the same methodological guidelines that apply to other water suppliers. However, for testing compliance, such water suppliers may prorate these targets depending on the year the water supplier became subject to the new requirements.

For example, if a water supplier chooses a 2020 target that is 20 percent below its baseline GPCD, but it became subject to the new requirements only in 2017, it shall test compliance against a target that is 6 percent below its baseline GPCD.

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# Methodology 5: Indoor Residential Use

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## Definition of Indoor Residential Use

Section 10608.20(b)(2)(A) states:

*For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.*

Section 10608.42 states:

*The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.*

Section 10608.20(b)(2)(A) sets a provisional standard for efficient indoor use (55 GPCD) that urban retail water suppliers using target Method 2 must use to set their 2020 target.

However, they are not required to demonstrate that this indoor residential target has actually been met – only that the overall target, which includes additional components for landscaped area water use and CII water use, has been met.

Section 10608.42 requires DWR to submit a report to the Legislature in 2016 that will include recommendations on changes to water use efficiency standards to reflect updated efficiency information and technological changes. DWR will conduct a study to assess whether the provisional indoor residential standard of 55 GPCD should be adjusted.

Based on the report DWR submits in 2016, the Legislature may change the indoor residential standard. The indoor residential standard is used only to set the target under Method 2; calculation of indoor usage by water supplier is not required for determining compliance with Method 2.

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# Methodology 6: Landscaped Area Water Use

The calculation of Landscaped Area Water Use requires a measurement (or estimate) of landscaped area and of the landscape water use per unit area (based on reference evapotranspiration [ET]). As with other urban water use measures under Section 10608, Landscaped Area Water Use is defined as a daily per capita rate of water use; consequently, Methodology 2: Service Area Population is used in calculating Landscaped Area Water Use.

## Definition of Landscaped Area Water Use

For the Landscaped Area Water Use component of target Method 2, Section 10608.20 (b) (2) (B) states:

*For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.*

All landscape irrigated by dedicated or residential meters must be included, including multifamily residential parcels. Definitions and calculations contained in the Model Water Efficient Landscape Ordinance (MWELo) are provided in Appendix A. These calculations give the Landscaped Area Water Use as a function of landscaped area and reference ET. The MWELo defines landscaped area as planting areas, turf areas, and water features. Landscaped area excludes footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (such as open spaces and existing native vegetation). Section 10608.20 (b)(2)(B) restricts the landscaped area to include only landscape irrigated through dedicated or residential meters or connections.

Landscaped area for the purposes of calculating the Method 2 target shall mean the water supplier's estimate or measurement of 2020 landscaped areas. Water suppliers shall develop a preliminary estimate (forecast) of 2020 landscaped areas for purposes of setting urban water use targets and interim urban water use targets under Subdivision 10608.20 (a) (1).

For final compliance-year calculations, water suppliers shall update the estimate of 2020 landscaped areas using one of the techniques described in the following sections.

## Approach to Calculating Landscaped Area Water Use

Water suppliers shall follow five steps to calculate Landscaped Area Water Use:

1. Identify applicable MWELo (1992, 2010 or 2015) for each parcel.

2. Estimate irrigated landscaped area for each parcel.
3. Determine reference evapotranspiration for each parcel.
4. Use the Maximum Applied Water Allowance (MAWA) equation from the applicable MWELo to calculate annual volume of landscaped area water use.
5. Convert annual volume to GPCD.

### **Identify Applicable MWELo for Each Parcel**

Before computing landscaped area, water suppliers must determine how MWELo ordinances apply to specific parcels in their service areas. Two versions of MWELo apply according to the date when landscaping was installed in a given parcel:

- For landscaped areas installed on or after December 1, 2015, the MAWA equation and all applicable criteria from the 2015 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed on or after January 1, 2010, the MAWA equation and all applicable criteria from the 2009 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed before January 1, 2010, the MAWA equation and all applicable criteria from the 1992 version of the ordinance or its equivalent shall be used.

For the purposes of this methodology, two important differences between the two ordinances are the ET adjustment factor and the inclusion of a special landscaped area for calculating a water allowance in the 2010 ordinance. The applicable definitions and calculations in these ordinances are provided in Appendix A.

Landscaped Area Water Use shall be calculated for each parcel (or groups of parcels with the same reference ET and applicable MWELo) using Maximum Applied Water Allowance (MAWA) computations from the applicable MWELo.

Water suppliers should use the best available information to determine which MWELo applies to each parcel. This may include date of submittal for MWELo design review, date of service establishment, and remote sensing information.

The calculations provided in Appendix A will yield water use estimates in gallons per year.

The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the water supplier's service area. Because Landscaped Area Water Use is defined in units of GPCD, the result of the calculation above must be divided by Service Area Population and then converted from annual to daily use.

### **Measure Landscaped Area**

The water supplier shall select a technique for measuring landscaped area that satisfies the following criteria:

- The landscaped area must be measured or estimated for all parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area.

- Only irrigated landscaped area served by residential or dedicated landscape water meter or connection shall be included in the calculation of Landscaped Area Water Use. Landscape served by CII connections and non-irrigated landscape shall be excluded. (All references to landscaped area below shall mean irrigated landscaped area served by a residential or dedicated landscape meter or connection.)

## Measurement Techniques

The following sections describe techniques that may be used to measure landscaped area. Water suppliers may use one or a combination of these techniques.

**Field-Based Measurement.** Field-based measurement of parcels' landscaped area may be accomplished by physical measurement using devices such as a total station, measuring wheel and compass, global positioning system (GPS), or other measuring devices having accuracy similar to these devices. Field-based measurement also may be obtained from landscape designs submitted to the water supplier for compliance with the MWEL0 or for other planning and billing purposes.

**Measuring with Remote Sensing.** The landscaped area may be measured by using remote sensing (aerial or satellite imaging) to identify the landscaped areas in conjunction with a GIS representation of the parcels in the water supplier's service area. A variety of remote sensing techniques are available, and additional techniques may become available between now and 2020. DWR will allow the water supplier to select the remote-sensing technique that it prefers. However, the following conditions shall be met:

- The remote-sensing information must be overlaid onto a GIS representation of each parcel boundaries to estimate the irrigated landscaped area in each parcel.
- The remote-sensing imagery must have a resolution of 1 meter or less per pixel.
- The remote-sensing technique must be verified for accuracy by comparing its results to the results of field-based measurement for a subset of parcels selected using random sampling. The water supplier shall report the resulting percent error between the estimates of landscaped area produced by the remote-sensing technique and those produced by field-based measurements for the sampled parcels.
- DWR has not set its own standards for remote-sensing verification and sampling design. The water supplier shall provide a description of its remote-sensing technique (including imagery, data processing, and verification) when it reports its landscaped area for purposes of complying with provisions of the Water Code. Congalton and Green (1999)<sup>19</sup> and Stein et al. (2002)<sup>20</sup> are two references that describe professional standards for remote sensing.

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<sup>19</sup>Congalton, R. G., and K. Green, 1999. *Assessing the Accuracy of Remotely Sensed Data: Principles and Practices*. CRC Press, Boca Raton, FL.

<sup>20</sup>Stein, A., F. van der Meer, and B. Gorte, eds. 2002. *Spatial Statistics for Remote Sensing*. Kluwer Academic Publishers, Netherlands.

**Using Sampling to Estimate Landscaped Area on Small Parcels.** The landscaped area for smaller-sized parcels may be calculated by measuring the percentage of total parcel area that is landscaped in a sample of similar parcels and applying that percentage to the remaining parcels. This technique may be used only for parcels with a total land area of 24,000 square feet or less. The parcels for which this technique is used shall be divided into groups, or strata, based on parcel size increments of 4,000 square feet or less. (For example, parcels up to 4,000 square feet would form one group, parcels between 4,001 and 8,000 square feet would form another group, and so forth.) Field-based measurement or remote sensing must be used to calculate the landscaped area for a subset of parcels sampled at random in each parcel size group. The percentage of landscaped area to total land area for the sampled parcels in each group can then be used to calculate the landscaped area for all other parcels in the group. Parcels greater than 24,000 square feet shall be measured directly.

Statistical sampling is a means to provide adequate information at reasonable cost. If implemented carefully, sampling allows the water supplier to develop accurate estimates of landscaped area for all relevant parcels from a subset of parcels. However, sampling shall not be used to estimate landscaped area for parcels larger than 24,000 square feet. Stratified sampling (random sampling in identified subgroups of parcels) should be used to estimate the landscaped area in different parcel size groups, as described earlier. Other characteristics of parcels may be used as a basis for selecting the strata in addition to parcel size.

DWR has not developed specific standards for sampling design. Urban water suppliers should follow standards of professional practice sufficient to demonstrate unbiased estimates of landscaped area. For example, Cochran (1977)<sup>21</sup> and Lohr (2010)<sup>22</sup> provide guidance for sound sampling design.

**Other Measurement Techniques.** The water supplier may use another technique to measure landscaped area for each parcel other than the ones described previously if one becomes available in the future. However, the technique must meet similar conditions to those described above for remote sensing:

- The landscaped area information must be gathered or reported on a parcel basis, or it must be overlaid onto a GIS representation of each parcel's boundaries to calculate the landscaped area in each parcel.
- The technique must be tested for accuracy by comparing its results to the results of field-based measurement for a subset of parcels. Field-based measurement should be performed for a subset of parcels selected at random from those for which the technique has been used. The water supplier should report the percent error between the calculations of landscaped area produced by the selected technique and those produced by field-based measurements for the sampled parcels.

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<sup>21</sup>Cochran, William G. 1977. *Sampling Techniques*. 3rd edition. Wiley; NY, NY.

<sup>22</sup>Lohr, Sharon. 2010. *Sampling: Design and Analysis*. Brooks/Cole Cengage, Boston, MA. 2nd edition.

## Estimate Reference Evapotranspiration

Calculations under the MWELo require determination of reference ET. Each parcels served by a residential or dedicated landscape water meter or connection in the water supplier's service area shall be assigned a reference ET based on one of the following methods:

- Appendix A of the 2015 ordinance contains tables of reference ET. In some cases, the water supplier may choose a single reference ET value most appropriate for all parcels in its service area. For parcels in geographic areas not covered in the Appendix A table, the ordinance provides the following direction for selecting the appropriate reference value: "For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999."
- DWR has developed a spatial program (Spatial CIMIS) that provides interpolated ET data between weather stations.<sup>23</sup> The program can provide estimates of reference ET for any part of California with a resolution of 2 kilometer (km) by 2 km. Water suppliers may use this tool to assign reference ET to parcels. Any other CIMIS enhancements or additional stations formally adopted by DWR between 2010 and 2020 also may be used.
- Water suppliers may use local reference ET estimates that are not formally part of CIMIS or that make adjustments to CIMIS station estimates, provided that such estimates or adjustments are scientifically derived and of comparable reliability to CIMIS estimates.

The water supplier shall explain why neither the CIMIS nor other approved DWR reference ET information is adequate, and shall provide the data and calculations used to develop the local reference ET estimate.

## Apply MAWA Equation to Calculate Annual Volume

Appendix A provides the MAWA equations that apply to parcels. These equations, or their equivalents, will yield water use estimates in gallons per year. The total Landscaped Area Water Use for the water supplier will equal the total Landscaped Area Water Use of all parcels in the supplier's service area.

## Convert Annual Volume to GPCD

After the MAWA for all parcels has been summed to determine the total Landscaped Area Water Use portion of the Method 2 target, the total must be divided by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD. Refer to Methodology 2: Service Area Population to complete this step. Because Landscaped Area Water Use is defined in units of GPCD, the result must be converted from annual to daily use.

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<sup>23</sup>California Irrigation Management Information System. The spatial model is available at <http://www.cimis.water.ca.gov/cimis/cimiSatSpatialCimis.jsp>.

## Summary of Steps to Calculate Landscaped Area Water Use

Calculating Landscaped Area Water Use requires the following process:

1. Assign applicable MWELo (1992, 2009 or 2015) to each parcel.
2. Estimate landscaped area for each parcel.
  - a. Select measurement technique(s) for landscaped area (for example, field based, remote sensing, or sampling).
  - b. Apply technique(s) to calculate total landscaped area for each parcel. (This applies only to parcels for which landscaped area has not yet been measured.)
  - c. Measure special landscape area (SLA) where applicable.
3. Determine the reference ET for each parcel.
4. Use the MAWA from the applicable MWELo to calculate Landscaped Area Water Use for all parcels.
  - a. Use the equations, or their equivalents, to calculate the MAWA for each parcel or group of parcels (grouped according to applicable MWELo, reference ET, and presence of SLA).
  - b. Sum the MAWA over all parcels to calculate the total annual Landscaped Area Water Use portion of the Method 2 target.
5. Divide the total from Step 4 by Service Area Population and then by 365 to calculate the Landscaped Area Water Use in GPCD.



# Methodology 7: Baseline Commercial, Industrial, and Institutional Water Use

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Baseline Commercial, Industrial and Institutional (CII) Water Use is needed for urban water use target Method 2 (along with the indoor residential and landscape uses). It also affects the adjustment factors that agencies may consider at the time of testing compliance in 2015 and 2020 by allowing them to make adjustments based on “substantial changes” in CII relative to Baseline CII Water Use per Section 10608.24 (d)(1)(B). The definition of “substantial change” and adjustments are discussed in Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use.

## Definition of Baseline CII Water Use

Section 10608.12 defines Baseline CII Water Use and related concepts as follows:

- (c) *“Baseline commercial, industrial, and institutional water use” means an urban retail water supplier’s base daily per capita water use for commercial, industrial, and institutional users.*
- (d) *“Commercial water user” means a water user that provides or distributes a product or service.*
- (h) *“Industrial water user” means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.*
- (i) *“Institutional water user” means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.*

## Use of Baseline CII Water Use

Urban retail water suppliers are given several methods for calculating water use targets. Method 2 allows them to calculate a target by using three components: Indoor Residential Use, Landscaped Area Water Use, and Baseline CII Water Use. Section 10608.20 (b)(2)(C) specifies that the CII portion of the target is to be calculated as follows:

For CII uses, a 10 percent reduction in water use from the baseline CII water use by 2020.

## Calculation of Baseline CII Water Use

Baseline periods that a retail water supplier may use to determine Baseline CII Water Use shall follow the same direction required for Base Daily Per Capita Water Use under Section 10608.12.(b):

*“Base daily per capita water use” means any of the following:*

- (1) *The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*
- (2) *For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*

A retail water supplier must have CII data for the entire baseline period used in the water supplier's calculation of Base Daily Per Capita Water Use. If the CII data do not exist, the retail water supplier should use another water use target method.

For each year in the baseline period, the volume of Baseline CII Water Use shall be divided by the Service Area Population (see Methodology 2), and the average of those calculations, converted to a daily rate, is the Baseline CII Water Use for the purpose of calculating the Method 2 target as defined in Section 10608.20(b)(2). The procedure for averaging the annual per capita CII use is the same as for calculating Base Daily Per Capita Water Use (refer to Methodology 3: Base Daily Per Capita Water Use).

The CII component of the 2020 target for Method 2 shall be the Baseline CII Water Use (in GPCD) multiplied by 0.9.

## Process Water Exclusion

A retail water supplier may elect to exclude process water from its calculation, consistent with Section 10608.24(e):

*When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.*

If a water supplier elects to exclude process water, it must do so for baseline and compliance year per capita water use and for baseline CII water use. DWR regulations that define when and how process water can be excluded from Gross Water Use and Baseline CII Water Use calculations are provided in Appendix C.

## Adjustments for Multifamily Residential Connections

A retail water supplier whose baseline CII data includes some multifamily residential uses must demonstrate that it can accurately adjust the data to remove those uses.

In cases where the retail water supplier can estimate the population in multifamily residences included in the CII data, the supplier must do both of the following:

1. Use the adjustment procedure described below in Adjustments for Residential Uses in CII Connections to remove indoor residential uses from the CII data.
2. Assure that landscaped area in the CII data is excluded from the calculations of Landscaped Area Water Use.

In situations where the supplier cannot estimate the population in multifamily residences included in the CII data, Method 2 cannot be used to set the water supplier's water use target.

## Adjustments for Residential Uses in CII Connections

Some CII connections also may serve group quarters or other residential uses. Examples could include campus dormitories, military base housing, and apartments that are served by a CII connection. Water use target Method 2 already provides an indoor use allowance of 55 GPCD for such residents. To ensure that this indoor use is not double-counted, the following steps must be used to adjust the CII component of the target water use under Method 2:

1. Estimate the average population served by CII connections during the baseline period and whose residents use is included in the water supplier's unadjusted Baseline CII Water Use.
2. Calculate the average daily volume of target Indoor Residential Use associated with this population by multiplying the result of Step 1 by the 55-GPCD target indoor use specified for Method 2.
3. Convert the unadjusted CII GPCD target (the Baseline CII Water Use times 0.9) to an average daily volume by multiplying by Service Area Population.
4. Subtract the average daily volume calculated in Step 2 from the unadjusted CII daily volume calculated in Step 3.
5. Divide the result from Step 4 by Service Area Population to give the adjusted Baseline CII Water Use in GPCD for use in calculating the water use target for Method 2.

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# Methodology 8: Criteria for Adjustments to Compliance Daily Per Capita Water Use

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## Introduction

In writing SBx7-7, the legislature recognized that factors outside of a water supplier's control could cause water use during a compliance year (2015 or 2020) to exceed the supplier's water use target despite the supplier's efforts to improve water use efficiency. The legislature addressed this issue in Section 10608.24 (d) by providing three possible adjustments water suppliers can use in calculating compliance daily per capita water use. These include adjustments for:

1. weather that is different from the average of the baseline years,
2. changes in water use due to new or expanded institutions, or economic activity beyond what is accounted for by population growth, and
3. extraordinary events such as increased water use to fight a large fire.

Methodology 8 was not included in the October 2010 publication of the Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use as the methodology was not required for water suppliers to complete their 2010 urban water management plans.

Methodology 8 describes the process that urban retail water suppliers must follow if they are eligible and choose to adjust their compliance daily per capita water use. The methodology addresses:

- The conditions under which suppliers are eligible to adjust compliance year daily per capita water use,
- The order in which adjustments are to be made in cases where water suppliers consider making more than one adjustment, and
- The information suppliers must provide to justify and calculate the compliance year adjustments.
- Adjustment calculations and application to the supplier's compliance daily per-capita water use.

## Definition of Adjustments to Compliance Daily Per Capita Water Use

Section 10608.24 of SBx7-7 states:

*(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:*

*(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.*

*(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.*

*(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.*

*(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.*

Water Code Section 10608.12(i) defines “Institutional water user” as a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

Water Code Section 10608.12(d) defines “Commercial water user” as “a water user that provides or distributes a product or service.”

Water Code Section 10608.12(h) defines “Industrial water user” as “a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.”

Water Code Section 10608.12(e) defines “Compliance daily per-capita water use” as “the gross water use during the final year of the reporting period.”

## Overview of Process and Sequence of Adjustments to Compliance Daily Per Capita Water Use

The adjustments described in this chapter are to be applied to compliance year water use. No adjustments should be made to the target water use and/or baseline water use. Baseline and target water use may be revised, but the revisions should be based on revised population and/or gross water use data or the selection of another target method. Directions for baseline and target revisions are provided in Methodologies 1, 2 and 3. Water suppliers may choose to adjust their compliance year water use regardless of the target method chosen.

Prior to making compliance year adjustments, the supplier should first calculate an unadjusted compliance daily per capita water use following Methodologies 1, 2 and 4 for gross water use, service area population and compliance daily per capita water use. Suppliers who are eligible and elect to exclude industrial process water use from the gross water use calculations must also exclude industrial process water use from all other calculations for compliance year adjustments.

Methodology 8 separates substantial changes in institutional water use into two adjustments (CWC 10608.24 (c)). Adjustment 1 is used for substantial changes to institutional water use due to extraordinary events such as fire suppression. Increases in institutional water use due to extraordinary events are primarily unmetered and are one time or rare occurrences. Adjustment 2 is used for substantial changes in institutional water use due to new or expanded operations, as well as substantial changes in commercial or industrial water use due to increased business output and economic development. The increase in institutional water use due to new or expanded operations should be based on metered data and the adjustment should be addressed in a manner consistent with adjustments for increased commercial or industrial water use.

Adjustments to compliance daily per capita water use should be applied via one of the two optional sequences:

#### **Option 1**

Step 1) Adjustments for institutional water use resulting from fire suppression services and other extraordinary events.

Step 2) Adjustments to institutional water use resulting from new or expanded operations and adjustments to commercial or industrial water use resulting from increased business output and economic development.

Step 3) Adjustments for differences in evapotranspiration and rainfall between the baseline and compliance reporting periods.

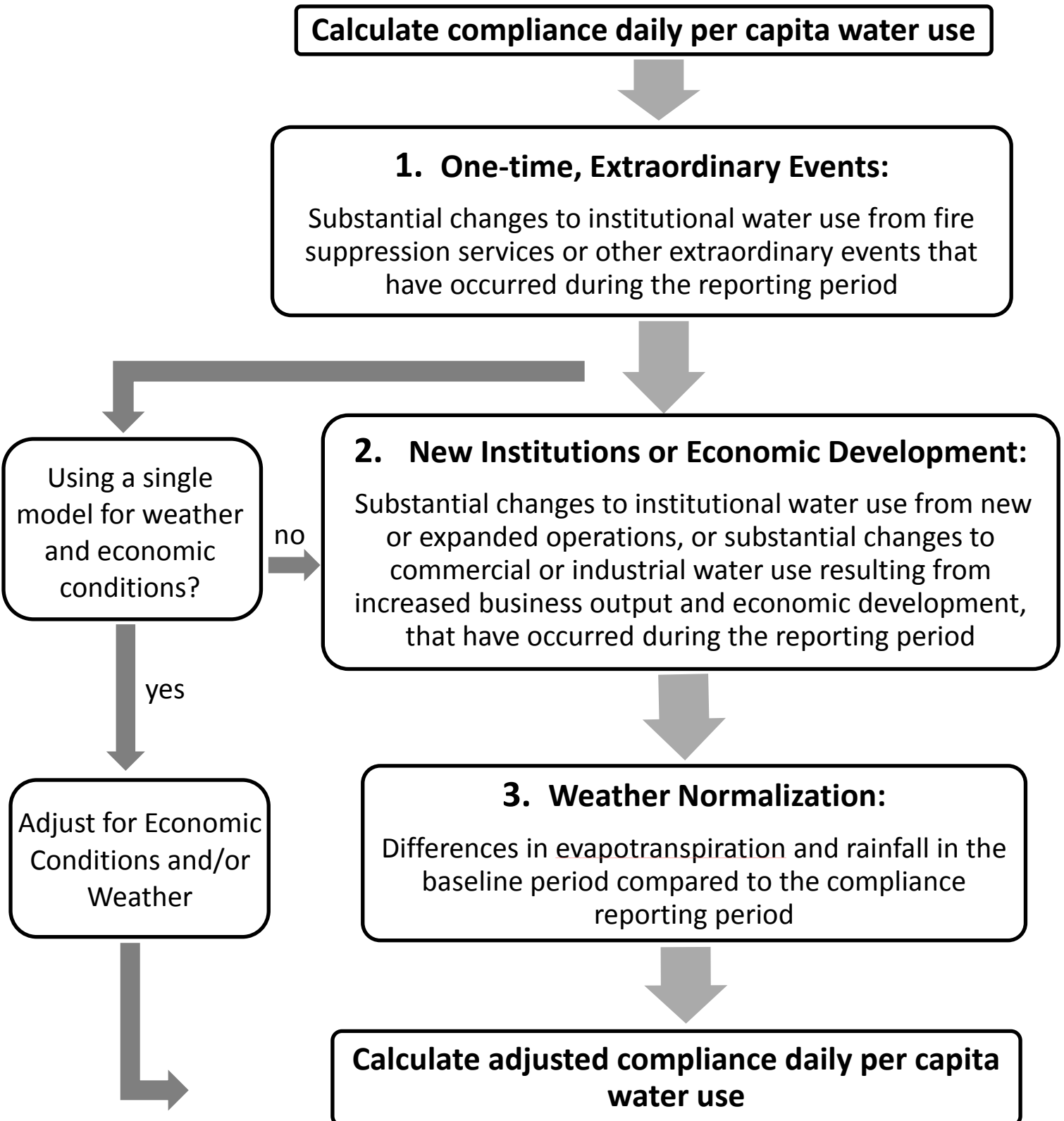
#### **Option 2**

It may be possible to develop both the weather and economic adjustments from a single statistical model. Within this single statistical model approach, water suppliers have the option of taking a credit due to unusual weather, or a credit due to differences in economic conditions, or both. They do not have to take both credits, even though both weather and economic effects could be included in the statistical model. However, water suppliers cannot engage in double-counting, by first adjusting their Gross Water Use for unusual economic conditions, then fitting a dual weather/economy normalization model to already adjusted Gross Water Use. Therefore the following sequence should be followed:

Step1) Adjust Gross Water Use for fire suppression services and other extraordinary institutional events.

Step 2) Further adjust Gross Water Use, using results of the statistical model fitted to Gross Water Use developed in Step 1 above, for differences in evapotranspiration, rainfall and economic factors between the baseline and compliance reporting periods.

# Sequence of Adjustments to Compliance Daily Per Capita Water Use





## **Adjustment 1: Calculating Adjustments to Institutional Water Use for Fire Suppression Services or Other Extraordinary Events**

This category of adjustments accounts for one-time, extraordinary events that substantially increased a supplier's compliance year water use and did not occur on a regular basis either in the baseline or compliance reporting years. The institutional water use associated with extraordinary events, such as fire suppression is typically unmetered. To document an unmetered increase in water use, water suppliers can use water production records during the time of the event, as shown in Step 2A below. Adjustments for metered institutional use for extraordinary events should use Step 2B. Adjustments to metered commercial or industrial use for extraordinary events should use Adjustment 2.

### **Step 1: Document that the event was extraordinary – for both metered and unmetered institutional water use**

Water suppliers must provide documentation illustrating that the event and its associated increase in water use was a one time or rare event and did not occur on a regular basis in the baseline period. This documentation can be in the form of fire department or emergency service records, media reports or other historical records.

### **Step 2: Document Use for Extraordinary Event**

#### **Step 2A: For Unmetered Institutional Water Use:**

Since water use under this category of adjustment is rarely metered, water suppliers shall estimate the water use for the extraordinary event through other available data such as water treatment plant production data, or drawdown from storage in the distribution system. When using water production data, the water supplier must calculate the increase in production for the time period of the event relative to the normal water production for that time period. The calculation of increased water use is only for water that is included in the gross water calculation. Water that is used for the extraordinary event that comes from sources outside of the distribution area defined in the gross water use calculation should not be included in the extraordinary event adjustment calculations.

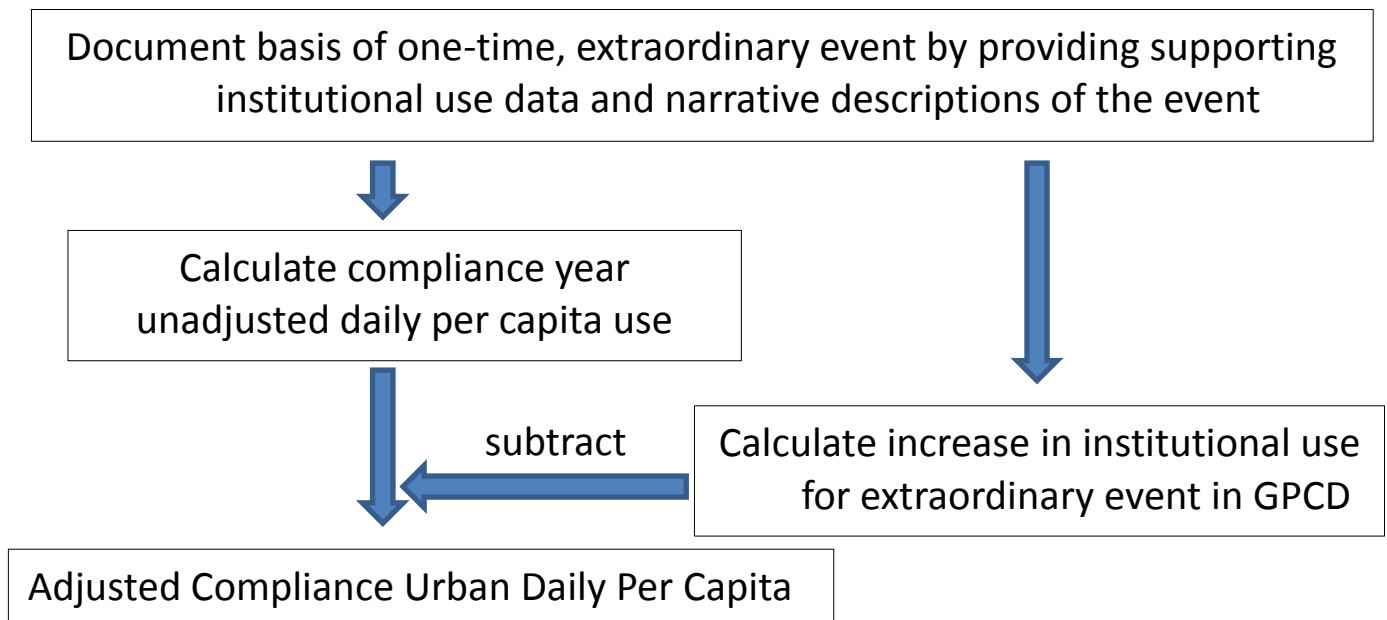
#### **Step 2B: For Metered Institutional Water Use:**

The water supplier shall document the quantity of increased water use during the time period of the extraordinary event, relative to the normal water use for that time period and relative to the use immediately prior and after the event, based on metered data. The calculation of increased water use is only for water that is included in the gross water calculation. Water that is used for the extraordinary event that comes from sources outside of the distribution area defined in the gross water use calculation should not be included in the extraordinary event adjustment calculations.

### Step 3: Calculate Extraordinary Event Institutional Water Use Adjustment

- 3.1. Convert the volume of water from Step 2A or Step 2B into daily per capita water use units. Divide the volume of water from Step 2A or Step 2B by the water supplier’s compliance year service area population and 365 days of the year. This constitutes the extraordinary event institutional water use adjustment, in GPCD.
  
- 3.2. Calculate the compliance year water use adjusted for an extraordinary event. Subtract the extraordinary event water use in units of GPCD (Step 3.1) from the unadjusted compliance year daily per capita water use. The result is the compliance year daily per capita water use adjusted for an extraordinary event.

### Institutional Use Adjustment for Fire Suppression or Extraordinary Events



#### Example 1A: Extraordinary Fire Suppression Services

Water Supplier A provides water for fire suppression services. In the interim compliance year 2015, there was an extraordinary fire event that lasted for five days named the Cleveland Fire. Fire Department reports and a local news story documented that the fire was the largest and longest lasting fire the region had experienced. Using water treatment plant records, Water Supplier A estimated that the quantity of treated water produced and sent into the distribution system during the five-day period increased by 8.6 million gallons (MG).

The extraordinary fire suppression adjustment is calculated as 2.4 GPCD by dividing 8.6 MG by the water supplier’s 2015 service area population of 10,000 and further divided by 365 days of the year. Water Supplier A had calculated an unadjusted compliance daily per capita water use of 148.2 GPCD. Subtracting 2.4 GPCD, Water Supplier A’s compliance daily per capita water use adjusted for the Cleveland fire is 145.8 GPCD.

## **Adjustment 2: Calculating Adjustments to Institutional Water Use from New or Expanded Operations or Adjustments to Commercial or Industrial Water Use Resulting from Increased Business Output and Economic Development**

Adjustment 2 accounts for substantial changes to commercial, industrial or institutional (CII) water use due to new or expanded institutional water use or increased commercial and/or industrial business output and economic development. The increase in water use due to economic activity should be as a result of factors outside of service area population growth. Therefore, any adjustment may primarily be driven by institutions and businesses that serve nonresident populations and customers. Examples include the expansion of a college or university that draws students from outside the service area, a regional mall, or a business making a product that is sold broadly.

Increases in water use from institutions or businesses that are started or expanded to serve a new residential development or a larger population are not eligible for this adjustment. Since compliance year water use is reported on a daily per capita basis, the increase in water use for institutions or businesses which expand to serve larger population should not increase the compliance year daily per capita water use.

To account for possible changes in water use between sectors (an industrial facility becoming a commercial facility) water suppliers must first document that the percentage reduction in CII water use between baseline years and the compliance year is less than the percent reduction from the baseline water use required to meet the supplier's water use target. Water suppliers whose CII percentage reduction is greater than the water use target percent reduction are not eligible for Adjustment 2.

Water suppliers must document that the increase in commercial, industrial or institutional water use proposed for adjustment has increased due to new or expanded institutions, or to increased business output and economic development. Water suppliers can document the increase through measures such as institutional enrollments, employment statistics, and statistics on business output or trade.

### **Step 1: Quantify CII Water Use Reduction**

This step is intended to identify CII water use that may be eligible for adjustment. The calculations also separate the effect of changes in CII water use due to new or expanded institutions and economic development from that due to growth in population. Only the former may be eligible for this adjustment.

- 1.1. Calculate daily CII water use per capita for both the baseline period and the compliance year(s) using Methodology 7. Calculate the percentage reduction achieved in CII daily per capita water use for the compliance year(s) compared to the baseline period.

- 1.2. If the percentage reduction in CII daily per capita water use in the compliance year(s) (from Step 1.1) equals or exceeds the target percentage reduction in baseline GPCD, no economic adjustment can be made.

## **Step 2: Documentation of Basis and Supporting Data for the Adjustment**

Water suppliers making the economic adjustment must provide both a narrative description and numeric water use data to substantiate the adjustments. The data must illustrate the specific changes in commercial, industrial, or institutional water use by customer accounts where possible, between the baseline period and the compliance year(s).

- 2.1 For substantial changes to institutional water use from new or expanded operations:
  - 2.1.1 Provide a narrative that identifies and documents new institutions or existing institutions with expanded operations within the service area that have caused institutional water use to increase significantly during the reporting period.
  - 2.1.2 Calculate the change in the compliance year's institutional daily per capita water use compared to that in the baseline period.
- 2.2 For substantial changes to commercial or industrial water use from increased business output and economic development:
  - 2.2.1 Provide a narrative that identifies and explains the increase in commercial and industrial water use within the service area due to increased business output and economic development.
  - 2.2.2 Document the change in compliance year(s) daily commercial and/or industrial water use per capita compared to that in the baseline period.

## **Step 3: Correlation with Institutional or Economic Development Indicators**

Demonstrate that the increase in commercial, industrial, or institutional water use is directly related to a net expansion in institutional operations, or a net increase in business output and economic development between the supplier's baseline period and compliance year(s). This step is necessary to prove that the increase in CII use is driven by economic factors and is not a result of service area population growth or change in water management.

- 3.1 Provide the institutional or economic development indicators that correlate with the increase in commercial, industrial, or institutional water use documented in Step 2. Institutional or economic indicators include:

- Employment statistics that show net increases in the specific commercial, industrial, or institutional sectors.<sup>1</sup>
- Net increase in institutional enrollment, census, employment, or occupancy.
- Net gain in measures of business output and economic development such as production volume, sales tax revenue, U.S. Department of Commerce measures of retail trade, or other indicators of manufacturing and wholesale activities.<sup>2</sup>
- Net gain in measures of non-resident population such as hotel occupancy rates, or measures of consumer expenditures such as attendance at entertainment venues.
- Net increase in commercial sector activities due to an extraordinary mega-event, such as hosting the Olympic Games or Super Bowl, during the compliance year.
- Other economic indicators.

3.2 Adjust any economic indicators measured in dollars for inflation by using the Consumer Price Index (CPI) (reference to specific CPI series, such as USACPIBLS).

#### **Step 4: Document CII Water Use Reduction Programs and Efforts**

Describe, in the demand management section of the supplier's urban water management plan or through the California Urban Water Conservation Council BMP reports submitted in lieu of the UWMP Demand Management Measures (DMM) section, the CII demand management measures the water supplier has implemented. Water suppliers not implementing CII DMMs are not eligible for the compliance year economic adjustment.

#### **Step 5: Calculate the Economic Adjustments due to New or Expanded Institutions or Increased Business Output and Economic Development**

To calculate the compliance daily per capita water use adjusted for economic activity, subtract the net change in commercial daily per capita water use, institutional daily per capita water use, or industrial daily per capita water use (from Step 2.1.2 or 2.2.2) from the unadjusted compliance year daily per capita water use.

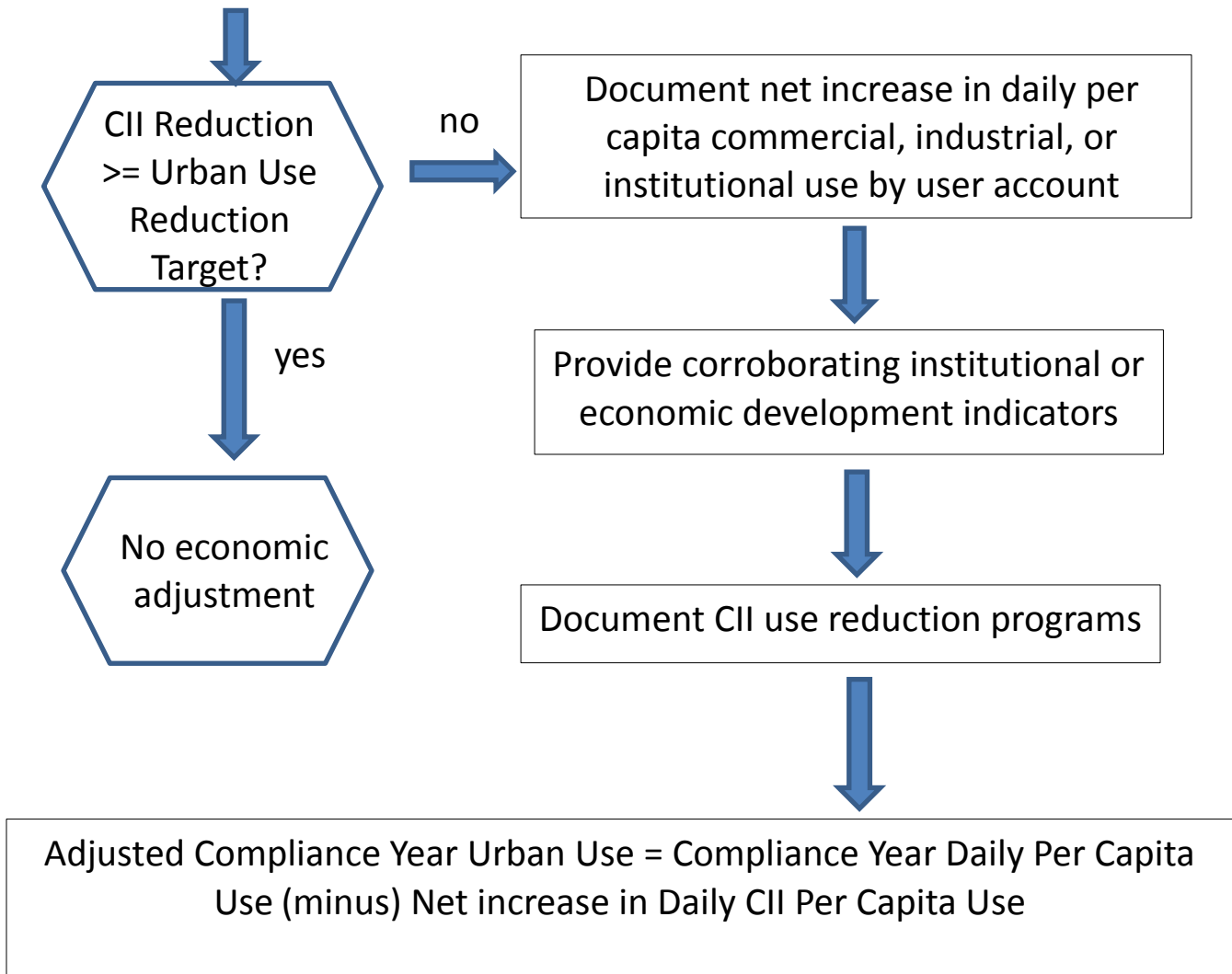
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<sup>1</sup> Employment Development Department publishes monthly labor force data by county.

<sup>2</sup> Board of Equalization publishes annual reports on local sales tax distribution by city.

## CII Use Adjustment from Expanded Institutional Operations or Increased Business Output and Economic Development

- Calculate daily CII use per capita for baseline and compliance year(s)
- Calculate CII use percent reduction achieved
- Calculate daily per capita use % reduction target to be achieved in the compliance year(s)



**Example 2A: Expanded Operation at a University Campus**

Retail Water Supplier A provides water service to University U. Between the baseline period and year 2020, University U expanded its campus and enrollment increased. Water Supplier A needs to compare the CII use reduction achieved in year 2020 to the 2020 urban water use reduction target, after factoring in the increase in resident population. The CII use reduction achieved in 2020 was 16 percent, smaller than the 2020 urban water use reduction target of 19 percent. Water Supplier A is thus eligible to make the expanded institutional water use adjustment.

Although institutional water use for University U increased between 2020 and the baseline period, the net increase in total institutional water use within Water Supplier A's service area was only 2.3 GPCD, due to downsizing of some government facilities. The net institutional water use adjustment is 2.3 GPCD, to be subtracted from the 2020 urban daily per capita water use.

**Example 2B: Increased Industrial Water Use Resulting from Increased Business Output and Economic Development**

There was a net increase in industrial water use between the baseline period and year 2015 within the service area of Water Supplier B. After performing the eligibility step, the supporting data show a decrease of industrial water use in the Fruit and Vegetable Preserving and Specialty Food Manufacturing Sector and an increase in industrial water use in the Dairy Product Manufacturing Sector. The net increase in daily per capita industrial water use is 1.2 GPCD and constitutes the economic adjustment to be subtracted from the compliance year unadjusted daily per capita water use.

**Example 2C: Increased Commercial Water Use Resulting from Economic Development**

In the intervening years between the baseline period and the compliance reporting year 2015, City C built a new sports stadium. There were also new commercial establishments such as retail businesses and restaurants built in the area. Existing commercial establishments also reported a general increase in sales. The water supplier that serves City C performed the eligibility step and provided supporting economic data including: employment figures, sales revenue, hotel occupancy rates, and stadium attendance records. Commercial water use in the Entertainment, Food Sales and Hospitality sectors show a net increase of Y GPCD in year 2015 compared to the baseline period. This Y GPCD is the magnitude of economic adjustment that can be subtracted from the 2015 urban daily per capita water use to arrive at the adjusted 2015 compliance urban daily per capita water use.

## **Adjustment 3: Approach to Calculating Adjustments due to Differences in Evapotranspiration and Rainfall and Economic Activity in the Baseline Period Compared to the Compliance Reporting Year**

It is expected that water suppliers who adjust compliance year GPCD for unusual weather conditions will use a statistical model calibrated using data from their selected baseline period. Suppliers may also choose to include economic and other factors in their statistical model in addition to weather to develop a model-based correction for unusual economic conditions.

DWR has evaluated several different approaches using real-world water supplier data for normalizing compliance year GPCD. As a result of that exploratory modeling, DWR is in a position to offer several guidelines for water suppliers to follow while developing their weather normalization, or their combined weather/economic normalization models. DWR will examine several model efficacy metrics to determine if the adjustments to compliance GPCD generated by said models meet DWR's criteria. However, DWR's exploratory modeling included a thorough evaluation of the California Urban Water Conservation Council's (Council's) weather normalization model and criteria and DWR has decided to waive the documentation and criteria requirements below (except for input data documentation submission) for 2015 if water suppliers use the Council's model as specified by the Council.

### **DWR Modeling Criteria**

DWR has separated out the criteria into the following topics:

- A. Model Specification Criteria
- B. Regression Output Criteria

#### **A. Model Specification Criteria**

These criteria are intended to ensure that weather and economic adjustments are produced using an appropriate method and that the resulting adjustments are used in an appropriate manner. For each criterion that is not met, an explanation with justification must be provided for DWR review.

1. To weather normalize compliance year GPCD, total water demand (Gross Water Use) should be modeled at the monthly level, or finer. Analysis at an annual level does not provide an adequate basis for weather normalization because the impact of weather on water demand is considerably attenuated. Water suppliers wishing to develop a combined weather/economic normalization model should include the unemployment rate or labor-force participation rate, as economic variables in these models. If these economic measures are available at a monthly level then monthly data should be used. Otherwise, annual economic values can be used by interpolating to obtain monthly values.



2. Water demands normally show variation from month to month, hitting minimum in winter and maximum in summer. This normal variation due to climate should be captured by inclusion of eleven monthly indicator variables or other alternatives, such as Fourier harmonics in the model specification. If one or more of these eleven monthly indicator variables is excluded, suppliers must demonstrate that excluded coefficients had p-values exceeding 0.32 (or t-statistic below 1). This criterion will help ensure that variation due to climate is not erroneously attributed to weather.
3. Changes in service area characteristics, including conservation, rate increases, rate structure changes, etc. may cause GPCD to change over time. The model specification should, at a minimum, include a trend term to capture these effects. Service areas that have experienced rapid changes (rate structure changes, large price increases, drought restrictions, metering of formerly unmetered accounts, etc.) coinciding with the model calibration period should include additional variables in their model to capture the impact of these changes instead of simply relying on a trend variable. The inclusion of these additional variables becomes paramount if suppliers choose to develop a fully-specified water demand model for estimating the impact of weather and economic factors on demand, especially if suppliers discover that estimation of statistically significant relationships between demand and economic factors requires extending the model calibration period beyond the 10-year baseline period.
4. Unusual weather can cause deviations in the month-to-month variation in water demand that is otherwise considered normal for a given area. The model specification should include measures of weather to capture these deviations. Weather measures should include rainfall and temperature, or rainfall and evapotranspiration; should be representative of the majority of the population in the service area; and should be from a credible source. DWR will make available these weather measures with statewide coverage.
5. Models should be specified to account for the seasonal differences in the influence of weather on water demand. Weather variables for at least three seasons should be included in the model specification.
6. If water suppliers choose to construct a combined weather/economic normalization model, economic measures should include the unemployment rate or the labor force participation rate for the geographic jurisdiction that best overlaps with a water supplier's service area. These data should be obtained from a state or federal source.
7. For the purpose of model estimation, the dependent variable (monthly GPCD) should first be logarithmically transformed. The log specification has a long, respected pedigree in water demand modeling. A model with a log transformed dependent variable generates compliance year corrections (because of deviations in weather and/or economic variables between the compliance year and baseline period) directly in the form of percentages, making it a more robust way for adjusting compliance year GPCD. Example calculations are provided in DWR's Weather Normalization Guidelines document.

## **B. Regression Output Criteria**

These criteria are intended to ensure that, by meeting specific objectives, the model results can be reasonably applied to adjust compliance year GPCD.

1. Model coefficients associated with the weather and, if applicable, economic variables that are used for adjusting compliance year GPCD should be statistically significant at the 5 percent level at a minimum (p-value  $\leq 0.05$ ).
2. Normality assumption for linear regression should not be unacceptably violated. Any appropriate statistical test for residual normality may be deployed. Up to four outliers may be excluded before performing the test. The test should demonstrate at a significance level of 10 percent that model residuals are distributed normally. If the normality test is still not met, suppliers should use Robust Regression or other appropriate techniques instead of Ordinary Least Squares Regression techniques to estimate their statistical model. See DWR's Weather Normalization Guidelines document for guidance.
3. Coefficients for the weather and economic variables should have the expected sign.
4. The model's annual GPCD prediction error band should be within  $\pm 10\%$  (i.e., the percentage difference between actual and predicted annual GPCD across all the years included in the model calibration time period is within  $\pm 10\%$ ).

## **Modeling Documentation**

The following documentation is necessary to allow DWR to verify that the modeling and regression output criteria have been met.

Water suppliers must submit:

1. Source and type of weather data with an explanation justifying how these are representative of the supplier's service area.
2. Source and type of economic data, if a dual weather/economic model is being estimated, with an explanation justifying how these are representative of the supplier's service area.
3. Model description, including dependent and independent variables used in the model.
4. Statistical software used.
5. Model input data.
6. Regression output, including R-square and estimated regression coefficients with the significance (p-values) of each coefficient.
7. Indicators of the credibility of regression significance metrics.
  - Probability plot of model residuals.
  - Results from a test of residual normality.
  - Results from a test for serial correlation.

8. Percent difference between actual GPCD and model predicted GPCD for each year during the baseline period (error band for the model calibration years).
9. Compliance year weather adjustment calculations and, if used, economic adjustment calculations.

Model and weather data options are described in greater detail in DWR's Weather Normalization Guidelines document.

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# Methodology 9: Regional Compliance

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According to Sections 10608.20(a)(1) and 10608.28, urban retail water suppliers may plan, comply, and report on a regional basis, an individual basis or both. Each group of water suppliers agreeing among themselves to plan, comply, and report as a region is referred to in this methodology as a “regional alliance.”

## Legislative Guidance for Regional Compliance

Section 10608.20(a)(1) states:

*Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.*

Section 10608.28 states:

- (a) *An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:*
- (1) *Through an urban wholesale water supplier.*
  - (2) *Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 commencing with Section 81300)).*
  - (3) *Through a regional water management group as defined in Section 10537.*
  - (4) *By an integrated regional water management funding area.*
  - (5) *By hydrologic region.*
  - (6) *Through other appropriate geographic scales for which computation methods have been developed by the department.*
- (b) *A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.*

## Criteria for Water Suppliers that May Report and Comply as a Region

To form a regional alliance, water suppliers must meet at least one of the following criteria:

- Water suppliers are recipients of water from a common wholesale water supplier. For this purpose, the State Water Project and the Central Valley Project are not considered wholesale water suppliers. Wholesale water suppliers are not required to establish and meet targets for daily per capita water use. Wholesale water suppliers serving in the role of a regional alliance are representing the urban retail water suppliers that are members of the alliance and compliance with a regional target is on behalf of the member suppliers and not the wholesaler supplier itself.
- Water suppliers are partners with a common regional agency authorized to plan and implement water conservation.
- Water suppliers are part of a regional water management group as defined in Water Code section 10537.
- Water suppliers are part of an integrated regional water management funding area, which for this purpose is interpreted to mean an Integrated Regional Water Management (IRWM) planning area.
- Water suppliers are located in the same hydrologic region, which for this purpose refers to the 10 hydrologic regions as shown in the California Water Plan. For situations where water suppliers may serve areas in more than one hydrologic region, the majority of each water supplier's Service Area Population must be in the hydrologic region being identified as a regional alliance.
- Water suppliers join through appropriate geographic scales for which these methodologies can be applied. For this provision, water suppliers' service area boundaries must be contiguous.

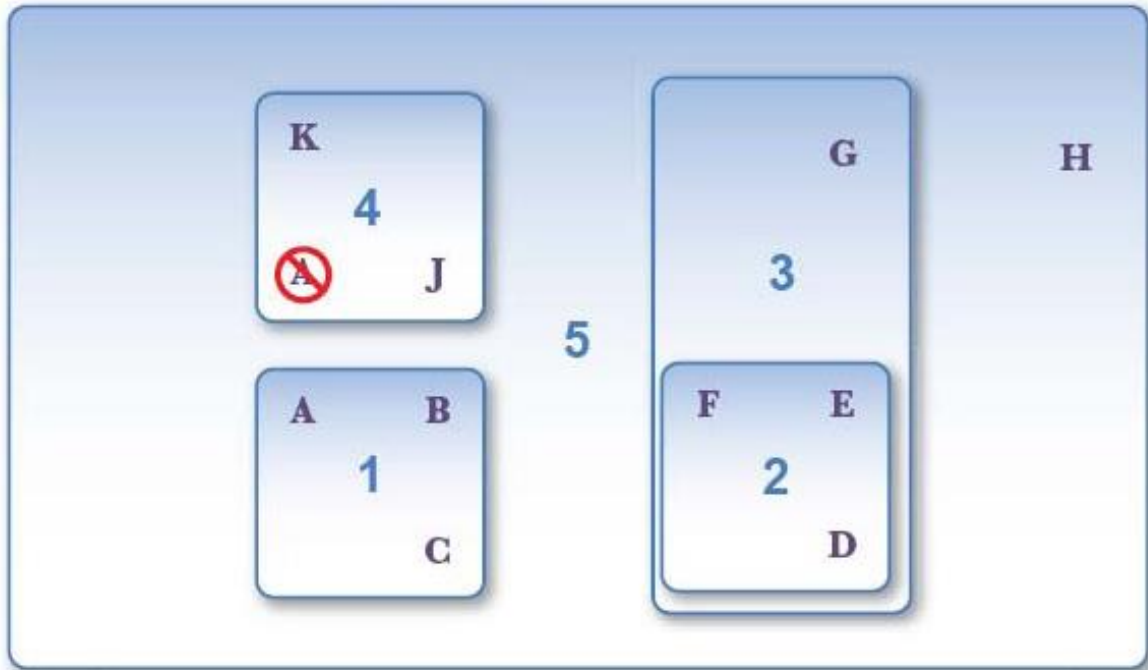
### Tiered Regional Alliances

In general, urban retail water suppliers can belong to only one regional alliance for the purpose of establishing and complying with urban water use targets. An exception is when regional alliances are tiered so that the members of the smallest alliance are all members of the larger alliance or alliances.

### Tiered Regional Alliances

Regional Alliances **1**, **2**, **3**, ...

Urban Retail Water Suppliers **A, B, C, ...**



**FIGURE 6: EXAMPLE OF TIERED ALLIANCES**

Figure 6 illustrates tiered alliances. For example, supplier A forms an alliance with suppliers B and C (Alliance 1). Supplier A cannot also form an alliance with suppliers J and K unless the A, J, K alliance were to include B and C as well. Water suppliers D, E, and F could comply as regional Alliance 2, or include supplier G and comply as regional Alliance 3. Alternatively, all suppliers in Figure 6 could comply as Alliance 5. The tiered alliance requirements are only for compliance with urban water use targets and do not apply to other regional water management activities or partnerships.

## Calculation of Targets and Compliance GPCD

### Calculation of Regional Targets

Water suppliers wishing to test compliance regionally are permitted to do so. Water suppliers in a regional alliance have three options for calculating their regional targets.

Under the first option, which preserves maximum flexibility at the supplier level, each supplier in a regional alliance would first calculate its individual target as if it were complying individually. These individual targets should then be weighted by each supplier's population and averaged over all members in the alliance to obtain the regional target.<sup>24</sup> For the 2011 urban water management plans, suppliers may use their current population data for generating the regional targets. However, for testing compliance in 2015 and 2020, the population weighting of the individual targets must be based upon the compliance-year population data. A retail water supplier may update its target in 2015 (see Water Code section 10608.20(g) and any such modifications made to individual targets after 2011 must be incorporated into updated regional targets and reported in the compliance year 2015. For those urban retailers or alliances that choose method 2 for developing a target (see Water Code section 10608.20(b)(2)), the target must be revised and reported in 2020. A modification in any individual target or a change in membership in a regional alliance will require a recalculation of the regional target.

A second approach for an alliance to calculate a regional target is to sum up the individual supplier's gross water use and service area populations to develop regional gross water use and population. The alliance would then calculate regional base daily per capita use and choose one target method to calculate a regional target. Alliances must have all their members use the same baseline period.

A third approach is to calculate regional gross water use or population directly for the entire regional alliance area. Regional base daily per capita use and a regional water use target would then be derived. Like the second approach, members of alliances using this approach must use the same baseline period and the same target method. A regional alliance must meet the requirements of Section 10608.22. The regional target may not exceed 95 percent of the region's 5-year Base Daily Per Capita Water Use. Methodology 3: Base Daily Per Capita Water Use describes in detail the interpretation and calculations required under Section 10608.22.

### Calculation of Regional Compliance Daily Per Capita Water Use

Gross Water Use and Service Area Population must be reported for each supplier during the compliance year. If applicable, adjustments for evapotranspiration and rainfall, fire suppression, and changes in distribution area should be made for each individual water supplier. Adjustments to Gross Water Use for extraordinary economic growth can be

<sup>24</sup> Assume there are (N) suppliers in an alliance, with individual targets ( $T_1, T_2, \dots, T_N$ ) and population ( $P_1, P_2, \dots, P_N$ ), where the subscript on the individual targets and population denote the identity of each supplier. Then, total population in a regional alliance (RP) becomes:

$$RP = P_1 + P_2 + \dots + P_N$$

The regional target (RT) can be derived as a weighted average of the individual supplier targets as follows:

$$RT = (P_1 * T_1 + P_2 * T_2 + \dots + P_N * T_N) / RP$$



applied either to the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods. Regional compliance daily per capita water use shall be calculated as the aggregate regional Gross Water Use divided by the aggregate Service Area Population.

## Data Reporting for a Regional Alliance

A regional alliance must send DWR a letter stating that an alliance has been formed and provide a list of the water supplier members. This letter should be sent by July 1, 2011, for alliances formed before submitting 2010 urban water management plans, or in ninety days after an alliance has been formed after July 1, 2011. In the case of tiered alliances, a retail water supplier cannot be cited as a member of a regional alliance unless it acknowledges its membership in that alliance in its urban water management plan.

DWR will collect data pertaining to regional alliances through three documents: (1) through the individual supplier urban water management plans; (2) through the regional urban water management plans; and (3) through the regional alliance reports.

### Individual Supplier Urban Water Management Plans

All members of a regional alliance must include the following data in their individual urban water management plans unless they are participating in a regional urban water management plan (applicable urban water management plan dates are shown in parentheses):

- A list of all of its regional alliances. If a supplier is a member of tiered alliances, it must name all the alliances it is a member of
- Baseline Gross Water Use and Service Area Population (2010, 2015, 2020)
- Individual 2020 Urban Water Use Target (2010, 2015, 2020) and Interim 2015 Urban Water Use Target (2010)
- Compliance Year Gross Water Use (2015 and 2020) and Service Area Population (2010, 2015, 2020)
- Adjustments to Gross Water Use in the compliance year (2015, 2020)
- Water suppliers who choose Target Method 2 also must provide Landscaped Area Water Use and Baseline CII Water Use data (2010, 2015, 2020)
- Water Suppliers who choose Target Method 4 must provide the components of calculation as required by Target Method 4. Appendix B describes Target Method 4 and the regional compliance reporting that applies to that method (2010, 2015, 2020)

### Regional Urban Water Management Plans

Members of regional alliance can forgo submitting individual urban water management plans and instead submit a regional urban water management plan. These regional urban water management plans are different from the regional alliance reports in that they must meet all the urban water management plan reporting requirements. The water use target data can be reported in the regional plan in either of two ways:

- The regional plan can report all the data elements that are now required to be included in the individual urban water management plans pertaining to this program (see section above titled Individual Supplier Urban Water Management Plans), for each supplier in the alliance. It would also report the same data elements aggregated over all members in the alliance.
- The regional plan may report some data elements only in aggregate for the alliance as a whole (not for each individual member). For example, the plan may report Service Area Population only for the regional alliance if the regional population data are more accurate or available. If the Service Area Population is only reported on a regional basis, then Base Daily per Capita Use, Compliance Daily per Capita Use, and Urban Water Use Targets would be calculated and reported only on a regional basis. Water suppliers that are part of a regional alliance that only reports a regional population can only develop a regional Urban Water Use Target and comply with this target regionally. Developing individual targets and testing compliance at the individual level is not possible unless an individual Service Area Population is calculated.

### **Regional Alliance Report**

For regional alliances that do not submit a regional urban water management plan, DWR will require a regional alliance report. This report shall include all the water use target data elements that are now required to be included in the individual urban water management plans (see section above titled Individual Supplier Urban Water Management Plans) for each supplier in the alliance, and also shall include the alliance-level aggregates.

## **Memoranda of Understanding or Agreements for Regional Alliances**

DWR will not review or approve the terms of memoranda of understanding (MOUs) or legal agreements that water suppliers use to create and manage regional alliances. However, terms of the agreements shall be consistent with all applicable sections of the Water Code. DWR will presume that water suppliers understand the consequences if partner suppliers withdraw from a regional alliance.

## **Compliance Assessment for Water Suppliers Belonging to a Regional Alliance**

Compliance will be assessed based upon how an individual retail water supplier performs relative to its individual target or how the retail water supplier's regional alliance performs as a whole relative to its regional target. Wholesale suppliers are not themselves subject to compliance assessment. The following guidelines will be used to assess compliance:

- If a regional alliance meets its regional target, all suppliers in the alliance will be deemed compliant. For tiered alliances, if a smaller alliance does not meet its water use target, the member agencies can still be in compliance if a larger alliance is in compliance. Conversely, members of a smaller alliance can be in compliance if the smaller alliance complies while the larger alliance fails. If a regional alliance fails to meet its regional

target, water suppliers in the alliance that meet their individual targets will be deemed compliant.

- Water suppliers in alliances that meet neither their individual targets nor their regional targets will be deemed noncompliant. These suppliers can still apply for grant funds if their application is accompanied by a plan that demonstrates how the funds being sought will bring them into compliance with their targets (Section 10608.56).

### **Withdrawal from a Regional Alliance before 2020**

If a water supplier withdraws from a regional alliance, the withdrawing water supplier must then comply individually. The water suppliers remaining in the regional alliance must revise regional baseline and target data and alliance membership in the subsequent UWMP plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

### **Dissolution of a Regional Alliance before 2020**

If a regional alliance dissolves before 2020, each affected water supplier must then comply individually or form or join another alliance. An affected water supplier that had not previously submitted an individual urban water management plan (for example, if it had participated in a regional urban water management plan for a regional alliance that has dissolved) has to submit an urban water management plan or a regional water management plan. The memorandum of understanding or other legal agreements governing the alliance may define additional consequences or remedies.

# APPENDIX A

## Model Water Efficient Landscape Ordinance Definitions and Calculations

The Model Water Efficient Landscape Ordinance (MWELo) was originally added to the California Code of Regulations (Title 23, Division 2, Chapter 2.7) in 1992 and revised in 2009 and 2015. Paragraph 492.4 defines the calculation of Maximum Applied Water Allowance (MAWA).

For landscaped areas that are installed on or after December 1, 2015, the MAWA equation and all applicable definitions of terms from the 2015 ordinance are provided below.

$$\text{Maximum Applied Water Allowance (MAWA)} = (ET_o) (0.62) [(ETAF \times LA) + [(1 - ETAF) \times SLA]]$$

*Maximum Applied Water Allowance (MAWA) is in gallons per year*

*ET<sub>o</sub> = Reference Evapotranspiration (inches per year). Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated. Reference Evapotranspiration values for each location can be found in Appendix A of the 2015 Model Water Efficient Landscape Ordinance.*

*0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)*

*0.55 = ET Adjustment Factor for residential landscapes (ETAF). When applied to reference evapotranspiration, the ETAF "adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape."*

*0.45 = ET Adjustment Factor for non-residential landscapes (ETAF). When applied to reference evapotranspiration, the ETAF "adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape."*

*LA = Landscaped Area including SLA (square feet), which includes "all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation)."*

*[(1-ETAF) x SLA] = Additional Water Allowance for Special Landscape Area (SLA), resulting in an effective ETAF for SLA of 1.0.*

*SLA = Special Landscaped Area (square feet), which is defined as “an area of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.”*

For landscaped areas that are installed on or after January 1, 2010, up to November 30, 2015 the MAWA equation and all applicable definitions of terms from the 2010 ordinance are provided below.

*Maximum Applied Water Allowance (MAWA) = (ET<sub>o</sub>) (0.62) [(0.7 x LA) + (0.3 x SLA)]*

*Maximum Applied Water Allowance (MAWA) is in gallons per year*

*ET<sub>o</sub> = Reference Evapotranspiration (inches per year). Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated.” Reference Evapotranspiration values for each location can be found in Appendix A of the 2010 Model Water Efficient Landscape Ordinance.*

*0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)*

*0.7 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”*

*LA = Landscaped Area including SLA (square feet), which includes “all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).”*

*0.3 = Additional Water Allowance for Special Landscape Area (SLA), resulting in an effective ETAF for SLA of 1.0.*

*SLA = Special Landscaped Area (square feet), which is defined as “an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.”*

For landscaped areas that are installed before January 1, 2010, the MAWA equation and all applicable definition of terms from the original 1992 version of the ordinance are as follows:

$$\text{Maximum Applied Water Allowance (MAWA)} = (ET_o) (0.62) (0.8 \times LA)$$

*Maximum Applied Water Allowance (MAWA) is in gallons per year*

*ET<sub>o</sub> = Reference Evapotranspiration (inches per year). Reference Evapotranspiration values for each location can be found on page 38.10 of the Model Water Efficient Landscape Ordinance.*

*0.62 = Conversion Factor (from inches/year to gallons/sq ft/year)*

*0.8 = ET Adjustment Factor (ETAF). When applied to reference evapotranspiration, the ETAF “adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.”*

*LA = Landscaped area includes the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, landscapes such as decks and patio, and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.*

# APPENDIX B

## PROVISIONAL METHOD 4 FOR DETERMINING WATER USE TARGETS

DWR developed Provisional Target Method 4 in accordance with Water Code Section 10608.20(b)(4). Urban retail water suppliers that adopt Target Method 4 to determine their 2020 urban water use target must use the provisional procedures described in this document. This target method has been developed with the assistance of the California Urban Water Conservation Council, the California State Water Resources Control Board, and the Urban Stakeholder Committee, composed of technical experts and representatives of water suppliers and environmental and other organizations.

Water Code Section 10608.20(d) provides that DWR will update Target Method 4 by December 31, 2014. It is anticipated that improvements will be made to the target method based on new data and analytical techniques in the update. Provisional Target Method 4 described here will be in effect until the update by 2014.

A Target Method 4 Calculator (Calculator) using an Excel spreadsheet has been developed for use with Provisional Target Method 4. The Calculator will be required to accomplish some of the procedures for this method. Other procedures may be accomplished without use of the Calculator but have been incorporated into the Calculator to automate the calculation of the 2020 target.

### Overview

The overall framework for Provisional Target Method 4 is described in this section. Details are presented in the Detailed Procedures section. For this target method, savings are assumed between the baseline period and 2020 due to metering of unmetered water connections and achieving water conservation measures in three water use sectors.

The 2020 water use target for individual urban water suppliers is determined by Equation 1 in units of gallons per capita per day (GPCD).

Equation 1

$$\boxed{\text{Urban Water Use Target}} = \boxed{\text{Base Daily per Capita Water Use}} - \boxed{\text{Total Savings}}$$

The base daily per capita water use is separated into three sectors for the purpose of Target Method 4:

1. Residential indoor
2. Commercial, Industrial, and Institutional (CII)
3. Landscape water use, water loss, and other unaccounted-for water

Because accurate methods are not generally available to estimate the water use in these three sectors, a standard of 70 GPCD is assumed for residential indoor water use. For the purpose of Target Method 4, CII water use does not include landscape irrigation use served by dedicated landscape irrigation meters. Dedicated landscape meters often serve large commercial or institutional irrigation sites such as golf courses, parks, or school grounds. CII water use includes irrigation water use served by mixed use water meters. Landscape irrigation water use in item 3 above is composed of residential irrigation and irrigation served by dedicated landscape irrigation meters or connections. Unaccounted for water is water that is lost in water distribution systems. Other unaccounted for water may include unmetered uses such as construction water or discrepancies in water meter accuracy. For simplification, water loss and other unaccounted for water are referred to as “water loss” in this document.

For the purpose of Target Method 4 it is necessary to calculate landscape water use and loss using Equation 2. The units for Equation 2 are GPCD.

Equation 2

$$\boxed{\begin{array}{l} \text{Landscape and} \\ \text{Water Loss per} \\ \text{Capita Use} \end{array}} = \boxed{\begin{array}{l} \text{Base Daily per} \\ \text{Capita Water} \\ \text{Use} \end{array}} - \boxed{\begin{array}{l} \text{Standard Indoor} \\ \text{Residential} \\ \text{70 gpcd} \end{array}} - \boxed{\begin{array}{l} \text{CII Water} \\ \text{Use} \end{array}}$$

Potential water savings are estimated for each of these water use sectors and for reduced water use due to installation of meters on unmetered connections, as shown in Equation 3. The units for Equation 3 are GPCD.

Equation 3

$$\boxed{\begin{array}{l} \text{Total} \\ \text{Savings} \end{array}} = \boxed{\begin{array}{l} \text{Metering} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{Indoor} \\ \text{Residential} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{CII} \\ \text{Savings} \end{array}} + \boxed{\begin{array}{l} \text{Landscape and} \\ \text{Water Loss} \\ \text{Savings} \end{array}}$$



## Detailed Procedures

### Step 1: Baseline Water Use and Midpoint Year

The Base Daily Per Capita Water Use is an average calculated for the base period selected by the urban retail water supplier, as described in Methodology 3 in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (Methodologies Report).

The data required for some of the following steps of Target Method 4 must be provided for the midpoint year for the base period. For a base period with an even number of years, the midpoint year will be the 12 months preceding the midpoint date.

The Calculator has been designed for calendar years. For water suppliers that choose to use a fiscal year reporting basis, the Calculator can be adapted by entering the fiscal year period representing the year designated in the Calculator.

### Step 2: Metering Savings

For service areas with water service connections without water meters, a water supplier must estimate the total amount of water delivered to unmetered connections during the midpoint year of the baseline period. The metering savings is calculated using Equation 4.

Equation 4

$$\begin{array}{r}
 \boxed{\text{Metering Savings, GPCD}} \\
 = \\
 \frac{\boxed{\text{Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons}} \times \boxed{0.20}}{\boxed{\text{Service Area Population in Midpoint Baseline Year}} \times \boxed{365 \text{ days}}}
 \end{array}$$

### Step 3: Indoor Residential Savings

Indoor residential water savings are estimated based upon anticipated increases in the installation of more efficient toilets, residential clothes washers, and showerheads. The savings estimates are based on a comparison of saturation levels of fixtures, at certain water use efficiencies, during the midpoint year of the baseline period and with saturation goals in 2020. Separating toilets in single-family and multi-family dwellings, the 2020 saturation goals for the four plumbing fixtures categories are listed in Table 1.

Table 1. Saturation Goals for Indoor Residential Fixtures

Fixture Type	2020 Saturation Goals
Single-family Toilets	85% 1.28 gal/flush toilets 15% average flush volume at midpoint baseline year
Multi-family Toilets	85% 1.28 gal toilets 15% average flush volume at midpoint baseline year
Residential Washers	85% Water Factor (WF) of 6 15% average WF at midpoint baseline year
Residential Showerheads	95% low flow showerheads 5% non-low flow showerheads

There are two alternatives for calculating indoor residential water savings, one using the Target Method 4 Calculator based on historic data for a water supplier and the other using a default savings of 15 GPCD.

#### Alternative 1:

To calculate indoor residential savings using the historic data of an individual water supplier the following types of data may be required to enter into the Calculator:

- Persons per household
- Toilets per household
- Showers per household
- Numbers of single- and multi-family dwelling units for years 1991 through the midpoint of baseline period
- Population residing in group quarters in the midpoint year of baseline period
- Either (1) numbers of efficient toilets, showerheads, and clothes washers either distributed, installed, or credited through incentives, such as rebates for years 1991 through the midpoint of baseline period or (2) saturation levels of fixtures at various efficiencies at the midpoint year of the baseline period

After entry of the required data, the Calculator will determine the indoor residential savings in terms of GPCD.

#### Alternative 2:

If a water supplier does not have historic data for the midpoint baseline and prior years, the supplier can use a default indoor residential water savings of 15 GPCD. While the Calculator allows Alternative 2 for the convenience of calculating the target, if this alternative is chosen, the Calculator is unnecessary.

Determining whether to use the default value, the following information may be helpful. In developing the Provisional Target Method 4, a random sample of 52 water suppliers were selected to test the Calculator. The sample represented a variety of climatic and demographic characteristics. An analysis of this random sample developed a statewide average savings from the four indoor residential elements was 14.1 GPCD, with a range of

7.9 to 16.8 GPCD. Sixty percent of the suppliers fell within the range of 13.1 to 15.1 GPCD and 15 percent exceeded 15.1 GPCD.

#### Step 4: CII Savings

CII water savings is assumed to be 10 percent of baseline CII water use, which is an average for the baseline period calculated following procedures in Methodology 7 in the Methodologies Report. For the purpose of Target Method 4, CII water use does not include landscape irrigation served by dedicated landscape irrigation meters. CII savings is calculated using Equation 5.

Equation 5

$$\boxed{\text{CII Savings, GPCD}} = \boxed{\text{Average baseline CII Water Use, GPCD}} \times \boxed{0.10}$$

#### Step 5: Landscape Irrigation and Water Loss Savings

Landscape water use and water loss savings are based on a 21.6 percent reduction in that sector for all suppliers. The 21.6 percent reduction was derived from an analysis of 52 sample water suppliers and was calculated so that the average water use target for the 52 sample suppliers would meet the overall goal of a cumulative 20% percent savings. Landscape water use and water loss use is calculated using Equation 2 and represents irrigation water use, water loss and other unaccounted-for water uses. The savings is calculated using Equation 6.

Equation 6

$$\boxed{\text{Landscape water use and Water Loss Savings, GPCD}} = \boxed{\text{Landscape Irrigation and Water Loss Sector Use per Eq. 2, GPCD}} \times \boxed{0.216}$$

#### Step 6: Total Savings

The total savings required using Target Method 4 is calculated using Equation 3, entering results from Steps 2 through 5.

#### Step 7: 2020 Urban Water Use Target

The 2020 urban water use target in GPCD is calculated using Equation 1.

## Example

To illustrate the procedures for the Provisional Target Method 4, calculations for the fictional Whispering Glen Water District are shown below.

### Step 1. Baseline Water Use and Midpoint Year

Whispering Glen Water District selected a 10-year baseline period of 1996-2005. The average base daily per capita water use for this period was calculated to be 228 GPCD. The savings are calculated based on water deliveries in the midpoint year of the baseline period, which is 2000.

### Step 2. Metering Savings (Equation 4)

Metering Savings, GPCD	=	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons</td> <td style="width: 5%; text-align: center;">X</td> <td style="width: 10%; padding: 10px;">0.20</td> </tr> <tr> <td style="border-top: 1px solid black; padding: 5px;">2,541,637,800</td> <td></td> <td></td> </tr> </table>	Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons	X	0.20	2,541,637,800			=	8.3 GPCD
	Water Deliveries to Unmetered Connections in Midpoint Baseline Year, gallons	X	0.20							
2,541,637,800										
=	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Service Area Population in Midpoint Baseline Year</td> <td style="width: 5%; text-align: center;">X</td> <td style="width: 10%; padding: 10px;">365 days</td> </tr> <tr> <td style="border-top: 1px solid black; padding: 5px;">168,118</td> <td></td> <td></td> </tr> </table>	Service Area Population in Midpoint Baseline Year	X	365 days	168,118			=		
Service Area Population in Midpoint Baseline Year	X	365 days								
168,118										

### Step 3. Indoor Residential Savings

Alternative 1, Target Method 4 Calculator:

Total Indoor Residential Savings, GPCD	=	Single-family Toilets Savings, GPCD	+	Multi-family Toilets Savings, GPCD	+	Residential Washers Savings, GPCD	+	Residential Showers Savings, GPCD	=	16.5 GPCD
		7.6		1.6		6.0		1.3		

Alternative 2, Default:

Total Indoor Residential Savings, GPCD	=	15.0 GPCD
--	---	--------------

**Step 4. CII Savings (Equation 5)**

CII Savings, GPCD	=	Average baseline CII Water Use, GPCD <hr/> 69.0	X	0.10	=	6.9 GPCD
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**Step 5. Landscape Irrigation and Water Loss Savings (Equations 2 and 6)**

Landscape Irrigation and Water Loss Sector Use, GPCD	=	2000 Base Daily per Capita Water Use <hr/> 227.7	-	Standard Indoor Residential Use, GPCD <hr/> 70.0	-	CII Water Deliveries in Midpoint Baseline Year, GPCD <hr/> 68.7	=	89.0 GPCD
--	---	--	---	--	---	--	---	--------------

Landscape Irrigation and Water Loss Savings, GPCD	=	Landscape Irrigation and Water Loss Sector Use, GPCD <hr/> 89.0	X	0.216	=	19.2 GPCD
--	---	--	---	-------	---	-----------

**Step 6. Total Savings**

Because there are two alternative methods to calculate indoor residential savings, there are two alternatives for total savings, calculated using Equation 3.

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

Total Savings, GPCD	=	Metering Savings, GPCD <hr/> 8.3	+	Indoor Residential Savings, GPCD <hr/> 16.5	+	CII Savings, GPCD <hr/> 6.9	+	Landscape Irrigation and Water Loss Savings, GPCD <hr/> 19.2	=	50.9 GPCD
---------------------------	---	---	---	---	---	--------------------------------------	---	--	---	--------------

Alternative 2 (based on default for Indoor Residential Savings):

Total Savings, GPCD	=	Metering Savings, GPCD	+	Indoor Residential Savings, GPCD	+	CII Savings, GPCD	+	Landscape Irrigation and Water Loss Savings, GPCD	=	49.4 GPCD
		8.3		15.0		6.9		19.2		

**Step 7. 2020 Urban Water Use Target (Equation 1)**

Alternative 1 (based on Target Method 4 Calculator for Indoor Residential Savings):

Urban Water Use Target, GPCD	=	Base Daily per Capita Water Use, GPCD	-	Total Savings, GPCD	=	176.8 GPCD
		227.7		50.9		

Alternative 2 (based on default for Indoor Residential Savings):

Urban Water Use Target, GPCD	=	Base Daily per Capita Water Use, GPCD	-	Total Savings, GPCD	=	178.3 GPCD
		227.7		49.4		

# APPENDIX C

## Regulations for Implementing Process Water Provision

**California Code of Regulations**  
**Title 23. Waters**  
**Division 2. Department of Water Resources**  
**Chapter 5.1. Water Conservation Act of 2009**  
**Article 1. Industrial Process Water Exclusion in the Calculation of Gross Water Use**

### **§596. Process Water**

(a) An urban retail water supplier that has a substantial percentage of industrial water use in its service area is eligible to exclude the process water use of existing industrial water customers from the calculation of its gross water use to avoid a disproportionate burden on another customer sector.

(b) The Department of Water Resources will review and assess the implementation of this article and may amend its provisions upon considering the recommendations of the Commercial, Industrial and Institutional task force convened pursuant to section 10608.43 of the Water Code.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20(e), 10608.24(e), and 10608.43 Water Code.

### **§596.1. Applicability and Definitions**

(a) Sections 596.2 through 596.5 describe criteria and methods whereby an urban retail water supplier may deduct process water use when calculating their gross water use in developing their urban water use targets.

(b) The terms used in this article are defined in this subdivision.

(1) “commercial water user” means a water user that provides or distributes a product or service. Examples include commercial businesses and retail stores, office buildings, restaurants, hotels and motels, laundries, food stores, and car washes.

(2) “disadvantaged community” means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(3) “distribution system” means a water conveyance system that delivers water to a residential, commercial, or industrial customer and for public uses such as fire safety where the source of water is either raw or potable water.

(4) “drought emergency” means a water shortage emergency condition that exists when there would be insufficient water for human consumption, sanitation and fire protection, as set forth in California Water Code Section 350-359 and Government Code Section 8550-8551.

(5) “gross water use” means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(A) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier

(B) The net volume of water that the urban retail water supplier places into long-term storage

(C) The volume of water the urban retail water supplier conveys for use by another urban water supplier

(D) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24 of the Water Code.

(6) “incidental water use” means water that is used by industry for purposes not related to producing a product or product content or research and development. This includes incidental cooling, air conditioning, heating, landscape irrigation, sanitation, bathrooms, cleaning, food preparation, kitchens, or other water uses not related to the manufacturing of a product or research and development.

(7) “industrial water user” means a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development. An industrial water user is primarily involved in product manufacturing and processing activities and research and development of products, such as those related to chemicals, food, beverage bottling, paper and allied products, steel, electronics and computers, metal finishing, petroleum refining, and transportation equipment. Data centers dedicated to research and development are considered an industrial water user.

(8) “institutional water user” means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(9) “local agency” means any municipality, such as a city or county government or public water agency.

(10) “non-industrial water use” means gross water use minus industrial water use.

(11) “process water” means water used by industrial water users for producing a product or product content, or water used for research and development. Process water includes, but is not limited to; the continuous manufacturing processes, water used for testing, cleaning and maintaining equipment. Water used to cool machinery or buildings used in the



manufacturing process or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms and other industrial facility units that are integral to the manufacturing or research and development process shall be considered process water. Water used in the manufacturing process that is necessary for complying with local, State and federal health and safety laws, and is not incidental water, shall be considered process water. Process water does not include incidental, commercial or institutional water uses.

(12) “recycled water” means water that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse that meets the following requirements, where applicable:

(A) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(i) Metered.

(ii) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(iii) Treated to a minimum tertiary level.

(iv) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(B) For reservoir augmentation, water supplies that meet the criteria of subdivision (A) and are conveyed through a distribution system constructed specifically for recycled water.

(13) “urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(14) “Urban Water Management Plan” means a plan prepared pursuant to California Water Code Division 6 Part 2.6. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.12, 10608.20, and 10631 Water Code.

### **§596.2 Criteria for Excluding Industrial Process Water Use from Gross Water Use Calculation**

When calculating its gross water use, an urban retail water supplier may elect to exclude up to 100 percent of process water use from its gross water use if any one of the following criteria is met in its service area:

- (a) Total industrial water use is equal to or greater than 12 percent of gross water use, or
- (b) Total industrial water use is equal to or greater than 15 gallons per capita per day, or
- (c) Non-industrial water use is equal to or less than 120 gallons per capita per day if the water supplier has self-certified the sufficiency of its water conservation program with the Department of Water Resources under the provisions of section 10631.5 of the Water Code, or
- (d) The population within the supplier's service area meets the criteria for a disadvantaged community.

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

### **§596.3. Quantification and Verification of Total Industrial Process and Industrial Incidental Water.**

The volumes of water uses in Section 596.3 shall be for the same period as urban water suppliers calculate their baseline daily per capita water use and reported in their Urban Water Management Plans.

(a) The volume of process water use shall be verified and separated from incidental water use.

(1) To establish a baseline for determining process water use, urban retail water suppliers shall calculate the process water use over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) Verification of process water can be accomplished by metering, sub-metering or other means determined suitable and verifiable by the urban retail water supplier and reported in their Urban Water Management Plans and reviewed by the Department of Water Resources.

(b) In cases where the urban retail water supplier provides only a portion of an industrial water user's water supply, the urban retail water supplier shall prorate the volume of process water use excluded from gross water use by considering the average share of the industrial water use that it supplied over a continuous ten year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

The verification of the proportion of industrial water use supplied shall be accomplished through metering, sub-metering, or other means determined suitable and verifiable by the

urban water supplier such as audits, historic manufacturing output or suppliers' billing records and as reported in their Urban Water Management Plans.

*Example. If an urban water supplier delivered only 60 percent of the average annual water used by an industrial water user, the urban supplier can only use that 60 percent of industrial water in determining if it is eligible to exclude process water from its gross water use; and if it is eligible, it can exclude only 60 percent of the volume of process water used by such industrial water user.*

Note: Authority cited: Section 10608.20, Water Code. Reference: Sections 10608.20 and 10608.24 Water Code.

#### **§596.4. Existing Industrial Customers**

When implementing this article, urban retail water suppliers shall meet the following provisions:

- (a) Any ordinance or resolution adopted by an urban retail water supplier after November 10, 2009 shall not require industrial water customers existing as of November 10, 2009 to undertake changes in product formulation, operations, or equipment that would reduce process water use.
- (b) An urban retail water supplier may encourage existing industrial customers to utilize water efficiency technologies, methodologies, or practices through the use of financial and technical assistance.
- (c) This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.26 Water Code.

#### **§596.5 New and Retrofitted Industries**

Local agencies and water suppliers shall encourage newly-established and retrofitted industries to adopt industry-specific water conservation practices and technologies where such technologies exist.

Note: Authority cited: Section 10608.20, Water Code. Reference: Section 10608.20 Water Code.

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**APPENDIX B**

Public Agency Notification

Public Hearing Notice

Resolution Adopting 2020 Urban Water Management Plan

Minutes of June 16, 2021 Board Meeting



1391 Engineer Street • Vista • California 92081-8840

Phone: (760) 597-3100 • Fax: (760) 598-8757

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*General Manager*

Lisa R. Soto

*Board Secretary*

David B. Cosgrove

*General Counsel*

March 23, 2021

Jack Griffin  
City Manager  
City of San Marcos  
1 Civic Center Drive  
San Marcos, CA 92069

***Re: 2020 Urban Water Management Plan Preparation***

Dear Mr. Griffin:

This letter is to inform you that Vista Irrigation District is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years and notify the counties and cities within their service area that a plan is being prepared. The District must adopt an updated UWMP by July 1, 2021 and submit the adopted plan to the California Department of Water Resources by August 1, 2021.

In accordance with State law, the District will distribute a copy of its draft 2020 UWMP to the county and cities within its service area for public review prior to holding a tentatively scheduled public hearing in June 2021.

Please feel free to contact Alisa Nichols, Management Analyst, at (760) 597-3173 or [anichols@vidwater.org](mailto:anichols@vidwater.org), if you have any questions or would like additional information.

Sincerely,

Brett Hodgkiss  
General Manager

cc: Dahvia Lynch, Development Services Director



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David B. Cosgrove

*General Counsel*

March 23, 2021

Helen Robbins-Meyer  
Chief Administrative Officer  
County of San Diego  
1600 Pacific Coast Highway, Room 209  
San Diego, CA 92101

***Re: 2020 Urban Water Management Plan Preparation***

Dear Ms. Robbins-Meyer:

This letter is to inform you that Vista Irrigation District is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years and notify the counties and cities within their service area that a plan is being prepared. The District must adopt an updated UWMP by July 1, 2021 and submit the adopted plan to the California Department of Water Resources by August 1, 2021.

In accordance with State law, the District will distribute a copy of its draft 2020 UWMP to the county and cities within its service area for public review prior to holding a tentatively scheduled public hearing in June 2021.

Please feel free to contact Alisa Nichols, Management Analyst, at (760) 597-3173 or [anichols@vidwater.org](mailto:anichols@vidwater.org), if you have any questions or would like additional information.

Sincerely,

Brett Hodgkiss  
General Manager

cc: Kathleen Flannery, Acting Director of Planning and Development Services



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*General Manager*

Lisa R. Soto

*Board Secretary*

David B. Cosgrove

*General Counsel*

March 23, 2021

Jeffrey Epp  
City Manager  
City of Escondido  
201 North Broadway  
Escondido, CA 92025

***Re: 2020 Urban Water Management Plan Preparation***

Dear Mr. Epp:

This letter is to inform you that Vista Irrigation District is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years and notify the counties and cities within their service area that a plan is being prepared. The District must adopt an updated UWMP by July 1, 2021 and submit the adopted plan to the California Department of Water Resources by August 1, 2021.

In accordance with State law, the District will distribute a copy of its draft 2020 UWMP to the county and cities within its service area for public review prior to holding a public hearing tentatively scheduled for June 2021.

Please feel free to contact Alisa Nichols, Management Analyst, at (760) 597-3173 or [anichols@vidwater.org](mailto:anichols@vidwater.org), if you have any questions or would like additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Brett Hodgkiss", is written over a light blue circular stamp.

Brett Hodgkiss  
General Manager

cc: Mike Strong, Director of Community Development





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*General Manager*

Lisa R. Soto

*Board Secretary*

David B. Cosgrove

*General Counsel*

March 23, 2021

Patrick Johnson  
City Manager  
City of Vista  
200 Civic Center Drive  
Vista, CA 92084

***Re: 2020 Urban Water Management Plan Preparation***

Dear Mr. Johnson:

This letter is to inform you that Vista Irrigation District is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years and notify the counties and cities within their service area that a plan is being prepared. The District must adopt an updated UWMP by July 1, 2021 and submit the adopted plan to the California Department of Water Resources by August 1, 2021.

In accordance with State law, the District will distribute a copy of its draft 2020 UWMP to the county and cities within its service area for public review prior to holding a tentatively scheduled public hearing in June 2021.

Please feel free to contact Alisa Nichols, Management Analyst, at (760) 597-3173 or [anichols@vidwater.org](mailto:anichols@vidwater.org), if you have any questions or would like additional information.

Sincerely,

Brett Hodgkiss  
General Manager

cc: John Conley, Director of Community Development & Engineering



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*General Manager*

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*Board Secretary*

David B. Cosgrove

*General Counsel*

March 23, 2021

Deanna Lorson  
City Manager  
City of Oceanside  
300 North Coast Highway  
Oceanside, CA 92054

***Re: 2020 Urban Water Management Plan Preparation***

Dear Ms. Lorson:

This letter is to inform you that Vista Irrigation District is updating its Urban Water Management Plan (UWMP). California State law requires urban water suppliers to update their UWMPs every five years and notify the counties and cities within their service area that a plan is being prepared. The District must adopt an updated UWMP by July 1, 2021 and submit the adopted plan to the California Department of Water Resources by August 1, 2021.

In accordance with State law, the District will distribute a copy of its draft 2020 UWMP to the county and cities within its service area for public review prior to holding a tentatively scheduled public hearing in June 2021.

Please feel free to contact Alisa Nichols, Management Analyst, at (760) 597-3173 or [anichols@vidwater.org](mailto:anichols@vidwater.org), if you have any questions or would like additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Brett Hodgkiss", is written over a light blue horizontal line.

Brett Hodgkiss  
General Manager

cc: Jeff Hunt, City Planner

**TO BE INSERTED  
AT A LATER DATE**

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## **APPENDIX C**

Department of Water Resources  
2020 Urban Water Management Plan Checklist

Urban Water Management Plan Standardized Tables

SBX7-7 Verification Forms

AWWA Audit Worksheet

## Appendix F: UWMP Checklist

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	
x	x	Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	



Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	
x	x	Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	
x	x	Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, <i>including changes in supply due to climate change.</i>	System Supplies	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	
x	x	Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	
x	x	Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	
x	x	Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	
x	x	Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	
x	x	Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	



Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	
x	x	Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	
x	x	Section 8.2	10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	
x	x	Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	
x	x	Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	
x	x	Section 8.5 and 8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	
x	x	Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	
x	x	Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	
x		Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	
x		Sections 9.2 and 9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	
x		Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	



Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	

**Vista Irrigation District  
 Submittal Tables for the  
 2020 Urban Water Management Plan**

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
<i>Add additional rows as needed</i>			
3710027	Vista Irrigation District	28,879	16,416
<b>TOTAL</b>		28,879	16,416
* <i>Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</i>			
NOTES:			

Submittal Table 2-2: Plan Identification		
Select Only One	Type of Plan	Name of RUWMP or Regional Alliance if applicable (select from drop down list)
<input checked="" type="checkbox"/>	<b>Individual UWMP</b>	
	<input type="checkbox"/> Water Supplier is also a member of a RUWMP	
	<input type="checkbox"/> Water Supplier is also a member of a Regional Alliance	
<input type="checkbox"/>	<b>Regional Urban Water Management Plan (RUWMP)</b>	
NOTES:		

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
<input type="checkbox"/>	Supplier is a wholesaler
<input type="checkbox"/>	Supplier is a retailer
Fiscal or Calendar Year (select one)	
<input type="checkbox"/>	UWMP Tables are in calendar years
<input checked="" type="checkbox"/>	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
7/1	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
<b>* Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</b>	
NOTES:	

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
<i>Add additional rows as needed</i>
San Diego County Water Authority
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045(opt)
	134,588	140,804	145,523	150,215	155,335	156,613
NOTES:						

**Submittal Table 4-1 Retail: Demands for Potable and Non-Potable<sup>1</sup> Water - Actual**

Use Type	2020 Actual		
<b>Drop down list</b> May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume <sup>2</sup>
Add additional rows as needed			
Single Family		Drinking Water	7,614
Multi-Family		Drinking Water	2,775
Industrial		Drinking Water	1,103
Institutional/Governmental		Drinking Water	520
Landscape		Drinking Water	276
Groundwater recharge		Drinking Water	1,834
Agricultural irrigation		Drinking Water	743
Losses	Real and Apparent Losses	Drinking Water	1,121
Other	Mobile Homes	Drinking Water	377
Other	Billed Unmetered	Drinking Water	10
Other	Unbilled Metered	Drinking Water	2
Other	Unbilled Unmetered	Drinking Water	41
<b>TOTAL</b>			<b>16,416</b>

<sup>1</sup> Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.

<sup>2</sup> Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

**NOTES:**

1 VID does not currently replenish groundwater supplies or inject water into freshwater aquifers to prevent intrusion of saltwater.

2 Agricultural irrigation includes single accounts that provide water for agricultural as well as domestic use. All accounts and deliveries for agricultural-domestic use are assigned to this use type.

3 VID does not wholesale water to other agencies. All exchanges of potable water with other agencies are tracked by the District's wholesale agency, the San Diego County Water Authority, and demands are allocated to each agency accordingly.

**Submittal Table 4-2 Retail: Use for Potable and Non-Potable<sup>1</sup> Water - Projected**

Use Type	Additional Description (as needed)	Projected Water Use <sup>2</sup> <i>Report To the Extent that Records are Available</i>				
		2025	2030	2035	2040	2045 (opt)
<b>Drop down list</b> May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool						
Add additional rows as needed						
Single Family		8,840	9,284	9,600	9,858	10,083
Multi-Family		3,230	3,558	3,777	4,069	4,215
Commercial		1,283	1,360	1,425	1,490	1,555
Industrial		606	630	644	658	678
Institutional/Governmental		321	341	357	374	390
Landscape		2,135	2,275	2,371	2,474	2,558
Agricultural irrigation		435	412	390	387	385
Losses	Real and Apparent Losses	1,220	1,260	1,300	1,345	1,355
Other Potable	Mobile Homes	437	445	446	446	457
Other	Billed Unmetered	10	10	10	10	10
Other	Unbilled Metered	2	2	2	2	2
Other	Unbilled Unmetered	40	40	40	40	40
<b>TOTAL</b>		18,559	19,617	20,362	21,153	21,728

<sup>1</sup> Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.

<sup>2</sup> Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

**NOTES:**

1 VID does not currently replenish groundwater supplies or inject water into freshwater aquifers to prevent intrusion of saltwater.

2 VID does not wholesale water to other agencies. All exchanges of potable water with other agencies are tracked by VID's wholesale agency, the San Diego County Water Authority, and demands are allocated to each agency accordingly.

<b>Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)</b>						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable <i>From Tables 4-1R and 4-2 R</i>	16,416	18,559	19,617	20,362	21,153	21,728
Recycled Water Demand <sup>1</sup> <i>From Table 6-4</i>	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage <sup>2</sup>						
<b>TOTAL WATER USE</b>	16,416	18,559	19,617	20,362	21,153	21,728
<p><sup>1</sup>Recycled water demand fields will be blank until Table 6-4 is complete</p> <p><sup>2</sup>Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier <b>may</b> deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.</p>						
NOTES:						

<b>Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting</b>	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss <sup>1,2</sup>
07/2015	772
07/2016	1,824
07/2017	1,024
07/2018	718
07/2019	1,121
<p><sup>1</sup> Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.</p> <p><sup>2</sup> <b>Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</b></p>	
NOTES:	

<b>Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections</b>	
<b>Are Future Water Savings Included in Projections?</b> (Refer to Appendix K of UWMP Guidebook) <i>Drop down list (y/n)</i>	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Section 4.6
<b>Are Lower Income Residential Demands Included In Projections?</b> <i>Drop down list (y/n)</i>	Yes
NOTES:	

<b>Submittal Table 5-1 Baselines and Targets Summary</b> From SB X7-7 Verification Form <i>Retail Supplier or Regional Alliance Only</i>				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	1996	2005	175	142
5 Year	2004	2008	175	
<i>*All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)</i>				
NOTES:				

<b>Submittal Table 5-2: 2020 Compliance From SB X7-7 2020 Compliance Form</b> <i>Retail Supplier or Regional Alliance Only</i>				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* (Adjusted if applicable)		
109	0	SB X7-7 Table 9	142	y
<i>*All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)</i>				
NOTES:				



**Submittal Table 6-1 Retail: Groundwater Volume Pumped**

<input checked="" type="checkbox"/>		Supplier does not pump groundwater. The supplier will not complete the table below.
<input type="checkbox"/>		All or part of the groundwater described below is desalinated.

Groundwater Type <b>Drop Down List</b> <i>May use each category multiple times</i>	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
<i>Add additional rows as needed</i>						
Alluvial Basin	Warner Basin					
<b>TOTAL</b>		0	0	0	0	0

**\* Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.**

NOTES: Because pumped groundwater is stored in an open reservoir and blended with surface runoff, it is reported as surface water production. Approximately 1/3 of water held in the lake evaporates; of the portion that is delivered 40% is for VID use, 40% for City of Escondido, and 20% for the Rincon Band under the terms of the Settlement Agreement.

**Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020**

<input type="checkbox"/>	There is no wastewater collection system. The supplier will not complete the table below.
	Percentage of 2020 service area covered by wastewater collection system <i>(optional)</i>
	Percentage of 2020 service area population covered by wastewater collection system <i>(optional)</i>

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? <i>Drop Down List</i>	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? <i>Drop Down List</i>	Is WWTP Operation Contracted to a Third Party? <i>(optional)</i> <i>Drop Down List</i>
Buena Sanitation District	Metered	7.01E+08	Encina Wastewater Authority	Encina Water Pollution Control Facility	No	No
City of Vista	Metered	2.31E+09	Encina Wastewater Authority	Encina Water Pollution Control Facility	No	No
<b>Total Wastewater Collected from Service Area in 2020:</b>		3,007,600,000				

**\* Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.**

NOTES:

**Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020**



No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number (optional) <sup>2</sup>	Method of Disposal <i>Drop down list</i>	Does This Plant Treat Wastewater Generated Outside the Service Area? <i>Drop down list</i>	Treatment Level <i>Drop down list</i>	2020 volumes <sup>1</sup>				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Encina Water Pollution Control Facility	Encina Ocean Outfall	Pacific Ocean		Ocean outfall	Yes	Secondary, Undisinfected	3,007,600,000	3,007,600,000	0	0	
<b>Total</b>							3.E+09	3.E+09	0	0	0

<sup>1</sup> Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

<sup>2</sup> If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at <https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility>

NOTES:

**Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area**

Recycled water is not used and is not planned for use within the service area of the supplier.  
The supplier will not complete the table below.

Name of Supplier Producing (Treating) the Recycled Water:	
Name of Supplier Operating the Recycled Water Distribution System:	
Supplemental Water Added in 2020 (volume) <i>Include units</i>	
Source of 2020 Supplemental Water	

Beneficial Use Type <i>additional rows if needed.</i>	<i>Insert</i> Potential Beneficial Uses of Recycled Water (Describe)	Amount of Potential Uses of Recycled Water (Quantity) <i>Include volume units<sup>1</sup></i>	General Description of 2020 Uses	Level of Treatment <i>Drop down list</i>	2020 <sup>1</sup>	2025 <sup>1</sup>	2030 <sup>1</sup>	2035 <sup>1</sup>	2040 <sup>1</sup>	2045 <sup>1</sup> (opt)
Agricultural irrigation										
Landscape irrigation (exc golf courses)										
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
<b>Total:</b>					0	0	0	0	0	0

**2020 Internal Reuse**

<sup>1</sup> Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

NOTES:

**Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual**



Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.

Beneficial Use Type	2015 Projection for 2020 <sup>1</sup>	2020 Actual Use <sup>1</sup>
<i>Insert additional rows as needed.</i>		
Agricultural irrigation		
Landscape irrigation (excl. golf courses)		
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
<b>Total</b>	<b>0</b>	<b>0</b>

<sup>1</sup> Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE:

**Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use**

<input checked="" type="checkbox"/>	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
<i>Add additional rows as needed</i>			
<b>Total</b>			0
<b>*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</b>			
NOTES:			

**Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs**

<input checked="" type="checkbox"/>	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
<input type="checkbox"/>	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type <i>Drop Down List</i>	Expected Increase in Water Supply to Supplier* <i>This may be a range</i>
	<i>Drop Down List (y/n)</i>	<i>If Yes, Supplier Name</i>				
<i>Add additional rows as needed</i>						
<b>*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</b>						
NOTES:						







**Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)**

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		<input type="checkbox"/>	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location
		<input checked="" type="checkbox"/>	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	% of Average Supply
Average Year	2020		100%
Single-Dry Year	2025		110%
Consecutive Dry Years 1st Year	2025		110%
Consecutive Dry Years 2nd Year	2026		110%
Consecutive Dry Years 3rd Year	2027		110%
Consecutive Dry Years 4th Year	2028		110%
Consecutive Dry Years 5th Year	2029		110%
Consecutive Dry Years 6th Year	2030		110%

*Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.*

**\*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.**

NOTES:

**Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison**

	2025	2030	2035	2040	2045 (Opt)
Supply totals (autofill from Table 6-9)	18,559	19,617	20,362	21,153	21,728
Demand totals (autofill from Table 4-3)	18,559	19,617	20,362	21,153	21,728
Difference	0	0	0	0	0
NOTES:					

**Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison**

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	20,415	21,579	22,398	23,268	23,900
Demand totals*	20,415	21579	22,398	23,268	23,900
Difference	0	0	0	0	0
<i>*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.</i>					
NOTES:					

**Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison**

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	20,415	21,579	22,398	23,268	23,900
	Demand totals	20,415	21,579	22,398	23,268	23,900
	Difference	0	0	0	0	0
Second year	Supply totals	20,648	21,743	22,572	23,394	24,029
	Demand totals	20,648	21,743	22,572	23,394	24,029
	Difference	0	0	0	0	0
Third year	Supply totals	20,881	21,907	22,746	23,521	24,158
	Demand totals	20,881	21,907	22,746	23,521	24,158
	Difference	0	0	0	0	0
Fourth year	Supply totals	21,113	22,070	22,920	23,647	24,287
	Demand totals	21,113	22,070	22,920	23,647	24,287
	Difference	0	0	0	0	0
Fifth year	Supply totals	21,346	22,234	23,094	23,774	24,416
	Demand totals	21,346	22,234	23,094	23,774	24,416
	Difference	0	0	0	0	0
Sixth year (optional)	Supply totals	21,579	22,398	23,268	23,900	24,545
	Demand totals	21,579	22,398	23,268	23,900	24,545
	Difference	0	0	0	0	0

*\*Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

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

<b>2021</b>		<b>Total</b>
Total Water Use		18,529
Total Supplies		18,529
Surplus/Shortfall w/o WSCP Action		0
<b>Planned WSCP Actions (use reduction and supply augmentation)</b>		
WSCP - supply augmentation benefit		0
WSCP - use reduction savings benefit		0
Revised Surplus/(shortfall)		0
Resulting % Use Reduction from WSCP action		0%
<b>2022</b>		<b>Total</b>
Total Water Use		19,000
Total Supplies		19,000
Surplus/Shortfall w/o WSCP Action		0
<b>Planned WSCP Actions (use reduction and supply augmentation)</b>		
WSCP - supply augmentation benefit		0
WSCP - use reduction savings benefit		0
Revised Surplus/(shortfall)		0
Resulting % Use Reduction from WSCP action		0%
<b>2023</b>		<b>Total</b>
Total Water Use		19,472
Total Supplies		19,472
Surplus/Shortfall w/o WSCP Action		0
<b>Planned WSCP Actions (use reduction and supply augmentation)</b>		
WSCP - supply augmentation benefit		0
WSCP - use reduction savings benefit		0
Revised Surplus/(shortfall)		0
Resulting % Use Reduction from WSCP action		0%
<b>2024</b>		<b>Total</b>
Total Water Use		19,944
Total Supplies		19,944
Surplus/Shortfall w/o WSCP Action		0
<b>Planned WSCP Actions (use reduction and supply augmentation)</b>		
WSCP - supply augmentation benefit		0
WSCP - use reduction savings benefit		0
Revised Surplus/(shortfall)		0
Resulting % Use Reduction from WSCP action		0%

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

2025	Total
Total Water Use	20,415
Total Supplies	20,415
Surplus/Shortfall w/o WSCP Action	0
<b>Planned WSCP Actions (use reduction and supply augmentation)</b>	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

**TABLE 8-2: DISTRICT WATER SUPPLY RESPONSE LEVELS**

Level	Percent Supply Reduction	Water Supply Condition
1	10% or Less	Level 1 applies at all times unless the District Board of Directors has declared another level, per the procedures set forth in the WSRP.
2	10% to 20%	Level 2 may be declared when 1) the Water Authority notifies member agencies that due to cutbacks caused by drought or other supply reductions, a consumer demand reduction is required in order to have sufficient supplies available to meet anticipated demands; 2) when a consumer demand reduction is required by a regulatory agency; or 3) when other conditions exist that require a consumer demand reduction.
3	20% to 30%	Level 3 may be declared when 1) the Water Authority notifies member agencies that due to increasing cutbacks caused by drought or other reduction in supplies, a serious water shortage condition exists that requires extensive consumer demand reductions in order to have sufficient supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require a serious consumer demand reduction.
4	30% to 40%	Level 4 may be declared when 1) the Water Authority Board of Directors declares a water shortage emergency pursuant to CA Water Code (WC) § 350 and notifies member agencies that Level 4 requires an water shortage demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require a serious consumer demand reduction. <b>Water conservation measures implemented in Level 4 have the ability to achieve a water reduction consistent with a 40% reduction in water supply (WC § 10632(e)).</b>
5	40% to 50%	Level 5 applies under the following conditions: 1) the Water Authority Board of Directors declares a water shortage emergency pursuant to California WC § 350 and notifies member agencies that Level 5 requires an emergency water demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require the Board of Directors to declare a water shortage emergency <b>Water conservation measures implemented in Level 5 have the ability to achieve a reduction consistent with a 50% reduction in water supply (WC § 10632(e)).</b>
6	More than 50%	Level 6 condition applies when the Water Authority Board of Directors declares a water shortage emergency pursuant to CA WC § 350 and notifies member agencies that Level 6 requires a demand reduction of more than 50% in order for the District to have maximum supplies available to meet anticipated demands. The District shall declare a Drought Emergency pursuant to CA WC § 350. <b>Water conservation measures implemented in Level 6 have the ability to achieve a reduction consistent with a 50% reduction in water supply (WC § 10632(e)).</b>

**Submittal Table 8-2: Demand Reduction Actions**

Shortage Level	Demand Reduction Actions <i><b>Drop down list</b></i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.</i>	How much is this going to reduce the shortage gap? <i>Include units used (volume type or percentage)</i>	Additional Explanation or Reference <i>(optional)</i>	Penalty, Charge, or Other Enforcement? <i>For Retail Suppliers Only Drop Down List</i>
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	0%	Restrictions in place at all times	Yes
1	Provide Rebates on Plumbing Fixtures and Devices	0%	Restrictions in place at all times	Yes
2	Landscape - Limit landscape irrigation to specific days	Up to 20%		Yes
2	Landscape - Prohibit certain types of landscape irrigation	Up to 20%		Yes
3	Moratorium or Net Zero Demand Increase on New Connections	UP to 30%		Yes
3	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	Up to 30%		Yes
4	Landscape - Prohibit certain types of landscape irrigation	UP to 40%		Yes
5	Landscape - Other landscape restriction or prohibition	Up to 50%		Yes
6	Landscape - Prohibit all landscape irrigation	50% or higher		Yes

NOTES: See Table 8-3 in District 2020 UWMP

**Submittal Table 8-3: Supply Augmentation and Other Actions**

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool</i>	How much is this going to reduce the shortage gap? <i>Include units used (volume type or percentage)</i>	Additional Explanation or Reference <i>(optional)</i>

NOTES: See Section 8.4.2 of the 2020 UWMP. As a secondary system, the District will rely on the comprehensive contingency plans developed by its regional wholesalers, Metropolitan and the Water Authority.



<b>Submittal Table 10-1 Retail: Notification to Cities and Counties</b>		
City Name	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Escondido	Yes	Yes
Oceanside	Yes	Yes
San Marcos	Yes	Yes
County Name <i>Drop Down List</i>	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
San Diego County	Yes	Yes
NOTES:		

**SB X7-7 Table 0: Units of Measure Used in UWMP\***

*(select one from the drop down list)*

Acre Feet

*\*The unit of measure must be consistent with Table 2-3*

NOTES: None

**SB X7-7 Table-1: Baseline Period Ranges**

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	23,525	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period <sup>1,2</sup>	10	Years
	Year beginning baseline period range	1996	
	Year ending baseline period range <sup>3</sup>	2005	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range <sup>4</sup>	2008	

<sup>1</sup> If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

<sup>2</sup> The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.

<sup>3</sup> The ending year must be between December 31, 2004 and December 31, 2010.

<sup>4</sup> The ending year must be between December 31, 2007 and December 31, 2010.

NOTES: None

**SB X7-7 Table 2: Method for Population Estimates****Method Used to Determine Population**  
(may check more than one)

<input type="checkbox"/>	<b>1. Department of Finance (DOF)</b> DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2010 - 2020) when available
<input type="checkbox"/>	<b>2. Persons-per-Connection Method</b>
<input type="checkbox"/>	<b>3. DWR Population Tool</b>
<input checked="" type="checkbox"/>	<b>4. Other</b> DWR recommends pre-review

NOTES: Source: Data compiled by SANDAG Service Bureau. 1 SANDAG Estimates, Vintage 2019 (2010-2019)

**SB X7-7 Table 3: Service Area Population**

Year	Population	
<b>10 to 15 Year Baseline Population</b>		
Year 1	1996	105,399
Year 2	1997	107,415
Year 3	1998	109,470
Year 4	1999	111,564
Year 5	2000	113,704
Year 6	2001	117,535
Year 7	2002	118,568
Year 8	2003	119,750
Year 9	2004	120,258
Year 10	2005	120,053
<i>Year 11</i>		
<i>Year 12</i>		
<i>Year 13</i>		
<i>Year 14</i>		
<i>Year 15</i>		
<b>5 Year Baseline Population</b>		
Year 1	2004	120,258
Year 2	2005	120,053
Year 3	2006	120,207
Year 4	2007	120,443
Year 5	2008	121,491
<b>2020 Compliance Year Population</b>		
<b>2020</b>		134,588
NOTES: None		

**SB X7-7 Table 4: Annual Gross Water Use \***

Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use	
		Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>		
<b>10 to 15 Year Baseline - Gross Water Use</b>								
Year 1	1996	21,629			-		-	21,629
Year 2	1997	21,767			-		-	21,767
Year 3	1998	19,357			-		-	19,357
Year 4	1999	21,477			-		-	21,477
Year 5	2000	23,927			-		-	23,927
Year 6	2001	22,220			-		-	22,220
Year 7	2002	23,783			-		-	23,783
Year 8	2003	22,770			-		-	22,770
Year 9	2004	24,779			-		-	24,779
Year 10	2005	22,398			-		-	22,398
<i>Year 11</i>	0	-			-		-	-
<i>Year 12</i>	0	-			-		-	-
<i>Year 13</i>	0	-			-		-	-
<i>Year 14</i>	0	-			-		-	-
<i>Year 15</i>	0	-			-		-	-
<b>10 - 15 year baseline average gross water use</b>							<b>22,411</b>	
<b>5 Year Baseline - Gross Water Use</b>								
Year 1	2004	24,779			-		-	24,779
Year 2	2005	22,398			-		-	22,398
Year 3	2006	23,349			-		-	23,349
Year 4	2007	24,030			-		-	24,030
Year 5	2008	23,525			-		-	23,525
<b>5 year baseline average gross water use</b>							<b>23,616</b>	
<b>2020 Compliance Year - Gross Water Use</b>								
<b>2020</b>		16416	-		-		-	<b>16,416</b>
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES: None								

**SB X7-7 Table 4-A: Volume Entering the Distribution System(s)**

Complete one table for each source.

**Name of Source** Lake Henshaw

**This water source is:**

- The supplier's own water source  
 A purchased or imported source

<b>Baseline Year</b> <i>Fm SB X7-7 Table 3</i>	<b>Volume Entering Distribution System</b>	<b>Meter Error Adjustment*</b> <i>Optional (+/-)</i>	<b>Corrected Volume Entering Distribution System</b>
---	--	---	--

**10 to 15 Year Baseline - Water into Distribution System**

Year 1	1996	13377		13,377
Year 2	1997	9659		9,659
Year 3	1998	7649		7,649
Year 4	1999	14001		14,001
Year 5	2000	6804		6,804
Year 6	2001	4664		4,664
Year 7	2002	4026		4,026
Year 8	2003	1578		1,578
Year 9	2004	1003		1,003
Year 10	2005	1170		1,170
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-

**5 Year Baseline - Water into Distribution System**

Year 1	2004	1003		1,003
Year 2	2005	1170		1,170
Year 3	2006	9856		9,856
Year 4	2007	5062		5,062
Year 5	2008	2245		2,245

**2020 Compliance Year - Water into Distribution System**

<b>2020</b>	1,999		1,999
-------------	-------	--	-------

*\* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: None

**SB X7-7 Table 4-A: Volume Entering the Distribution**

**Name of Source** Purchased Water - Water Authority

**This water source is:**

The supplier's own water source

A purchased or imported source

<b>Baseline Year</b> <i>Fm SB X7-7 Table 3</i>	<b>Volume Entering Distribution System</b>	<b>Meter Error Adjustment*</b> <i>Optional (+/-)</i>	<b>Corrected Volume Entering Distribution System</b>
---	--	---	--

**10 to 15 Year Baseline - Water into Distribution System**

Year 1	1,996		0
Year 2	1,997		0
Year 3	1,998		0
Year 4	1,999		0
Year 5	2,000		0
Year 6	2,001		0
Year 7	2,002		0
Year 8	2,003		0
Year 9	2,004		0
Year 10	2,005		0
Year 11	-		0
Year 12	-		0
Year 13	-		0
Year 14	-		0
Year 15	-		0

**5 Year Baseline - Water into Distribution System**

Year 1	2,004		0
Year 2	2,005		0
Year 3	2,006		0
Year 4	2,007		0
Year 5	2,008		0

**2020 Compliance Year - Water into Distribution System**

<b>2020</b>	15,222		15,222
-------------	--------	--	--------

*\* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: None



**SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)**

<b>Baseline Year</b> <i>Fm SB X7-7 Table 3</i>		<b>Service Area Population</b> <i>Fm SB X7-7 Table 3</i>	<b>Annual Gross Water Use</b> <i>Fm SB X7-7 Table 4</i>	<b>Daily Per Capita Water Use (GPCD)</b>
<b>10 to 15 Year Baseline GPCD</b>				
Year 1	1996	105,399	21,629	183
Year 2	1997	107,415	21,767	181
Year 3	1998	109,470	19,357	158
Year 4	1999	111,564	21,477	172
Year 5	2000	113,704	23,927	188
Year 6	2001	117,535	22,220	169
Year 7	2002	118,568	23,783	179
Year 8	2003	119,750	22,770	170
Year 9	2004	120,258	24,779	184
Year 10	2005	120,053	22,398	167
<i>Year 11</i>	0	-	-	
<i>Year 12</i>	0	-	-	
<i>Year 13</i>	0	-	-	
<i>Year 14</i>	0	-	-	
<i>Year 15</i>	0	-	-	
<b>10-15 Year Average Baseline GPCD</b>				<b>175</b>
<b>5 Year Baseline GPCD</b>				
<b>Baseline Year</b> <i>Fm SB X7-7 Table 3</i>		<b>Service Area Population</b> <i>Fm SB X7-7 Table 3</i>	<b>Gross Water Use</b> <i>Fm SB X7-7 Table 4</i>	<b>Daily Per Capita Water Use</b>
Year 1	2004	120,258	24,779	184
Year 2	2005	120,053	22,398	167
Year 3	2006	120,207	23,349	173
Year 4	2007	120,443	24,030	178
Year 5	2008	121,491	23,525	173
<b>5 Year Average Baseline GPCD</b>				<b>175</b>
<b>2020 Compliance Year GPCD</b>				
<b>2020</b>		134,588	16,416	<b>109</b>
NOTES: None				

**SB X7-7 Table 6:** Gallons per Capita per Day  
*Summary From Table SB X7-7 Table 5*

10-15 Year Baseline GPCD	175
5 Year Baseline GPCD	175
2020 Compliance Year GPCD	109
NOTES: None	

**SB X7-7 Table 7: 2020 Target Method***Select Only One*

Target Method		Supporting Documentation
<input type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>See UWMP DWR webpage or contact staff for these tables</i>
<input checked="" type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator

NOTES: None

**SB X7-7 Table 7-E: Target Method 3**

Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
<input type="checkbox"/>		North Coast	137	130
<input type="checkbox"/>		North Lahontan	173	164
<input type="checkbox"/>		Sacramento River	176	167
<input type="checkbox"/>		San Francisco Bay	131	124
<input type="checkbox"/>		San Joaquin River	174	165
<input type="checkbox"/>		Central Coast	123	117
<input type="checkbox"/>		Tulare Lake	188	179
<input type="checkbox"/>		South Lahontan	170	162
<input checked="" type="checkbox"/>		South Coast	149	142
<input type="checkbox"/>		Colorado River	211	200
<p align="center"><b>Target</b> <i>(If more than one region is selected, this value is calculated.)</i></p>				<b>0</b>
<p>NOTES: None</p>				

**SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target**

5 Year Baseline GPCD From SB X7-7 Table 5	Maximum 2020 Target <sup>1</sup>	Calculated 2020 Target <sup>2</sup>	Confirmed 2020 Target
175	166	142	<b>142</b>

<sup>1</sup> Maximum 2020 Target is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 GPCD.

<sup>2</sup> 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

NOTES: Calculated 2020 Target based on Method 3.

**SB X7-7 Table 8: 2015 Interim Target GPCD**

Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	<b>2015 Interim Target GPCD</b>
142	175	<b>158</b>

NOTES: None

**SB X7-7 Table 8: 2020 Compliance**

Actual 2020 GPCD	2020 Interim Target GPCD	Optional Adjustments <i>(in GPCD)</i>					2020 GPCD <i>(Adjusted if applicable)</i>	Did Supplier Achieve Targeted Reduction for 2020?
		Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2020 GPCD		
		Extraordinary Events	Weather Normalization	Economic Adjustment				
109	158	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	-	109	109	<b>YES</b>

NOTES: None



# AWWA Free Water Audit Software: Reporting Worksheet

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?	Click to access definition
+	Click to add a comment

**Water Audit Report for:** Vista Irrigation District (CA3710027)  
**Reporting Year:** 2020 7/2019 - 6/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

### WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	+	?	5		acre-ft/yr				
Water imported:	+	?	7	16,415.700	acre-ft/yr	+	?	5	17.200
Water exported:	+	?			acre-ft/yr	+	?		

### Master Meter and Supply Error Adjustments

Pcnt:									
Value:	○	●	○	○	○	○	○	○	○
	○	●	○	○	○	○	○	○	○

Enter negative % or value for under-registration  
Enter positive % or value for over-registration

**WATER SUPPLIED:** 16,398.500 acre-ft/yr

### AUTHORIZED CONSUMPTION

Billed metered:	+	?	5		acre-ft/yr
Billed unmetered:	+	?	10	10.092	acre-ft/yr
Unbilled metered:	+	?	10	2.078	acre-ft/yr
Unbilled unmetered:	+	?	5	41.039	acre-ft/yr

**AUTHORIZED CONSUMPTION:** 15,277.069 acre-ft/yr

Click here: ? for help using option buttons below

Pcnt:									
Value:	○	●	○	○	○	○	○	○	○
	○	●	○	○	○	○	○	○	○

Use buttons to select percentage of water supplied **OR** value

Pcnt:									
Value:	○	●	○	○	○	○	○	○	○
	○	●	○	○	○	○	○	○	○

### WATER LOSSES (Water Supplied - Authorized Consumption)

**1,121.431** acre-ft/yr

### Apparent Losses

Unauthorized consumption:	+	?	5		acre-ft/yr
---------------------------	---	---	---	--	------------

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+	?	3		acre-ft/yr
Systematic data handling errors:	+	?	5	38.060	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

**Apparent Losses:** 232.853 acre-ft/yr

### Real Losses (Current Annual Real Losses or CARL)

**Real Losses = Water Losses - Apparent Losses:** 888.578 acre-ft/yr

**WATER LOSSES:** 1,121.431 acre-ft/yr

### NON-REVENUE WATER

**NON-REVENUE WATER:** 1,164.548 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

### SYSTEM DATA

Length of mains:	+	?	9		miles
Number of <u>active</u> AND <u>inactive</u> service connections:	+	?	10	28128	
Service connection density:	?	?	?	62	conn./mile main

Are customer meters typically located at the curbside or property line? Yes (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+	?	10		psi
-----------------------------	---	---	----	--	-----

### COST DATA

Total annual cost of operating water system:	+	?	10		\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	9	\$4.53	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	10	\$951.70	\$/acre-ft

Use Customer Retail Unit Cost to value real losses

### WATER AUDIT DATA VALIDITY SCORE:

**\*\*\* YOUR SCORE IS: 74 out of 100 \*\*\***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Customer metering inaccuracies

3: Billed metered









# AWWA Free Water Audit Software: Reporting Worksheet

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**Water Audit Report for:** Vista Irrigation District  
**Reporting Year:** 2017 7/2016 - 6/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

### WATER SUPPLIED

<----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="n/a"/>	<input type="text" value=""/>	acre-ft/yr
Water imported:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="5"/>	<input type="text" value="17,200.810"/>	acre-ft/yr
Water exported:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="n/a"/>	<input type="text" value="0.000"/>	acre-ft/yr

### Master Meter and Supply Error Adjustments

Pcnt:	<input type="text" value=""/>	Value:	<input type="text" value=""/>	acre-ft/yr
	<input type="button" value="+"/>		<input type="radio"/>	<input checked="" type="radio"/>
	<input type="button" value="+"/>		<input type="radio"/>	<input checked="" type="radio"/>
	<input type="button" value="+"/>		<input checked="" type="radio"/>	<input type="radio"/>

Enter negative % or value for under-registration  
Enter positive % or value for over-registration

**WATER SUPPLIED:** 17,206.810 acre-ft/yr

### AUTHORIZED CONSUMPTION

Billed metered:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="6"/>	<input type="text" value="15,331.106"/>	acre-ft/yr
Billed unmetered:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="10"/>	<input type="text" value="5.210"/>	acre-ft/yr
Unbilled metered:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="10"/>	<input type="text" value="3.020"/>	acre-ft/yr
Unbilled unmetered:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="5"/>	<input type="text" value="43.017"/>	acre-ft/yr

**AUTHORIZED CONSUMPTION:** 15,382.353 acre-ft/yr

Click here: [?](#)  
for help using option

Pcnt:	<input type="text" value=""/>	Value:	<input type="text" value="43.017"/>	acre-ft/yr
	<input type="radio"/>		<input checked="" type="radio"/>	

Use buttons to select percentage of water supplied **OR** value

Pcnt:	<input type="text" value="0.25%"/>	Value:	<input type="text" value=""/>	acre-ft/yr
	<input checked="" type="radio"/>		<input type="radio"/>	

	<input checked="" type="radio"/>	<input type="radio"/>	<input type="text" value=""/>	acre-ft/yr
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="text" value=""/>	acre-ft/yr

### WATER LOSSES (Water Supplied - Authorized Consumption)

1,824.457 acre-ft/yr

### Apparent Losses

Unauthorized consumption:   43.017 acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="3"/>	<input type="text" value="523.295"/>	acre-ft/yr
Systematic data handling errors:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="5"/>	<input type="text" value="38.328"/>	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

**Apparent Losses:**  604.640 acre-ft/yr

### Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:  1,219.817 acre-ft/yr

**WATER LOSSES:** 1,824.457 acre-ft/yr

### NON-REVENUE WATER

**NON-REVENUE WATER:**  1,870.494 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

### SYSTEM DATA

Length of mains:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="9"/>	<input type="text" value="497.6"/>	miles
Number of <u>active AND inactive</u> service connections:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="10"/>	<input type="text" value="29,087"/>	
Service connection density:	<input type="button" value="?"/>			<input type="text" value="58"/>	conn./mile main

Are customer meters typically located at the curbside or property line?  (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line:

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:     psi

### COST DATA

Total annual cost of operating water system:	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="10"/>	<input type="text" value="\$46,111,625"/>	\$/Year
Customer retail unit cost (applied to Apparent Losses):	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="9"/>	<input type="text" value="\$4.22"/>	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	<input type="button" value="+"/>	<input type="button" value="?"/>	<input type="text" value="5"/>	<input type="text" value="\$1,019.31"/>	\$/acre-ft

Use Customer Retail Unit Cost to value real losses

### WATER AUDIT DATA VALIDITY SCORE:

**\*\*\* YOUR SCORE IS: 65 out of 100 \*\*\***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

### PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Customer metering inaccuracies

3: Billed metered



# AWWA Free Water Audit Software: Reporting Worksheet

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**Water Audit Report for:** Vista Irrigation District  
**Reporting Year:** 2016    7/2015 - 6/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

**All volumes to be entered as: ACRE-FEET PER YEAR**

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

**WATER SUPPLIED**

<----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	<input type="button" value="+"/>	<input type="button" value="7"/>	1,618.000	acre-ft/yr
Water imported:	<input type="button" value="+"/>	<input type="button" value="7"/>	16,228.800	acre-ft/yr
Water exported:	<input type="button" value="+"/>	<input type="button" value="3"/>	13.300	acre-ft/yr

**Master Meter and Supply Error Adjustments**

	<input type="button" value="+"/>	<input type="button" value="2"/>		acre-ft/yr
	<input type="button" value="+"/>	<input type="button" value="1"/>	-0.63%	acre-ft/yr
	<input type="button" value="+"/>	<input type="button" value="1"/>		acre-ft/yr

**WATER SUPPLIED:**  acre-ft/yr

Enter negative % or value for under-registration  
Enter positive % or value for over-registration

**AUTHORIZED CONSUMPTION**

Billed metered:	<input type="button" value="+"/>	<input type="button" value="6"/>	17,112.060	acre-ft/yr
Billed unmetered:	<input type="button" value="+"/>	<input type="button" value="10"/>	2.055	acre-ft/yr
Unbilled metered:	<input type="button" value="+"/>	<input type="button" value="10"/>	4.940	acre-ft/yr
Unbilled unmetered:	<input type="button" value="+"/>	<input type="button" value="5"/>	44.841	acre-ft/yr

**AUTHORIZED CONSUMPTION:**  acre-ft/yr

Click here:  for help using option buttons below

Pcnt:  Value:  acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

Pcnt:  Value:  acre-ft/yr

acre-ft/yr

**WATER LOSSES (Water Supplied - Authorized Consumption)**

acre-ft/yr

**Apparent Losses**

Unauthorized consumption:    acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:    acre-ft/yr  
Systematic data handling errors:    acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

**Apparent Losses:**  acre-ft/yr

**Real Losses (Current Annual Real Losses or CARL)**

Real Losses = Water Losses - Apparent Losses:  acre-ft/yr

**WATER LOSSES:**  acre-ft/yr

**NON-REVENUE WATER**

**NON-REVENUE WATER:**  acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

**SYSTEM DATA**

Length of mains:    miles  
Number of active AND inactive service connections:     
Service connection density:  conn./mile main

Are customer meters typically located at the curbside or property line?  (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:    psi

**COST DATA**

Total annual cost of operating water system:    \$/Year  
Customer retail unit cost (applied to Apparent Losses):    \$/100 cubic feet (ccf)  
Variable production cost (applied to Real Losses):    \$/acre-ft  Use Customer Retail Unit Cost to value real losses

**WATER AUDIT DATA VALIDITY SCORE:**

**\*\*\* YOUR SCORE IS: 73 out of 100 \*\*\***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

**PRIORITY AREAS FOR ATTENTION:**

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported

2: Customer metering inaccuracies

3: Billed metered

## **APPENDIX D**

Resolution No. 21-xx  
Water Supply Response Program

Resolution No. 20-34  
Resolution of the Vista Irrigation District  
Adopting Rules and Regulations Pertaining to the  
Permanent Special Agricultural Water Rate Program

RESOLUTION NO. 21-XX

RESOLUTION OF THE BOARD OF DIRECTORS  
OF VISTA IRRIGATION DISTRICT AMENDING THE DISTRICT'S  
WATER SUPPLY RESPONSE PROGRAM

WHEREAS, article 10, section 2 of the California Constitution declares that waters of the State are to be put to beneficial use; that waste, unreasonable use, or unreasonable method of use of water be prevented; and that water be conserved for the public welfare; and

WHEREAS, conservation of current water supplies and minimization of the effects of water supply shortages are essential to the public health, safety and welfare; and

WHEREAS, regulation of the time of certain water use, manner of certain water use, design of rates, method of application of water for certain uses, and installation and use of water-saving devices, provide an effective and immediately available means of conserving water; and

WHEREAS, California Water Code sections 375 et seq. authorize water suppliers to adopt and enforce a comprehensive water conservation program; and

WHEREAS, the Board of Directors of Vista Irrigation District (District) amended its Drought Response Conservation Program and renamed it the Water Supply Response Program on June 1, 2011, and amended the Water Supply Response Program adopted on May 27, 2015 as part of the District's 2015 Urban Water Management Plan; and

WHEREAS, amendment and enforcement of a comprehensive water conservation program will allow the District to delay or avoid implementing measures such as water rationing or more restrictive water use regulations pursuant to a declared water shortage emergency as authorized by California Water Code sections 350 et seq.; and

WHEREAS, San Diego County is a semi-arid region and local water resources are scarce. The region is dependent upon imported water supplies provided by the San Diego County Water Authority (Water Authority), which obtains a substantial portion of its supplies from the Metropolitan Water District of Southern California. Because the region is dependent upon imported water supplies, weather and other conditions in other portions of this State and of the Southwestern United States affect the availability of water for use in San Diego County; and

WHEREAS, the Water Authority has an Urban Water Management Plan that includes water conservation as a necessary and effective component of the Water Authority's programs to provide a reliable supply of water to meet the needs of the Water Authority's 24 member public agencies, including the District. The Water Authority's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This resolution is consistent with the Water Authority's Urban Water Management Plan; and



WHEREAS, as anticipated by its Urban Water Management Plan, the Water Authority, in cooperation and consultation with its member public agencies, has established a program for responding to water supply limitations. This resolution is intended to be consistent with and the Water Authority's Water Shortage Contingency Plan and

WHEREAS, this resolution contains six levels and corresponding actions that will assist the District in meeting conservation targets; and

WHEREAS, the District, due to the geographic and climatic conditions within its territory and its dependence upon water imported and provided by the Water Authority, may experience shortages due to drought conditions, regulatory restrictions enacted upon imported supplies and other factors. The District has adopted an Urban Water Management Plan that includes water conservation as a necessary and effective component of its programs to provide a reliable supply of water to meet the needs of the public within its service territory. The District's Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This resolution is consistent with the Urban Water Management Plan adopted by the District; and

WHEREAS the water-use efficiency practices, water conservation measures and progressive restrictions on water use and method of use identified by this resolution provide certainty to water users and enable the District to control water use, provide water supplies, and plan and implement water management measures in a fair and orderly manner for the benefit of the public; and

WHEREAS, a public hearing was held upon the proposed amended Water Supply Response Program (also referred to as Water Shortage Contingency Plan) at the Board of Directors meeting on June 16, 2021, at which all present were given an opportunity to be heard on the proposed amended Water Supply Response Program; and

WHEREAS, the Board of Directors has considered the proposed amended Water Supply Response Program and the evidence and testimony presented at the June 16, 2021 public hearing.

NOW, THEREFORE, the Board of Directors of Vista Irrigation District does resolve as follows:

**ARTICLE ONE:** The Water Supply Response Program is amended and restated, in its entirety as follows:

**SECTION 1.0            DECLARATION OF NECESSITY AND INTENT**

(a) This resolution establishes water management requirements necessary to conserve water, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, prevent unreasonable use of water, prevent unreasonable method of use of water within the District in order to assure adequate supplies of water to meet the needs of the public, and further the public health, safety, and welfare, recognizing that water is a scarce natural resource that requires careful management not only in times of drought, but at all times.

(b) This resolution establishes regulations to be implemented at all times including during times of declared water shortages or declared water shortage emergencies. It establishes six levels of actions, with increasing restrictions on water use in response to worsening water supply conditions and decreasing available supplies.

(c) During Levels 1 through 6, all water-use efficiency practices, water conservation measures and water use restrictions are mandatory and become increasingly restrictive in order to attain escalating conservation goals.

(d) During all Levels, violations of water-use efficiency practices, water conservation measures and water use restrictions established by this resolution are subject to criminal, civil, and administrative remedies and penalties, including fees specified in this resolution.

**SECTION 2.0            DEFINITIONS**

(a) The following words and phrases whenever used in this chapter shall have the meaning defined in this section:

1. “Grower” refers to those engaged in the growing or raising, in conformity with recognized practices of husbandry, for the purpose of commerce, trade, or industry, or for use by public educational or correctional institutions, of agricultural, horticultural or floricultural products, and produced: (1) for human consumption or for the market, or (2) for the feeding of fowl or livestock produced for human consumption or for the market, or (3) for the feeding of fowl or livestock for the purpose of obtaining their products for human consumption or for the market. “Grower” does not refer to customers who purchase water subject to the Water Authority’s Permanent Special Agricultural Water Rate program.
2. “District” means Vista Irrigation District
3. “Water Authority” means the San Diego County Water Authority.
4. “Metropolitan” means the Metropolitan Water District of Southern California.
5. “Person” means any natural person, corporation, public or private entity, public or private association, public or private agency, government agency or institution, school district, college, university, or any other user of water provided by the District.



### **SECTION 3.0 APPLICATION**

(a) The provisions of this resolution apply to any person in the use of any water provided by the District.

(b) This resolution is intended to maintain efficient water use practices and to further the conservation of water. It is not intended to implement any provision of federal, State, or local statutes, resolutions, or regulations relating to protection of water quality or control of drainage or runoff. Refer to the local jurisdiction or Regional Water Quality Control Board for information on any stormwater resolutions and stormwater management plans.

(c) Nothing in this resolution is intended to affect or limit the ability of the District to declare and respond to an emergency, including an emergency that affects the ability of the District to supply water.

(d) The provisions of this resolution do not apply to use of water from private wells or to recycled water.

(e) Nothing in this resolution shall apply to use of water that is subject to a special supply program, such as the Water Authority's Permanent Special Agricultural Water Rate. Violations of the conditions of special supply programs are subject to the penalties established under the applicable program. A person using water subject to a special supply program and other water provided by the District is subject to this resolution in the use of the other water.

(f) When the General Manager has determined that the District's water supply is in a water emergency condition, everyone shall be required to reduce water consumption as prescribed by the General Manager.

(g) The General Manager shall have the authority and discretion to interpret and apply the provisions set forth in the Water Supply Response Program as long as the interpretations and applications of the measures meet the intent and goals of the Water Supply Response Program.

### **SECTION 4.0 LEVEL 1 – WATER EFFICIENCY**

(a) Level 1 is also referred to as the "Water Efficiency" level. Level 1 applies at all times and up to and including 10 percent water shortage, unless the District Board of Directors has declared another level, per the procedures set forth in this resolution. Level 1 is designed to ensure customers use water efficiently and eliminate water waste at all times.

(b) At Level 1, the District will utilize its public education and outreach efforts to raise public awareness of the following mandatory water-use efficiency practices:

1. No washing down paved surfaces, including but not limited to sidewalks, driveways, parking lots, tennis courts, or patios, except when it is necessary to alleviate safety or sanitation hazards or to maintain, repair, construct/reconstruct streets.

2. No water waste resulting from inefficient landscape irrigation, such as runoff, low head drainage, or overspray, etc. Similarly, water shall not flow onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.
3. No irrigating residential or commercial landscapes during or within 48 hours following measurable rainfall.
4. Irrigate residential and commercial landscape with in-ground or hose-end sprinkler systems before 8 a.m. and after 6 p.m. only. Irrigation of new turf and/or plantings is exempt from these watering hour restrictions for a period of 30 days following the date of planting. Watering is permitted at any time with a hand-held hose equipped with a positive shut-off nozzle, a bucket, or when a drip/micro-irrigation system/equipment is used.
5. Irrigate nursery and commercial grower's products before 8 a.m. and after 6 p.m. only. Watering is permitted at any time with a hand-held hose equipped with a positive shut-off nozzle, a bucket, or when a drip/micro-irrigation system/equipment is used. Irrigation of nursery propagation beds is permitted at any time. Watering of livestock is permitted at any time.
6. Use potable water taken through construction meters to irrigate landscape before 8 a.m. and after 6 p.m. Watering is permitted at any time with a hand-held hose equipped with a positive shut-off nozzle, a bucket, or when a drip/micro-irrigation system/equipment is used.
7. Irrigate landscape outside of newly constructed homes and buildings in a manner that is consistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.
8. Use re-circulated water to operate ornamental fountains.
9. Wash vehicles using a bucket and a hand-held hose with positive shut-off nozzle, mobile high pressure/low volume wash system, or at a commercial site that re-circulates (reclaims) water on-site. Avoid washing during hot conditions when additional water is required due to evaporation.
10. Serve and refill water in restaurants and other food service establishments only upon request.
11. Offer guests in hotels, motels, and other commercial lodging establishments the option of not laundering towels and linens daily.
12. Repair all water leaks within 48 hours of notification by the District unless other arrangements are made with the General Manager.

13. Use recycled or non-potable water for construction purposes when available.

## **SECTION 5.0 LEVEL 2 – WATER CONSERVATION**

(a) A Level 2 may be declared under the following conditions: 1) when the Water Authority notifies its member agencies that due to cutbacks caused by drought or other reduction in supplies, a consumer demand reduction is required in order to have sufficient supplies available to meet anticipated demands; 2) when a consumer demand reduction is required by a regulatory agency; or 3) when other conditions exist that require a consumer demand reduction. The consumer demand reduction amounts in Level 2 typically apply during a shortage of up to and including 20 percent, although the District Board of Directors may declare Level 2 and implement the mandatory Level 2 conservation measures identified in this resolution to achieve a consumer demand reduction of a different amount. The General Manager shall have the authority and discretion to implement water conservation measures commensurate with the level of demand reduction required and/or the reduction targets achieved, as described in Section 5 (b) below. The General Manager shall inform the Board of Directors of the status of the implementation of the measures set forth in this section and the resulting water conservation in a timely manner.

(b) All persons using District water shall comply with Level 1 water-use efficiency practices during Level 2, and shall also comply with the following additional conservation measures:

1. Stop watering ornamental turf in public street medians with potable water.
2. Irrigate residential and commercial landscape with in-ground or hose-end sprinkler systems before 8 a.m. and after 6 p.m. only.
3. Irrigate nursery and commercial grower's products before 8 a.m. and after 6 p.m. only. Watering by nurseries and commercial growers is permitted at any time with a hand-held hose equipped with a positive shut-off nozzle, a bucket, or when a drip/micro-irrigation system/equipment is used. Irrigation of nursery propagation beds is permitted at any time. Watering of livestock is permitted at any time.
4. Irrigation of landscape on a construction project with potable water taken through a construction meter before 8 a.m. and after 6 p.m. only.
5. Limit residential and commercial landscape irrigation to assigned days per week and limited duration times on a schedule established by the General Manager and posted by the District. This section shall not apply to commercial growers or nurseries for water that they use for agricultural purposes.
6. Limit lawn watering and landscape irrigation using in-ground or hose-end sprinklers to time limits per watering station per assigned day as established by the General Manager and posted by the District. This provision does not apply to landscape irrigation systems using drip/micro-irrigation systems and stream rotor sprinklers.

7. Turf and/or plant establishment is allowed if required by a landscape permit or necessary for erosion control, landscape renovation after a natural disaster, or establishment, repair or renovation of public use fields for schools or parks. New turf and/or plantings are exempt from irrigation limitations set forth in sections 4 (b) (3) (4), 5 (b) (1) and 5 (b) (2) for a period of 30 days following the date of planting.

8. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system, before 8 a.m. and after 8 p.m. only by using a bucket, hand-held hose with positive shut-off nozzle, or low-volume non-spray irrigation per assigned day as established by the General Manager and posted by the District.

9. Commercial and agricultural customers are asked to implement all measures practicable toward improving efficiency and conserving water.

## **SECTION 6.0 LEVEL 3 – WATER SHORTAGE**

(a) Level 3 may be declared under the following conditions: 1) when the Water Authority notifies its member agencies that due to increasing cutbacks caused by drought or other reduction of supplies, a serious water shortage condition exists that requires extensive consumer demand reductions in order to have sufficient supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require a serious consumer demand reduction. The consumer demand reduction amounts in Level 3 typically apply during a shortage of up to and including 30 percent, although the District Board of Directors may declare Level 3 and implement the Level 3 conservation measures identified in this resolution to achieve a consumer demand reduction of a different amount. The General Manager shall have the authority and discretion to implement water conservation measures commensurate with the level of demand reduction required and/or the reduction targets achieved, as described in Section 6 (b) below. The General Manager shall inform the Board of Directors of the status of the implementation of the measures set forth in this section and the resulting water conservation in a timely manner.

(b) All persons using District water shall comply with Level 1 water-use efficiency practices and Level 2 water conservation practices during Level 3 and shall also comply with the following additional mandatory conservation measures:

1. Comply with any new residential and commercial landscape irrigation restrictions relative to assigned days per week and limited duration times on a schedule established by the General Manager and posted by the District.

2. Stop re-filling pools/spas more than one foot per week. Draining and re-filling of pools and spas is not permitted except to repair leaks or for health and safety reasons.

3. Stop filling or re-filling ornamental lakes or ponds, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have

been actively managed within the water feature prior to declaration of another level under this resolution.

4. Stop operating ornamental fountains or decorative water features. These types of fountains and water features may be operated on a limited basis for maintenance purposes only. The operation of fountains and water features that do not use re-circulated water is prohibited.

5. Stop washing vehicles except at commercial car washes that re-circulate water, or by high pressure/low volume wash systems.

(c) Upon the declaration of Level 3, no new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) shall be issued, except under the following circumstances:

1. A valid, unexpired building permit has been issued for the project; or

2. The project is necessary to protect the public's health, safety, and welfare;

or

3. The applicant participates in a District-approved demand offset program that produces or saves at least the same amount of water as is being used by the new development, prior to the issuance by the District of a new water meter or water meters for the project.

This provision shall not be construed to preclude the resetting or turn-on of meters to provide continuation of water service or to restore service that has been interrupted for a period of one year or less.

(d) Upon the declaration of Level 3, District will suspend consideration of annexations to its service area.

(e) The District may establish a water allocation for property served by the District using a method that does not penalize persons for the implementation of conservation methods or the installation of water saving devices. If the District establishes a water allocation it shall provide notice of the allocation by including it in the regular billing statement for water service or by any other mailing to the address to which the District customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the District, any person that uses water in excess of the allocation shall be subject to a penalty for each billing unit of water in excess of the allocation. The penalty for excess water usage shall be cumulative to any other remedy or fee that may be imposed for violation of this resolution.

**SECTION 7.0            LEVEL 4 – CRITICAL WATER SHORTAGE**

(a) Level 4 applies under the following conditions: 1) when the Water Authority Board of Directors declares a water shortage emergency pursuant to California Water Code section 350 and notifies its member agencies that Level 4 requires a water shortage demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require the Board of Directors to declare a water shortage emergency. The consumer demand reduction amounts in Level 4 typically apply during a shortage of up to and including 40 percent, although the District Board of Directors shall declare a Level 4 water shortage in the manner and on the grounds provided in California Water Code section 350.

(b) All persons using District water shall comply with water-use efficiency practices and conservation measures required under Levels 1 through 3 and shall also comply with the following additional mandatory conservation measures:

1. Stop all commercial landscape irrigation, unless the District has determined that recycled water is available and may be lawfully applied to the use. This restriction shall not apply to the following categories of use.

A. Maintenance of trees and shrubs that are watered on the same schedule set forth in section 6 (b) (1) by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation;

B. Maintenance of existing landscaping necessary for fire protection as specified by the Fire Marshal of the local fire protection agency having jurisdiction over the property to be irrigated;

C. Maintenance of existing landscaping for erosion control;

D. Maintenance of plant materials identified to be rare or essential to the well being of rare animals;

E. Maintenance of landscaping within active public parks and playing fields, day care centers, school grounds, cemeteries, and golf course greens, provided that such irrigation does not exceed two days per week according to the schedule established under section 6 (b) (1);

F. Watering of livestock; and

G. Public works projects and actively irrigated environmental mitigation projects.

H. Irrigation of crops and landscape products of commercial growers and nurseries.

2. Stop all vehicle washing, including at commercial car washes.
3. Repair all water leaks within 24 hours of notification by the District unless other arrangements are made with the General Manager.

The District may establish a water allocation for property served by the District. If the District establishes a water allocation it shall provide notice of the allocation by including it in the regular billing statement for water service or by any other mailing to the address to which the District customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the District, any person that uses water in excess of the allocation shall be subject to a penalty for each billing unit of water in excess of the allocation. The penalty for excess water usage shall be cumulative to any other remedy or fee that may be imposed for violation of this resolution.

## **SECTION 8.0 LEVEL 5 – WATER EMERGENCY**

(a) Level 5 applies under the following conditions: 1) when the Water Authority Board of Directors declares a water shortage emergency pursuant to California Water Code section 350 and notifies its member agencies that Level 5 requires an emergency water demand reduction in order for the District to maximize supplies available to meet anticipated demands; 2) when a similar requirement is imposed by a regulatory agency; or 3) when other conditions exist that require the Board of Directors to declare a water shortage emergency. The consumer demand reduction amounts in Level 5 typically apply during a shortage of up to and including 50 percent, although the District Board of Directors shall declare a Level 5 water shortage in the manner and on the grounds provided in California Water Code section 350.

(b) All persons using District water shall comply with water-use efficiency practices and conservation measures required under Levels 1 through 4 and shall also comply with the following additional mandatory conservation measures:

1. Stop all residential landscape irrigation, unless the District has determined that recycled water is available and may be lawfully applied to the use. This restriction shall not apply to the following categories of use.
  - A. Maintenance of trees and shrubs that are watered on the same schedule set forth in section 7 (b) (1) by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation;
  - B. Maintenance of existing landscaping necessary for fire protection as specified by the Fire Marshal of the local fire protection agency having jurisdiction over the property to be irrigated;
  - C. Maintenance of existing landscaping for erosion control;
  - D. Maintenance of plant materials identified to be rare or essential to the well being of rare animals; and

E. Watering of livestock.

The District may establish a water allocation for property served by the District. If the District establishes a water allocation it shall provide notice of the allocation by including it in the regular billing statement for water service or by any other mailing to the address to which the District customarily mails the billing statement for fees or charges for on-going water service. Following the effective date of the water allocation as established by the District, any person that uses water in excess of the allocation shall be subject to a penalty for each billing unit of water in excess of the allocation. The penalty for excess water usage shall be cumulative to any other remedy or fee that may be imposed for violation of this resolution.

**SECTION 9.0 LEVEL 6 – CRITICAL WATER EMERGENCY**

Level 6 condition applies when the Water Authority Board of Directors declares a water shortage emergency pursuant to California Water Code Section 350 and notifies its member agencies that Level 6 requires a demand reduction of more than 50% in order for the District to have maximum supplies available to meet anticipated demands. The District shall declare a Critical Water Emergency in the manner and on the grounds provided in California Water Code section 350.

(b) All persons using District water shall comply with conservation measures required during Levels 1 through 5 conditions and shall also comply with the following additional mandatory conservation measures:

1. Stop all landscape irrigation, including maintenance of trees and shrubs, and crops and landscape products of commercial growers and nurseries at the General Manager's discretion. This restriction shall not apply to the following categories of use unless the District has determined that recycled water is available and may be lawfully applied to the use.

A. Maintenance of existing landscaping necessary for fire protection as specified by the Fire Marshal of the local fire protection agency having jurisdiction over the property to be irrigated;

B. Maintenance of existing landscaping for erosion control;

C. Maintenance of plant materials identified to be rare or essential to the well-being of rare animals;

D. Watering of livestock; and

E. Public works projects and actively irrigated environmental mitigation projects.

2. At the discretion of the General Manger, the District may shut off or lock irrigation meters without customer notification.



**SECTION 10.0        PROCEDURES FOR DETERMINATION AND NOTIFICATION OF LEVEL OF ACTION**

(a) Level 1 under this Program applies at all times unless the District Board of Directors has declared another Level, per the procedures set forth in this section. The District shall, at a minimum, provide notice of a Level 1 declaration and condition by news release and by posting information on the District’s website.

(b) The existence of a Level 2 or Level 3 may be declared by resolution of the District Board of Directors adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation measures applicable to Level 2 or Level 3 shall take effect on the tenth day after the date the response level is declared. Within five days following the declaration of the level, the District shall publish a copy of the resolution in a newspaper used for publication of official notices.

(c) The existence of Level 4, 5 or 6 may be declared in accordance with the procedures specified in California Water Code sections 351 and 352. The mandatory conservation measures applicable to Levels 4 through 6 shall take effect on the tenth day after the date the response level is declared. Within five days following the declaration of the level, the District shall publish a copy of the resolution in a newspaper used for publication of official notices. If the District establishes a water allocation, it shall provide notice of the allocation by including it in the regular billing statement for the fee or charge or by any other mailing to the address to which the District customarily mails the billing statement for fees or charges for on-going water service. Water allocation shall be effective on the fifth day following the date of mailing or at such later date as specified in the notice.

(c) The District Board of Directors may declare an end to a level by the adoption of a resolution at any regular or special meeting held in accordance with State law.

(d) The District shall notify customers of any changes in levels or water use restrictions using multiple communication methods.

**SECTION 11.0        NON-COMPLIANCE AND FEES**

(a) Any person, who uses, causes to be used, or permits the use of water in violation of this resolution is guilty of an offense punishable as provided herein.

(b) Each day that a violation of this resolution occurs is a separate offense.

(c) Water Conservation Fees, as set forth in Section 4.4.17 of the District’s Rules and Regulations, may be levied for each violation of a provision of this resolution as follows:

1. A first violation of any provision of this resolution shall result in a letter of warning.

2. A second violation of any provision of this resolution within one year shall result in the assessment of a Water Conservation Fee.

3. A third violation of this resolution within one year shall result in the assessment of an additional Water Conservation Fee.

4. Four or more violations of any provision of this resolution shall result in the assessment of additional Water Conservation Fees.

(d) Violation of a provision of this resolution is subject to enforcement through installation of a flow-restricting device in the meter. The cost of installing and removing a flow-restricting device will be paid for by the person, who uses, causes to be used, or permits the use of water in violation of this resolution.

(e) Each violation of this resolution may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than 30 days or by a fine not exceeding \$1,000, or by both as provided in Water Code section 377.

(f) Willful violations of the mandatory conservation measures and water use restrictions as set forth in Sections 7.0, 8.0 and 9.0 and applicable during Levels 4 through 6 may be enforced by discontinuing service to the property at which the violation occurs as provided by Water Code section 356. The cost of disconnecting and re-connecting water service be paid for by the person, who uses, causes to be used, or permits the use of water in violation of this resolution.

(g) All fees and costs associated with installing and removing a flow-restricting device and disconnecting and re-connecting water service will be added to the account of the person, who uses, causes to be used, or permits the use of water in violation of this resolution. Fees and costs will appear on and be payable with the first billing statement for the period the violation occurred and be subject to the same remedies that are imposed by the District for failure to pay other charges.

(h) All remedies provided for herein shall be cumulative and not exclusive.

## **SECTION 12.0 APPEALS**

(a) Any person complaining about fees and/or other remedies applied in accordance with Section 11 of this resolution shall have that complaint be first taken up with the General Manager before any action will be taken by the District's Board of Directors.

(b) The General Manager's determination may be appealed in writing within 10 days of the mailing of a notice of determination. Any determination not timely appealed shall be final.

(c) The person appealing the General Manager's determination shall submit a written request to the Board Secretary to have his or her appeal considered as an item for discussion and action at an upcoming Board meeting. The written request shall include: 1) a description of the issues, 2) evidence supporting the claim, and 3) a request for resolution of the dispute.

(d) The District shall at least 10 days before the date of the hearing mail an appropriate notice of the regular or special meeting at which the appeal will be heard. The Board may, in its discretion, affirm, reverse or modify the determination.

**ARTICLE TWO:** This resolution shall take effect immediately upon adoption or as otherwise established by State law for Vista Irrigation District.

**PASSED AND ADOPTED** by the following roll call vote of the Board of Directors of Vista Irrigation District this 16th day of June, 2021:

AYES:

NOES:

ABSTAIN:

ABSENT:

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Patrick Sanchez, President

ATTEST:

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Lisa R. Soto, Secretary  
Board of Directors  
Vista Irrigation District

RESOLUTION NO. 20-34

RESOLUTION OF THE VISTA IRRIGATION DISTRICT  
ADOPTING RULES AND REGULATIONS PERTAINING TO THE  
PERMANENT SPECIAL AGRICULTURAL WATER RATE PROGRAM

WHEREAS, the Board of Directors of the San Diego County Water Authority will terminate its Transitional Special Agricultural Water Rate program on December 31, 2020; and

WHEREAS, the Board of Directors of the San Diego County Water Authority adopted the Permanent Special Agricultural Water Rate program on September 24, 2020; and

WHEREAS, the Board of Directors of Vista Irrigation District approved participation in San Diego County Water Authority's Permanent Special Agricultural Water Rate; and

WHEREAS, participation in this program necessitates that rules and regulations be adopted pursuant to Permanent Special Agricultural Water Rate program requirements.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Vista Irrigation District, as follows:

PERMANENT SPECIAL AGRICULTURAL WATER RATE PROGRAM

1.1 Definitions

- A. *Water Authority*: San Diego County Water Authority.
- B. *Metropolitan*: Metropolitan Water District of Southern California.
- C. *Owner*: Owner of Record per the County of San Diego.
- D. *Reduction in Delivery*: Reduction in delivery to PSAWR program customers will be the percentage rate cutback established by Metropolitan under a shortage action. At least a five percent differential between the Water Authority municipal and industrial (M&I) customer cutback level and the PSAWR program cutback level will also be maintained.
- E. *Transitional Special Agricultural Water Rate (TSAWR)*: The TSAWR program adopted by the Water Authority's Board on March 25, 2010 and extended on April 26, 2012, June 26, 2014 and June 25, 2015 wherein an agricultural water discount for treated water and untreated water shall be applied to water purchased by those water agencies participating in the TSAWR program. The TSAWR program will terminate on December 31, 2020.
- F. *VID*: Vista Irrigation District

1.2 Qualification to Participate in this Program: Customers must be on one of four lists maintained by either the County of San Diego or the San Diego Regional Water Control Board.

- 1. Regional Board General Agricultural Orders Enrollment List
  - 2. County of San Diego Grower's List
  - 3. County of San Diego Active Certified Producers
  - 4. County of San Diego Organic Producers

- 1.3 Duration of Program: The PSAWR program begins on January 1, 2021; the program rules remain in effect until the program rules are amended or the program terminates. Once an owner has entered into this program, the owner's land will be subject to the conditions of this program for the duration of the program unless the agricultural owner's lands no longer qualify for the program or the owner terminates participation in the program, subject to the conditions specified below. It is the intent of the Vista Irrigation District (VID) Board of Directors that the benefits and obligations of the program shall run with the land and not with the owner, and it is the responsibility of the owner to disclose that the land is subject to this program.
- 1.4 Request to Terminate Participation in Program: Owners enrolling in the program are able to terminate participation (opt-out) in the program effective January 1 of the following year. Should a shortage action be taken while a parcel is enrolled in the PSAWR program or in the year immediately following the year that a participant has opted out that parcel will be subject to PSAWR program delivery reductions for the duration of the shortage action. Once an owner terminates participation in the program, he/she may not re-enroll.
- 1.5 Amount of Discount to be Passed on to VID Agricultural Customers: A discounted commodity rate will be applied to each individual agricultural account in an amount equal to the PSAWR program discount received from Water Authority. VID will use a melded rate, based on the PSAWR program for treated and untreated water, as the discount.
- 1.6 Parcels served by multiple meters: If a parcel qualifying under this program is served by more than one meter, all meters shall be considered included in this program and will be subject to a Reduction in Delivery.
- 1.7 Agricultural Meters Serving One or More Homes: When a meter supplies water to a parcel qualifying under this program which contains one or more residences, the first 22 units of water delivered per month shall be considered domestic water and shall be billed at the VID's domestic water rate. The PSAWR shall only apply to that water used after the first 22 units of water per month. The Water Authority determines the quantity of water considered domestic use; said quantity is subject to change by the Water Authority.
- 1.8 Execution of Program Forms: The PSAWR Program Enrollment Form and an Agreement Re Covenants Burdening Real Property Form must be signed by the owner of the property and shall be recorded against the property. In cases where the owner has given the proper power of attorney to an agent, the agent may execute the PSAWR Program Enrollment Form and an Agreement Re Covenants Burdening Real Property Form by providing a copy of the power of attorney to VID.
- 1.9 Verification of Program Qualifications: Customers may be required to provide proof that they "Grow or raise – for commercial purposes – products of an agricultural, horticultural, or floricultural nature".
- 1.10 Liability for PSAWR Rates, Fees, Penalties and Charges as Required by VID: Should VID determine that water purchased under this program was done so under the basis of incorrect information supplied by the applicant or used for purposes other than agricultural purposes as defined in Section 1.2, VID may assess rates, fees, penalties and charges. VID shall assess the then current owner these rates, fees, penalties and charges even though the then current owner may not have been the owner executing the PSAWR Program Enrollment Form.

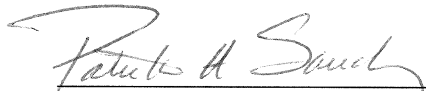
- 1.11 Interruption in Delivery of Water: The owner shall certify and acknowledge by executing the PSAWR Program Form or Request to Terminate Participation Form that he/she further acknowledges that his/her parcel is subject to reductions in delivery up to full interruption based on water supply conditions as determined by VID. For owners who have terminated participation in the program after January 1 of a given year, the condition that their parcels are subject to reductions in delivery up to full interruption remain in place for the duration of the shortage action.
- 1.12 VID Matching Agricultural Rate: The Board of Directors of VID authorizes a matching reduction in water rates for local water to any agricultural customer participating in Water Authority's PSAWR program.
- 1.13 Non-Compliance, Penalty Water Rates and Fees
- A. Any person, who uses, causes to be used, or permits the use of water in violation of this resolution is guilty of an offense punishable as provided herein.
  - B. Each day that a violation of this resolution occurs is a separate offense.
  - C. Water usage in excess of required reductions, as set forth in Section 1.1 F, will be billed at the PSAWR rate plus a penalty water rate.
  - D. Water Conservation Fees, as set forth in Section 4.4.17 of the VID's Rules and Regulations, may be levied for each violation of a provision of this resolution as follows:
    - 1. A first violation of any provision of this resolution shall result in a letter of warning.
    - 2. A second violation of any provision of this resolution within one year shall result in the assessment of a Water Conservation Fee.
    - 3. A third violation of this resolution within one year shall result in the assessment of an additional Water Conservation Fee.
    - 4. Four or more violations of any provision of this resolution shall result in the assessment of an additional Water Conservation Fees.
  - E. Violation of a provision of this resolution is subject to enforcement through installation of a flow-restricting device in the meter. The cost of installing and removing a flow-restricting device will be paid for by the person, who uses, causes to be used, or permits the use of water in violation of this resolution.
  - F. All fees and costs associated with installing and removing a flow-restricting device and disconnecting and re-connecting water service will be added to the account of the person, who uses, causes to be used, or permits the use of water in violation of this resolution. Fees and costs will appear on and be payable with the first billing statement for the period the violation occurred and be subject to the same remedies that are imposed by VID for failure to pay other charges.
  - G. All remedies provided for herein shall be cumulative and not exclusive. In addition, remedies may be invoked, combined, or accelerated based on the timing and severity of the violation.

1.14 Appeals

- A. Any person complaining about fees and/or other remedies applied in accordance with Section 1.13 shall have that complaint be first taken up with the General Manager before VID's Board of Directors will take any action.
- B. The General Manager's determination may be appealed in writing within ten days of the mailing of a notice of determination. Any determination not timely appealed shall be final.
- C. The person appealing the General Manager's determination shall submit a written request to the Board Secretary to have his or her appeal considered as an item for discussion and action at an upcoming Board meeting. The written request shall include: 1) a description of the issues, 2) evidence supporting the claim, and 3) a request for resolution of the dispute.
- D. VID shall at least ten days before the date of the hearing mail an appropriate notice of the regular or special meeting at which the appeal will be heard. The Board may, in its discretion, affirm, reverse or modify the determination.

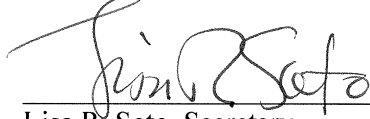
PASSED AND ADOPTED by the Board of Directors of the Vista Irrigation District this 9th day of December, 2020 by the following roll call vote:

AYES: Directors Miller, Dorey, Sanchez, MacKenzie, and Vásquez  
NOES: None  
ABSTAIN: None  
ABSENT: None



Patrick H. Sanchez, Vice President

ATTEST:



Lisa R. Soto, Secretary

Board of Directors

VISTA IRRIGATION DISTRICT

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## **APPENDIX E**

### Reporting on Reduced Delta Reliance

# **Vista Irrigation District**

## **Reporting on Reduced Delta Reliance**

### **BACKGROUND**

An urban water supplier that anticipates participating in or receiving water supply benefits from a proposed project (covered action) such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) should provide information in their 2015 and 2020 Urban Water Management Plans (Plans) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (California Code Reg., Title 23, Section 5003).

### **VISTA IRRIGATION DISTRICT DELTA RELIANCE**

The District is a secondary system and primarily relies on regional water wholesalers, Metropolitan Water District of Southern California (Metropolitan) and the San Diego County Water Authority (Water Authority) for long-term water supply planning. The District receives potable water purchased from the Water Authority. The Water Authority imports State Water Project (SWP) water from Metropolitan, among other imported and local supplies. The District's reliance on the Bay Delta originates from its water supply delivered by the Water Authority via Metropolitan.

### **WATER AUTHORITY REDUCED DELTA RELIANCE ANALYSIS**

The Water Authority completed a Delta Reliance analysis as part of the Water Authority's 2020 Plan. As the District's only potential source of water from the Delta watershed is water purchased from the Water Authority, the District relies on the Water Authority's Delta reliance analysis to demonstrate reduced regional reliance on the Delta.

The Water Authority's information on its reduced reliance on the Delta is documented below (the analysis is in draft form until the Water Authority Board of Directors adopts their 2020 Plan) and can be used in future certifications of consistency with WR P1 for potential future water supply covered actions in the Delta.

# **Vista Irrigation District**

## **Reporting on Reduced Delta Reliance**

### **BACKGROUND**

An urban water supplier that anticipates participating in or receiving water supply benefits from a proposed project (covered action) such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) should provide information in their 2015 and 2020 Urban Water Management Plans (UWMP's) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (California Code Reg., Title 23, Section 5003).

### **VISTA IRRIGATION DISTRICT DELTA RELIANCE**

The District is a secondary system and primarily relies on regional water wholesalers, Metropolitan and the Water Authority for long-term water supply planning. The District receives potable water purchased from the Water Authority. The Water Authority imports State Water Project (SWP) water from Metropolitan Water District of Southern California (Metropolitan), among other imported and local supplies. The District's reliance on the Bay Delta originates from its water supply delivered by the Water Authority via Metropolitan.

### **WATER AUTHORITY REDUCED DELTA RELIANCE ANALYSIS**

The Water Authority completed a Delta Reliance analysis as part of the Water Authority's 2020 Urban Water Management Plan (2020 Plan). As the District's only potential source of water from the Delta watershed is water purchased from the Water Authority, the District relies on the Water Authority's Delta reliance analysis to demonstrate reduced regional reliance on the Delta.

The Water Authority's information on its reduced reliance on the Delta is documented below (the analysis is in draft form until the Water Authority Board of Directors adopts their 2020 Plan) and can be used in future certifications of consistency with WR P1 for potential future water supply covered actions in the Delta.

# DRAFT

## Appendix J – Reporting on Reduced Delta Reliance

### Background

An urban water supplier that anticipates participating in or receiving water from a proposed project, such as a multiyear water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta), should provide information in their 2015 and 2020 UWMPs that can then be used in the certification of consistency process to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (California Code Regulations, Title 23, §5003).<sup>1</sup>

Delta Plan Policy WR P1 is one of fourteen regulatory policies in the Delta Plan. The Delta Plan is a comprehensive, long-term, legally enforceable plan guiding how federal, state, and local agencies manage the Delta's water and environmental resources. The Delta Plan was adopted in 2013 by the Delta Stewardship Council (DSC). Delta Plan Policy WR P1 identifies urban water management plans (UWMP) as the tool to demonstrate consistency with the state policy that suppliers that carry out or take part in covered actions must reduce their reliance on the Delta.<sup>2</sup>

The California Code of Regulations, Title 23, § 5003(c)(1), states that commencing in 2015, water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improving regional self-reliance and are therefore consistent with Delta Plan Policy WR P1:

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

<sup>1</sup> *Draft Urban Water Management Plan Guidebook 2020*, California Department of Water Resources, August 2020, p. C-1.

<sup>2</sup> *Ibid.*, p. C-2.

# DRAFT

The Water Authority’s information on its reduced reliance on the Delta is documented below and can be used in future certifications of consistency with WR P1 for potential future water supply covered actions in the Delta.

## **Process to Demonstrate Reduced Reliance on Delta**

Consistent with Appendix C in the California Department of Water Resource’s *Draft UWMP Guidebook 2020*<sup>3</sup> (DWR Guidebook), the analysis followed Steps 2 through 4 in the DWR Guidebook to document consistency with WR P1 and produce data and information covering the Water Authority’s 2015 and 2020 UWMPs. It should be noted that Step 1 of the DWR Guidebook process applies to water suppliers that do not quantify the water use efficiency supply volumes in their UWMPs. The Water Authority quantifies this information in its UWMPs, therefore, Step 1 of the process was not included in the analysis.<sup>4</sup> A list of Steps 1 through 4 is shown below.

- 1) Quantify the water use efficiency supply volume (not applicable);
- 2) Quantify total water supplies;
- 3) Quantify water supplies that contribute to regional self-reliance; and
- 4) Demonstrate reduced reliance on water supplies from the Delta watershed.

Unless otherwise noted, the sources of the data used in the analysis are shown in Table 1.

Table 1 – Source of Water Supply Data

Analysis Year	Data Source	
2010 (Baseline)	2005 UWMP	Tables 2-2 and 8-1
2015	2010 UWMP	Tables 2-5 and 9-1
2020	2015 UWMP	Tables 2-4 and 9-1
2025, 2030, 2035, 2040, 2045	2020 UWMP	Tables 2-4 and 9-1

## **Quantification of Total Water Supplies**

To demonstrate reduced reliance on the Delta, the Water Authority compared its projected Delta water use against a baseline. The baseline, shown in Table 2, was calculated by taking the projected 2010 normal year water demand and adding projected water efficiency savings for 2010. Consistent with DWR’s Guidebook, normal year water demands were used as a surrogate for normal year water supplies to help alleviate issues associated with instances where available water supplies exceed normal year water demands.<sup>5</sup> In addition, consistent with the DWR

<sup>3</sup> *Ibid.*, p. C-6.

<sup>4</sup> *Ibid.*, p. C-14.

<sup>5</sup> *Ibid.*, p. C-16.

# DRAFT

Guidebook, actual water use was not used for the current year due to the influence of weather and other variables on water use.<sup>6</sup> Rather, UWMP normal year demand projections were used to represent current and future water use.

Table 2 – Service Area Water Demands without Water Use Efficiency

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015 <sup>a</sup>	2020	2025	2030	2035	2040	2045 (opt)
Service Area Water Demands with Water Use Efficiency	715,450	647,285	587,581	555,758	578,244	598,474	614,235	630,771
Saving from Water Use Efficiency	79,960	6,737	74,141	62,411	66,921	73,035	81,625	85,698
Service Area Water Demands without Water Use Efficiency	795,410	654,022	661,722	618,169	645,165	671,509	695,860	716,469

<sup>a</sup> Consistent with SBX7-7 guidelines, water use efficiency targets could be met through both recycled water supplies and additional conservation savings. For 2015, the savings from water use efficiency represents the additional increment of water use efficiency required to meet the region’s water use efficiency target under SBX7-7 after accounting for available recycled water supplies.

## Quantification of Water Supplies that Contribute to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) states that water suppliers must report in their UWMP the expected outcome for measurable improvement in regional self-reliance as a reduction in water used from the Delta watershed. To determine whether there is an increase in regional self-reliance, the baseline calculated in Table 2 is used to compare against the water supplies listed in Table 3 that contribute to regional self-reliance. The comparison is done over five-year periods, from 2015 through 2045, to calculate how regional self-reliance will change over time.

Table 3 lists the sources of water supplies and volumes that contribute to regional self-reliance. As shown in the table, the Water Authority’s reliance on the Delta watershed decreases over time as the percent of water supplies that contribute to regional self-reliance increase over time. The volumes of the individual supplies that contribute to regional self-reliance can be found in Section 8 of the Water Authority’s 2005 UWMP, and Section 9 of the Water Authority’s 2010, 2015, and 2020 UWMPs.

The water supplies included in Table 3 that contribute to regional self-reliance are grouped into categories that are consistent with the DWR Guidebook and represent Water Authority and member agency verifiable supplies. Recycled water supplies are listed in the “Water Recycling” category. Water supplies from the Carlsbad Desalination Plant are listed in the “Advanced Water Technologies” category. The remaining water supplies are included in the “Local and Regional Water Supply and Storage Projects” category, and consist of water supplies from the Imperial Irrigation District water transfer, All-American and Coachella Canal lining projects, groundwater, brackish groundwater, surface water, potable reuse, and San Luis Rey water transfers. Since supplies from the Metropolitan Water District of Southern California (Metropolitan) may include a percentage of water from the Delta watershed, Metropolitan supplies are excluded from the list of supplies that contribute to regional self-reliance in the San Diego region.

<sup>6</sup> *Ibid.*, p. C-7.

# DRAFT

Table 3 – Calculation of Supplies Contributing to Regional Self-Reliance

<b>Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)</b>	<b>Baseline (2010)</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045 (opt)</b>
Water Use Efficiency	79,960	6,737	74,141	62,411	66,921	73,035	81,625	85,698
Water Recycling	33,668	38,660	40,459	42,993	46,493	46,593	46,693	46,793
Stormwater Capture and Use	-	-	-	-	-	-	-	-
Advanced Water Technologies	-	-	56,000	56,000	56,000	56,000	56,000	56,000
Conjunctive Use Projects	-	-	-	-	-	-	-	-
Local and Regional Water Supply and Storage Projects	235,924	250,436	355,120	402,599	423,959	484,021	480,521	480,521
Other Programs and Projects the Contribute to Regional Self-Reliance	-	-	-	-	-	-	-	-
<b>Water Supplies Contributing to Regional Self-Reliance</b>	<b>349,552</b>	<b>295,833</b>	<b>525,720</b>	<b>564,003</b>	<b>593,373</b>	<b>659,649</b>	<b>664,839</b>	<b>669,012</b>

<b>Service Area Water Demands without Water Use Efficiency</b>	<b>Baseline (2010)</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045 (opt)</b>
Service Area Water Demands without Water Use Efficiency	795,410	654,022	661,722	618,169	645,165	671,509	695,860	716,469

<b>Change in Regional Self Reliance (Acre-Feet)</b>	<b>Baseline (2010)</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045 (opt)</b>
Water Supplies Contributing to Regional Self-Reliance	349,552	295,833	525,720	564,003	593,373	659,649	664,839	669,012
Change in Water Supplies Contributing to Regional Self-Reliance		(53,719)	176,168	214,451	243,821	310,097	315,287	319,460

<b>Change in Percentage Regional Self Reliance (As a Percent of Water Demand without WUE)</b>	<b>Baseline (2010)</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045 (opt)</b>
Percentage of Water Supplies Contributing to Regional Self-Reliance	43.9%	45.2%	79.4%	91.2%	92.0%	98.2%	95.5%	93.4%
Change in Percentage of Water Supplies Contributing to Regional Self-Reliance		102.9%	180.8%	207.6%	209.3%	223.5%	217.4%	212.5%

## Demonstration of Reduced Reliance on Water Supplies from the Delta Watershed

WR P1 subdivision (c)(1)(C) requires water suppliers to report on the expected outcomes for measurable reductions in water supplies from the Delta watershed. For the Water Authority and its member agencies, the only potential source of water from the Delta watershed is water purchased from Metropolitan. However, because of the integrated nature of Metropolitan’s systems and operations, and the collective nature of Metropolitan’s regional efforts, it is infeasible to attempt to completely segregate and quantify individual reliance on the Delta for each of Metropolitan’s member agencies. In addition, the Water Authority receives blended water from Metropolitan as determined by Metropolitan. That blend varies from month-to-month and year-to-year due to hydrology, operational constraints, use of storage, and other factors. Because of these data limitations, the Water Authority utilized the data contained in Table A.11-3 of Metropolitan’s *Draft 2020 UWMP* to report on the expected outcomes for measurable reductions in water supplies from the Delta watershed.<sup>7</sup> This information is shown in Table 4.

<sup>7</sup> *Draft 2020 UWMP*, Metropolitan Water District of Southern California, May 2021, Appendix 11, Table A.11-3.

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Table 4 – Calculation of Reliance on Water Supplies from Delta Watershed <sup>8</sup>

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions	-	-	-	-	-	-	-	-
Transfers and Exchanges	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed								
<b>Total Water Supplies from the Delta Watershed</b>	<b>1,492,000</b>	<b>1,073,000</b>	<b>1,075,000</b>	<b>1,191,000</b>	<b>1,182,000</b>	<b>1,180,000</b>	<b>1,178,000</b>	<b>1,178,000</b>
Service Area Water Demands without Water Use Efficiency	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Service Area Water Demands without Water Use Efficiency Savings	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000
Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Water Supplies from the Delta Watershed		(419,000)	(417,000)	(301,000)	(310,000)	(312,000)	(314,000)	(314,000)
Change in Percentage of Supplies from the Delta Watershed (As a Percent of Water Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (opt)
Percentage of Total Water Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percentage of Water Supplies from the Delta Watershed		-7.6%	-6.6%	-3.0%	-3.7%	-4.3%	-4.8%	-5.2%

The CVP/SWP contract supplies in Table 4 include Metropolitan's State Water Project Table A and Article 21 supplies. The values in Table 4 do not include supplies from San Luis Carryover storage or Central Valley storage programs. The transfers and exchanges of supplies from the Delta watershed shown in Table 4 include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, and other generic SWP and Central Valley transfers and exchanges. Additional information can be found in Section 3.2 and Appendix 3 of Metropolitan's *Draft 2020 UWMP*.<sup>9</sup>

<sup>8</sup> *Ibid.*, Table A.11-3.

<sup>9</sup> *Ibid.*, pg. A.11-8.



## **APPENDIX F**

San Diego County  
Multi-Jurisdictional Hazard Mitigation Plan (October 2017)

# MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

SAN DIEGO COUNTY, CALIFORNIA



October 2017



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## 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 on families and individuals can be immense and damages to businesses can result in regional economic consequences. The time, money and effort to respond to and recover from these disasters divert public resources and attention from other important programs and problems. With four presidential disaster declarations, four gubernatorial proclamations and fifteen local proclamations of emergency since 1999 San Diego County, California recognizes the consequences of disasters and the need to reduce the impacts of natural and manmade hazards. The elected and appointed officials of the County also know that with careful selection, mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural and manmade hazards.

This *Multi-Hazard Mitigation Plan for San Diego County, California* (the Plan), was prepared with input from county residents, responsible officials, the San Diego County Water Authority, the Alpine and Rancho Santa Fe Fire Protection Districts, the Padre Dam Municipal Water District, the San Diego Foundation, ICLEI, the California Office of Emergency Services (Cal OES) and the Federal Emergency Management Agency (FEMA). The process to develop the Plan included over a year of coordination with representatives from all of the jurisdictions in the region. The Plan will guide the region toward greater disaster resilience in harmony with the character and needs of the community.

This section of the Plan includes an overview of the Plan, a discussion of the Plan's purpose and authority, and a description of the 18 incorporated cities and the unincorporated County within the San Diego region.

### 1.1 Plan Description/Purpose of Plan

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). The new 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).

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies new 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 post-disaster HMGP funds. Local and tribal 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.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan;
- Reviewing and updating the state mitigation plan every three years;
- Providing technical assistance and training to local governments to assist them in applying for HMGP grants and in developing local mitigation plans; and
- Reviewing and approving local plans if the state is designated a managing state and has an approved enhanced plan.

The intent of DMA 2000 is 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 resilience. 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 an Interim Final Rule, published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206), which establishes planning and funding criteria for states and local communities.

The Plan has been prepared to meet FEMA requirements thus making the County and all participating jurisdictions and special districts eligible for funding and technical assistance from state and federal hazard mitigation programs.

## 1.2 Plan Purpose and Authority

In the early 1960s, the incorporated cities and the County of San Diego formed a Joint Powers Agreement which established the Unified San Diego County Emergency Services Organization (USDCESO) and the Unified Disaster Council (UDC) as the policy making group. The UDC, the San Diego County Board of Supervisors, City Councils and governing Boards for each participating municipality or special district will adopt the Plan once the State of California and FEMA have granted provisional approval. This Plan is intended to serve many purposes, including:

*Enhance Public Awareness and Understanding* – to help residents of the County better understand the natural and manmade hazards that threaten public health, safety, and welfare; economic vitality; and the operational capability of important institutions;

*Create a Decision Tool for Management* – to provide information that managers and leaders of local government, business and industry, community associations, and other key institutions and organizations need to take action to address vulnerabilities to future disasters;

*Promote Compliance with State and Federal Program Requirements* – to ensure that San Diego County and its incorporated cities can take full advantage of state and federal grant programs, policies, and regulations that encourage or mandate that local governments develop comprehensive hazard mitigation plans;

*Enhance Local Policies for Hazard Mitigation Capability* – to provide the policy basis for mitigation actions that should be promulgated by participating jurisdictions to create a more disaster-resistant future; and



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Provide *Inter-Jurisdictional Coordination of Mitigation-Related Programming* – to ensure that proposals for mitigation initiatives are reviewed and coordinated among the participating jurisdictions within the County.

Achieve *Regulatory Compliance* – 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 (44 CFR Section 201.6). DMA 2000 intends for hazard mitigation plans to remain relevant and current. Therefore, it requires that State hazard mitigation plans are updated every three years and local plans, including the San Diego Regional Plan, every five years. This means that the Multi-jurisdictional Hazard Mitigation Plan for San Diego uses a “five-year planning horizon”. It is designed to carry the region through the next five years, after which its assumptions, goals, and objectives will be revisited and the plan resubmitted for approval.

## 1.3 Community Description

### 1.3.1 The County of San Diego

San Diego County, one of 58 counties in the State of California, was established on February 18, 1850, just after California became the 31st state. The County stretches 65 miles from north to south, and 86 miles from east to west, covering 4,261 square miles. Elevation ranges from sea level to about 6,500 feet. Orange and Riverside Counties border it to the north, the agricultural communities of Imperial County to the east, the Pacific Ocean to the west, and the State of Baja California, Mexico to the south. Geographically, the County is on the same approximate latitude as Dallas, Texas and Charleston, South Carolina.

San Diego County is comprised of 18 incorporated cities and 17 unincorporated communities. The county's total population in 2016 was approximately 3.2 million with a median age of 35 years (US 2010 Census Quickfacts). San Diego is the third most populous county in the state.

The following subsections provide an overview of the *Economy, Physical Features, Infrastructure, and Jurisdictional Summaries* for the County of San Diego.

#### 1.3.1.1 Economy

San Diego offers a vibrant and diverse economy along with a strong and committed public/private partnership of local government and businesses dedicated to the creation and retention of quality jobs for its residents. Although slowed by the recession in 2008, the business climate continues to thrive due to the diversification of valuable assets such as world class research institutions; proximity to Mexico and the Pacific Rim; a well educated, highly productive work force; and an unmatched entrepreneurial spirit.

According to the [U.S. Bureau of Economic Analysis \(BEA\)](#), San Diego's Gross Regional Product (GRP)—an estimate of the total output of goods and services in the county—was \$197.9 billion in 2013 San Diego's abundant and diverse supply of labor at competitive rates is one of the area's greatest assets. As of November 2014, the total civilian labor force was estimated at 1.33 million, which includes self-employed individuals and wage and salary employment. Unemployment for

November 2014 was 5.8% or 94,000 persons. This was slightly higher than the national rate of 5.5% but significantly lower than the state's rate of 7.1% (Source: [State of California Employment Development Department](#)).

There are several reasons for the strong labor supply in San Diego. The area's appealing climate and renowned quality of life are two main factors that attract a quality workforce. The excellent quality of life continues to be an important advantage for San Diego companies in attracting and retaining workers. In addition, local colleges and universities augment the region's steady influx of qualified labor. Each year San Diego's educational institutions graduate approximately 1,500 students with bachelors, masters and PhD degrees in electrical engineering, computer science, information systems, mechanical engineering and electronic technology. Over 2,500 students annually receive advanced degrees in business administration. There is also a pool of qualified workers from San Diego's business schools, which annually graduate over 1,000 students with administrative and data processing skills.

### **1.3.1.2 Employment**

San Diego's diverse and thriving high-tech industry has become the fastest growing sector of employment and a large driving force behind the region's continued economic prosperity. San Diego's high-tech industry comprises over a tenth of the region's total economic output.

San Diego boasts the third largest concentration of biotech companies in the country with an estimated 700 firms. Currently there are over 34,500 people employed in San Diego's biotech industry. Life Science activity accounts for more than \$14.2 billion in direct economic activity and \$36.6 billion in total economic impact in San Diego (Source: BIOCUM 2013 Southern California Economic Impact Report). The general services industry is the second largest employment sector in the County, totaling nearly 51% of the county's industry employment. This sector includes business services, San Diego's tourism industry, health services and various business services, employing 671,600 workers. Government is the fourth largest employer with 236,200 jobs accounting for about 187% of total industry employment. (Source: [California Employment Development Division](#)).

### **1.3.1.3 Physical Features**

The physical, social and economic development of the region has been influenced by its unique geography, which encompasses over 70 miles of coastline, broad valleys, lakes, forested mountains and the desert. The county can be divided into three basic geographic areas, all generally running in the north-south direction. The coastal plain extends from the ocean to inland areas for 20 to 25 miles. The foothills and mountains, rising in elevation to 6,500 feet, comprise the middle section of the county. The third area is the desert, extending from the mountains into Imperial County, 80 miles east of the coast. San Diegans can live in the mountains, work near the ocean, and take recreational day trips to the desert.

One of San Diego's greatest assets is its climate. With an average yearly temperature of 70 degrees, the local climate has mild winters, pleasant summers, and an abundance of sunshine and light rainfall.

San Diego County experiences climatic diversity due to its varied topography. Traveling inland, temperatures tend to be warmer in the summer and cooler in the winter. In the local mountains, the average daily highs are 77 degrees and lows are about 45 degrees. The mountains get a light snowfall several times a year. East of the mountains is the Anza Borrego Desert, where rainfall is minimal and the summers are hot. The dry, mild climate of San Diego County is conducive to productivity. Outdoor work and recreational activities are possible almost all year-round. In addition, storage and indoor work can be handled with minimum investment in heating and air conditioning, although extreme heat events have increased slightly in both frequency and severity.

### **1.3.1.4 Infrastructure**

San Diego has a well-developed highway system. There are about 610 miles of state highways and 1,000 miles of regional arterials within the San Diego region. The county also encompasses more than 7,185 miles of maintained city streets and county roads. Roughly 11.6 million vehicle trips are made on the region's roadways daily, accounting for more than 68 million vehicle miles traveled daily.

Since 1980, San Diego's licensed drivers have increased 46%; likewise, auto registrations have increased 57%. Vehicle miles of travel (VMT) are up 86% since 1980. Unfortunately the increase in drivers, vehicles and VMT has not been matched by corresponding increases in freeway mileage (10%) or local street and road mileage (19%). Over the same time period, there has been a decrease in both reported fatal accidents and injury accidents.

All urbanized areas in the region and some rural areas are served by public transit. The San Diego Region is divided into two transit development boards: the San Diego Metropolitan Transit Development Board (MTDB), and the North County Transit Development Board (NCTD). San Diego Transit Corporation (SDTC), which operates transit service under MTDB, serves about two million people annually with routes that cover the cities of San Diego, Chula Vista, El Cajon, La Mesa and National City, as well as portions of San Diego County's unincorporated areas. SDTC routes also connect with other regional operators' routes. San Diego Trolley operates the light rail transit system under MTDB. The North County Transit District (NCTD) buses carry passengers in north San Diego County, including Del Mar, east to Escondido, north to Orange County and Riverside County, and north to Camp Pendleton. NCTD's bus fleet carries more than 11 million passengers every year. NCTD's bus system has 35 routes. In addition, NCTD runs special Express Buses for certain sporting and special events in San Diego.

San Diego Gas & Electric is a public utility that provides natural gas and electric service to 3 million consumers through 1.2 million electric meters and 720,000 natural gas meters in San Diego and southern Orange counties. SDG&E's service area encompasses 4,100 square miles, covering two counties and 25 cities. SDG&E is a subsidiary of Sempra Energy, a Fortune 500 energy services holding company based in San Diego. Virtually all of the petroleum products in the region are delivered via a pipeline system operated by Kinder Morgan Energy Partners.

The San Diego County Water Authority is a public agency serving the San Diego region as a wholesale supplier of water. The Water Authority works through its 24 member agencies to provide a safe, reliable water supply to support the region's \$171 billion economy and the quality

of life of 3 million residents or 90 percent of the county's population. The 24 member agencies are comprised of six cities, five water districts, three irrigation districts, eight municipal water districts, one public utility district and one federal agency (military base) and cover a service area of 920,000 acres. In 2008, Metropolitan Water District of Southern California supplied 71% of the water while 29% came from local and other supplies. Metropolitan imports the water from two sources, the Colorado River and the state Water Project (Bay-Delta) in northern California. Traveling hundreds of miles over aqueduct systems that include pump stations, treatment plants and reservoirs, approximately 700,000 acre-feet of water is transported annually through the Water Authority's five pipelines and then distributed to the member agencies for delivery to the public. Residents place the highest demand on water, consuming roughly 59% of all water in San Diego County. Industrial/commercial use is the second largest consumer of water at 17%, followed by the public sector at 13% and agriculture at 12% of the total water demand.

### 1.3.2 Local Jurisdictions

#### 1.3.2.1 *Carlsbad (Population: 110,972)*

Carlsbad is a coastal community located 35 miles north of downtown San Diego. It is bordered by Encinitas to the south, Vista and San Marcos to the east and Oceanside to the north. Carlsbad is home to world-class resorts such as the La Costa Resort and Spa and the Four Seasons Resort at Aviara, offering championship-level golf and tennis facilities. The newest addition to Carlsbad's commercial/recreational landscape is Legoland, which opened in the spring of 1999. The city of Carlsbad has a strong economy, much of which has come from industrial development. Callaway Golf, Cobra Golf, ISIS Pharmaceuticals, Mallinckrodt Medical, NTN Communications and Immune Response are just a few of the local companies located in Carlsbad. The area has nine elementary schools, two junior high schools, and three high schools. The school district ranks among the best in the county. Distinguished private and parochial schools also serve Carlsbad, including the internationally renowned Army Navy Academy.

#### 1.3.2.2 *Chula Vista (Population: 256,780)*

Chula Vista is home to an estimated 44% of all businesses in the South Bay Region of San Diego County. Chula Vista is the second largest municipality in San Diego County, and the 21st largest of 450 California cities. Today Chula Vista is attracting such companies as Solar Turbines and Raytheon, a \$20 billion global technology firm serving the defense industry. Chula Vista ranks among the nation's top ten governments in terms of employee productivity and local debt levels.

#### 1.3.2.3 *Coronado (Population: 23,500)*

Coronado is a 13.5 square mile ocean village. The military bases of the Naval Air Station North Island and Naval Amphibious Base occupy 5.3 square miles. Coronado is connected to San Diego by a 2.3-mile bridge and to Imperial Beach (its neighbor to the south), by a six-mile scenic highway, the Silver Strand. It is primarily a bedroom community for San Diego executives, a haven for retired senior military officers and an internationally renowned tourist destination. This vibrant community welcomes more than two million visitors annually to soak up the sun and the sand while enjoying

the lush surroundings and village appeal of Coronado. The city contains 14 hotels, amongst them are 3 world-class resorts including the Hotel Del Coronado and 67 highly acclaimed restaurants.

#### **1.3.2.4 Del Mar (Population: 4,311)**

Del Mar is the smallest city in the County with only 4,580 residents in the year 2014. Located 27 miles north of downtown San Diego, this coastal community is known for its affluence and comfortable standard of living. It is a beautiful wooded hillside area overlooking the ocean and has a resort-like atmosphere. The Del Mar Racetrack and Thoroughbred Club serve as Del Mar's most noted landmark. This racetrack is also the location for the annual San Diego County Fair. The City of Del Mar has 2.9 miles of shoreline that include the Del Mar City Beach and the Torrey Pines State Beach. There are two elementary schools, one junior high school and one high school in Del Mar, which is considered one of the region's best school districts.

#### **1.3.2.5 El Cajon (Population: 102,211)**

El Cajon is located 15 miles east of the City of San Diego. El Cajon is an inland valley surrounded by rolling hills and mountains. El Cajon's current population of 97,934 makes it the sixth most populated jurisdiction in the region. As one of the most eastern cities in the County, El Cajon has a warm and dry climate. El Cajon is a diverse residential, commercial, and industrial area, and serves as the main commerce center for several surrounding communities. Gillespie Field, a general aviation airport, is a major contributing factor to the city's vibrant industrial development. El Cajon includes a cross-section of housing types from lower cost mobile homes and apartments to moderately priced condominiums to higher cost single-family residences. There are 23 elementary schools, seven middle schools and four high schools.

#### **1.3.2.6 Encinitas (Population: 61,588)**

Encinitas is located along six miles of Pacific coastline in the northern half of San Diego County. Approximately 21 square miles, Encinitas is characterized by coastal beaches, cliffs, flat topped coastal areas, steep mesa bluffs and rolling hills. Incorporated in 1986, the City encompasses the communities of Old Encinitas, New Encinitas, Olivenhain, Leucadia and Cardiff-By-The-Sea. The Los Angeles/San Diego (LOSSAN) rail passes through the city, and other transit corridors traversing the city include El Camino Real and Coast Highway 101. Encinitas is bordered by Carlsbad to the north, Solana Beach to the south and the community of Rancho Santa Fe to the east.

#### **1.3.2.7 Escondido (Population: 148,738)**

Escondido has a reputation as a bedroom community due to the large percentage of residents who work outside of the city. Escondido is located 30 miles north of San Diego and is approximately 18 miles inland from the coast. It is the region's fifth most populated city. More than a decade ago, the people of Escondido conceived a vision of cultural excellence. Today, the \$73.4 million California Center for the Arts stands as a product of this vision. Escondido has 18 elementary schools, nine of which are parochial schools, three middle schools and six high schools, three of which are parochial. There is a unique mix of agriculture, industrial firms, high-tech firms, recreational centers and parks, as well as residential areas. The area's largest shopping mall, the

North County Fair, houses 6 major retail stores and approximately 175 smaller stores. California State University, San Marcos and Palomar Community College are located within minutes of Escondido.

#### **1.3.2.8 Imperial Beach (Population: 27,063)**

Imperial Beach claims the distinction of being the "Most Southwesterly City - in the continental United States." The City is located in the Southwest corner of San Diego County, only five miles from the Mexican Border and 15 miles from downtown San Diego. With a population of 28,200, Imperial Beach occupies an area of 4.4 square miles. Imperial Beach offers some of the least expensive housing to be found west of the I-5. It is primarily a resort/recreation community with a vast beach area as well as a 12,000-foot pier for fishing. Some describe Imperial Beach as quaint, but mostly the town has a rare innocence and a relaxed atmosphere. Looking south just across the International border, Tijuana's famous "Bullring by the Sea," the Plaza De Monumental can be seen.

#### **1.3.2.9 La Mesa (Population: 58,642)**

La Mesa is centrally located 12 miles east of downtown San Diego. La Mesa is a suburban residential community as well as a commercial and trade center. The area is characterized by rolling hills and has a large number of hilltop home sites that take advantage of the beautiful views. La Mesa offers affordable housing within a wide range of prices, as well as high-end luxury homes atop Mt. Helix. La Mesa has an abundance of mixed-use condominiums for those who prefer a downtown village atmosphere. There is a positive balance between single-family housing and multi-family housing within La Mesa's city limits. One of the region's major retail facilities, Grossmont Center is located in the heart of the city adjacent to another major activity center, Grossmont Hospital. The La Mesa-Spring Valley Elementary School District provides 18 elementary schools and four junior high schools. There are two high schools in the area and Grossmont College, a two-year community college, is also located in La Mesa.

#### **1.3.2.10 Lemon Grove Population: (26,141)**

Lemon Grove lies eight miles east of downtown San Diego. Lemon Grove is the third smallest jurisdiction in the San Diego region based on population and geographic size. Initially the site of expansive lemon orchards, the city still remains a small town with a rural ambiance. Currently manufacturing and trade account for over one-third of the total employment in this area. A substantial proportion of the homes in Lemon Grove are single-family dwellings with the addition of several apartments and condominiums built over the last 20 years. There are five elementary schools and two junior high schools.

#### **1.3.2.11 National City (Population: 59,578)**

National City is one of the county's oldest incorporated areas. Just five miles south of San Diego, National City is the South Bay's center of industrial activity. The economy is based on manufacturing, shipbuilding and repair. The San Diego Naval Station, which overlaps San Diego and National City is the largest naval facility in the country. There are a great number of historical

sites in National City and homes in the area are usually 50 years or older. Stately Victorians reflect the early part of the century when shipping and import/export magnates lived here. Served by National Elementary and Sweetwater High School districts, National City also offers several private schools for all grade levels. National City is best known for its Mile of Cars; the title describing its abundant auto dealerships. Two large shopping malls, Plaza Bonita and South Bay Plaza, are located in National City.

#### **1.3.2.12 Oceanside (Population: 172,794)**

Oceanside is centrally located between San Diego and Los Angeles. Located just 36 miles north of downtown San Diego, Oceanside is bordered by Camp Pendleton to the north, Carlsbad to the south, Vista to the east and the ocean to the west. The current population of 178,806 makes Oceanside the fourth largest jurisdiction in the County and the largest coastal community. Industrial real estate rates tend to be lower than the County average. There is an abundant supply of new housing and condominium developments, which tend to be more affordable than in other areas of Southern California coastal cities. With a near-perfect year-round climate and recognition as one of the most livable places in the nation, Oceanside offers both an incomparable lifestyle and abundant economic opportunity. Its extensive recreational facilities include 3.5 miles of sandy beaches, the Oceanside Harbor and the Oceanside Lagoon. There are 16 elementary schools, two parochial and two private, three middle schools and three high schools, as well as Mira Costa College and the United States International University.

#### **1.3.2.13 Poway (Population: 49,417)**

Poway is located 23 miles northeast of San Diego within the well-populated I-15 corridor. Poway is distinct because it is set into the foothills. Poway's main recreational facility is the 350-acre Lake Poway Park; the Lake also serves as a reservoir for the water supplied to San Diego by the Colorado River Aqueduct. The area has many recreational facilities, providing complete park sites, trails and fishing opportunities. Poway is also home to the Blue Sky Ecological Reserve, 700 acres of natural habitat with hiking, horseback riding and interpretive trails. The Poway Performing Arts Center is an 815 seat professional theater that began its eleventh season in 2001. The Poway Unified School District is excellent and has been consistently rated in the top tier. The district has four high schools, five middle schools and 19 elementary schools. There are eight private and parochial schools offering instruction from K-8 grades.

#### **1.3.2.14 San Diego (Population 1,356,865)**

The City of San Diego is the largest city in San Diego County, containing roughly half of the County's total population. With its current population of 1,336,865, the City of San Diego is the second largest city in the state. It is the region's economic hub, with well over half of the region's jobs and nearly three-quarters of the region's large employers. Thirteen of the region's 20 major colleges and universities are in the City of San Diego, as are six of the region's major retail centers. The City's visitor attractions are world-class and include Balboa Park, San Diego Zoo, Wild Animal Park, Sea World, Cabrillo National Monument and Old Town State Historic Park. The City of San Diego spans approximately 40 miles from its northern tip to the southern border. Including the

shoreline around the bays and lagoons, the City of San Diego borders a majority of the region's shoreline, encompassing 93 of the region's 182 shoreline miles.

### **1.3.2.15 San Marcos (Population: 89,387)**

San Marcos is located between Vista and Escondido, approximately 30 miles north of downtown San Diego. San Marcos is known for its resort climate, rural setting, central location and affordable housing prices. San Marcos has been the fastest growing jurisdiction in the region since 1956. It is home to two of the region's major educational facilities, Palomar Community College and California State University, San Marcos. The K-12 School District is an award winning district with over seven Schools of Distinction Awards to their credit.

### **1.3.2.16 Santee (Population: 56,105)**

Santee lies 18 miles northeast of downtown San Diego and is bordered on the east and west by slopes and rugged mountains. The San Diego River runs through this community, which was once a dairy farming area. It is now a residential area that has experienced phenomenal growth since the 1970's. Since the expansion of the San Diego Trolley, Santee residents can ride the Trolley to Mission Valley, Downtown San Diego and as far as the U.S./Mexico Border. Elementary students attend one of 11 elementary schools, while high school students attend Santana or West Hills High School.

### **1.3.2.17 Solana Beach (Population: 13,236)**

As one of the county's most attractive coastal communities, Solana Beach is known for its small-town atmosphere and pristine beaches. Incorporated in 1986, it has one of the highest median income levels in the County as well as an outstanding school system recognized with state and national awards of excellence. Lomas Santa Fe, located east of the freeway, is a master planned community, which features shopping, homes, and condominiums, two golf courses and the family oriented Lomas Santa Fe Country Club.

### **1.3.2.18 Vista (Population: 96,929)**

Vista has been growing at twice the rate of the State of California and 50% faster than the rest of the San Diego area in the last decade. There are 10 elementary schools, four middle schools, and five high schools. More than 400 companies have located their businesses in the city since 1986.

### **1.3.2.19 Unincorporated County of San Diego (Population: 609,062)**

The unincorporated County consists of approximately 34 Community Planning and Sub-regional Areas. Many of the communities in the Unincorporated County jurisdiction are located in the mountains, desert, North County, or on the border of Mexico. Rancho Santa Fe, an affluent residential and resort community, is one of the exceptions, located within the urban core area. The community of Julian is located in the central mountains along a principle travel route between the desert and Metropolitan San Diego, and is a common tourist destination. Alpine is located east of El Cajon on Interstate 8 and is considered a gateway to San Diego County's wilderness areas of mountains, forests, and deserts.



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The Sub-regional Planning Areas are Central Mountain, County Islands, Mountain Empire, North County Metro, and North Mountain. Communities within the Central Mountain Sub-region are Cuyamaca, Descanso, Guatay, Pine Valley, and Mount Laguna. The County Islands Community Plan area consists of Mira Mesa, Greenwood, and Lincoln Acres. The North Mountain Sub-region is mostly rural and includes Santa Ysabel, Warner Springs, Palomar Mountain, Mesa Grande, Sunshine Summit, Ranchita and Oak Grove. The Mountain Empire Sub-region contains Tecate, Potrero, Boulevard, Campo, Jacumba, and the remainder of the plan area. The Community Planning Areas are Alpine, Bonsall, Borrego Springs, Boulevard, Crest/Dehesa/Granite Hills/Harbison Canyon, Cuyamaca, Descanso, Desert, Fallbrook, Hidden Meadows, Jacumba, Jamul/Dulzura, Julian, Lake Morena/Campo, Lakeside/Pepper Drive-Bostonia, Otay, Pala-Pauma, Palomar/North Mountain, Pendleton/Deluz, Pine Valley, Portrero, Rainbow, Ramona, San Dieguito (Rancho Santa Fe), Spring Valley, Sweetwater, Tecate, Twin Oaks, Valle De Oro, and Valley Center.

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## 2.1 List of Participating and Non-Participating Jurisdictions

The incorporated cities that participated in the planning process are Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego (City), San Marcos, Santee, Solana Beach, Unincorporated (County), and Vista. There were no non-participating cities. The two Fire Protection District that participated in the revision of the plan were the Alpine Fire Protection District and the Rancho Santa Fe Fire Protection District. One municipal water district also participated, Padre Dam MWD. Representatives from all participating jurisdictions, local businesses, educational facilities, various public, private and non-profit agencies, and the general public provided input into the preparation of the Plan. Local jurisdictional representatives included but were not limited to fire chiefs/officials, police chiefs/officials, planners and other jurisdictional officials/staff.

## 2.2 Description of Each Jurisdiction's Participation in the Planning Process

A Hazard Mitigation Working Group (HMWG) was established to facilitate the development of the Plan. Representatives from each incorporated city, special district and the unincorporated county were designated by their jurisdiction as the HMWG member. Each HMWG member identified a Local Mitigation Planning Team for their jurisdiction that included decision-makers from police, fire, emergency services, community development/planning, transportation, economic development, public works and emergency response/services personnel, as appropriate. The jurisdiction-level Local Mitigation Planning Team assisted in identifying the specific hazards/risks that are of concern to each jurisdiction and to prioritize hazard mitigation measures. The HMWG members brought this information to HMWG meetings held regularly to provide jurisdiction-specific input to the multi-jurisdictional planning effort and to assure that all aspects of each jurisdiction's concerns were addressed. A list of the lead contacts for each participating jurisdiction is included in Section 3.2.

All HMWG members were provided an overview of hazard mitigation planning elements at the HMWG meetings. This training was designed after the FEMA State and Local Mitigation Planning How-to Guide worksheets, which led the HMWG members through the process of defining the jurisdiction's assets, vulnerabilities, capabilities, goals and objectives, and action items. The HMWG members were also given additional action items at each meeting to be completed by their Local Mitigation Planning Team. HMWG members also participated in the public workshops held to present the risk assessment, preliminary goals, objectives and actions. In addition, several HMWG members met with OES staff specifically to discuss hazard-related goals, objectives and actions. Preliminary goals, objectives and actions developed by jurisdiction staff were then reviewed with their respective City Council, City Manager and/or representatives for approval.

Throughout the planning process, the HMWG members were given maps of the profiled hazards as well as detailed jurisdiction-level maps that illustrated the profiled hazards and critical infrastructure. These maps were created using the data sources listed in Appendix B. These data sources contain the most recent data available for the San Diego region. A very large portion of this data was supplied by the regional GIS agency, SanGIS. The SanGIS data is updated periodically with the new data being provided by the local agencies and jurisdictions. This ensured that the data used was the most recent available for each participating jurisdiction. The HMWG members reviewed these maps and provided updates or changes to the critical facility or hazard layers. Data received from HMWG members were added to the hazard

## SECTION TWO

### Multi-jurisdictional Participation Information

database and used in the modeling process described in the Risk Assessment portion of the Plan (Section 4). The data used in this revision of the plan is considered to be more accurate than that utilized in the original plan

All 18 incorporated cities and participating special districts provided OES with edits to critical facilities within their jurisdictions.

### **3.1 Description of Planning Committee Formation**

The San Diego County Operational Area consists of the County of San Diego and the eighteen incorporated cities located within the county's borders. Planning for emergencies, training and exercises are all conducted on a regional basis. In 1961 the County and the cities formed a Joint Powers Agency (JPA) to facilitate regional planning, training, exercises and responses. This JPA is known as the Unified San Diego County Emergency Services Organization (USDCESO). Its governing body is the Unified Disaster Council (UDC). The membership of the UDC is defined in the JPA. Each city and the County have one representative. Representatives from the cities can be an elected official, the City Manager or from the municipal law enforcement or fire agency. The County is represented by the Chairperson of the County Board of Supervisors, who also serves as Chair of the UDC.

In addition there are 26 fire protection districts and 17 water districts within the San Diego Region. Each was offered the opportunity to participate in the development of this plan.

#### **3.1.1 Invitation to Participate**

The original development of the Hazard Mitigation Plan, as well as this current revision, was conducted under the auspices of the UDC. At the direction of the UDC, the San Diego County Office of Emergency Services (OES) acted as the lead agency in the revision of this plan. Thomas Amabile, the representative for the San Diego County OES, requested input from each jurisdiction in the county. Each municipality and special district was formally invited to attend a meeting to develop an approach to the planning process and to form the HMWG Committee (See Appendix A). These invitations were in the form of an email to each member jurisdiction. Invitations were also emailed to each Water District and Fire Protection District within the County. At the October 17, 2013 UDC meeting, it was again announced that the plan was reaching the five year mark and required updating. Each jurisdiction also confirmed their participation on the HMWG. In addition to the eighteen incorporated cities, OES provided an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as business, academia and other private and non-profit interested to be involved in the planning process. Some of those parties are listed in Section 3.2 below. The committee was formed as a working group to undertake the planning process and meeting dates were set for all members of the committee and interested parties to attend. Local jurisdictional representatives included but were not limited to fire chiefs/officials, police chiefs/officials, planners and other jurisdictional officials/staff.

### **3.2 Name of Planning Committee and its Members**

The HMWG is comprised of representatives from San Diego County (County), each of the 18 incorporated cities in the County four special districts and interested public agencies and citizens, as listed above in Section 2.1. The HMWG met regularly, and served as a forum for participating agencies to voice their opinions and concerns about the mitigation plan. Although several jurisdictions sent several representatives to the HMWG meetings, each jurisdiction selected a lead representative who acted as the liaison between their jurisdictional Local Mitigation Planning Team and the HMWG. Each local team, made up of other jurisdictional staff/officials met separately and provided additional local-level input to the leads for inclusion into the Plan. These lead representatives are:

**Lead HMWG Representatives for Participating Jurisdictions:**

- City of Carlsbad, David Harrison, Fire Department, Emergency Preparedness Manager
- City of Chula Vista, Marisa Balmer, Fire Department, Emergency Services Coordinator
- City of Coronado, Perry Peake, Fire Department, Battalion Chief
- City of Del Mar, Ashlee Stratakis, Fire Department, Program Analyst
- City of El Cajon, Rick Sitta, Fire Department, Deputy Chief
- City of Encinitas, Tom Gallup, Fire Department, Senior Program Analyst
- City of Escondido, Don Rawson, Fire Department, Emergency/Disaster Preparedness Manager
- City of Imperial Beach, Dean Roberts, Fire Department, Emergency Services Coordinator
- City of La Mesa, Greg McAlpine, Fire Dept, Deputy Chief
- City of Lemon Grove, Tim Smith, Fire Department, Deputy Chief
- City of National City, Walter Amadee, Fire Department, Management Analyst III
- City of Oceanside, Greg Vanvorhees, Fire Department, Fire Marshall
- City of Poway, Dane Cawthone, Fire Department, Division Chief
- City of San Diego, Jeff Pack, Office of Homeland Security, Sr. Homeland Security Coordinator
- City of San Diego, Eugene Ruzzini, Office of Homeland Security, Analyst
- City of San Marcos, Scott Hansen, Fire Department, Battalion Chief
- City of Santee, Richard Mattick, Fire Department, Assistant Chief
- City of Solana Beach, Ashlee Stratakis, Fire Department, Program Analyst
- City of Vista, Mike Easterling, Fire Department, Deputy Chief
- County of San Diego, Thomas Amabile, OES, Sr. Emergency Services Coordinator
- County of San Diego, Jason Batchelor, SD County Planning and Developmental Services, GIS Coordinator
- Alpine FPD, Bill Paskle, Fire Chief
- Padre Dam MWD, Larry Costello, Safety and Risk Manager
- Rancho Santa Fe FPD, Tony Michel, Fire Chief

Representatives of the following agencies/organizations were invited to attend all planning team meetings and provided both data and general input to and feedback on the plan:

- California Office of Emergency Services (Cal OES.), Joanne Phillips, Sr. Emergency Services Coordinator
- Emergency Preparedness and Disaster Medical Response, Donna Johnson, EMS Specialist
- San Diego County Hazardous Materials Division, Dave Cammall, Registered Environmental Health Specialist
- San Diego Department of Public Works, Gitanjali Shinde, Assistant Engineer

The California Office of Emergency Services participated on the regional planning committee. The representatives from San Diego County EMS, Hazardous Materials and Public Works participated on the County's local planning team.

Each participating jurisdiction had their own local planning team. Details on the membership of those teams can be found in the individual jurisdiction's portion of Section Five. Each local planning team met

either before or after the regional team to discuss the topics of the regional meetings (listed in Section 3.3 below).

Finally, the Unified Disaster Council (UDC) received briefings regularly on the progress of the planning process. UDC meetings are open to the public, with agendas and notices posted according to California's Brown Act, with emailed invitations and reminders sent out one to two weeks prior to the meetings. Included on that email list are representatives from the following agencies:

- American Red Cross
- Chambers of Commerce
- Federal Agencies (USN, USMC, USCG, DHS)
- Hospitals
- Port of San Diego
- State Agencies (Cal OES, DMV, Caltrans)
- School Districts
- Universities and colleges
- Utilities (Power- SDG&E, Water – San Diego County Water Authority and Water Districts, Cable, telephone and internet – Cox Communications)

### 3.3 Hazard Mitigation Working Group Meetings

The Hazard Mitigation Working Group met regularly. The following is a list of meeting dates and results of meetings (see Appendix A for sign-in sheets, meeting agendas, and meeting minutes).

**HMWG Meeting Dates/Results of Meeting:**

HMWG Meeting 1: 2/11/2014 - Kickoff and Formation of HMWG

Climate Change Workshop 1: 3/4/2014

HMWG Meeting 2: 3/11/2014 - Overview of Planning Process/Assessing Risks

Climate Change Workshop 2: 6/10/2014

HMWG Meeting 3: 6/10/2014 - Overview of Planning Process/Profiling Hazards

HMWG Meeting 4: 9/16/2014 - Review Risk Assessment/Development of Mitigation Plan

The distribution of the draft and final plans was accomplished electronically. Other meetings included individual meetings with jurisdictions and meetings with GIS staff.

Not all members were able to attend all meetings. Follow-up phone calls and in person meetings were conducted with those who were not able attend to ensure they were kept current on the process.

### 3.4 Planning Process Milestones

The approach taken by San Diego County relied on sound planning concepts and a methodical process to identify County vulnerabilities and to propose the mitigation actions necessary to avoid or reduce those vulnerabilities. Each step in the planning process was built upon the previous, providing a high level of assurance that the mitigation actions proposed by the participants and the priorities of implementation are valid. Specific milestones in the process included:

*Risk Assessment (June 2014 – September 2014)* - The HMWG used the list of hazards from the current Multi-jurisdictional Hazard Mitigation Plan to determine if they were still applicable to the region and if there were any new threats identified that should be added to the plan. Specific geographic areas subject to the impacts of the identified hazards were mapped using a Geographic Information System (GIS). The HMWG had access to updated information and resources regarding hazard identification and risk estimation. This included hazard specific maps, such as floodplain delineation maps, earthquake shake potential maps, and wildfire threat maps; GIS-based analyses of hazard areas; the locations of infrastructure, critical facilities, and other properties located within each jurisdiction and participating special district; and an estimate of potential losses or exposure to losses from each hazard.

The HMWG also conducted a methodical, qualitative examination of the vulnerability of important facilities, systems, and neighborhoods to the impacts of future disasters. GIS data and modeling results were used to identify specific vulnerabilities that could be addressed by specific mitigation actions. The HMWG also reviewed the history of disasters in the County and assessed the need for specific mitigation actions based on the type and location of damage caused by past events. The process used during the completion of the initial plan and first update was utilized for this update.

Finally, the assessment of community vulnerabilities included a review of current codes, plans, policies, programs, and regulations used by local jurisdictions to determine whether existing provisions and requirements adequately address the hazards that pose the greatest risk to the community. Again, this was a similar process to that used in the original plan and first update.

*Goals, Objectives and Alternative Mitigation Actions (August, 2014- October, 2014)* – Based on this understanding of the hazards faced by the County, the goals and objectives identified in the current plan were reviewed to see what had been completed and could be removed and which were not able to be completed due to funding or other roadblocks. Members then added those goals, objectives or actions as required for the completion of the update. This was done by the members working with their local planning groups and in a series of one-on-one meetings with OES staff.

*Mitigation Plan and Implementation Strategy (October 2014 - February, 2015)* – Each jurisdiction reviewed their priorities for action from among their goals, objectives and actions, developing a specific implementation strategy including details about the organizations responsible for carrying out the actions, their estimated cost, possible funding sources, and timelines for implementation.

*Work Group Meetings (February, 2014 – December, 2014)* - As listed in Section 3.3 a series of HMWG meetings were held in which the HMWG considered the probability of a hazard occurring in an area and its impact on public health and safety, property, the economy, and the environment, and the mitigation actions that would be necessary to minimize impacts from the identified hazards. These meetings were held every month or two (depending on the progress made) starting February 2014 and continued through September 2014. The meetings evolved as the planning process progressed, and were designed to aid the jurisdictions in completing worksheets that helped define hazards within their jurisdictions, their existing capabilities and mitigation goals and action items for the Mitigation Plan.

*Climate Change Workshops and Stakeholder Meeting (March, 2014-September 2014)* – A series of workshops to discuss the impact climate change is having on the regions natural hazards were conducted to educate local planners and community members. Topics discussed included sea level rise, drought, changes to precipitation patterns and extreme weather, as well as their current and potential future impacts. The information presented in these workshops were incorporated into the risk assessment process as well in the development of mitigation goals and objectives.



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### 3.5 Public Involvement

A detailed survey was posted on the websites of all participating jurisdictions. It was active from the beginning of March 2014 to the end of July 2014. There were 532 responses to the survey. The survey questions and respondents answers are found in Appendix D.

A Hazard Mitigation Plan Web Page, as part of the San Diego County Office of Emergency Services website was developed to provide the public with information. Items posted on the web site included the current plan, and draft updates, by jurisdiction or agency.

Public involvement was valuable in the development of the Plan. The areas of concern provided by the survey responses were used by each jurisdiction while developing mitigation objectives and actions.

### 3.6 Existing Plans or Studies Reviewed

HMWG team members and their corresponding Local Mitigation Planning Teams prior to and during the planning process reviewed several plans, studies, and guides. These plans included FEMA documents, emergency services documents as well as county and local general plans, community plans, local codes and ordinances, and other similar documents. These included:

San Diego County/Cities General Plans

Various Local Community Plans

Various Local Codes and Ordinances

FEMA Local Mitigation Handbook March 2013

FEMA Mitigation Ideas January 25, 2013

Integrating Hazard Mitigation and Climate Adaptation Planning – ICLEI February 2014

Climate Change Impacts in the United States – U.S. Government Printing Office 2014

Local Mitigation Plan Review Tool

California State Hazard Mitigation Plan 2013

Unified San Diego County Emergency Services Organization Operational Area Emergency Plan dated September 2010

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## 4.1 Overview of the Risk Assessment Process

Risk Assessment requires the collection and analysis of hazard-related data in order to enable local jurisdictions to identify and prioritize appropriate mitigation actions that will reduce losses from potential hazards. The FEMA Local Mitigation Handbook March 2013 identifies nine tasks to the hazard mitigation planning process, including: 1) determining the planning area and resources, which requires establishing the planning area and those jurisdictions to be included in the planning process 2) building the planning team, which involves identifying local team members, engaging local leadership, getting buy-in and documentation of the process, 3) creating an outreach strategy, to ensure public participation 4) reviewing community capabilities, which involves assessing what resources are in place, such as the National Flood Insurance Program, to help mitigate the hazards, 5) conducting the risk assessment which profiles the hazards, 6) developing a mitigation strategy to minimize the impacts of the hazards, 7) keeping the plan current, 8) reviewing and adopting the plan and 9) creating a safe and resilient community . Tasks 1, 2 3 and 4 were described in Section Three. The remaining tasks are described below.

When the revision process began in 2014 a complete review of the hazards identified in the original plan and first update was conducted to determine if they were still valid and should be kept as a target for mitigation measures or removed from the list. We also reassessed those hazards that were not considered for mitigation actions in 2010 to determine if that decision was still applicable or if they should be moved to the active list. Finally, we examined potential or emerging hazards, including climate change, to see if any should be included on the active list.

The data used was the most recent data available from SanGIS and the participating jurisdictions. This data changed the model results in some cases raising the risks and reducing it in others. The overall result was a more accurate picture of the risks facing the region. An example of this is the data for dam failure. The 2010 plan shows an exposed population of is 241,767, with the exposure for residential buildings at \$23,054,569. The 2014 data shows the exposed population has increased to 432,664, with exposure for residential buildings increasing to \$40,141,337.

While many of the mitigation measures listed in the original plan and revision were accomplished, the risk of the hazard did not significantly diminish. This is easily seen in both the wildfire and earthquake hazards. While mitigation measures have been put in place (such as the update of the fire code and vegetation management measures) wildfire remains, and will continue to be, the greatest risk to the San Diego region. The HMG reviewed all events since 2010 (wildfires, etc.) and all were profiled accurately in the original plan. The review of the other hazards showed that the updated data was consistent with previous growth in the region. Any significant changes to the hazard profiles were the result of the incorporation of climate change into this plan.

### 4.1.1 Risk Assessment

Risk Assessment is the process of identifying the potential impacts of 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, tornadoes, tsunamis, coastal storms, landslides, and wildfires that strike populated areas. Man-made 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 risk assessment includes determining whether or not the hazard has occurred previously. Approaches to collecting historical hazard data include researching newspapers and other records, conducting a planning document and report literature review in all relevant hazard subject areas, gathering hazard-related GIS data, and engaging in conversation with relevant experts from the community. In addition, a variety of sources were used to determine the full range of all potential hazards within San Diego County. Even though a particular hazard may not have occurred in recent history in San Diego County, it is important during the hazard identification stage to consider all hazards that may potentially affect the study area.

#### **4.1.2 Profiling (Describing) Hazards**

Hazard profiling entails describing the physical characteristics of hazards such as their magnitude, duration, past occurrences and probability. This stage of the hazard mitigation planning process involves creating base maps of the study area and then collecting and mapping hazard event profile information obtained from various federal, state, and local government agencies. Building upon the original hazard profiles, OES used the existing hazard data tables (created for the original Hazard Mitigation Plan and revision) and updated them using current data. The revised hazard data was mapped to determine the geographic extent of the hazards in each jurisdiction in the County. The level of risk associated with each hazard in each jurisdiction was also estimated and assigned a risk level of high, medium or low depending on several factors unique to that particular hazard. The hazards looked at were both natural and man-made.

Probability of future events are described in the plan as:

- Highly Likely – Occurs at intervals of 1 – 10 years
- Likely - Occurs at intervals of 10 - 50 years
- Somewhat Likely - Occurs at intervals greater than every 50 years

#### **4.1.3 Identifying Assets**

The next step of the risk assessment process entails identifying which assets in each jurisdiction will be affected by each hazard type. Assets include the built environment (any type of structure or critical facility such as hospitals, schools, museums, apartment buildings, and public infrastructure), people, economic factors, future development and the natural environment. The inventory of existing and proposed assets within the County was updated. The assets were then mapped to show their locations and to determine their vulnerability to each hazard type. The HMWG also considered proposed structures, including planned and approved developments, based upon a review of the General Plan Land Use Element for the County and the cities.

#### **4.1.4 Analyze Risk**

Analyzing risk involves evaluating vulnerable assets, describing potential impacts and estimating losses for each hazard. Vulnerability describes the degree to which an asset is susceptible to damage from a hazard. Vulnerability depends on an asset's construction, contents and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of

another. Often, indirect effects can be much more widespread and damaging than direct effects. Risk analysis predicts the extent of injury and damage that may result from a hazard event of a given intensity in a given area. It identifies the effects of natural and man-made hazard events by estimating the relative exposure of existing and future population, land development, and infrastructure to hazardous conditions. The analysis helps set mitigation priorities by allowing local jurisdictions to focus attention on areas most likely to be damaged or most likely to require early emergency response during a hazard event.

#### 4.1.5 Repetitive Loss

Disaster records were reviewed for repetitive losses. No repetitive losses were found for Coastal storms, erosion and Tsunamis, Dam Failures, Earthquakes, landslides, wildfire or liquefaction. The City of Lemon Grove had one address involved in a series of repetitive structure fires caused by arson. A list of repetitive losses by jurisdiction is below (Repetitive loss due to flooding is found in Section 4.3.5.3):

Alpine FPD	0	National City	0
Carlsbad	1 Structure Fire	Oceanside	0
Chula Vista	0	Poway	0
Coronado	0	Padre Dam MWD	0
Del Mar	3 Storm /Erosion	San Diego	0
El Cajon	0	San Marcos	0
Encinitas	0	Santee	0
Escondido	0	Solana Beach	0
Imperial Beach	0 Flood	Vista	0
La Mesa	0	County of San Diego	0 Flood
Lemon Grove	1 Structure Fire	Rancho Santa Fe FPD	0

#### 4.1.6 Exposure Analysis

Exposure analysis identifies the existing and future assets located in an identified hazard area. It can quantify the number, type and value of structures, critical facilities, and infrastructure located in those areas, as well as assets exposed to multiple hazards. It can also be used to quantify the number of future structures and infrastructure possible in hazard prone areas based on zoning and building codes.

## 4.2 Hazard Identification and Screening

### 4.2.1 List of Hazards Prevalent in the Jurisdiction

The HMWG reviewed the hazards identified in the original Hazard Mitigation Plan and evaluated each to see if they still posed a risk to the region. In addition, the hazards listed in the How-to Guide were also reviewed to determine if they should be added to the list of hazards to include in the plan revision. All hazards identified by FEMA in the How-To-Guides were reviewed. They include: avalanche, coastal storm, coastal erosion, dam failure, drought/water supply, earthquake, expansive soils, extreme heat, flooding, hailstorm, house/building fire, land subsidence, landslide, liquefaction, severe winter storm, tornado, tsunami, wildfire, windstorm, and volcano. Although not required by the FEMA *Disaster Mitigation Act of 2000*, manmade hazards such as hazardous materials release, nuclear materials release, and terrorism were also reviewed by the HMWG.

Climate change was not included as a hazard. However, the impact of climate change on the identified hazards was included in the evaluation of the hazards and their impacts.

#### 4.2.2 Hazard Identification Process

As summarized above, hazard identification is the process of identifying all hazards that threaten an area, including both natural and man-made events. In the hazard identification stage, The HMWG determined hazards that potentially threaten San Diego County. The hazard screening process involved narrowing the all-inclusive list of hazards to those most threatening to the San Diego region. The screening effort required extensive input from a variety of HMWG members, including representatives from City governments, County agencies, special districts, fire agencies and law enforcement agencies, the California Office of Emergency Services, local businesses, community groups, the 2010 Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, and the general public.

OES, with assistance of GIS experts from the County of San Diego's Planning and Development Services used information from FEMA and other nationally and locally available databases to map the County's hazards, infrastructure, critical facilities, and land uses. This mapping effort was utilized in the hazard screening process to determine which hazards would present the greatest risk to the County of San Diego and to each jurisdiction within the County.

It was also determined that the coastal storm, erosion, and tsunami hazards should be profiled together because the same communities in the County have the potential to be affected by all three hazards. In the development of the initial plan, the HMWG indicated that based on the fact that the majority of the development in San Diego is relatively recent (within the last 60 years), an urban type of fire that destroys multiple city blocks is not likely to occur alone, without a wildfire in the urban/wild-land interface occurring first. Therefore, it was determined that house/building fire and wildfire should be addressed as one hazard category in the plan. This current revised plan continues to discuss structure fire and wildfire together. Similarly, the original plan and first revision addressed earthquake and liquefaction as one category because liquefaction does not occur unless an adequate level of ground shaking from an earthquake occurs first. With the decommissioning of the San Onofre Nuclear Generating Station it was decided to incorporate nuclear materials release (resulting from an accident) under hazardous materials release.

The final list of hazards to be profiled for San Diego County was determined as Wildfire/Structure Fire, Flood, Coastal Storms/Erosion/Tsunami, Earthquake/Liquefaction, Rain-Induced Landslide, Dam Failure, Drought, Hazardous Materials Incidents, and Terrorism.

Table 4.2-1 shows a summary of the hazard identification results for San Diego County.

**Table 4.2-1  
Summary of Hazard Identification Results**

Hazard	Data Collected for Hazard Identification	Justification for Inclusion
Coastal Storms, Erosion and Tsunami	<ul style="list-style-type: none"> <li>• Historical Coastlines (NOAA)</li> <li>• Shoreline Erosion Assessment (SANDAG)</li> <li>• Maximum Tsunami Run up Projections (USCA OES)</li> <li>• FEMA FIRM Maps</li> <li>• FEMA Hazards website</li> <li>• Coastal Zone Boundary (CALTRANS)</li> <li>• Tsunamis and their Occurrence along the San Diego County Coast (report, Westinghouse Ocean Research Laboratory)</li> <li>• Tsunami (article, Scientific American)</li> <li>• Storms in San Diego County (publication of San Diego County Dept. of Sanitation and Flood Control)</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal storms prompted 11 Proclaimed States of Emergency from 1950-2017</li> <li>• Coastline stabilization measures have been implemented at various times in the past (erosion)</li> <li>• Extensive development along the coast</li> </ul>
Dam Failure	<ul style="list-style-type: none"> <li>• FEMA-HAZUS</li> <li>• Dam Inundation Data (SanGIS)</li> <li>• San Diego County Water Authority (SDCWA) (Olivenhain Dam)</li> <li>• FEMA FIRM maps</li> <li>• Topography (SANDAG)</li> <li>• FEMA Hazards website</li> </ul>	<ul style="list-style-type: none"> <li>• Dam failure</li> <li>• 58 dams exist throughout San Diego County</li> <li>• Many dams over 30 years old</li> <li>• Increased downstream development</li> </ul>
Drought	<ul style="list-style-type: none"> <li>• California Department of Water Resources</li> <li>• San Diego County Water Authority</li> </ul>	<ul style="list-style-type: none"> <li>• Statewide multiple year droughts have occurred numerous times since 1976</li> <li>• Regional water storage reserves are at the lowest point since 2008</li> </ul>
Earthquake	<ul style="list-style-type: none"> <li>• USGS</li> <li>• CGS</li> <li>• URS</li> <li>• CISN</li> <li>• SanGIS</li> <li>• SANDAG</li> <li>• FEMA-HAZUS 99</li> <li>• FEMA Hazards website</li> </ul>	<ul style="list-style-type: none"> <li>• Several active fault zones pass through San Diego County</li> </ul>

# SECTION FOUR

## Risk Assessment

Hazard	Data Collected for Hazard Identification	Justification for Inclusion
Floods	<ul style="list-style-type: none"> <li>• FEMA FIRM Maps</li> <li>• Topography</li> <li>• Base flood elevations (FEMA)</li> <li>• Historical flood records</li> <li>• San Diego County Water Authority</li> <li>• San Diego County Dept. of Sanitation and Flood Control</li> <li>• FEMA Hazards website</li> </ul>	<ul style="list-style-type: none"> <li>• Much of San Diego County is located within the 100-year floodplain</li> <li>• Flash floods and other flood events occur regularly during rainstorms due to terrain and hydrology of San Diego County</li> <li>• There have been multiple Proclaimed States of Emergency between 1950-2016 for floods in San Diego County</li> </ul>
Hazardous Materials Release	<ul style="list-style-type: none"> <li>• County of San Diego Dept. of Environmental Health, Hazardous Materials Division</li> </ul>	<ul style="list-style-type: none"> <li>• San Diego County has several facilities that handle or process hazardous materials</li> <li>• Heightened security concerns since September 2001</li> </ul>
Landslide	<ul style="list-style-type: none"> <li>• USGS</li> <li>• CGS</li> <li>• Tan Map Series</li> <li>• Steep slope data (SANDAG)</li> <li>• Soil Series Data (SANDAG)</li> <li>• FEMA-HAZUS</li> <li>• FEMA Hazards website</li> <li>• NEH</li> </ul>	<ul style="list-style-type: none"> <li>• Steep slopes within earthquake zones characterize San Diego County, which creates landslide risk.</li> <li>• There have been 2 Proclaimed States of Emergency for landslides in San Diego County</li> </ul>
Liquefaction	<ul style="list-style-type: none"> <li>• Soil-Slip Susceptibility (USGS)</li> <li>• FEMA-HAZUS MH</li> <li>• FEMA Hazards website</li> </ul>	<ul style="list-style-type: none"> <li>• Steep slopes or alluvial deposit soils in low-lying areas are susceptible to liquefaction during earthquakes or heavy rains. San Diego County terrain has both of these characteristics and lies within several active earthquake zones</li> </ul>
Nuclear Materials Release	<ul style="list-style-type: none"> <li>• San Onofre Nuclear Generating Station (SONGS) and Department of Defense</li> </ul>	<ul style="list-style-type: none"> <li>• The potential exists for an accidental release to occur at San Onofre or from nuclear ships in San Diego Bay</li> <li>• Heightened security concerns since September 2001</li> </ul>
Terrorism	<ul style="list-style-type: none"> <li>• County of San Diego Environmental Health Department Hazardous Materials Division</li> </ul>	<ul style="list-style-type: none"> <li>• The federal and state governments have advised every jurisdiction to consider the terrorism hazard</li> <li>• Heightened security concerns since September 2001</li> </ul>
Wildfire/ Structure Fire	<ul style="list-style-type: none"> <li>• CDF-FRAP</li> <li>• USFS</li> <li>• CDFG</li> <li>• Topography</li> <li>• Local Fire Agencies</li> <li>• Historical fire records</li> <li>• FEMA Hazards website</li> </ul>	<ul style="list-style-type: none"> <li>• San Diego County experiences wildfires on a regular basis</li> <li>• 9 States of Emergency were declared for wildfires between 1950-2016</li> <li>• Terrain and climate of San Diego</li> <li>• Santa Ana Winds</li> </ul>

A matrix of all data collected, including source, original projection, scale and data limitations is included in Attachment B. Maps were generated depicting the potential hazards throughout the county and distributed to the jurisdictions. Data and methods that were ultimately used to determine risk levels and probability of occurrence for each hazard are described in detail in the hazard profiling sections.



Hazards are categorized in this plan as being highly likely (occurring every 1-10 years), likely (occurring every 10-50 years) or somewhat likely (occurring at intervals greater than 50 years).

### 4.2.3 Hazard Identification Sources

Once the hazards of concern for San Diego County were determined, the available data was collected, using sources including the Internet, direct communication with various agencies, discussions with in-house URS experts, and historical records. Specific sources included the United States Geological Survey (USGS), California Geological Survey (CGS), Federal Emergency Management Agency (FEMA) HAZUS, FEMA Flood Insurance Rate Maps (FIRM), United States Forest Service (USFS), California Department of Forestry – Fire and Resource Assessment Program (CDF-FRAP), National Oceanographic and Atmospheric Administration (NOAA), San Diego Geographic Information Source (SanGIS), San Diego Association of Governments (SANDAG), San Diego County Flood Control District, Southern California Earthquake Data Center (SCEDC), California Seismic Safety Commission (CSSC), California Integrated Seismic Network (CISN), California Department of Fish and Game (CDFG), Drought Outlook websites, and input gathered from local jurisdictions districts and agencies. When necessary, agencies were contacted to ensure the most updated data was obtained and used. Historical landmark locations throughout the County were obtained from the National Register and from the San Diego Historical Resources Board.

Table 4.2-1 also depicts data sources researched and utilized by hazard, as well as brief justifications for inclusion of each hazard of concern in the San Diego region. See Appendix B for a Data Matrix of all sources used to gather initial hazard information.

### 4.2.4 Non-Profiled Hazards

During the initial evaluation the HMWG determined that those hazards that were not included in the original plan’s profiling step because they were not prevalent hazards within the County, were found to pose only minor or very minor threats to the County compared to the other hazards had not changed and would not be included in the revision. The following table gives a brief description of those hazards and the reason for their exclusion from the list.

**Table 4.2-2  
Summary of Hazards Excluded from Hazard Profiling**

Hazard	Description	Reason for Exclusion
Avalanche	A mass of snow moving down a slope. There are two basic elements to a slide; a steep, snow-covered slope and a trigger	Snowfall in County mountains not significant; poses very minor threat compared to other hazards
Expansive soils	Expansive soils shrink when dry and swell when wet. This movement can exert enough pressure to crack sidewalks, driveways, basement floors, pipelines and even foundations	Presents a minor threat to limited portions of the County
Hailstorm	Can occur during thunderstorms that bring heavy rains, strong winds, hail, lightning and tornadoes	Occurs during severe thunderstorms; most likely to occur in the central and southern states; no historical record of this hazard in the region.
Land subsidence	Occurs when large amounts of ground water have been withdrawn from certain types of	Soils in the County are mostly granitic. Presents a minor threat to limited parts of the county. No historical record

Hazard	Description	Reason for Exclusion
	rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn, the rocks fall in on themselves.	of this hazard in the region.
Tornado	A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris.	Less than one tornado event occurs in the entire State of California in any given year; poses very minor threat compared to other hazards. No historical record of this hazard in the region.
Volcano	A volcano is a mountain that is built up by an accumulation of lava, ash flows, and airborne ash and dust. When pressure from gases and the molten rock within the volcano becomes strong enough to cause an explosion, eruptions occur	No active volcanoes in San Diego County. No historical record of this hazard in the region.
Windstorm	A storm with winds that have reached a constant speed of 74 miles per hour or more	Maximum sustained wind speed recorded in the region is less than 60 miles per hour and would not be expected to cause major damage or injury (see Figure 4.3.1)

### 4.3 Hazard Profiles

A hazard profile is a description of the physical characteristics of a hazard and a determination of various hazard descriptors, including magnitude, duration, frequency, probability, and extent. The hazard data that were collected in the hazard identification process were mapped to determine the geographic extent of the hazards in each jurisdiction in the County and the level of risk associated with each hazard. Most hazards were given a risk level of high, medium or low depending on several factors unique to the hazard. The hazards identified and profiled for San Diego County, as well as the data used to profile each hazard are presented in this section. The hazards are presented in alphabetical order; and this does not signify level of importance to the HMWG. Because Nuclear Materials Release, Hazardous Materials Release and Terrorism hazards are sensitive issues and release of information could pose further unnecessary threat, the HMWG decided that each of these hazards would be discussed separately in a “For Official Use Only” Appendix and would be exempt from public distribution and disclosure by Section 6254 (99) of the California Government Code (See separately bound Attachment A).

#### 4.3.1 Emerging Risk – Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), warming of the climate system is unequivocal, as is now evident from observations of increased global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.<sup>1</sup> The overwhelming majority of

<sup>1</sup> IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

climate scientists agree that human activities, especially burning of fossil fuels, are responsible for most of the global warming observed.<sup>2</sup>

Climate change is already affecting California and the San Diego region. Sea levels measured at a station in La Jolla have risen at a rate of 6 inches over the last century.<sup>3</sup> Flooding and erosion in coastal areas is already occurring even at existing sea levels and damaging some coastal areas during storms and extreme high tides.<sup>4</sup> California has also seen an increase in average temperatures of about 1.5F since 1985, more extreme heat events, and decreasing spring snowmelt from the Sierra Nevada as more precipitation falls as rain instead of snow.<sup>5</sup> Eighty-four percent of San Diego County residents believe that climate change is happening.<sup>6</sup>

The climate is projected to continue to change over this century and beyond.<sup>7</sup> Climate change is not a hazard in and of itself, but rather is a factor that could affect the location, extent, probability of occurrence, and magnitude of climate-related hazards. This risk assessment goes on to discuss climate change as a factor affecting extreme heat, coastal storms/erosion, wildfire, flooding, and drought/water supply. The climate change factor is increasing risk for some natural hazards, and this assessment includes information about how risk will change into the future. By assessing ongoing changes in risk—in addition to the traditional practice of risk assessment based on observed hazard events—this plan’s hazard mitigation strategies can better reduce risk from hazards expected going forward. The following section provides a summary of projections for temperatures, sea level rise, and precipitation, provided by Dr. Daniel Cayan and his team at Scripps Institution of Oceanography.<sup>8</sup>

#### 4.3.1.1 Annual Average Temperature

According to the National Climate Assessment, the Southwestern United States has already heated up markedly. The period since 1950 has been hotter than any other comparably long period in the last 600 years and the decade from 2000 to 2010 was the hottest in the 110-year instrumental record.<sup>9</sup> Global climate

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<sup>2</sup> Ibid.

<sup>3</sup> California Environmental Protection Agency and Office of Environmental Health Hazard Assessment, 2013. “Indicators of Climate Change in California.”

<sup>4</sup> Walsh, J., D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, S. Doney, R. Feely, P. Hennon, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville, 2014: Ch. 2: Our Changing Climate. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 19-67. doi:10.7930/J0KW5CXT.

<sup>5</sup> Ibid.

<sup>6</sup> Climate Education Partners, 2014. “San Diego, 2050 Is Calling. How Will We Answer?”

<sup>7</sup> Walsh, J., D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, S. Doney, R. Feely, P. Hennon, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville, 2014: Ch. 2: Our Changing Climate. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 19-67. doi:10.7930/J0KW5CXT.

<sup>8</sup> Higbee, Melissa, Daniel Cayan, Sam Iacobellis, Mary Tyree (2014). Report from San Diego Hazard Mitigation Plan Update Training Workshop #1: Climate Change and Hazards in San Diego. ICLEI-Local Governments for Sustainability. Accessed July 7, 2014. <http://www.icleiusa.org/library/documents/training-workshop-report/view>

<sup>9</sup> Garfin, G., G. Franco, H. Blanco, A. Comrie, P. Gonzalez, T. Piechota, R. Smyth, and R. Waskom, 2014: Ch. 20: Southwest. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486. doi:10.7930/J08G8HMN.

models project that *San Diego will likely warm 2-3 °F by 2050* under the relatively low GHG emissions scenario (RCP 4.5). Greater warming can be expected in inland areas than along the coast. Under the higher emissions scenario (RCP 8.5), the warming trend becomes significantly more pronounced after 2050. This tendency occurs in coastal and inland areas.

#### 4.3.1.2 Heat Waves

For this analysis, the definition of a heat wave is the occurrence of the 98<sup>th</sup> percentile maximum temperature calculated from the historical period of 1970-2000 for at least one day. For coastal areas, a heat wave is defined as at least one day with the temperature reaching 83 °F or higher. For inland areas, a heat wave is at least one day with the temperature reaching 116 degrees °F or higher.

By this definition, heat waves occur about 2 times per year in San Diego’s present climate. However, *heat waves are projected to increase in frequency and intensity* (higher maximum temperatures) over the 21<sup>st</sup> century. By mid-century, the San Diego region could see heat waves occurring 12-16 times per year. *Heat waves are also projected to increase in duration* (number of days). In the current climate, heat waves last 2 days on average. By mid-century, heat waves are projected to last 3-4 days on average.

#### 4.3.1.3 Sea Level Rise

Sea levels measured at a station in La Jolla have risen at a rate of 6 inches over the last century.<sup>10</sup> The table below shows the ranges of sea level rise that the California Coastal Commission<sup>11</sup> recommends local jurisdictions plan for based on the National Research Council’s (NRC) report on Sea Level Rise in California, Oregon and Washington: Past Present and Future.<sup>12</sup> *San Diego is projected to experience up to two feet of sea level rise by mid-century.*

#### NRC Average Sea Level Rise Projections for South of Cape Mendocino

Time Period	Range	Central Estimate
2000-2030	4 to 30 cm (.13 to .98 ft)	14.7 ± 5.0 cm
2000-2050	12 to 61 cm (.39 to 2.0 ft)	28.4 ± 9.2 cm
2000-2100	42 to 167 cm (1.38 to 5.48 ft)	91.9 ± 24.9 cm

#### 4.3.1.4 High Sea Level Events

It’s not only important to consider increases in average sea level, but also consider other fluctuations that will occur on top of the increase in the average, such as high astronomical tides, wind, waves, and storm surge. These fluctuations produce high sea level events.

This analysis of high sea levels uses a model that includes sea level rise, weather, and tidal-related fluctuations in sea level. This analysis defines a high sea level as the 99.99th percentile hourly sea level

<sup>10</sup> California Environmental Protection Agency and Office of Environmental Health Hazard Assessment, 2013. “Indicators of Climate Change in California.”

<sup>11</sup> California Coastal Commission Draft Sea Level Rise Policy Guidance (2013) [http://www.coastal.ca.gov/climate/slr/guidance/CCC\\_Draft\\_SLR\\_Guidance\\_PR\\_10142013.pdf](http://www.coastal.ca.gov/climate/slr/guidance/CCC_Draft_SLR_Guidance_PR_10142013.pdf)

<sup>12</sup> Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future (2012). [http://www.nap.edu/catalog.php?record\\_id=13389](http://www.nap.edu/catalog.php?record_id=13389)

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calculated for the period 1970-1999. The analysis sums the total number of hours in a year that the sea level is at or above this threshold.

The chart below illustrates how as the annual mean sea level increases, *San Diego's shoreline will see increasingly more hours of high sea levels as the century progresses*. In the present climate, San Diego experiences one hour of high sea levels per year on average. By the 2030 period, high sea levels occur 12 hours per year on average. By mid-century, this increases to 62 hours per year. These high sea levels put more natural ecosystems (beaches, cliffs, wetlands) and man-made infrastructure at risk of exposure to flooding and wave action.

**High Sea Levels Trend Chart:**

## **4.3.2 Sea Level Rise, Coastal Storms, Erosion and Tsunami**

### **4.3.2.1 Nature of Hazard**

These four hazards were mapped and profiled as a group because many of the factors and risks involved are similar and limited to the coastal areas. Coastal storms can cause increases in tidal elevations (called storm surge), wind speed, and erosion. The most dangerous and damaging feature of a coastal storm is storm surge. Storm surges are large waves of ocean water that sweep across coastlines where a storm makes landfall. Storm surges can inundate coastal areas, wash out dunes, and cause backwater flooding. If a storm surge occurs at the same time as high tide, the water height will be even greater.

With up to two feet of sea level rise projected by 2050, low-lying areas could become inundated more frequently and with increasingly higher water levels. In addition, storm related flooding may reach farther inland and occur more often<sup>13</sup>. Beaches and cliffs could also see increased erosion as they are exposed to more hours of high sea levels and wave action.<sup>14</sup> The NOAA Sea Level Rise Viewer allows for planners to predict the impact of sea level rise over the next several decades. It can be found at <https://coast.noaa.gov/digitalcoast/tools/slr>.

According to the Sea Level Rise Adaptation Strategy for the San Diego Bay, the sectors most vulnerable to sea level rise are storm water, wastewater, shoreline parks, transportation facilities, commercial buildings, and ecosystems. Low-lying communities, such as Imperial Beach, Coronado, Mission Beach, and parts of La Jolla Shores, Del Mar, and Oceanside may be particularly vulnerable to sea level rise.<sup>15</sup> In addition, some of San Diego's military installations and the region controlled by the Port of San Diego may also be affected.<sup>16</sup> According to the County of San Diego Local Coastal Program Land Use Plan, (dated February 2017), fewer than one percent of the residents of San Diego County reside in areas at risk of inundation from a 55-inch rise in sea level by 2100. Based on that information, sea level rise is considered (on a scale of low, medium, high, very high) a low hazard for the region.

Coastal erosion is the wearing away of coastal land. It is commonly used to describe the horizontal retreat of the shoreline along the ocean, and is considered a function of larger processes of shoreline change, which include erosion and accretion. Erosion results when more sediment is lost along a particular shoreline than is re-deposited by the water body, and is measured as a rate with respect to either a linear retreat or volumetric loss. Erosion rates are not uniform and vary over time at any single location. Various locations along the Coast of San Diego County are highly susceptible to erosion. Erosion prevention and repair measures such as installation of seawalls and reinforcement of cliffs have been required in different locations along the San Diego coast in the past. The risk of coastal erosion in San Diego County is considered medium.

- A tsunami is a series of long waves generated in the ocean by a sudden displacement of a large volume of water. Underwater earthquakes, landslides, volcanic eruptions, meteoric impacts, or onshore slope failures can cause this displacement. Tsunami waves can travel at speeds averaging 450 to 600 miles per hour. As a tsunami nears the coastline, its speed diminishes, its wavelength decreases, and its height increases greatly. After a major earthquake or other tsunami-inducing activity occurs, a tsunami could reach the shore within a few minutes. One coastal community may experience no damaging waves while another may experience very destructive waves. Some low-lying areas could experience severe inland inundation of water and deposition of debris more than 3,000 feet inland. Historically the impact of Tsunamis on the San Diego coastline has been low, but inundation maps developed by the California Office of Emergency Services and the California Geologic Survey show the potential for moderate damage along low-lying areas. The California Geologic Survey has developed Tsunami Inundation maps that can be found at [http://www.conservation.ca.gov/cgs/geologic\\_hazards/Tsunami/Inundation\\_Maps](http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps).

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<sup>13</sup> San Diego's Changing Climate: A Regional Wake-Up Call. A Summary of the Focus 2050 Study Presented by The San Diego Foundation

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

### **4.3.2.2 Disaster History**

There were eleven (11) Proclaimed States of Emergency for Weather/Storms in San Diego County between 1950 and 2017. In January and February 1983, the strongest-ever El Nino-driven coastal storms caused over 116 million dollars in beach and coastal damage. Thirty-three homes were destroyed and 3900 homes and businesses were damaged. Other coastal storms that caused notable damage were during the El Nino winters of 1977-1978 and 1997-1998 and 2003-2004. Other Proclamations occurred in December 2010, July 2015, and February 2017. The City of San Diego proclaimed for winter storms in 2013.

Coastal erosion is an ongoing process that is difficult to measure, but can be seen in various areas along the coastline of San Diego County. Unstable cliffs at Beacon's Beach in Encinitas caused a landslide that killed a woman sitting on the beach in January 2000. In 1942, the Self-Realization Fellowship building fell into the ocean because of erosion and slope failure caused by groundwater oversaturated the cliffs it was built on.

Wave heights and run-up elevations from tsunami along the San Diego Coast have historically fallen within the normal range of the tides (Joy 1968). The largest tsunami effect recorded in San Diego since 1950 was May 22, 1960, which had a maximum wave height 2.1 feet (NOAA, 1993). In this event, 80 meters of dock were destroyed and a barge sunk in Quivera Basin. Other tsunamis felt in San Diego County occurred on November 5, 1952, with a wave height of 2.3 feet and caused by an earthquake in Kamchatka; March 9, 1957, with a wave height of 1.5 feet; May 22, 1960, at 2.1 feet; March 27, 1964 with a wave height of 3.7 feet, September 29, 2009 with a wave height of 0.5 feet, February 2010 with a wave height of 0.6 meters, and in June, 2011 with wave height of 2 feet.. It should be noted that damage does not necessarily occur in direct relationship to wave height, illustrated by the fact that the damages caused by the 2.1-foot wave height in 1960 were worse than damages caused by several other tsunamis with higher wave heights.

### **4.3.2.3 Location and Extent/Probability of Occurrence and Magnitude**

Figure 4.3.1 displays the location and extent of coastal storm/coastal erosion/tsunami hazard areas for the County of San Diego. As shown in this figure, the highest risk zones in San Diego County are located within the coastal zone of San Diego County. Coastal storm hazards are most likely during El Nino events. As shown on Figure 4.3.1, maximum wind speeds along the coast are not expected to exceed 60 miles per hour, resulting in only minor wind-speed related damage. Coastal erosion risk is highest where geologically unstable cliffs become over-saturated by irrigation or rainwater. The greatest type of tsunami risk is material damage to small watercraft, harbors, and some waterfront structures (Joy 1968), with flooding along the coast as shown in the run-up projections on Figure 4.3.1.

As stated above, the risk of damage from seal level rise is considered somewhat likely with the risk of damage from coastal erosion considered to be likely and from tsunami highly likely.

Data used to profile this group of hazards included the digitized flood zones from the FEMA FIRM Flood maps, NOAA historical shoreline data, and Caltrans' coastal zone boundary for the coastal storm/erosion hazard (refer to Appendix B for complete data matrix). Maximum tsunami run up projections modeled by the University of Southern California and distributed by the California Office of Emergency Services were used for identifying tsunami hazard. The tsunami model was the result of a combination of inundation modeling and onsite surveys and shows maximum projected inundation levels from tsunamis along the entire coast of San Diego County. NOAA historical tsunami effects data were also used, which showed

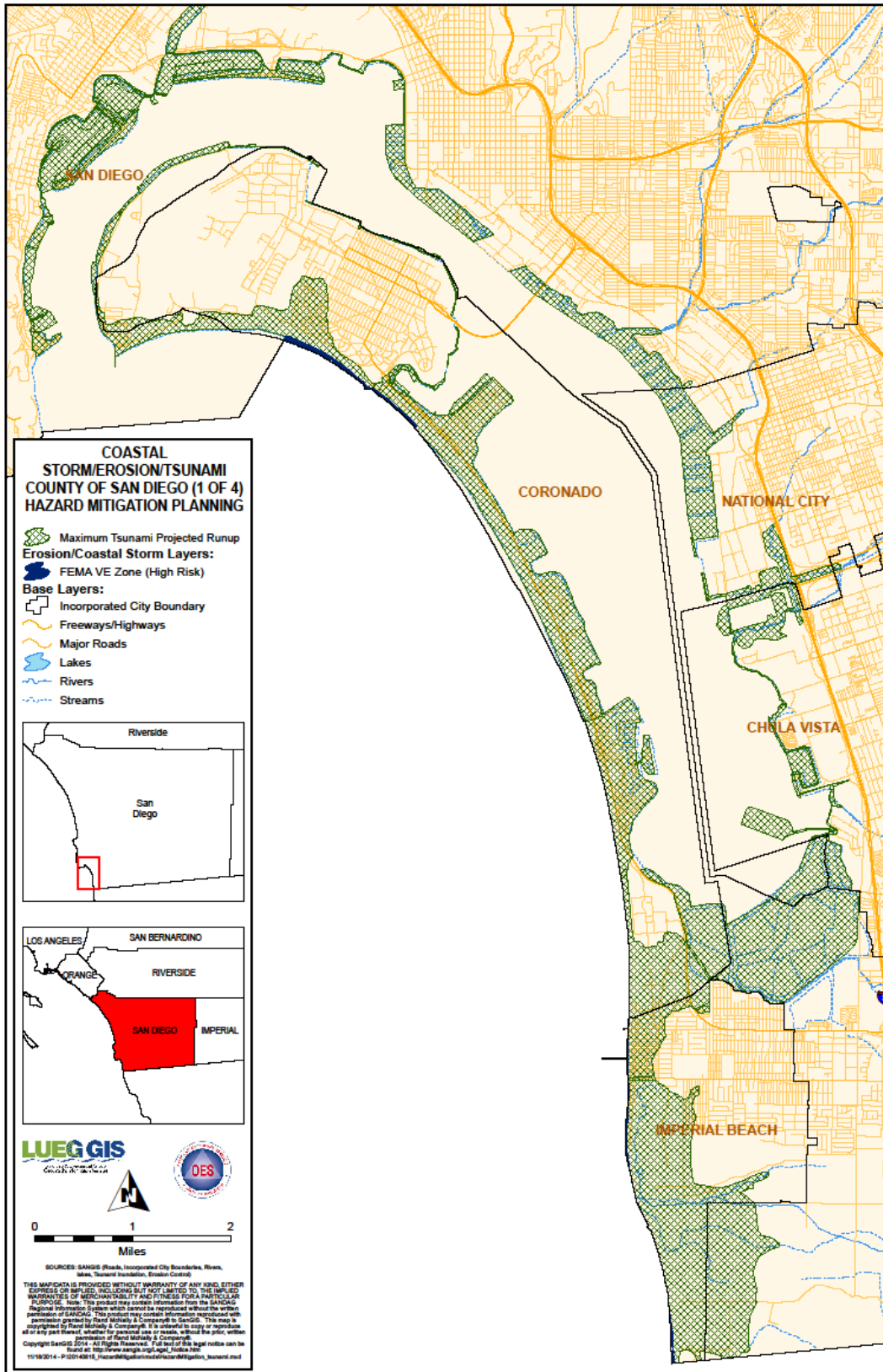
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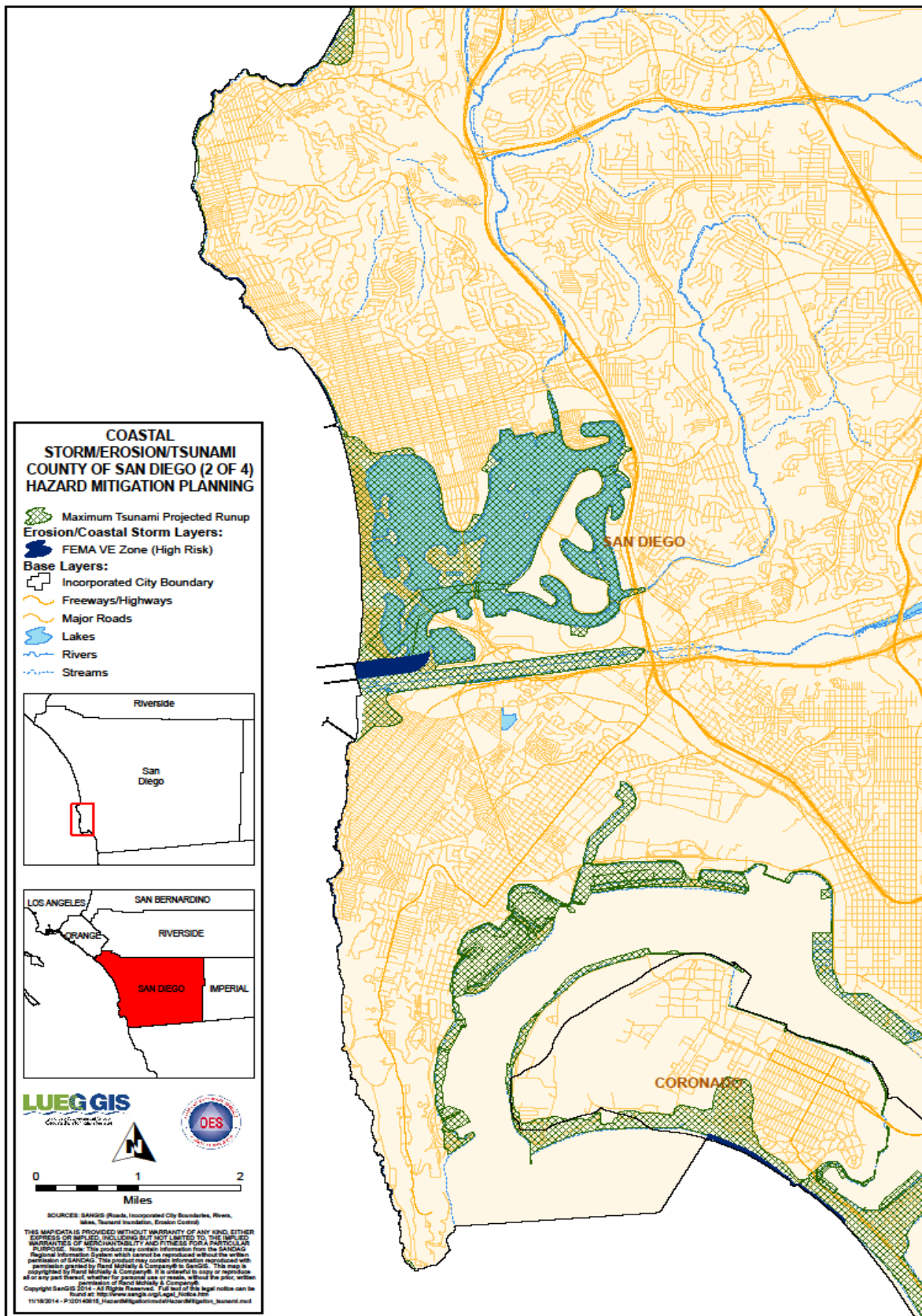
locations where tsunami effects have been felt, and when available, details describing size and location of earthquakes that caused the tsunamis. *The Shoreline Erosion Assessment and Atlas of the San Diego Region Volumes I and II* (SANDAG, 1992) were reviewed for the shoreline erosion category. This publication shows erosion risk levels of high, moderate and low for the entire coastline of San Diego County.

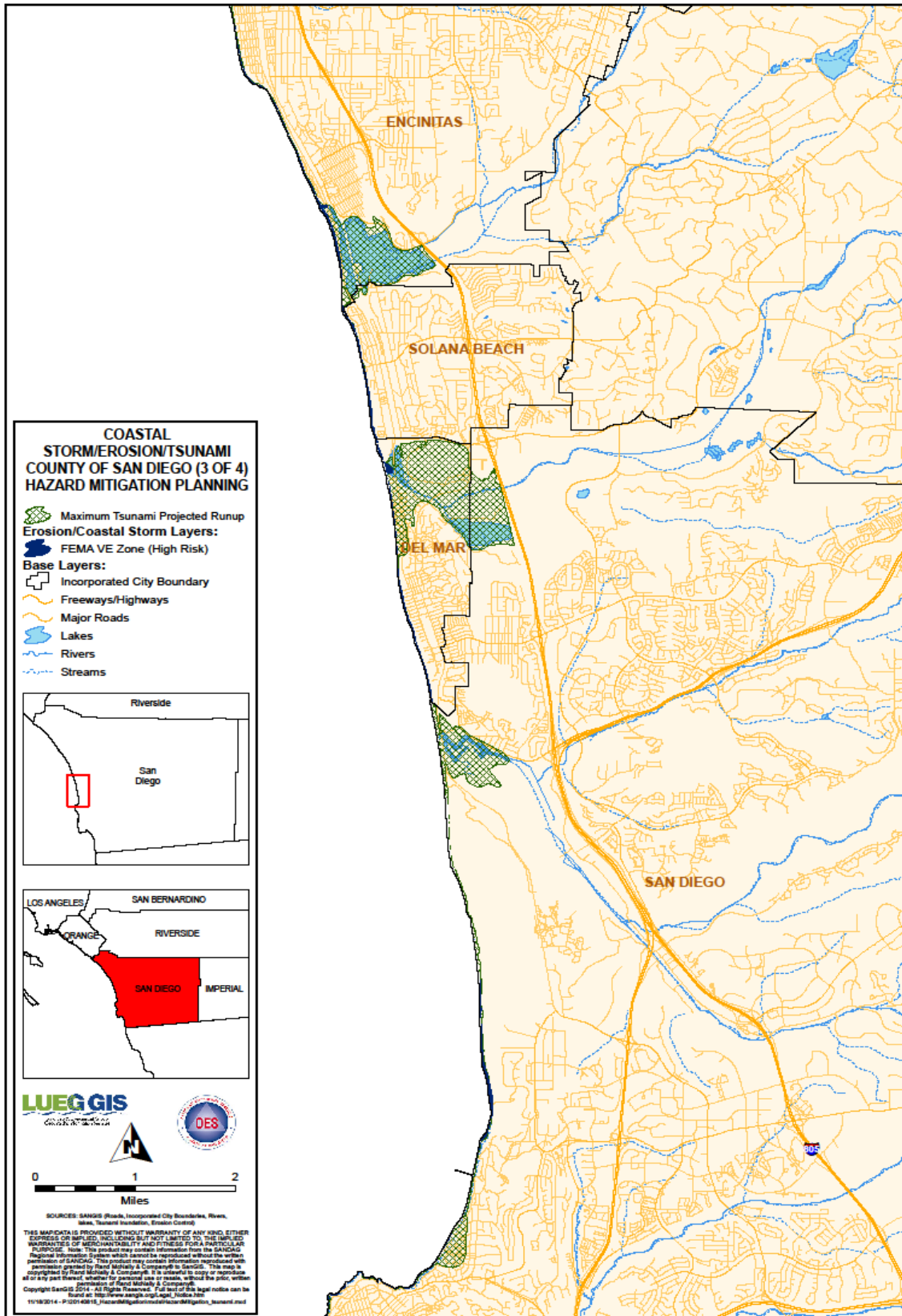
For modeling purposes, the VE Zone of the FEMA FIRM map series was used as the high hazard value for coastal storms and coastal erosion. The VE Zone is defined by FEMA as the coastal area subject to a velocity hazard (wave action). Coastal storm and erosion risk were determined to be high if areas were found within the VE zone of the FEMA FIRM maps. Tsunami hazard risk levels were determined to be high if an area was within the maximum projected tsunami run-up and inundation area.



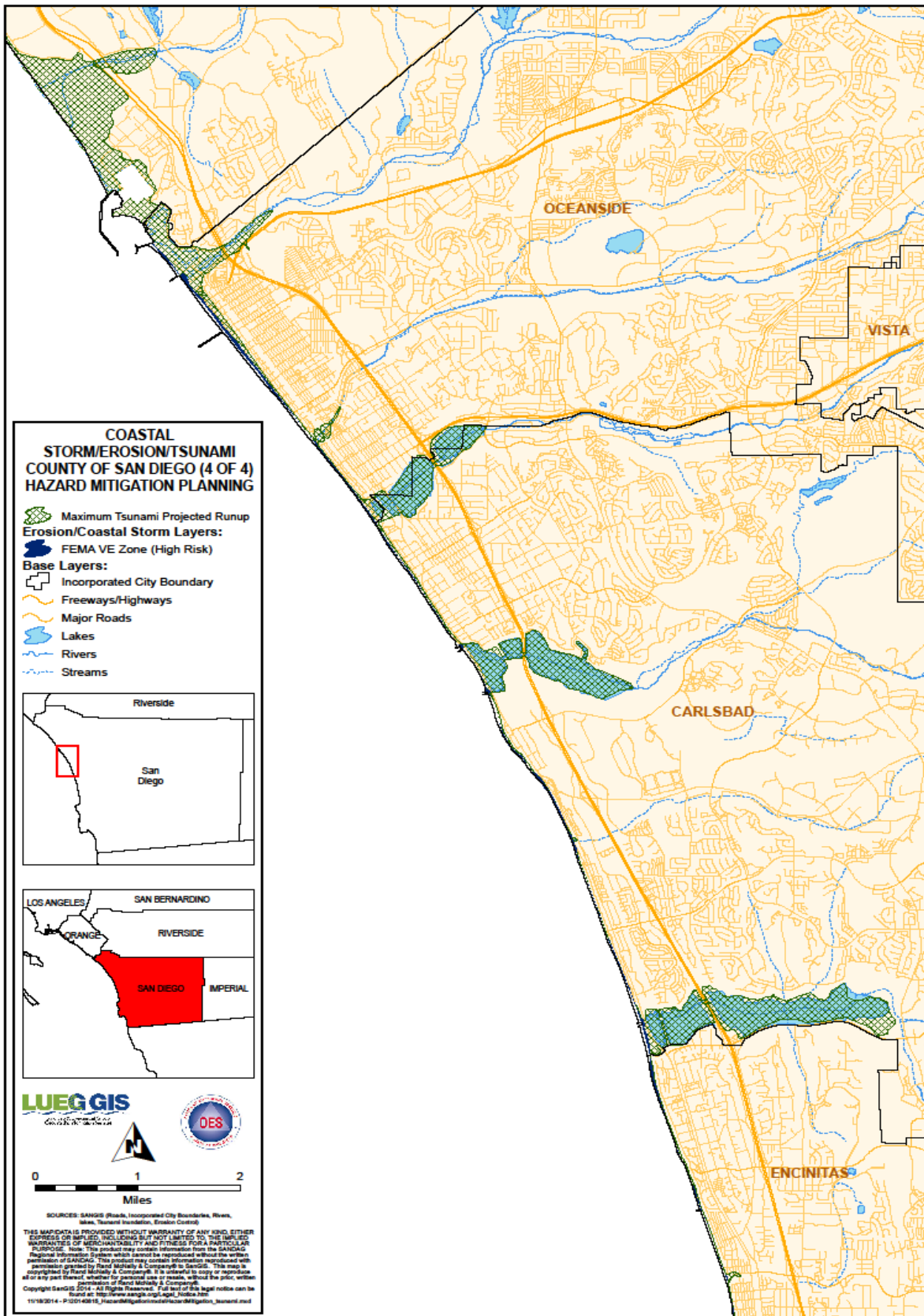
Figure 4.3.1











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### 4.3.3 Dam Failure

#### 4.3.3.1 Nature of Hazard

Dam failures can result in severe flood events. When a dam fails, a large quantity of water is suddenly released with a great potential to cause human casualties, economic loss, lifeline disruption, and environmental damage. A dam failure is usually the result of age, poor design, or structural damage caused by a major event such as an earthquake or flood.

#### 4.3.3.2 Disaster History

Two major dam failures have been recorded in San Diego County. The Hatfield Flood of 1916 caused the failure of the Sweetwater and Lower Otay Dams, resulting in 22 deaths. Most of those deaths were attributed to the failure of Lower Otay Dam (County of San Diego Sanitation and Flood Control, 2002).

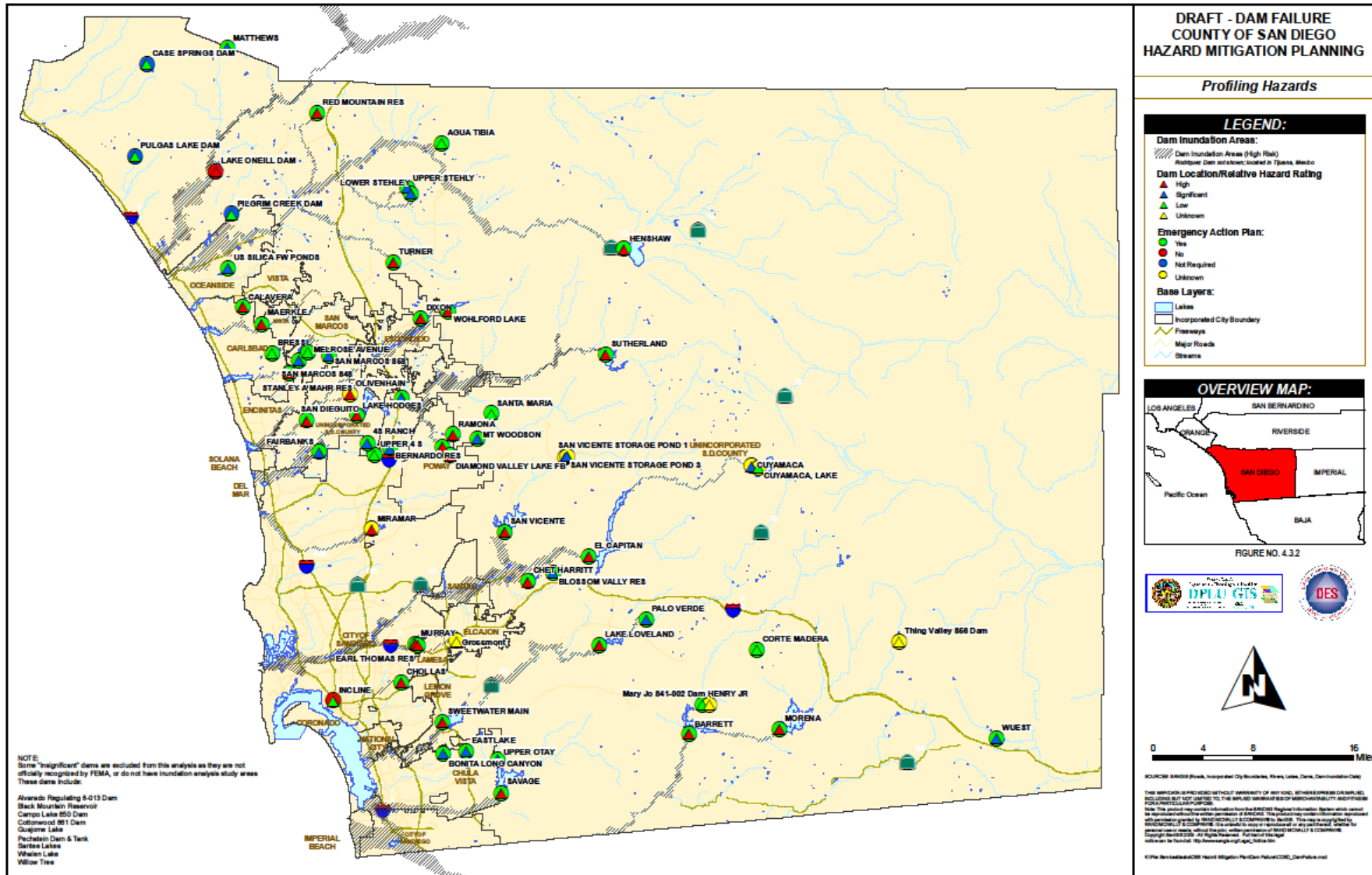
#### 4.3.3.3 Location and Extent/Probability of Occurrence and Magnitude

Figure 4.3.2 displays the location and extent of dam failure hazard areas for the County of San Diego. Dam failures are rated as one of the major “low-probability, high-loss” events.

Dam inundation map data were used to profile dam failure risk levels (refer to Appendix B for complete data matrix). These maps were created by agencies that own and operate dams. OES obtained this data from SanGIS, a local GIS data repository. The dam inundation map layers show areas that would be flooded in the event of a dam failure. If an area lies within a dam inundation zone, it was considered at high risk. A dam is characterized as high hazard if it stores more than 1,000 acre-feet of water, is higher than 150 feet tall, has potential for downstream property damage, and potential for downstream evacuation. Ratings are set by FEMA and confirmed with site visits by engineers. A simple way to define high risk of dam failure is if failure of the dam is likely to result in loss of human life. Most dams in the County are greater than 50 years old and are characterized by increased hazard potential due to downstream development and increased risk due to structural deterioration in inadequate spillway capacity (Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, 2014). The potential for dam failure is considered to be somewhat likely.

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Figure 4.3.2



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### 4.3.4 Earthquake

#### 4.3.4.1 Nature of Hazard

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A 100% g earthquake is very severe. More damage tends to occur from earthquakes when ground acceleration is rapid. Peak ground acceleration (PGA) is a measure of the strength of ground movement. PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity (980 cm/sec/sec). PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in construction design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

Another tool used to describe earthquake intensity is the Richter scale. The Richter scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a magnitude (M) 7 earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy. An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than S waves they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the Richter scale magnitude for the earthquake.

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. This rates the level of severity of an earthquake by the amount of damage and perceived shaking (Table 4.3-1).

**Table 4.3-1  
Modified Mercalli Intensity Scale**

MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
I.			Not felt
II.			Felt by persons at rest, on upper floors, or favorably placed.
III.			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV.			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
V.	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
VI.	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
VII.	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
VIII.	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
IX.	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
X.			Rails bent greatly. Underground pipelines completely out of services.
XI.			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Several major active faults exist in San Diego County, including the Rose Canyon, La Nacion, Elsinore, San Jacinto, Coronado Bank and San Clemente Fault Zones. The Rose Canyon Fault Zone is part of the Newport-Inglewood fault zone, which originates to the north in Los Angeles, and the Vallecitos and San Miguel Fault Systems to the south in Baja California (see Figure 4.3.3). The Rose Canyon Fault extends inland from La Jolla Cove, south through Rose Canyon, along the east side of Mission Bay, and out into San Diego Bay. The Rose Canyon Fault is considered to be the greatest potential threat to San Diego as a region, due to its proximity to areas of high population. The La Nacion Fault Zone is located near National City and Chula Vista. The Elsinore Fault Zone is a branch of the San Andreas Fault System. It originates near downtown Los Angeles, and enters San Diego County through the communities of Rainbow and Pala; it then travels in a southeasterly direction through Lake Henshaw, Santa Ysabel, Julian; then down into Anza-Borrego Desert State Park at Agua Caliente Springs, ending at Ocotillo, approximately 40 miles east of downtown. The San Jacinto Fault is also a branch of the San Andreas Fault System. This fault branches off from the major fault as it passes through the San Bernardino Mountains. Traveling southeasterly, the fault passes through Clark Valley, Borrego Springs, Ocotillo Wells, and then east toward El Centro in Imperial County. This fault is the most active large fault within County of San Diego. The Coronado Bank fault is located about 10 miles offshore. The San Clemente Fault lies about 40 miles off La Jolla and is the largest offshore fault at 110 miles or more in length (Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, 2014).

#### **4.3.4.2 Disaster History**

Historic documents record that a very strong earthquake struck San Diego on May 27, 1862, damaging buildings in Old Town and opening up cracks in the earth near the San Diego River mouth. This destructive earthquake was centered on either the Rose Canyon or Coronado Bank faults and descriptions of damage suggest that it had a magnitude of about 6.0 (M6). The strongest recently recorded earthquake in San Diego County was a M5.3 earthquake that occurred on July 13, 1986 on the Coronado Bank Fault, 25 miles west of Solana Beach. In recent years there have been several moderate earthquakes recorded within the Rose Canyon Fault Zone as it passes beneath the City of San Diego. Three temblors shook the city on 17 June 1985 (M3.9, 4.0, 3.9) and a stronger quake occurred on 28 October 1986 (M4.7) (Demere, SDNHM website 2003). The most recent significant earthquake activity occurred on June 15, 2004 with a M5.3 on the San Diego Trough Fault Zone approximately 50 miles SW of San Diego. It was reported as an IV on the MMI (Southern California Seismic Network).

#### **4.3.4.3 Location and Extent/Probability of Occurrence and Magnitude**

Figure 4.3.3 displays the location and extent of the profiled earthquake hazard areas for San Diego County. This is based on a USGS earthquake model that shows probabilistic peak ground acceleration for every location in San Diego County. Since 1984, earthquake activity in San Diego County has increased twofold over the preceding 50 years (Demere, SDNHM website 2003). All buildings that have been built in recent decades must adhere to building codes that require them to be able to withstand earthquake magnitudes that create a PGA of 0.4 or greater. Ongoing field and laboratory studies suggest the following maximum likely magnitudes for local faults: San Jacinto (M6.4 to 7.3), Elsinore (M6.5 to 7.3), Rose Canyon (M6.2 to 7.0), La Nacion (M6.2 to 6.6), Coronado Bank (M6.0 to 7.7), and San Clemente (M6.6 to 7.7) (Demere, SDNHM website 2003).

Data used to profile earthquake hazard included probabilistic PGA data from the United States Geological Survey (USGS) and a Scenario Earthquake Shake map for Rose Canyon from the California Integrated Seismic Network (CISN) (refer to Attachment A for complete data matrix). From these data, the HMWG determined that risk level for earthquake is determined to be high if an area lies within a 0.3 or greater PGA designation. Earthquakes were modeled using HAZUS-MH, which uses base information to derive probabilistic peak ground accelerations much like the PGA map from USGS that was used for the profiling process.

The potential for an earthquake in the San Diego region is considered somewhat likely.



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### 4.3.5 Flood

#### 4.3.5.1 Nature of Hazard

A flood occurs when excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto a river's bank or to adjacent floodplains. Floodplains are lowlands adjacent to rivers, lakes, and oceans that are subject to recurring floods. Most injury and death from flood occurs when people are swept away by flood currents, and property damage typically occurs as a result of inundation by sediment-filled water. Average annual precipitation in San Diego County ranges from 10 inches on the coast to approximately 45 inches on the highest point of the Peninsular Mountain Range that transects the county, and 3 inches in the desert east of the mountains.

Several factors determine the severity of floods, including rainfall intensity and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A sudden thunderstorm or heavy rain, dam failure, or sudden spills can cause flash flooding. The National Weather Service's definition of a flash flood is a flood occurring in a watershed where the time of travel of the peak of flow from one end of the watershed to the other is less than six hours. There are no watersheds in San Diego County that have a longer response time than six hours. In this county, flash floods range from the stereotypical wall of water to a gradually rising stream. The central and eastern portions of San Diego County are most susceptible to flash floods where mountain canyons, dry creek beds, and high deserts are the prevailing terrain.

#### 4.3.5.2 Disaster History

From 1770 until 1952, 29 floods were recorded in San Diego County. Between 1950 and 1997, flooding prompted 10 Proclaimed States of Emergency in the County of San Diego. Several very large floods have caused significant damage in the County of San Diego in the past. The Hatfield Flood of 1916 destroyed the Sweetwater and Lower Otay Dams, and caused 22 deaths and \$4.5 million in damages. The flood of 1927 caused \$117,000 in damages, and washed out the Old Town railroad bridge (Bainbridge, 1997). The floods of 1937 and 1938 caused approximately \$600,000 in damages. (County of San Diego Sanitation and Flood Control, 1996). In the 1980 floods, the San Diego River at Mission Valley peaked at 27,000 cubic feet per second (cfs) and caused \$120 million in damage (Bainbridge, 1997).

Table 4.3-2 displays a history of flooding in San Diego County, as well as loss associated with each flood event.

Date	Loss Estimation	Source of Estimate	Comments
1862	Not available	County of San Diego Sanitation and Flood Control	6 weeks of rain
1891	Not available	County of San Diego Sanitation and Flood Control	33 inches in 60 hours
1916	\$4.5 million	County of San Diego Sanitation and Flood Control	Destroyed 2 dams, 22 deaths
1927	\$117,000	County of San Diego Sanitation and Flood Control	Washed out railroad bridge Old Town
1937 & 1938	\$600,000	County of San Diego Sanitation and Flood Control	N/A
1965	Not available	San Diego Union	6 killed
1969	Not available	San Diego Union	All of State declared disaster area
1979	\$2,766,268	County OES	Cities of La Mesa, Lemon Grove, National City, San Marcos, San Diego and unincorporated areas
1980	\$120 million	County of San Diego Sanitation and Flood Control; Earth Times	San Diego river topped out in Mission Valley
Oct-87	\$640,500	State OES	N/A
1995	\$Tens of Millions	County OES	San Diego County Declared Disaster Area
2003	Not Available	County OES	Storm floods areas impacted by the 2003 firestorm.
Sept 2004	Not Available	San Diego Union-Tribune	Series of storms caused localized flooding
Oct 2004	Not Available	San Diego Union-Tribune	Flash-flood in Borrego Springs
Jan-Mar 2005	Not Available	Cal EMA (formerly State OES)	San Diego County Declared Disaster Area
Jan 2017	\$14.5 million (estimated)	County OES	San Diego County Declared Disaster Area

**Table 4.3-2  
Historical Records of Large Floods in San Diego County**

#### **4.3.5.3 Location and Extent/Probability of Occurrence and Magnitude**

In regions such as San Diego, without extended periods of below-freezing temperatures, floods usually occur during the season of highest precipitations or during heavy rainfalls after long dry spells. The areas



surrounding the river valleys in all of San Diego County are susceptible to flooding because of the wide, flat floodplains surrounding the riverbeds, and the numerous structures that are built in the floodplains. One unusual characteristic of San Diego's hydrology is that it has a high level of variability in its runoff. The western watershed of the County of San Diego extends about 80 miles north from the Mexican border and approximately 45 miles east of the Pacific Ocean. From west to east, there are about 10 miles of rolling, broken coastal plain, 10 to 15 miles of foothill ranges with elevations of 600 to 1,700 feet; and approximately 20 miles of mountain country where elevations range from 3,000 to 6,000 feet. This western watershed constitutes about 75% of the County, with the remaining 25% mainly desert country. There are over 3,600 miles of rivers and streams which threaten residents and over 200,000 acres of flood-prone property. Seven principle streams originate or traverse through the unincorporated area. From north to south they are the Santa Margarita, San Luis Rey, San Dieguito, San Diego, Sweetwater, Otay, and Tijuana Rivers (Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, 2006).

FEMA FIRM data was used to determine hazard risk for floods in the County of San Diego. FEMA defines flood risk primarily by a 100-year flood zone, which is applied to those areas with a 1% chance, on average, of flooding in any given year. Any area that lies within the FEMA-designated 100-year floodplain is designated as high risk. Any area found in the 500-year floodplain is designated at low risk. Base flood elevations (BFE) were also used in the HAZUS-MH modeling process. A BFE is the elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year (i.e. the height of the base flood).

Figure 4.3.4 displays the location and extent of flood hazard areas for the County of San Diego. As shown in this figure, high hazard (100-year floodway) zones in San Diego County are generally concentrated within the coastal areas, including bays, coastal inlets and estuaries. Major watershed areas connecting the local mountain range to the coastal region, where flash floods are more common, show several 100-year flood hazard areas.

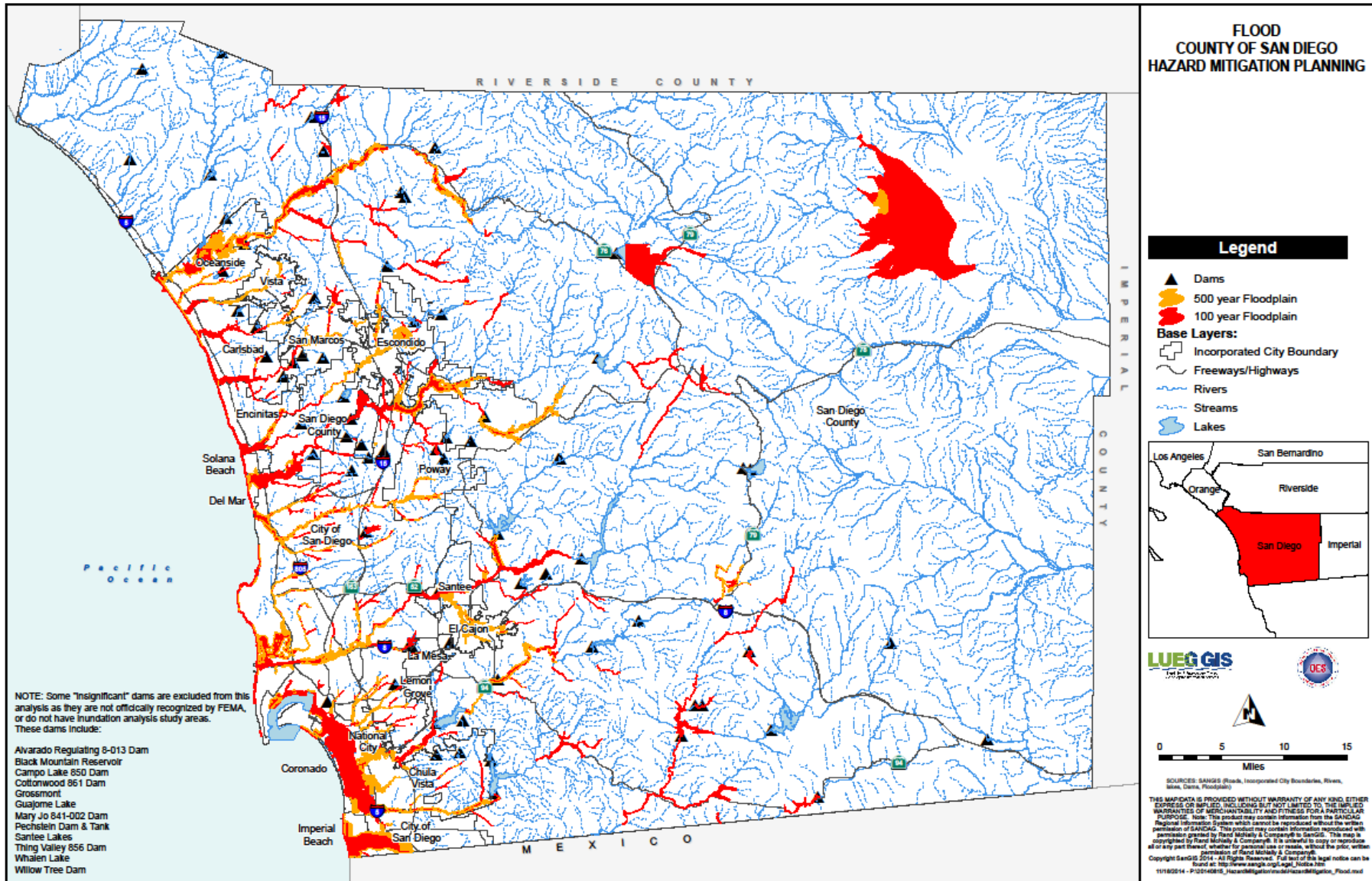
Based on FEMA Records the San Diego region has not suffered severe repetitive loss (residential properties that have at least four NFIP payments over \$5,000 each with the cumulative claim exceeding \$20,000 or at least two separate claims payments with the cumulative amount exceeding the market value of the building) since 1974. There have been numerous repetitive losses (losses of at least \$1,000 each). These losses are provided in the table below:

**Table 4.3-3**  
**Repetitive Loss Due to Floods in San Diego County**

Jurisdiction	Number of Repetitive Losses	Jurisdiction	Number of Repetitive Losses	Jurisdiction	Number of Repetitive Losses
Carlsbad	1	Chula Vista	2	Coronado	0
Del Mar	13	El Cajon	4	Encinitas	2
Escondido	2	Imperial Beach	4	La Mesa	2
Lemon Grove	0	National City	2	Oceanside	15
Poway	7	San Diego	35	San Marcos	1
Santee	1	Solana Beach	6	Vista	2
County of San Diego	14				

Based on the historical record, the likelihood of flooding in the San Diego region is highly likely.

Figure 4.3.4



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### 4.3.6 Rain-Induced Landslide

#### 4.3.6.1 *Nature of Hazard*

Landslides occur when masses of rock, earth, or debris move down a slope, including rock falls, deep failure of slopes, and shallow debris flows. Landslides are influenced by human activity (mining and construction of buildings, railroads, and highways) and natural factors (geology, precipitation, and topography). Frequently they accompany other natural hazards such as floods, earthquakes, and volcanic eruptions. Although landslides sometimes occur during earthquake activity, earthquakes are rarely their primary cause. The most common cause of a landslide is an increase in the down slope gravitational stress applied to slope materials (oversteepening). This may be produced either by natural processes or by man's activities. Undercutting of a valley wall by stream erosion or of a sea cliff by wave erosion are ways in which slopes may be naturally oversteeped. Other ways include excessive rainfall or irrigation on a cliff or slope. Another type of soil failure is slope wash, the erosion of slopes by surface-water runoff. The intensity of slope wash is dependent on the discharge and velocity of surface runoff and on the resistance of surface materials to erosion. Surface runoff and velocity is greatly increased in urban and suburban areas due to the presence of roads, parking lots, and buildings, which have zero filtration capacities and provide generally smooth surfaces that do not slow down runoff.

Mudflows are another type of soil failure, and are defined as flows or rivers of liquid mud down a hillside. They occur when water accumulates under the ground, usually following long and heavy rainfalls. If there is no brush, tree, or ground cover to hold the soil, mud will form and flow down-slope.

#### 4.3.6.2 *Disaster History*

Landslides and landslide prone sedimentary formations are present throughout the coastal plain of western San Diego County. Landslides also occur in the granitic mountains of East San Diego County, although they are less prevalent. Ancient landslides are those with subdued topographic expressions that suggest movements at least several hundred and possibly several thousands of years before present. Many of these landslides are thought to have occurred under much wetter climatic conditions than at present. Recent landslides are those with fresh or sharp geomorphic expressions suggestive of active (ongoing) movement or movement within the past several decades. Reactivations of existing landslides can be triggered by disturbances such as heavy rainfall, seismic shaking and/or grading. Many recent landslides are thought to be reactivations of ancient landslides.

Areas where significant landslides have occurred are: the Otay Mesa area, Oceanside, Mt. Soledad in La Jolla, Sorrento Valley, in the vicinity of Rancho Bernardo and Rancho Penasquitos, along the sides of Mission Gorge (San Carlos and Tierrasanta), western Santee, the Fletcher Hills area of western El Cajon, western Camp Pendleton, and the east side of Point Loma. Some of the more significant historical coastal bluff landslides have occurred along north La Jolla (Black's Beach), Torrey Pines, Del Mar, and Encinitas. Landslides tend to be more widespread in these areas where the underlying sedimentary formations contain weak claystone beds that are more susceptible to sliding.

Remedial grading and other mitigation measures have stabilized many but not all landslides in urban areas and other developments within San Diego County. Published geologic maps and other sources of information pertaining to landslide occurrence may not differentiate between known or suspected landslides. Moreover, published landslide maps (such as those used to compile the landslide areas for this effort) are not always updated or revised to reflect landslides that have been stabilized, or in some cases

completely removed. The landslide maps for this study have been compiled for planning and emergency responses preparedness, and the compilation sources may not reflect current or existing conditions.

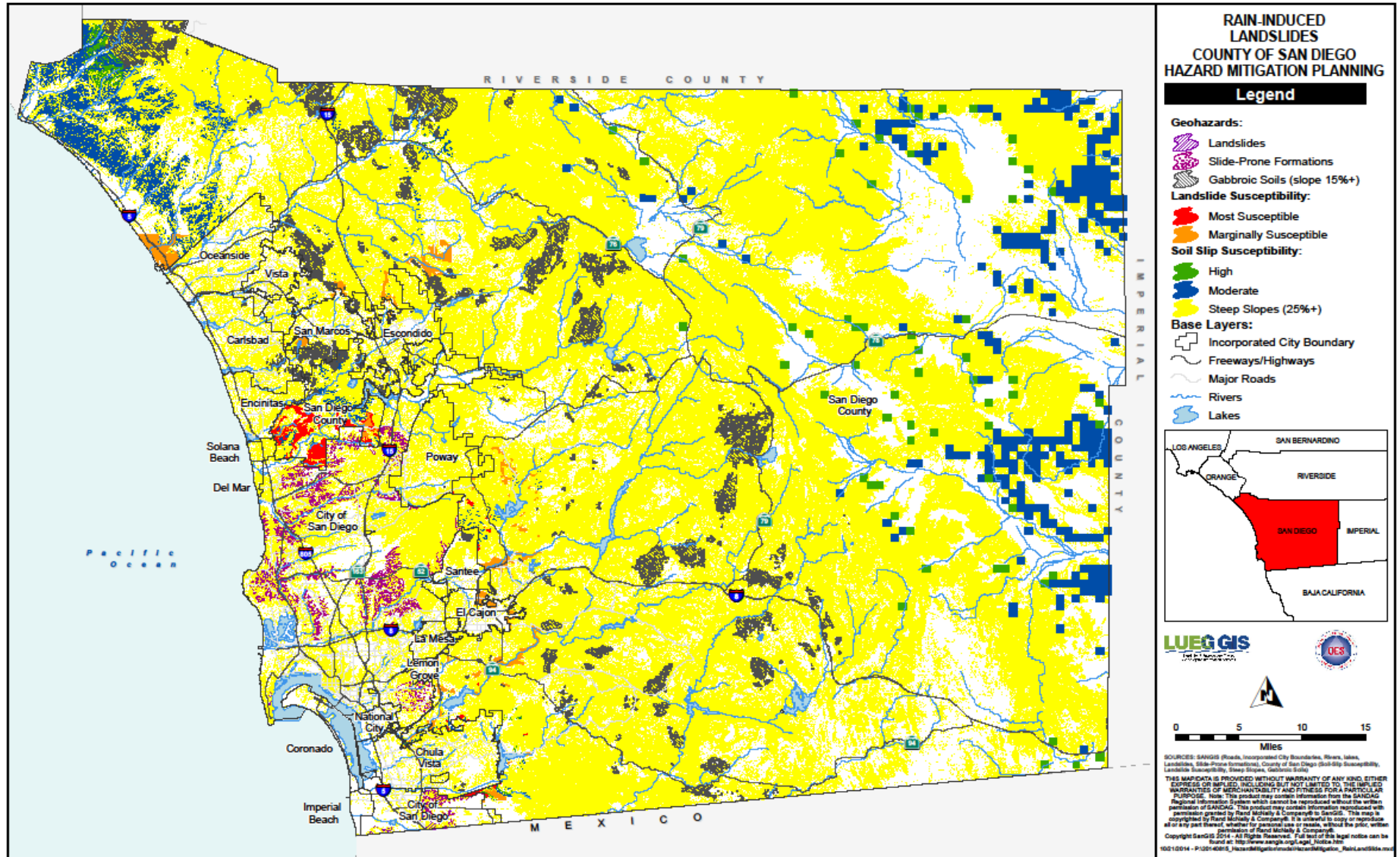
#### **4.3.6.3 Location and Extent/Probability of Occurrence and Magnitude**

Data used to determine landslide risk were steep slope (greater than 25%), soil series data (SANDAG, based on USGS 1970s series), and soil-slip susceptibility from USGS. Because landslide data in GIS format was not available for the entire county, a model was run using USGS soils and steep slope data to determine landslide risk areas for the entire County. Tan Landslide Susceptibility Maps that depict steep slope areas, landslide formations, and landslide susceptible areas based on a combination of slope, soils and geologic instability were also used in the analysis.

As shown in Figure 4.3.5, the location and extent of landslide hazard areas are generally concentrated along canyons near the coastal areas with steep slopes. The western portion of the county shows the soil-slip susceptibility data, while the eastern portion of the county shows the results of the model used to determine landslide risk for areas that were not included in the soil-slip susceptibility model. Housing development on marginal lands and in unstable but highly desirable coastal areas has increased the threat from landslides throughout San Diego County.

Based on historical occurrences the potential for a rain-induced landslide is considered likely.

Figure 4.3.5



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### 4.3.7 Liquefaction

#### 4.3.7.1 Nature of Hazard

Liquefaction is the phenomenon that occurs when ground shaking causes loose soils to lose strength and act like viscous fluid. 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 collapse.

#### 4.3.7.2 Disaster History

Liquefaction is not known to have occurred historically in San Diego County, although liquefaction has occurred in the Imperial Valley in response to large earthquakes (Magnitude 6 or greater) originating in that area. Although San Diego is one of several major California cities in seismically active regions, ground failures or damage to structures has not occurred as a consequence of liquefaction. Historically, seismic shaking levels have not been sufficient to trigger liquefaction. Paleoseismic indicators of liquefaction have been recognized locally, and several pre-instrumental (prior to common use of seismographs) earthquakes could have been severe enough to cause at least some liquefaction.

#### 4.3.7.3 Location and Extent/Probability of Occurrence and Magnitude

Recognizing active faults in the region, and the presence of geologically young, unconsolidated sediments and hydraulic fills, the potential for liquefaction to occur has been long recognized in the San Diego area. The regions of San Diego Bay and vicinity are thought to be especially vulnerable. The potential exists in areas of loose soils and/or shallow groundwater in earthquake fault zones throughout the County. Figure 4.3.6 displays the location and extent of areas with a risk of liquefaction.

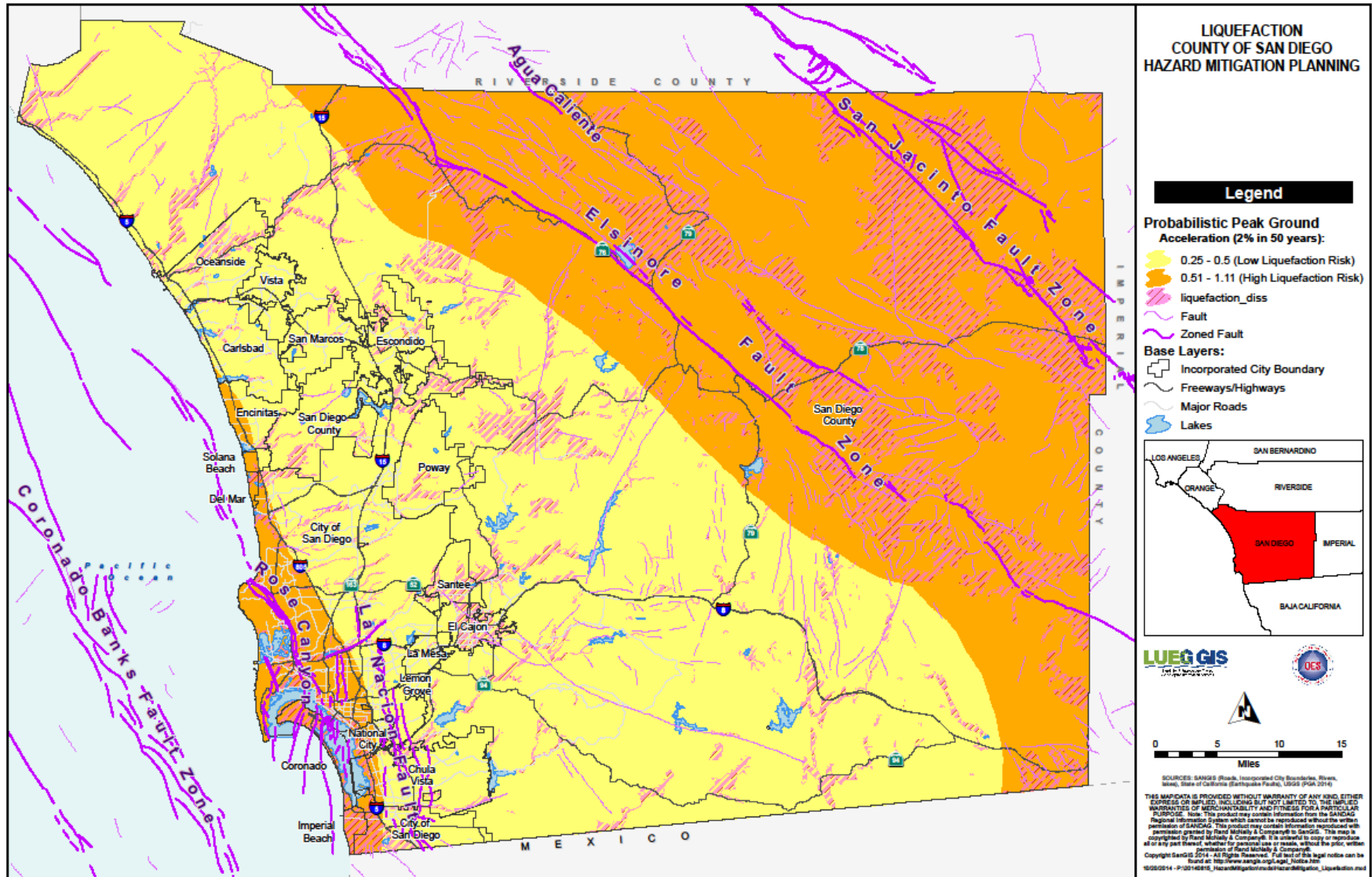
Data used to profile liquefaction hazard included probabilistic PGA data from the United States Geological Survey (USGS) and a Scenario Earthquake Shake map for Rose Canyon from the California Integrated Seismic Network (CISN), along with existing liquefaction hazard areas from local maps (refer to Attachment A for complete data matrix). Liquefaction hazards were modeled as collateral damages of earthquakes using HAZUS-MH, which uses base information and NEHRP soils data to derive probabilistic peak ground accelerations much like the PGA map from USGS. Soils were considered because liquefaction risk may be amplified depending on the type of soil found in a given area. The National Earthquake Hazards Reduction Program (NEHRP) rates soils from hard to soft, and give the soils ratings from Type A through Type E, with the hardest soils being Type A, and the softest soils rated at Type E. Liquefaction risk was considered high if there were soft soils (Types D or E) present within an active fault zone. Liquefaction risk was considered low if the PGA risk value was less than 0.3, and hard soils were present (Types A-C). For example, an area may lie in a PGA zone of 0.2, which would be a low liquefaction risk in hard soils identified by the NEHRP. However, if that same PGA value is found within a soft soil such as Type D or E, a PGA of 0.2, when multiplied by 1.4 or 1.7 (amplification values for type D and E soil, shown below), would become a PGA value of at least 0.28 to 0.3. This would increase the liquefaction risk to high. Areas where soil types D or E are located are illustrated in Figure 4.3.6.

The potential for liquefaction in San Diego is considered somewhat likely.

Soil Amplification Factors

	Soil Type				
PGA	A	B	C	D	E
0.1	0.80	1.00	1.20	1.60	2.50
0.2	0.80	1.00	1.20	1.40	1.70
0.3	0.80	1.00	1.10	1.20	1.20
0.4	0.80	1.00	1.00	1.10	0.90
0.5	0.80	1.00	1.00	1.00	0.80

Figure 4.3.6



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### 4.3.8 Structure/Wildfire Fire

#### 4.3.8.1 Nature of Hazard

A structural fire hazard is one where there is a risk of a fire starting in an urban setting and spreading uncontrollably from one building to another across several city blocks, or within hi-rise buildings.

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. An Urban-Wildland/Urban Interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Significant development in San Diego County is located along canyon ridges at the wildland/urban interface. Areas that have experienced prolonged droughts or are excessively dry are at risk of wildfires.

People start more than 80 percent of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires.

San Diego County's topography consists of a semi-arid coastal plain and rolling highlands which, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.

Large fires would have several indirect effects beyond those that a smaller, more localized fire would create. These may include air quality and health issues, road closures, business closures, and others that increase the potential losses that can occur from this hazard. Modeling for a larger type of fire would be difficult, but the consequences of the three largest San Diego fires this century (October, 203, October 2007 and May 2014) should be used as a guide for fire planning and mitigation.

#### 4.3.8.2 Disaster History

Table 4.3-3 lists the most recent major wildfires in San Diego County. Wildland fires prompted five (5) Proclaimed States of Emergency, and Urban/Intermix Fires prompted four (4) Proclaimed States of Emergency in the County of San Diego between 1950-2014. In October of 2003 the second-worse wild-land fire in the history of San Diego County destroyed 332,766 acres of land, 3,239 structures and 17 deaths at a cost of \$450M. San Diego County's worst wildfire occurred in October 2007. At the height of the firestorm there were seven fires burning within the County. The fires destroyed 369,000 acres (13% of the County), 2,670 structures, 239 vehicles, and two commercial properties. There were 10 civilian deaths, 23 civilian injuries and 10 firefighter injuries. The cost of fire exceeded \$1.5 billion. San Diego County's third worst wildfire in history, known as the Laguna Fire, destroyed thousands of acres in the backcountry in September of 1970. The fire resulted in the loss or destruction of 383 homes and 1,200 other structures

(\$5.7 million); 225,000 acres of trees and other watershed (\$30 million); small dams (\$3 million); and bridges and roads (\$600,000). The total dollar cost of the Laguna Fire was approximately \$40 million. The Bernardo, Poinsettia and Cocos Fires of May, 2014 burned 26,000 acres, destroyed 65 homes and damaged 19 others.

**Table 4.3-3**  
**Major Wildfires in San Diego County**  
**Larger than 5,000 acres**

Fire	Date	Acres Burned	Structures Destroyed	Structures Damaged	Deaths
Conejos Fire	July 1950	62,000	Not Available	Not Available	0
Laguna Fire	October 1970	190,000	382	Not Available	5
Harmony Fire (Carlsbad, Elfin Forest, San Marcos)	October 1996	8,600	122	142	1
La Jolla Fire (Palomar Mtn)	September 1999	7,800	2	2	1
Viejas Fire	January 2001	10,353	23	6	0
Gavilan Fire (Fallbrook)	February 2002	6,000	43	13	0
Pines Fire (Julian, Ranchita)	July 2002	61,690	45	121	0
Cedar Fire	October 2003	280,278	5,171	63	14
Paradise Fire	October 2003	57,000	415	15	2
Otay Fire	October 2003	46,291	6	0	0
Roblar (Pendleton)	October 2003	8,592	0	0	0
Mataguay Fire*	July 2004	8,867	2	0	0
Horse Fire*	July 2006	16,681	Not Available	Not Available	0
Witch Creek Fire*	October 2007	197,990	1,125	77	2
Harris Fire*	October 2007	90,440	255	12	5
Poomacha Fire*	October 2007	49,410	139	Not Available	0
Ammo Fire*	October 2007	21,004	Not Available	Not Available	0
Rice Fire*	October 2007	9,472	208	Not Available	0
Bernardo, Poinsettia & Cocos Fires	May 2014	26,000	65	19	0

\* Information gathered from the California Department of Forestry and Fire Protection website

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**4.3.8.3 Location and Extent/Probability of Occurrence and Magnitude**

The wildfire risk maps use the most recent USGS Fire Regime data. Data for Regimes II and IV were utilized to develop the risk tables for the participating jurisdictions. Additional wildland fire hazard maps are available at [http://www.fire.ca.gov/fire\\_prevention/fhsz\\_maps\\_sandiego](http://www.fire.ca.gov/fire_prevention/fhsz_maps_sandiego). Perimeter maps for the three most significant wildfire events of the past 15 years, the 2003 and 2007 Firestorms and the 2014 North County wildfires, are below.

Under current climate conditions, the wildfire threat to property, lives, and ecosystems in the San Diego region is very high. With hotter temperatures and possibly fewer rainy days in the coming decades, vegetation could become drier. As a result, it is likely that San Diego region will see an increase in the frequency and intensity of fires, making the region more vulnerable to devastating fires like the ones seen in 2003 and 2007.<sup>17</sup> The fire season could also become longer and less predictable, making firefighting efforts more costly.<sup>18</sup> Using the scale described in Section 4.2.3 the potential for a wildfire in the San Diego region is considered highly likely.

Building density is also a factor in potential building loss during a wildfire. A recent study in the Ecological Society of America's publication *Ecological Applications*<sup>19</sup> indicates that the area of the building clusters, the number of buildings in the cluster and building dispersion all contribute to the potential for building loss. While all three factors had a positive influence on the number of structures lost, larger building structures were most strongly associated with building loss. The likeliest reason being that more buildings are exposed. Two other top factors were the number of buildings in the cluster and the distance to the nearest building. In the mediterranean California model the closer the buildings were to each other the less likely they were to be affected.

An increase in wildfire also impacts public health. Fire-related injuries and death are likely to increase as wildfires occur more frequently.<sup>20</sup> Wildfires can also be a significant contributor to air pollution. Wildfire smoke contains numerous toxic and hazardous pollutants that are dangerous to breath and can worsen lung disease and other respiratory conditions.<sup>21</sup>

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<sup>17</sup> San Diego's Changing Climate: A Regional Wake-Up Call. A Summary of the Focus 2050 Study Presented by The San Diego Foundation.

<sup>18</sup> Ibid.

<sup>19</sup> Alexander, Patricia M., et. al. (2016). Factors related to Building Loss Due to Wildfires in the Conterminous United States. *Ecological Applications*, 0(0), 1-16.

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

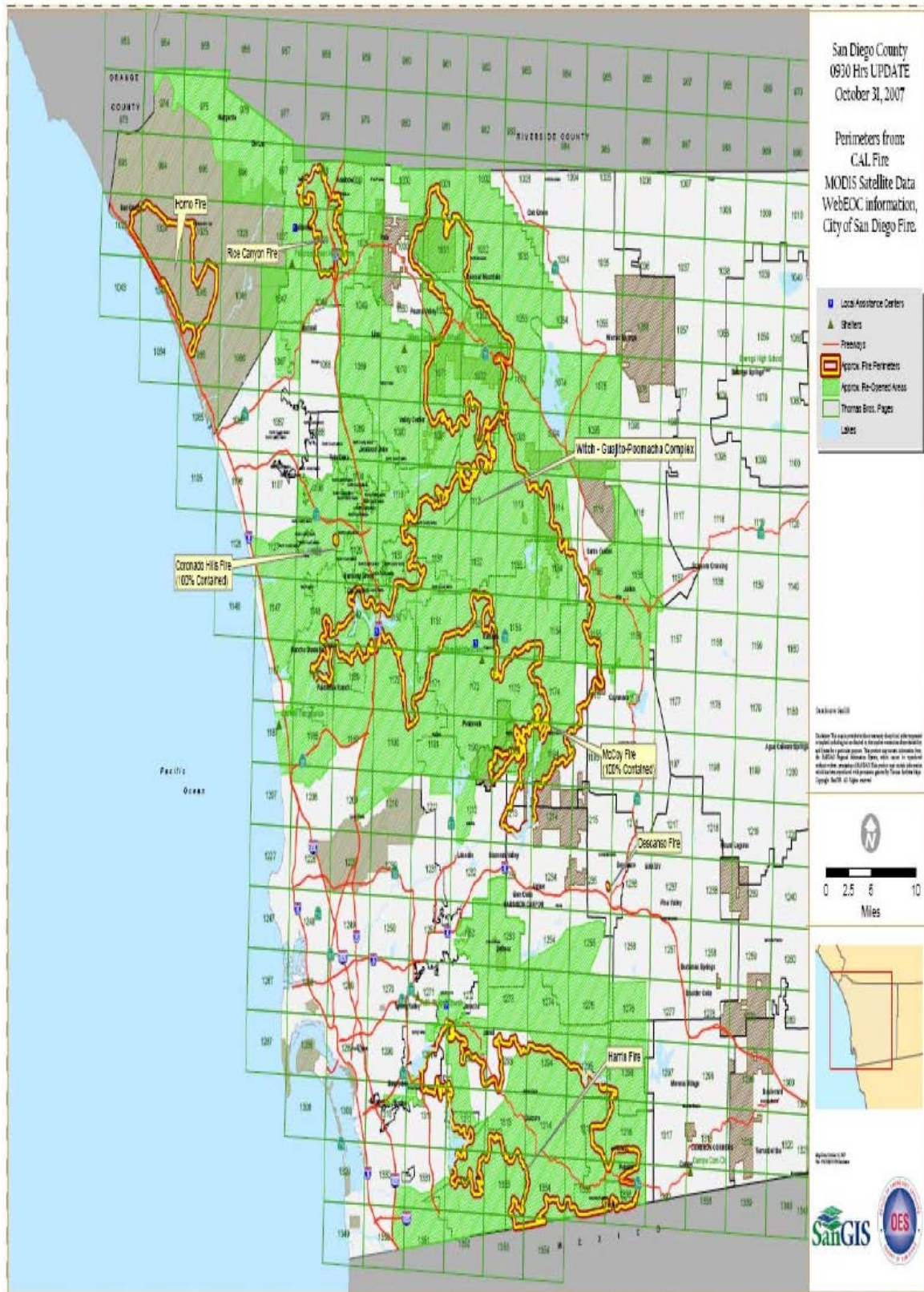


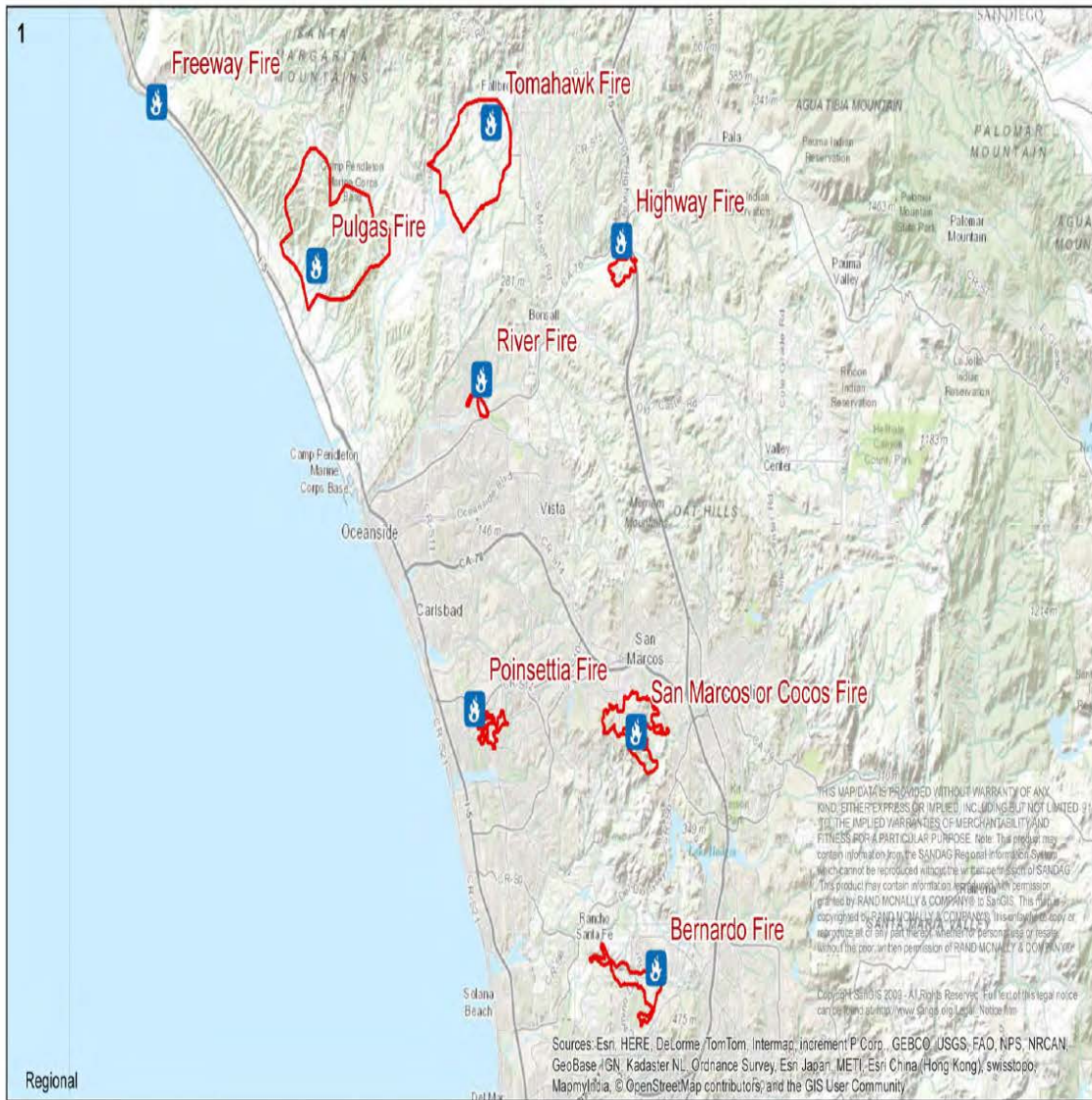






October 31, 2007 Wildfire Perimeter Map





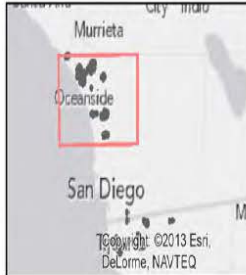
### Major North County Wildfires- May 2014



Official data is derived from SanMAPS, MODIS, CAL FIRE, GeoMAC, NICS, and WebEOC. All data stored in the program of record PA-ID 2340 County of San Diego Enterprise GIS system.

**Legend**

- Fire Name
- Fire Perimeter



Date: 6/10/2014

**2014 North County Wildfires Perimeter Map**



### 4.3.9 Extreme Heat

#### 4.3.9.1 Nature of the Hazard

Although extreme heat does not cause structural damage like floods, fires, and earthquakes, heat waves claim many lives due to heat exhaustion and heat stroke. According to a California Energy Commission Study, from 1994 to 2009, heat waves have claimed more lives in California than all declared disaster events combined.<sup>22</sup> Despite this history, not a single heat emergency was formally proclaimed at the state level or as a federal disaster between 1960 and 2008. The author of an account of a heat wave which killed 739 people in Chicago in July 1995 suggests that the hidden nature of social vulnerability combined with the inconspicuous nature of heat events (unlike floods, fires, and earthquakes) prevent them from being declared as legitimate disasters.<sup>23</sup> However, the California State Hazard Mitigation Plan considers extreme heat a legitimate disaster type.<sup>24</sup>

Extreme heat is exacerbated by the “urban heat island effect”, whereby impervious surfaces, such as concrete and asphalt, absorb heat and result in greater warming in urban areas compared to rural areas. Urban heat islands exacerbate the public health impacts that heat waves have upon the more vulnerable populations.<sup>25</sup> San Diego County has among the highest percentages of impervious surfaces in the states, increasing the potential impacts of heat islands.<sup>26</sup> In fact, Southern California’s urban centers are warming more rapidly than other parts of the state.<sup>27</sup>

Extreme heat events put vulnerable populations, such as the elderly, children, chronically ill, and people who work outside at risk of heat-related illnesses and even death. Extreme heat events highlight the importance of thoughtful social vulnerability analysis.<sup>28</sup> For example, socially isolated elderly persons are especially vulnerable. People who live in urban areas with high impervious surface coverage and no access to air conditioning are also especially vulnerable. In California, San Diego County ranks second, behind Los Angeles, in absolute numbers of the elderly and children less than five years of age. These two populations are most likely to suffer from heat-related illnesses and heat events.<sup>29</sup>

Extreme heat also has secondary impacts, such as power outages and poor air quality. Heat events, and the increased use of air conditioning, can lead to power outages, which makes the events even more

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<sup>22</sup> Messner, Steven, Sandra C. Miranda, Karen Green, Charles Phillips, Joseph Dudley, Dan Cayan, Emily Young. Climate Change Related Impacts in the San Diego Region by 2050. PIER Research Report, CEC-500-2009-027-D, Sacramento, CA: California Energy Commission. 2009.

<sup>23</sup> Klinenberg, Eric. *Heat Wave: A Social Autopsy of Disaster in Chicago*, The University of Chicago, 2002

<sup>24</sup> Governor’s Office of Emergency Services (2013) California Multi-Hazard Mitigation Plan

<sup>25</sup> Ibid.

<sup>26</sup> English et al. (2007). Executive Summary, Heat-Related Illness and Mortality Information for the Public Health Network in California

<sup>27</sup> Ibid.

<sup>28</sup> Governor’s Office of Emergency Services (2013) California Multi-Hazard Mitigation Plan

<sup>29</sup> English et al. (2007). Executive Summary, Heat-Related Illness and Mortality Information for the Public Health Network in California

dangerous.<sup>30</sup> Hotter temperatures may also lead to poorer air quality because ozone formation, a component of smog, increases with higher temperatures.<sup>31</sup>

#### **4.3.9.2 Disaster History**

Following the events of 2006 when there was a prolonged period of extreme heat across the state of California, San Diego County developed an Excess Heat Preparedness and Response Plan.<sup>32</sup>

According to the Spatial Hazard Events and Losses Database for the United States (SHELDUS) there have been four extreme heat events in San Diego in the past 18 years resulting in 4 heat related fatalities and 28 heat related injuries.

#### **4.3.9.3 Location and Extent/Probability of Occurrence and Magnitude**

San Diego is facing an increase in the frequency, duration, and strength of heat waves in the coming decades. While greater warming is expected in inland areas, residents of coastal areas are vulnerable when the temperature spikes, because they are less accustomed to the heat and they are less likely to have air conditioning. Research also indicates that heat waves are likely to become more humid in the future and with nighttime temperatures staying high, further stressing public health.<sup>33</sup> Extreme warm temperatures in the San Diego region mostly occur in July and August, but as climate warming takes hold, the occurrences of these events will likely begin in June and could continue to take place into September.<sup>34</sup>

The potential for extreme heat event is considered highly likely.

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<sup>30</sup> Ibid.

<sup>31</sup> USGCRP (2009). *Global Climate Change Impacts in the United States*. Karl, T.R., J.M. Melillo, and T.C. Peterson (eds.). United States Global Change Research Program. Cambridge University Press, New York, NY, USA.

<sup>32</sup> Messner, Steven, Sandra C. Miranda, Karen Green, Charles Phillips, Joseph Dudley, Dan Cayan, Emily Young. *Climate Change Related Impacts in the San Diego Region by 2050*. PIER Research Report, CEC-500-2009-027-D, Sacramento, CA: California Energy Commission. 2009.

<sup>33</sup> Gershunov, A., and K. Guirguis (2012), California heat waves in the present and future, *Geophysical Research Letters*, 39, L18710

<sup>34</sup> Messner, Steven, Sandra C. Miranda, Karen Green, Charles Phillips, Joseph Dudley, Dan Cayan, Emily Young. *Climate Change Related Impacts in the San Diego Region by 2050*. PIER Research Report, CEC-500-2009-027-D, Sacramento, CA: California Energy Commission. 2009.

### 4.3.10 Drought/Water Supply

#### 4.3.10.1 Location and Extent/Probability of Occurrence and Magnitude

##### *Climate Change and Drought/Water Supply*

Warming temperatures statewide could result in reduced water supply for the San Diego region. The State Water Project and Colorado River provide 75% to 95% of the water supply for the San Diego region, depending on the year.<sup>35</sup> Both of these water supplies originate in mountain snowpack. Over the past 50 years across most of the Southwest, there has been less late-winter precipitation falling as snow, earlier snowmelt, and earlier arrival of most of the year's streamflow.<sup>36</sup> Projections of further warming will result in reduced snowpack, which could translate into reduced water supply for the San Diego region's cities, agriculture, and ecosystems.<sup>37</sup> In fact, studies indicate that San Diego's sources of water could shrink by 20 percent or more by 2050.<sup>38</sup> An additional threat to water supply is the vulnerability of the levees protecting the California Delta, which feeds the State Water Project.<sup>39</sup> According to the California Adaptation Planning Guide, jurisdictions in the San Diego region must carefully consider the vulnerability of their water supply.<sup>40</sup>

At the same time that the San Diego region's water supply is likely to decrease, water demand is expected to increase approximately 29% by 2050 due to economic growth and population pressures.<sup>41</sup> Local water managers also report that higher temperatures could lead to increased demand for water for irrigation. Water shortages could become more frequent and more severe in the future, straining the local economy. The potential for drought in San Diego is highly likely.

Off-setting this slightly is the desalinization plant in Carlsbad. The plant, designed to produce 50 million gallons per day, is estimated to provide 8% of the regions water resources by 2020.

A U.S. Drought Monitor, using the Palmer Drought Severity Index, can be found at <http://droughtmonitor.unl.edu/>

#### 4.3.10.2 History of Drought in San Diego

The depression ear drought of 1929-1934 was the worst drought in California's history. Its impact was felt statewide. At that time San Diego was self-sufficient relying on local water supplies. The region would not begin to import water until 1947.

The drought of 1987-1992 was extremely severe and resulted in the Metropolitan Water District ordered a 50% reduction in water use. The San Diego County Water Authority actually considered banning outdoor water use. The rains of "Miracle March" in 1991 replenished rivers, reservoirs and the Sierra snowpack.

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<sup>35</sup> Ibid.

<sup>36</sup> Garfin, G., G. Franco, H. Blanco, A. Comrie, P. Gonzalez, T. Piechota, R. Smyth, and R. Waskom, 2014: Ch. 20: Southwest. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486. doi:10.7930/J08G8HMN.

<sup>37</sup> California Adaptation Planning Guide, Understanding Regional Characteristics (2012)

<sup>38</sup> San Diego's Changing Climate: A Regional Wake-Up Call. A Summary of the Focus 2050 Study Presented by The San Diego Foundation.

<sup>39</sup> California Adaptation Planning Guide, Understanding Regional Characteristics (2012)

<sup>40</sup> Ibid.

<sup>41</sup> San Diego's Changing Climate: A Regional Wake-Up Call. A Summary of the Focus 2050 Study Presented by The San Diego Foundation

Another drought occurred in 2007 and lasted until 2011. The latest drought that began in 2012 just ended in 2017 following a series of winter storms that brought heavy rainfall to the state.

### **4.3.11 Manmade Hazards**

#### **4.3.11.1 Nature of Hazard**

Manmade hazards are distinct from natural hazards in that they result directly from the actions of people. Two types of manmade hazards can be identified: technological hazards and terrorism. Technological hazards refer to incidents that can arise from human activities such as the manufacture, storage, transport, and use of hazardous materials, which include toxic chemicals, radioactive materials, and infectious substances. Technological hazards are assumed to be accidental and their consequences unintended. Terrorism, on the other hand, encompasses intentional, criminal, and malicious acts involving weapons of mass destruction (WMDs) or conventional weapons. WMDs can involve the deployment of biological, chemical, nuclear, and radiological weapons. Conventional weapons and techniques include the use of arson, incendiary explosives, armed attacks, intentional hazardous materials release, and cyber-terrorism (attack via computer).

#### ***Hazardous Materials***

Technological hazards involving hazardous material releases can occur at facilities (fixed site) or along transportation routes (off-site). They can occur as a result of human carelessness, technological failure, intentional acts, 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 particular facility or at any point along a known transportation corridor is relatively low, the consequences of releases of these materials can be very serious.

Some hazardous materials 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 are composed of atoms that are unstable. 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 in San Diego County including:

- by doctors to detect and treat serious diseases,
- by educational institutions and companies for research,
- by the military to power large ships and submarines.

With the shutdown of SONGS, radiological materials are no longer used to generate commercial electric power within San Diego County. However, the stored spent fuel that remains on site does pose a hazard.

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 body. The longer a person is exposed to radiation and the closer the person is to the radiation, the greater the risk. Although

radiation cannot be detected by the senses (sight, smell, etc.), it is easily detected by scientists 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 a number of serious international and domestic terrorist incidents during the 1990's and early 2000's, 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 (FBI) 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 utilize a wide variety of agents and delivery systems.

#### **4.3.11.2 Disaster History**

##### *Hazardous Material Releases*

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 biohazardous 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.

Numerous facilities in San Diego County generate hazardous wastes in addition to storing and using large numbers of hazardous materials. There are a total of 12,747 sites with permits to store and maintain chemical, biological and radiological agents, and explosives in the County. Although the scale is usually small, emergencies involving the release of these substances can occur daily at both these fixed sites and on the County's streets and roadways. The major transit corridors of Interstates 5 and 805 have been the locations of the majority of incidents the Hazardous Incident Response Team (HIRT) has responded to in recent years.

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 methylisocyanate 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 agency. 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.

Table 4.3-4 shows a breakdown by jurisdiction of facilities in the County with permits to store and maintain chemical, biological and radiological agents, and explosives. Facilities with EPA ID Numbers are facilities that generate hazardous waste.

**Table 4.3-4  
Licensed Hazardous Material Sites by Jurisdiction**

Jurisdiction	Facilities with County Environmental Health Hazardous Material Permits	Sites with Toxic/Radiologic Hazardous Materials or Large and Complex Sites	Sites with Flammable hazardous Materials
Carlsbad	409	4	0
Chula Vista	805	5	0
Coronado	77	0	0
Del Mar	47	0	0
El Cajon	679	2	0
Encinitas	290	0	0
Escondido	790	7	0
Imperial Beach	36	0	0
La Mesa	305	1	0
Lemon Grove	111	0	0
National City	369	2	0
Oceanside	523	2	0
Poway	311	0	0
San Diego	5,458	15	2
San Marcos	431	2	0
Santee	227	1	0
Solana Beach	63	0	0
Unincorporated	1,192	9	0
Vista	522	1	0
USMCB Camp Pendleton	102	0	0
<b>TOTAL</b>	<b>12,747</b>	<b>55</b>	<b>2</b>



Hazardous materials spills and releases in San Diego County have occurred as a result of clandestine drug manufacturing; spills from commercial, military and recreational vessels on the region's waterways; traffic accidents; sewer breaks and overflows; and various accidents/incidents related to the manufacture, use, and storage of hazardous materials by County industrial, commercial and government facilities. Although the following emergency response history for San Diego County chronicles various hazardous materials releases, the incidents do not necessarily indicate the degree of exposure to the public.

There were 504 responses to a hazardous materials release within San Diego County in 2014. Table 4.3-5 lists the numbers by jurisdiction.

**Table 4.3-5  
County of San Diego Environmental Health Department  
Hazardous Materials Division HIRT Responses in 2014**

City	Number of Hazardous Materials Releases
Carlsbad	18
Chula Vista	28
Coronado	1
Del Mar	2
El Cajon	26
Encinitas	9
Escondido	22
Imperial Beach	7
La Mesa	8
Lemon Grove	5
National City	15
Oceanside	16
Poway	8
San Diego	220
San Marcos	7
Santee	12
Solana Beach	0
Unincorporated	86
Vista	14
<b>TOTAL RESPONSES IN 2014</b>	<b>504</b>

There has not been significant exposure to the public in San Diego County due to manmade releases of chemical or biological agents, although there have been several smaller-scale incidents. Chemical spills and releases from transportation and industrial accidents have resulted in short-term chemical exposure to individuals in the vicinity of the release. San Diego beaches are routinely closed because of sewage spills and storm run-off. Bacterial levels can increase significantly in ocean and bay waters, especially near storm drain, river, and lagoon outlets, during and after rainstorms. Elevated bacterial levels may continue for a period of up to 3 days depending upon the intensity of rainfall and volume of runoff.

Waters contaminated by urban runoff may contain human pathogens (bacteria, viruses, or protozoa) that can cause illnesses.

San Diego experienced its first significant E. coli bacteria outbreak in 10 years after patrons ate tainted food at local area restaurants in 2003. In 1992 and 1993 a similar outbreak occurred in San Diego County, which resulted in the death of a child after he ate tainted food from a Carlsbad fast-food restaurant. Additionally, in the early 1980s a hepatitis outbreak associated with poor food handling techniques resulting in the closure of a major restaurant in Mission Valley and the implementation of a food-handler certification program by the San Diego County Health Department.

The only known release of radiological agents 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 San Onofre Nuclear Generating Station (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.

### *Terrorism*

While San Diego County has not experienced any high profile attacks by groups or individuals associated with international terrorist organizations, the region has been the site of several incidents with domestic origins. Most notable is the August 1, 2003 arson attack on a mixed-use housing and office development under construction in the University City neighborhood. The blaze, which officials estimate caused around \$50 million in damage, was allegedly set by the Earth Liberation Front, a radical environmentalist group.

San Diego has been linked to the 9-11 attacks in New York City and on the Pentagon; two of the confirmed hijackers of the commercial aircraft used in the attacks took flight school lessons while living in San Diego.

San Diego County has received numerous bomb threats to schools, government buildings, religious sites, and commercial facilities over the years. While the majority of bomb threats are hoaxes, authorities have been required to mobilize resources and activate emergency procedures on a fairly regular basis in response.

### *Other Manmade Disasters*

On September 25th, 1978 San Diego was the scene of one of the worst air disasters in the United States. A mid-air collision between a Cessna 172 and a Pacific Southwest Airlines (PSA) Boeing 727 caused both planes to crash into the North Park neighborhood below. A total of 144 lives were lost including 7 people on the ground. More than 20 residences were damaged or destroyed.

In 1984, a gunman opened fire in a San Ysidro McDonald's restaurant, killing 21 people. This event was not considered an act of terrorism as no political or social objectives were associated with this event.

#### **4.3.11.3 Location and Extent/Probability of Occurrence and Magnitude**

Information related to the probability and magnitude of manmade hazards is considered sensitive homeland security related information. Consequently, this information is provided in a separate confidential document (Attachment C). The potential for a man-made event is highly likely.

### **4.4 Vulnerability Assessment**

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, contents and the economic value of its functions. This vulnerability analysis predicts the extent of injury and damage that may result from a hazard event of a given intensity in a given area on the existing and future built environment. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. Indirect effects can be much more widespread and damaging than direct effects. For example, damage to a major utility line could result in significant inconveniences and business disruption that would far exceed the cost of repairing the utility line.

#### **4.4.1 Asset Inventory**

Hazards that occur in San Diego County can impact critical facilities located in the County. A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions. Figure 4.4-1 shows the critical facilities identified for the County. The critical facilities identified in San Diego County include 57 hospitals and other health care facilities; 289 emergency operations facilities, fire stations, and police stations; 1,057 schools, 3,732 hazardous material sites, 7 transportation systems that include 46 airport facilities, 1,985 bridges, 23 bus and 40 rail facilities; 68 marinas and port facilities, and 1,040 kilometers of highways; utility systems that include 21 electric power facilities, natural gas facilities, crude and refined oil facilities, 13 potable and waste water facilities, and 672 communications facilities and utilities; 56 dams, 124 government office/civic centers, jails, prisons, military facilities, religious facilities, and post offices (Figure 4.4.1).

GIS, HAZUS-MH, and other modeling tools were used to map the critical facilities in the county and to determine which would most likely be affected by each of the profiled hazards. San Diego County covers 4,264 square miles with several different climate patterns and types of terrain, which allows for several hazards to affect several different parts of the county and several jurisdictions at once or separately. The hazards addressed are described in Section 4.3.

#### **4.4.2 Estimating Potential Exposure and Losses, and Future Development Trends**

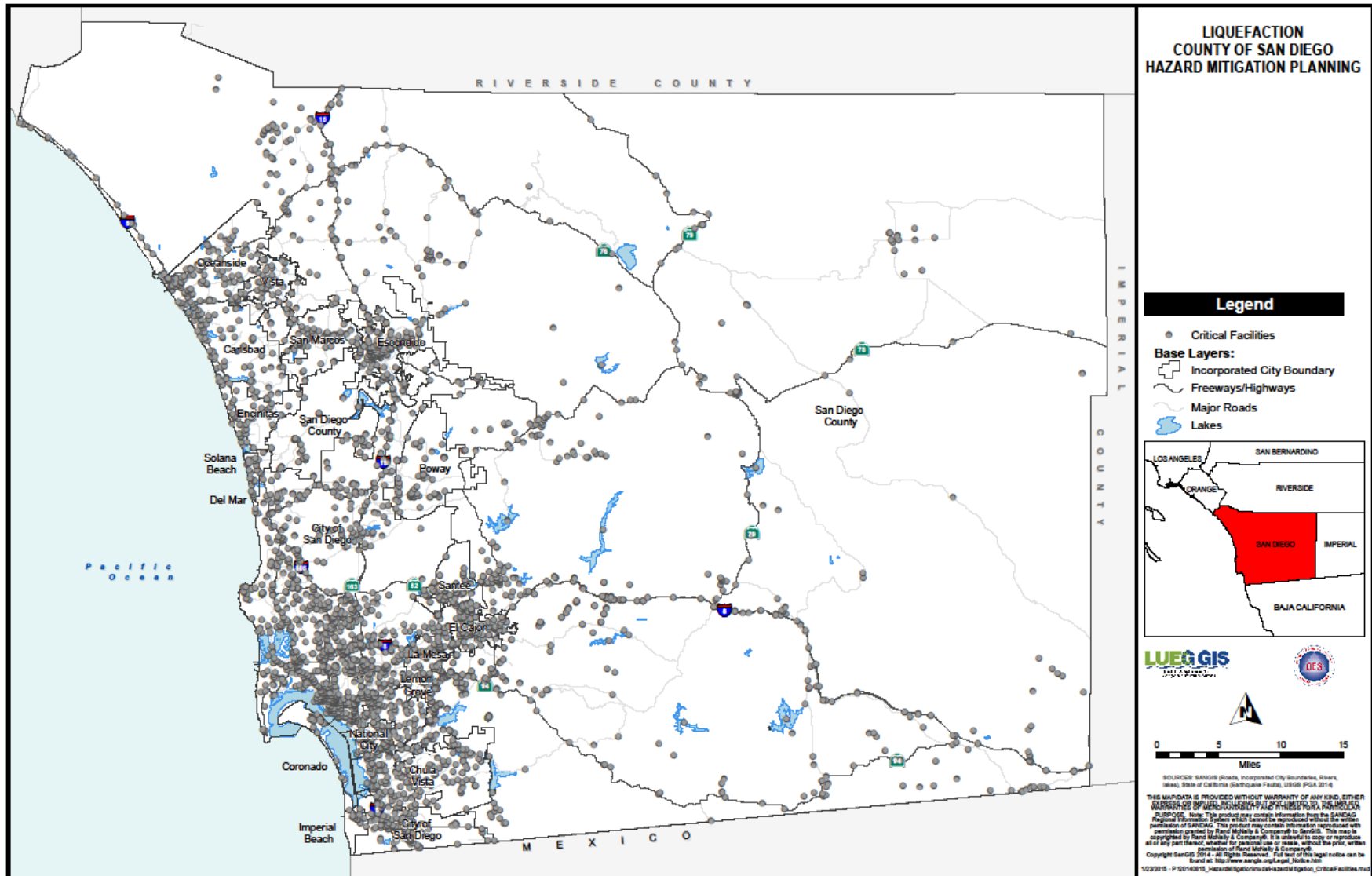
GIS modeling was used to estimate exposure to population, critical facilities, infrastructure, and residential/commercial properties, from coastal storms/erosion, tsunami, structure fire/wildfire, dam failure, landslide, and manmade hazards. The specific methods and results of all analyses are presented below. The results are shown as potential exposure in thousands of dollars, and as the worst-case scenario. For infrastructure, which has been identified as highways, railways and energy pipelines, the length of

exposure/impact is given in kilometers. Exposure characterizes the value of structures within the hazard zone, and is shown as estimated exposure based on the overlay of the hazard on the critical facilities, infrastructure, and other structures, which are given an assumed cost of replacement for each type of structure exposed. These replacement costs are estimated using a building square footage inventory purchased from Dun and Bradstreet. The square footage information was classified based on Standard Industrial Code (SIC) and provided at a 2002 census-tract resolution. The loss or exposure value is then determined with the assumption that the given structure is totally 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 jurisdiction. Table 4.4-1 provides abbreviations and average replacement costs used for critical facilities and infrastructure listed in all subsequent exposure/loss tables. Table 4.4-2 provides the total inventory and exposure estimates for the critical facilities and infrastructure by jurisdiction. Table 4.4-3 shows the estimated exposure inventory for infrastructure by jurisdiction. Table 4.4-4 provides an inventory of the maximum population and building exposure by jurisdiction.

In addition to estimating potential exposure for structures, at-risk populations were also identified per hazard area. At-risk populations were defined as low-income, disabled and/or elderly and were based upon the 2000 census information.

Loss was estimated for earthquake and flood hazards in the County, in addition to exposure. Loss is that portion of the exposure that is expected to be lost to a hazard, and is estimated by referencing frequency and severity of previous hazards. Hazard risk assessment methodologies embedded in HAZUS, FEMA's loss estimation software, were applied to earthquake and flood hazards in San Diego County. HAZUS (a loss estimation software) integrates with GIS to provide estimates for the potential impact of earthquake and flood hazards by using a common, systematic framework for evaluation. This software contains economic and structural data on infrastructure and critical facilities, including replacement value costs with 2006 square footage and valuation parameters to use in loss estimation assumptions. This approach provides estimates for the potential impact by using a common, systematic framework for evaluation. The HAZUS risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g. ground shaking and building types) were modeled to determine the impact (damages and losses) on the built environment. The HAZUS-MH models were used to estimate losses from earthquake and flood hazards to critical facilities, infrastructure, and residential/commercial properties, as well as economic losses on several return period events and annualized levels. Loss estimates used available data, and the methodologies applied resulted in an approximation of risk. The economic loss results are presented as the Annualized Loss (AL) for the earthquake hazard. AL addresses the two key components of risk: the probability of the hazard occurring in the study area and the consequences of the hazard, largely a function of building construction type and quality, and of the intensity of the hazard event. By annualizing estimated exposure values, the AL takes into account historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk. These estimates should be used to understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (such as incomplete inventories, demographics, or economic parameters).

Figure 4.4.1



**Table 4.4-1  
Abbreviations and Costs Used for Critical Facilities and Infrastructure**

Abr.	Name	Building Type (where applicable)	Average Replacement Cost
AIR	Airport facilities	s1l	200,000,000
BRDG	Bridges	n/a	191,600
BUS	Bus facilities	c1l	2,000,000
COM	Communication facilities and Utilities	c1l	2,000,000
ELEC	Electric Power facility	c1l	10,000,000
EMER	Emergency Centers, Fire Stations and Police Stations	c1l	2,000,000
GOVT	Government Office/Civic Center	c1l	2,000,000
HOSP	Hospitals/Care facilities	s1m	100,000,000
INFR	Kilometers of Infrastructure. Includes:		
	Oil/Gas Pipelines (OG)	n/a	300
	Railroad Tracks (RR)	n/a	860
	Highway (HWY)	n/a	3,860
PORT	Port facilities	c1l	20,000,000
POT	Potable and Waste Water facilities	c1l	100,000,000
RAIL	Rail facilities	c1l	2,000,000
SCH	Schools	rm1l	1,000,000

**Table 4.4-2  
Inventory of Critical Facilities and Infrastructure and Exposure Value by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	RAIL	SCH	TOTAL
Carlsbad	Number	1	33	0	2	1	7	5	2	153	0	2	0	33	239
	Exposure (x\$1000)	200,000	6,323	0	4,000	10,000	14,000	10,000	200,000	247	0	200,000	0	33,000	677,570
Chula Vista	Number	0	44	2	2	1	13	9	7	119	1	1	0	75	274
	Exposure (x\$1000)	0	8,430	4,000	4,000	10,000	26,000	18,000	700,000	255	20,000	100,000	0	75,000	965,686
Coronado	Number	0	2	0	1	0	3	4	1	28	0	0	0	9	48
	Exposure (x\$1000)	0	383	0	2,000	0	6,000	8,000	100,000	51	0	0	0	9,000	125,434
Del Mar	Number	0	5	0	0	0	1	2	0	14	0	0	0	2	24
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	10	0	0	0	2,000	8,968
El Cajon	Number	1	37	1	2	1	8	7	6	64	0	0	0	47	174
	Exposure (x\$1000)	200,000	7,089	2,000	4,000	10,000	16,000	14,000	600,000	161	0	0	0	47,000	900,250
Encinitas	Number	0	16	0	1	0	6	3	3	85	0	1	7	25	147
	Exposure (x\$1000)	0	3,066	0	2,000	0	12,000	6,000	300,000	145	0	100,000	14,000	25,000	462,211
Escondido	Number	0	74	1	4	0	8	8	8	83	0	1	1	46	234
	Exposure (x\$1000)	0	14,178	2,000	8,000	0	16,000	16,000	800,000	211	0	100,000	2,000	46,000	1,004,389
Imperial Beach	Number	0	1	0	0	0	2	2	2	4	0	0	0	8	19
	Exposure (x\$1000)	0	192	0	0	0	4,000	4,000	200,000	2	0	0	0	8,000	216,194
La Mesa	Number	0	36	0	1	0	4	4	2	53	0	0	0	25	125
	Exposure (x\$1000)	0	6,898	0	2,000	0	8,000	8,000	200,000	113	0	0	0	25,000	250,011
Lemon Grove	Number	0	8	0	0	0	2	3	0	24	0	0	0	10	47
	Exposure (x\$1000)	0	1,533	0	0	0	4,000	6,000	0	60	0	0	0	10,000	21,593
National City	Number	0	47	1	1	2	4	4	7	37	5	1	3	20	132
	Exposure (x\$1000)	0	9,005	2,000	2,000	20,000	8,000	8,000	700,000	88	100,000	100,000	6,000	20,000	975,093
Oceanside	Number	1	43	2	4	0	10	12	11	124	0	1	8	43	259
	Exposure (x\$1000)	200,000	8,239	4,000	8,000	0	20,000	24,000	1,100,000	250	0	100,000	16,000	43,000	1,523,489
Poway	Number	0	45	1	0	0	4	2	1	34	0	0	0	25	112
	Exposure (x\$1000)	0	8,622	2,000	0	0	8,000	4,000	100,000	98	0	0	0	25,000	147,720
San Diego (City)	Number	4	498	12	33	9	89	98	50	959	62	2	5	361	2,182
	Exposure (x\$1000)	800,000	95,417	24,000	66,000	90,000	178,000	196,000	5,000,000	2,168	1,240,000	200,000	10,000	361,000	8,262,585
San Marcos	Number	0	12	0	2	0	8	3	2	59	0	0	2	28	116
	Exposure (x\$1000)	0	2,299	0	4,000	0	16,000	6,000	200,000	149	0	0	4,000	28,000	260,448
Santee	Number	0	15	1	4	0	4	3	0	33	0	1	0	15	76
	Exposure (x\$1000)	0	2,874	2,000	8,000	0	8,000	6,000	0	72	0	100,000	0	15,000	141,946
Solana Beach	Number	0	5	0	0	0	1	2	0	28	0	0	1	9	46
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	46	0	0	2,000	9,000	18,004
Unincorporated - Rural	Number	33	227	2	44	3	100	3	15	1,334	0	0	0	86	1,847
	Exposure (x\$1000)	6,600,000	43,493	4,000	88,000	30,000	200,000	6,000	1,500,000	4,402	0	0	0	86,000	8,561,895
Unincorporated - Urban Core	Number	0	117	0	12	0	40	7	10	320.3	0	1	2	115	624
	Exposure (x\$1000)	0	22417.2	0	24000	0	80000	14000	1000000	597.25	0	100000	4000	115000	1,360,014
Vista	Number	0	12	0	0	0	9	4	3	53	0	0	10	40	131
	Exposure (x\$1000)	0	2,299	0	0	0	18,000	8,000	300,000	101	0	0	20,000	40,000	388,400
<b>Total Number</b>		<b>40</b>	<b>1,277</b>	<b>23</b>	<b>113</b>	<b>17</b>	<b>323</b>	<b>185</b>	<b>130</b>	<b>12,749</b>	<b>68</b>	<b>11</b>	<b>39</b>	<b>1,022</b>	<b>15,997</b>
<b>Total Exposure (x\$1000)</b>		<b>8,000,000</b>	<b>244,673</b>	<b>46,000</b>	<b>226,000</b>	<b>170,000</b>	<b>646,000</b>	<b>370,000</b>	<b>13,000,000</b>	<b>42,540</b>	<b>1,360,000</b>	<b>1,100,000</b>	<b>78,000</b>	<b>1,022,000</b>	<b>26,305,213</b>

**Table 4.4-3  
Inventory of Exposure for Infrastructure**

<b>Jurisdiction</b>	<b>Data</b>	<b>HWY</b>	<b>Replacen</b>	<b>RR</b>	<b>Total</b>
Carlsbad	Number	55	87	11	153
	Exposure (x\$1000)	212	26	9	247
Chula Vista	Number	61	52	6	119
	Exposure (x\$1000)	234	15	6	255
Coronado	Number	12	16	0	28
	Exposure (x\$1000)	46	5	0	51
Del Mar	Number	1	8	5	14
	Exposure (x\$1000)	3	3	4	10
El Cajon	Number	39	19	7	64
	Oil/Gas Pipeplines	150	6	6	161
Encinitas	Railroad Tracks	32	43	10	85
	Exposure (x\$1000)	124	13	8	145
Escondido	Number	52	27	3	83
	Exposure (x\$1000)	200	8	3	211
Imperial Beach	Number	0	4	0	4
	Exposure (x\$1000)	1	1	0	2
La Mesa	Number	26	16	12	53
	Exposure (x\$1000)	99	5	10	113
Lemon Grove	Number	14	6	4	24
	Exposure (x\$1000)	54	2	4	60
National City	Number	21	12	4	37
	Exposure (x\$1000)	81	4	4	88
Oceanside	Number	57	49	18	124
	Exposure (x\$1000)	220	15	15	250
Poway	Number	25	9	0	34
	Exposure (x\$1000)	95	3	0	98
San Diego (City)	Number	514	354	92	959
	Exposure (x\$1000)	1,983	106	79	2,168
San Marcos	Number	35	15	9	59
	Exposure (x\$1000)	136	4	8	149
Santee	Number	17	15	1	33
	Exposure (x\$1000)	67	4	1	72
Solana Beach	Number	10	15	3	28
	Exposure (x\$1000)	40	4	2	46
Unicorporated - Rural	Number	1,107	117	110	1,334
	Exposure (x\$1000)	4,272	35	94	4,402
Unicorporated - Urban Core	Number	136	152	33	320
	Exposure (x\$1000)	523	46	28	597
Vista	Number	23	24	7	53
	Exposure (x\$1000)	88	7	6	101
<b>Total Number</b>		<b>10,777</b>	<b>1,352</b>	<b>620</b>	<b>12,749</b>
<b>Total Exposure (x\$1000)</b>		<b>41,601</b>	<b>405</b>	<b>533</b>	<b>42,540</b>



**Table 4.4-4  
Inventory of the Maximum Population and Building Exposure by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	104,707	43,723	\$12,308,025	1,559	\$6,986,970
Chula Vista	232,095	77,457	\$21,804,146	2,184	\$9,788,033
Coronado	23,009	9,541	\$2,685,792	470	\$2,106,399
Del Mar	4,591	2,537	\$714,166	220	\$985,974
El Cajon	98,205	35,656	\$10,037,164	1,360	\$6,095,112
Encinitas	64,145	24,848	\$6,994,712	1,268	\$5,682,796
Escondido	143,071	47,044	\$13,242,886	1,835	\$8,223,920
Imperial Beach	28,243	9,859	\$2,775,309	346	\$1,550,668
La Mesa	56,880	25,333	\$7,131,240	952	\$4,266,578
Lemon Grove	25,650	8,824	\$2,483,956	365	\$1,635,821
National City	56,522	15,776	\$4,440,944	892	\$3,997,676
Oceanside	179,626	64,642	\$18,196,723	1,964	\$8,802,059
Poway	51,126	16,339	\$4,599,429	732	\$3,280,604
San Diego (City)	1,354,013	510,740	\$143,773,310	18,862	\$84,533,825
San Marcos	83,149	27,726	\$7,804,869	812	\$3,639,140
Santee	56,848	19,681	\$5,540,202	582	\$2,608,349
Solana Beach	13,547	6,512	\$1,833,128	322	\$1,443,107
Unincorporated - Rural	168,254	60,561	\$17,047,922	2,177	\$9,756,661
Unincorporated - Urban Core	333,626	108,042	\$30,413,823	3,560	\$15,954,852
Vista	96,100	30,707	\$8,644,021	1,163	\$5,212,217
<b>Total</b>	<b>3,173,407</b>	<b>1,145,548</b>	<b>\$322,471,762</b>	<b>41,625</b>	<b>\$186,550,763</b>

**4.4.2.1 Coastal Storm/Erosion**

FEMA FIRM flood hazard data compiled and digitized in 1997 was used to profile the coastal storm/erosion hazard. Specifically, the FEMA FIRM VE zone was used in the hazard modeling process in HAZUS-MH. As discussed earlier, the VE Zone is defined by FEMA as the coastal area subject to a velocity hazard (wave action). The identified vulnerable assets were superimposed on the identified hazard areas, resulting in three risk/exposure estimates: 1) the aggregated exposure and building count (both dollar exposure and population) at the census block level for residential and commercial occupancies, 2) lifeline infrastructure and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). These results were then aggregated and presented by hazard risk level per jurisdiction.

Table 4.4-5 provides a breakdown of potential coastal storm/coastal erosion exposure by jurisdiction. No losses to critical facilities and infrastructure are expected from these hazards. Approximately 4,600 people may be at risk from coastal storm/coastal erosion hazards in San Diego County. In addition, special populations at risk that may be impacted by coastal storm/coastal erosion in San Diego County include: 331 low-income households and 813 elderly persons.

**Table 4.4-5  
Potential Exposure from Coastal Storm/Erosion Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	14	8	\$2,252	0	\$0
Chula Vista	0	0	\$0	0	\$0
Coronado	580	261	\$73,472	1	\$4,482
Del Mar	17	10	\$2,815	0	\$0
El Cajon	0	0	\$0	0	\$0
Encinitas	94	42	\$11,823	0	\$0
Escondido	0	0	\$0	0	\$0
Imperial Beach	157	64	\$18,016	0	\$0
La Mesa	0	0	\$0	0	\$0
Lemon Grove	0	0	\$0	0	\$0
National City	0	0	\$0	0	\$0
Oceanside	76	54	\$15,201	3	\$13,445
Poway	0	0	\$0	0	\$0
San Diego (City)	199	128	\$36,032	1	\$4,482
San Marcos	0	0	\$0	0	\$0
Santee	0	0	\$0	0	\$0
Solana Beach	402	167	\$47,011	2	\$8,963
Unincorporated - Rural	0	0	\$0	0	\$0
Unincorporated - Urban Core	0	0	\$0	0	\$0
Vista	0	0	\$0	0	\$0
<b>Total</b>	<b>1,539</b>	<b>734</b>	<b>\$206,621</b>	<b>7</b>	<b>\$31,372</b>

**4.4.2.2 Tsunami**

Tsunami maximum run-up projections were modeled for the entire San Diego County coastline in 2000 by the University of Southern California, and distributed by the CA Office of Emergency Services. The model was a result of a combination of inundation modeling and onsite surveys to show maximum predicted inundation levels due to tsunami. This was a scenario model, which uses a given earthquake intensity and location to determine resulting tsunami effects. The identified vulnerable assets were superimposed on top of this information, resulting in three risk/exposure estimates: 1) the aggregated exposure and building count (both dollar exposure and population) at the census block level for residential and commercial occupancies, 2) the aggregated population at risk at the census block level, and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). These results were then aggregated and presented by hazard risk level per jurisdiction.

Table 4.4-6 provides a breakdown of potential exposure by jurisdiction, and Table 4.4-7 provides a breakdown of potential exposure to infrastructure and critical facility by jurisdiction. Approximately 37,000 people may be at risk from the tsunami hazard in San Diego County. In addition, special populations at risk that may be impacted by tsunami in San Diego County include: 2,558 low income households and 3,655 elderly persons.

**Table 4.4-6  
Potential Exposure from Tsunami Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	1,165	535	\$150,603	23	\$103,079
Chula Vista	83	26	\$7,319	1	\$4,482
Coronado	8,523	3,367	\$947,811	98	\$439,207
Del Mar	1,023	542	\$152,573	35	\$156,860
El Cajon	0	0	\$0	0	\$0
Encinitas	388	178	\$50,107	9	\$40,335
Escondido	0	0	\$0	0	\$0
Imperial Beach	5,225	2,138	\$601,847	97	\$434,725
La Mesa	0	0	\$0	0	\$0
Lemon Grove	0	0	\$0	0	\$0
National City	1,306	0	\$0	5	\$22,409
Oceanside	2,108	1,059	\$298,109	46	\$206,158
Poway	0	0	\$0	0	\$0
San Diego (City)	10,294	6,490	\$1,826,935	393	\$1,761,308
San Marcos	0	0	\$0	0	\$0
Santee	0	0	\$0	0	\$0
Solana Beach	324	135	\$38,003	3	\$13,445
Unincorporated - Rural	5,154	95	\$26,743	0	\$0
Unincorporated - Urban Core	35	11	\$3,097	1	\$4,482
Vista	0	0	\$0	0	\$0
<b>Total</b>	<b>35,628</b>	<b>14,576</b>	<b>\$4,103,144</b>	<b>711</b>	<b>\$3,186,489</b>

**Table 4.4-7  
Potential Exposure to Critical Facilities and Infrastructure from Tsunami Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	2	0	0	0	0	0	0	4	0	0	0	0	0	6
	Exposure (x \$1000)	0	383	0	0	0	0	0	0	3	0	0	0	0	0	386
Chula Vista	Number	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
	Exposure (x \$1000)	0	192	0	0	0	0	0	0	0	20,000	0	0	0	0	20,192
Coronado	Number	0	1	0	0	0	1	2	0	18	0	0	0	0	1	23
	Exposure (x \$1000)	0	192	0	0	0	2,000	4,000	0	36	0	0	0	0	1,000	7,227
Del Mar	Number	0	2	0	0	0	1	0	0	3	0	0	0	0	0	6
	Exposure (x \$1000)	0	383	0	0	0	2,000	0	0	2	0	0	0	0	0	2,385
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	1	0	0	0	0	0	0	3	0	1	0	0	0	5
	Exposure (x \$1000)	0	192	0	0	0	0	0	0	1	0	100,000	0	0	0	100,193
Escondido	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imperial Beach	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	1	0	0	0	0	1,000	1,001
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	2	0	0	0	0	0	0	0	3	0	0	0	0	5
	Exposure (x \$1000)	0	383	0	0	0	0	0	0	1	60,000	0	0	0	0	60,384
Oceanside	Number	0	3	0	0	0	0	0	0	2	0	0	0	0	0	5
	Exposure (x \$1000)	0	575	0	0	0	0	0	0	3	0	0	0	0	0	578
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	7	0	0	0	0	1	1	10	49	0	0	0	0	68
	Exposure (x \$1000)	0	1,341	0	0	0	0	2,000	100,000	5	980,000	0	0	0	0	1,083,347
San Marcos	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santee	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	0	4	0	0	0	0	0	0	1	0	0	0	0	0	5
	Exposure (x \$1000)	0	766	0	0	0	0	0	0	1	0	0	0	0	0	768
Unincorporated Urban Core	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x \$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Number</b>		<b>0</b>	<b>23</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>42</b>	<b>53</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>127</b>
<b>Total Exposure (x\$1000)</b>		<b>0</b>	<b>4,407</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,000</b>	<b>6,000</b>	<b>100,000</b>	<b>55</b>	<b>1,060,000</b>	<b>100,000</b>	<b>0</b>	<b>0</b>	<b>2,000</b>	<b>1,276,462</b>

(Refer to Table 4.4-1 for abbreviation definition)

**4.4.2.3 Dam Failure**

Dam inundation zones, compiled by FEMA or the National Inventory of Dams throughout San Diego County, and purchased through SanGIS, show areas that would be flooded if each dam failed. The San Diego County Water Authority provided the San Vicente Dam and Olivenhain Dam inundation maps. Olivenhain Dam is the newest dam in San Diego County, and had not yet been filled at the time of preparation of this report. Inundation areas for Olivenhain Dam however were identified and modeled as high risk. The identified vulnerable assets were superimposed on top of this information, resulting in three risk/exposure estimates: 1) the aggregated exposure and building count (both dollar exposure and population) at the census block level for residential and commercial occupancies, 2) the aggregated population at risk at the census block level, and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). These results were then aggregated and presented by hazard risk level per jurisdiction.

Table 4.4-8 provides a breakdown of potential exposure by jurisdiction, and Table 4.4-9 provides a breakdown of potential exposure to infrastructure and critical facility by jurisdiction. Approximately 368,000 people are at risk from the dam failure hazard. In addition, special populations at risk that may be impacted by the dam failure hazard in San Diego County include 13,689 low-income households and 24,316 elderly persons.

**Table 4.4.8  
Potential Exposure from Dam Failure Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	4,113	1,951	\$549,207	49	\$219,603
Chula Vista	8,635	2,973	\$836,900	190	\$851,523
Coronado	0	0	\$0	0	\$0
Del Mar	1,139	612	\$172,278	47	\$210,640
El Cajon	0	0	\$0	0	\$0
Encinitas	1,204	425	\$119,638	35	\$156,860
Escondido	47,700	14,323	\$4,031,925	766	\$3,432,982
Imperial Beach	5,526	1,880	\$529,220	42	\$188,231
La Mesa	1,701	731	\$205,777	19	\$85,152
Lemon Grove	0	0	\$0	0	\$0
National City	1,998	496	\$139,624	184	\$824,633
Oceanside	33,755	11,437	\$3,219,516	285	\$1,277,285
Poway	47	16	\$4,504	1	\$4,482
San Diego (City)	75,686	28,036	\$7,892,134	1,206	\$5,404,930
San Marcos	2,481	829	\$233,364	59	\$264,420
Santee	20,815	6,968	\$1,961,492	267	\$1,196,614
Solana Beach	40	17	\$4,786	2	\$8,963
Unincorporated - Rural	14,512	3,686	\$1,037,609	135	\$605,030
Unincorporated - Urban Core	21,862	7,304	\$2,056,076	277	\$1,241,431
Vista	553	215	\$60,523	16	\$71,707
<b>Total</b>	<b>241,767</b>	<b>81,899</b>	<b>\$23,054,569</b>	<b>3,580</b>	<b>\$16,044,486</b>



**Table 4.4-9  
Potential Exposure to Critical Facilities and Infrastructure  
from Dam Failure Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	4	0	0	0	0	0	0	7	0	0	0	0	1	12
	Exposure (x\$1000)	0	766	0	0	0	0	0	0	9	0	0	0	0	1,000	1,775
Chula Vista	Number	0	16	0	0	1	1	1	2	23	0	0	0	0	1	45
	Exposure (x\$1000)	0	3,066	0	0	10,000	2,000	2,000	200,000	60	0	0	0	0	1,000	218,126
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	3	0	0	0	1	0	0	9	0	0	0	0	0	13
	Exposure (x\$1000)	0	575	0	0	0	2,000	0	0	5	0	0	0	0	0	2,579
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	5	0	0	0	0	0	0	19	0	1	0	0	3	28
	Exposure (x\$1000)	0	958	0	0	0	0	0	0	13	0	100,000	0	0	3,000	103,971
Escondido	Number	0	33	1	1	0	4	8	6	48	0	0	1	1	15	118
	Exposure (x\$1000)	0	6,323	2,000	2,000	0	8,000	16,000	600,000	149	0	0	100,000	2,000	15,000	751,472
Imperial Beach	Number	0	1	0	0	0	0	1	0	3	0	0	0	0	1	6
	Exposure (x\$1000)	0	192	0	0	0	0	2,000	0	1	0	0	0	0	1,000	3,192
La Mesa	Number	0	2	0	0	0	0	0	0	9	0	0	0	0	0	11
	Exposure (x\$1000)	0	383	0	0	0	0	0	0	12	0	0	0	0	0	395
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	26	0	0	0	0	1	0	22	1	0	0	1	2	53
	Exposure (x\$1000)	0	4,982	0	0	0	0	2,000	0	63	20,000	0	0	2,000	2,000	31,044
Oceanside	Number	1	17	0	1	0	3	2	0	25	0	0	0	0	7	56
	Exposure (x\$1000)	200,000	3,257	0	2,000	0	6,000	4,000	0	62	0	0	0	0	7,000	222,319
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	120	0	1	1	8	12	2	286	0	1	0	1	12	444
	Exposure (x\$1000)	0	22,992	0	2,000	10,000	16,000	24,000	200,000	605	0	100,000	0	2,000	12,000	389,597
San Marcos	Number	0	1	0	0	0	0	0	0	3	0	0	0	0	2	6
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	4	0	0	0	0	2,000	2,196
Santee	Number	0	12	1	3	0	4	2	0	67	0	1	0	0	6	96
	Exposure (x\$1000)	0	2,299	2,000	6,000	0	8,000	4,000	0	130	0	100,000	0	0	6,000	128,429
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	1	42	0	1	0	5	0	0	68	0	0	1	0	5	123
	Exposure (x\$1000)	200,000	8,047	0	2,000	0	10,000	0	0	211	0	0	100,000	0	5,000	325,258
Unincorporated Urban Core	Number	0	22	0	0	0	6	2	2	76	0	0	0	0	15	123
	Exposure (x\$1000)	0	4,215	0	0	0	12,000	4,000	200,000	140	0	0	0	0	15,000	235,356
Vista	Number	0	2	0	0	0	1	0	0	1	0	0	0	0	0	4
	Exposure (x\$1000)	0	383	0	0	0	2,000	0	0	0	0	0	0	0	0	2,384
<b>Total Number</b>		<b>2</b>	<b>306</b>	<b>2</b>	<b>7</b>	<b>2</b>	<b>33</b>	<b>29</b>	<b>12</b>	<b>664</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>70</b>	<b>1,136</b>
<b>Total Exposure (x\$1000)</b>		<b>400,000</b>	<b>58,630</b>	<b>4,000</b>	<b>14,000</b>	<b>20,000</b>	<b>66,000</b>	<b>58,000</b>	<b>1,200,000</b>	<b>1,465</b>	<b>20,000</b>	<b>300,000</b>	<b>200,000</b>	<b>6,000</b>	<b>70,000</b>	<b>2,418,094</b>

Refer to Table 4.4-1 for abbreviation definition

#### **4.4.2.4 Earthquake, Liquefaction and Earthquake-Induced Landslides**

The data used in the earthquake hazard assessment were: 100-, 250-, 500-, 750-, 1000-, 1500-, 2000-, and 2500- year return period USGS probabilistic hazards. Soil conditions for San Diego County as developed by USGS were also used, which allowed for a better reflection of amplification of ground shaking that may occur. The HAZUS software model, which was developed for FEMA by the National Institute of Building Services as a tool to determine earthquake loss estimates, was used to model earthquake and flood for this assessment. This software program integrates with a GIS to facilitate the manipulation of data on building stock, population, and the regional economy with hazard models. PBS&J updated this model in 2003 to HAZUS-MH (Multiple Hazard), which can model earthquake and flood, along with collateral issues associated with each model, such as liquefaction and landslide with earthquakes. This software was not released prior to the beginning of the planning process; however, PBS&J performed vulnerability and loss estimation models for earthquakes and flood for this project using the newer model.

Additionally, the earthquake risk assessment explored the potential for collateral hazards such as liquefaction and earthquake-induced landslides. Three cases were examined, one case with shaking only, a second case with liquefaction potential, and a third with earthquake-induced landslides. Once the model was complete, the identified vulnerable assets were superimposed on top of this information, resulting in three risk/loss estimates: 1) the aggregated exposure and building count (both dollar exposure and population) at the census block level for residential and commercial occupancies, 2) the aggregated population at risk at the census block level, and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). These results were then aggregated and presented by hazard risk level per jurisdiction. Results for residential and commercial properties were generated as annualized losses, which average all eight of the modeled return periods (100-year through 2500-year events). For critical facility losses it was helpful to look at 100- and 500-year return periods to plan for an event that is more likely to occur in the near-term. In the near term, a 500-year earthquake would cause increased shaking, liquefaction and landslide, which would be expected to increase loss numbers. Exposure for annualized earthquake included buildings and population in the entire county because a severe or worst case scenario earthquake could affect any structure in the County. Furthermore, the annualized earthquake loss table also shows potential collateral exposure and losses from liquefaction and landslide separately; this is the additional loss from earthquake due to liquefaction or landslide caused by earthquakes and should be added to the shaking-only loss values to get the correct value. (The collateral liquefaction and landslide loss results for critical facilities were included with earthquake in Tables 4.4-11 and 4.4-12, to plan for an event that is more likely to occur in the near-term as discussed above).

Table 4.4-10 provides a breakdown of potential exposure and losses due to annualized earthquake events by jurisdiction. Tables 4.4-11 and 4.4-12 provide a breakdown of infrastructure and critical facility losses from 100-year and 500-year earthquakes, respectively. Approximately 2,800,000 people may be at risk from the annualized earthquake and earthquake-induced liquefaction hazards. In addition, special populations at risk that may be impacted by the earthquake hazard in San Diego County include 13,689 low-income households and 24,316 elderly persons.

**Table 4.4-10  
Potential Exposure and Losses from Annualized Earthquake Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk					Commercial Buildings at Risk				
		Building Count	**Potential Loss from Shaking (x\$1000)	**Potential Additional Loss from Liquefaction (x\$1000)	**Potential Additional Loss from Landslide (x\$1000)	Potential Exposure (x\$1000)	Building Count	**Potential Loss from Shaking (x\$1000)	**Potential Additional Loss from Liquefaction (x\$1000)	**Potential Additional Loss from Landslide (x\$1000)	Potential Exposure (x\$1000)
Carlsbad	104,707	43,723	2,649	0	524	12,308,025	1,559	998	0	352	6,986,970
Chula Vista	232,095	77,457	3,086	332	586	21,804,146	2,184	772	50	262	9,788,033
Coronado	23,009	9,541	1,309	156	208	2,685,792	470	224	0	75	2,106,399
Del Mar	4,591	2,537	235	0	46	714,166	220	110	0	27	985,974
El Cajon	98,205	35,656	1,739	0	319	10,037,164	1,360	726	0	218	6,095,112
Encinitas	64,145	24,848	1,962	0	536	6,994,712	1,268	659	0	209	5,682,796
Escondido	143,071	47,044	2,743	0	399	13,242,886	1,835	1,149	0	339	8,223,920
Imperial Beach	28,243	9,859	680	149	94	2,775,309	346	87	8	34	1,550,668
La Mesa	56,880	25,333	1,026	0	121	7,131,240	952	318	0	82	4,266,578
Lemon Grove	25,650	8,824	454	0	56	2,483,956	365	95	0	32	1,635,821
National City	56,522	15,776	874	56	203	4,440,944	892	420	0	132	3,997,676
Oceanside	179,626	64,642	4,336	646	1,156	18,196,723	1,964	849	34	293	8,802,059
Poway	51,126	16,339	776	0	141	4,599,429	732	257	0	82	3,280,604
San Diego (City)	1,354,013	510,740	32,046	1,648	8,721	143,773,310	18,862	12,428	725	4,231	84,533,825
San Marcos	83,149	27,726	934	0	113	7,804,869	812	518	0	153	3,639,140
Santee	56,848	19,681	1,076	0	279	5,540,202	582	252	0	108	2,608,349
Solana Beach	13,547	6,512	573	62	108	1,833,128	322	312	15	84	1,443,107
Unincorporated-Rural	168,254	60,561	886	0	152	17,047,922	2,177	149	0	43	9,756,661
Unincorporated-Urban Core	333,626	108,042	8,963	1	2,113	30,413,823	3,560	1,123	0	329	15,954,852
Vista	96,100	30,707	1,597	0	251	8,644,021	1,163	411	0	116	5,212,217
<b>Total</b>	<b>3,173,407</b>	<b>1,145,548</b>	<b>\$67,943</b>	<b>\$3,050</b>	<b>\$16,126</b>	<b>\$322,471,762</b>	<b>\$41,625</b>	<b>\$21,860</b>	<b>\$832</b>	<b>\$7,202</b>	<b>\$186,550,763</b>

**Table 4.4-11  
Potential Exposure to Critical Facilities and Infrastructure from 100-Year Earthquake Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	TOTAL
Carlsbad	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chula Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escondido	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Marcos	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santee	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated - Rural	Number	15	30	1	19	0	26	0	8	437	0	0	1	0	28	565
	Exposure (x\$1000)	3,000,000	5,748	2,000	38,000	0	52,000	0	800,000	1,647	0	0	100,000	0	28,000	4,027,395
Unincorporated - Urban Core	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Number</b>		<b>15</b>	<b>30</b>	<b>1</b>	<b>19</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>8</b>	<b>437</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>28</b>	<b>565</b>
<b>Total Exposure (x\$1000)</b>		<b>3,000,000</b>	<b>5,748</b>	<b>2,000</b>	<b>38,000</b>	<b>0</b>	<b>52,000</b>	<b>0</b>	<b>800,000</b>	<b>1,647</b>	<b>0</b>	<b>0</b>	<b>100,000</b>	<b>0</b>	<b>28,000</b>	<b>4,027,395</b>

**Table 4.4-12  
Potential Exposure to Critical Facilities and Infrastructure from 500-Year Earthquake Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVTT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	TOTAL
Carlsbad	Number	1	33	0	2	1	7	5	2	153	0	2	0	0	33	239
	Exposure (x\$1000)	200,000	6,323	0	4,000	10,000	14,000	10,000	200,000	247	0	200,000	0	0	33,000	677,570
Chula Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coronado	Number	0	1	0	1	0	2	4	1	19	0	0	0	0	9	37
	Exposure (x\$1000)	0	192	0	2,000	0	4,000	8,000	100,000	30	0	0	0	0	9,000	123,222
Del Mar	Number	0	5	0	0	0	1	2	0	14	0	0	0	0	2	24
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	10	0	0	0	0	2,000	8,968
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	16	0	1	0	6	3	3	85	0	1	0	7	25	147
	Exposure (x\$1000)	0	3,066	0	2,000	0	12,000	6,000	300,000	145	0	100,000	0	14,000	25,000	462,211
Escondido	Number	0	71	1	4	0	8	8	8	83	0	1	1	1	46	232
	Exposure (x\$1000)	0	13,604	2,000	8,000	0	16,000	16,000	800,000	211	0	100,000	100,000	2,000	46,000	1,103,815
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	Number	1	43	2	4	0	10	12	11	124	0	1	0	8	43	259
	Exposure (x\$1000)	200,000	8,239	4,000	8,000	0	20,000	24,000	1,100,000	250	0	100,000	0	16,000	43,000	1,523,489
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	2	115	3	15	4	24	35	4	239	47	1	0	5	68	562
	Exposure (x\$1000)	400,000	22,034	6,000	30,000	40,000	48,000	70,000	400,000	421	940,000	100,000	0	10,000	68,000	2,134,455
San Marcos	Number	0	12	0	2	0	8	3	2	59	0	0	0	2	28	116
	Exposure (x\$1000)	0	2,299	0	4,000	0	16,000	6,000	200,000	149	0	0	0	4,000	28,000	260,448
Santee	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solana Beach	Number	0	5	0	0	0	1	2	0	28	0	0	0	1	9	46
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	47	0	0	0	2,000	9,000	18,005
Unincorporated - Rural	Number	30	188	2	31	2	76	1	12	1,145	0	0	4	0	63	1,554
	Exposure (x\$1000)	6,000,000	36,021	4,000	62,000	20,000	152,000	2,000	1,200,000	3,818	0	0	400,000	0	63,000	7,942,838
Unincorporated - Urban Core	Number	0	39	0	9	0	20	3	6	165	0	1	0	2	45	290
	Exposure (x\$1000)	0	7472.4	0	18000	0	40000	6000	600000	252	0	100000	0	4000	45000	820,725
Vista	Number	0	12	0	0	0	9	4	3	53	0	0	0	10	40	131
	Exposure (x\$1000)	0	2,299	0	0	0	18,000	8,000	300,000	101	0	0	0	20,000	40,000	388,400
<b>Total Number</b>		<b>34</b>	<b>540</b>	<b>8</b>	<b>69</b>	<b>7</b>	<b>172</b>	<b>82</b>	<b>52</b>	<b>2,167</b>	<b>47</b>	<b>7</b>	<b>5</b>	<b>36</b>	<b>411</b>	<b>3,637</b>
<b>Total Exposure (x\$1000)</b>		<b>6,800,000</b>	<b>103,464</b>	<b>16,000</b>	<b>138,000</b>	<b>70,000</b>	<b>344,000</b>	<b>164,000</b>	<b>5,200,000</b>	<b>5,681</b>	<b>940,000</b>	<b>700,000</b>	<b>500,000</b>	<b>72,000</b>	<b>411,000</b>	<b>15,464,145</b>

#### 4.4.2.5 Flood

Digitized 100-year and 500-year flood maps with base flood elevation (BFE) from the FEMA FIRM program for most of the areas were utilized for this project. Census blocks with non-zero population and non-zero dollar exposure that intersect with these polygons were used in the analysis. For the areas that did not include BFE information, a base flood elevation was estimated for the final purpose of computing the flood depth at different locations of the region as follows:

- Transect lines across the flood polygon (perpendicular to the flow direction) were created using an approximation method for Zone A flood polygons. Zone A is the FEMA FIRM Zone that is defined as the 100-year base flood.
- A point file was extracted from the line (Begin node, End node and center point). The Zonal operation in the GIS tool Spatial Analyst (with the point file and a digital elevation model [DEM]) was used to estimate the ground elevation in the intersection of the line with the flood polygon borders. The average value of the End and Begin point of the line was calculated. This value was assumed as the base flood elevation for each transect.

A surface model (triangulated irregular network, or TIN) was derived from the original transect with the derived BFE value and the flood polygon. This TIN file approximated a continuous and variable flood elevation along the flood polygon. A grid file was then derived from the TIN file with the same extent and pixel resolution of the DEM (30-meter resolution). The difference of the flood elevation grid file and the DEM was calculated to produce an approximate flood depth for the whole study area. HAZUS-MH based damage functions, in a raster format, were created for each of the occupancies present in the census blocks. A customized Visual Basic (VBA) script was written to assign the ratio of damage expected (function of computed flood depth) for each type of occupancy based on the HAZUS-MH damage functions. HAZUS-MH exposure values (\$) in raster format were created using Spatial Analyst. Since not all areas in the census blocks are completely within the flood area, the exposure at risk was weighted and estimated accordingly based on the number of pixels in flood area. Losses were then estimated through multiplication of damage ratio with the exposure at risk for each block. Losses were then approximated based on 100- and 500-year losses (high and low hazards).

Table 4.4-13 provides a breakdown of potential exposure and losses by jurisdiction for 100-year flood, and Table 4.4-14 provides a breakdown of infrastructure and critical facility losses for 100-year flood by jurisdiction. Table 4.4-15 provides a breakdown of potential exposure and losses by jurisdiction from 500-year flood, and Table 4.4-16 provides a breakdown of potential infrastructure and critical facility losses by jurisdiction. The loss tables also provide a breakdown of loss ratios for commercial and residential properties by jurisdiction. These loss ratios are determined by dividing the loss values by the exposure values for each jurisdiction, and give a perspective of the potential losses for each jurisdiction for this hazard. For example, a loss ratio value of 0.4 in El Cajon would mean that 40% of the exposed buildings in El Cajon would be lost due to a 100- or 500-year flood.

Approximately 134,000 people may be at risk from the 100-year flood hazard. In addition, special populations at risk that may be impacted by the 100-year flood hazard in San Diego County include 8,424 low-income households and 15,144 elderly persons. Approximately 215,000 people are at risk from the 500-year flood hazard. In addition, special populations at risk that may be impacted by the 500-year flood hazard in San Diego County include 13,689 low-income households and 24,316 elderly persons.

**4.4.2.5.1 Participation in the National Flood Insurance Program**

Most jurisdictions within San Diego County participate in the National Flood Insurance program. Specific details for each participating jurisdiction are listed below.

*City of Carlsbad*

The City of Carlsbad has participated in the National Flood Insurance Program since 1974. Participation in the NFIP allows FEMA to authorize the sale of flood insurance (up to program limits) for businesses and residents within the appropriate flood risk zones. FEMA provides Flood Insurance Rate Maps (FIRM) delineating base flood elevations and flood risk zones and provides requirements to be adopted by the City. Their maps were updated in 2012.

*City of Chula Vista*

The City of Chula Vista participates in the National Flood Insurance Program, allowing FEMA to authorize the sale of flood insurance (up to program limits) for businesses and residents within the appropriate flood risk zones. FEMA provides Flood Insurance Rate Maps delineating base flood elevations and flood risk zones and provides requirements to be adopted by the City. The Chula Vista Municipal Code has been amended to include the language required by FEMA.

*City of Coronado*

The City of Coronado participates in the National Flood Insurance Program, allowing FEMA to authorize the sale of flood insurance (up to program limits) for businesses and residents within the appropriate flood risk zones. FEMA provides Flood Insurance Rate Maps (FIRM) delineating base flood elevations and flood risk zones and provides requirements to be adopted by the City.

*City of Del Mar*

The City of Del Mar participates in the National Flood Insurance Program, allowing FEMA to authorize the sale of flood insurance (up to program limits) for businesses and residents within the appropriate flood risk zones. FEMA provides Flood Insurance Rate Maps (FIRM) identifying base flood elevations and flood risk zones and provides requirements. All FEMA requirements have been adopted by the City.

*City of El Cajon*

The City of El Cajon is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the City and as designated by FEMA. The City of El Cajon manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas.

*City of Encinitas*

Encinitas participates in the National Flood Insurance Program (NFIP) and is required to adopt and enforce floodplain ordinances that meet FEMA's requirements. In return the NFIP makes federally backed flood insurance available in areas that are prone to flooding (have at least 1% chance of flooding annually). Without Federally backed insurance for flooding, homeowners either can't find flood insurance or the rate is very high. The NFIP is a Federal program administered by FEMA that provides flood insurance, floodplain management, and flood hazard mapping. The City of Encinitas Engineering Department

manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to address questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Encinitas received updated maps last year. Any proposed changes to these maps are processed by the City through FEMA. The Floodplain Management Regulations in Chapter 23.40 of the Encinitas Municipal Code meet or exceed FEMA guidelines and requirements.

#### City of Escondido

The City of Escondido does not participate in the National Flood Insurance Program (NFIP). As part of their property insurance policy the City does purchase flood coverage. The City has a \$30,000,000 limit with a deductible of either \$250,000 or \$100,000 depending upon the specific flood zone.

#### City of Imperial Beach

The City of Imperial Beach participates in the NFIP. The staff member with the key role in the program is the Floodplain Administrator. The Administrator determines if a proposed structure would be situated within an area of special flood hazard (usually a 100-year floodplain or floodway) as shown on the FEMA Flood Insurance Rate Map (FIRM). They are usually along the oceanfront, bay-front, or river valley. It is rare if the City receives a building permit application to build within a floodplain. When that occurs, the Administrator requires the finish floor elevation to be above the base flood elevation. In addition there would be a requirement for the applicant's engineer to submit a hydrology study that would show the proposed structure would not raise the base flood elevation. The requirements in the City of Imperial beach follow the rules, regulations and guidelines of the National Flood Insurance Program.

#### City of La Mesa

The City of La Mesa is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the City and as designated by FEMA. The City of La Mesa manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas.

#### City of Lemon Grove

The City of Lemon Grove is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the City and as designated by FEMA. The City of Lemon Grove manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas.

#### City of National City

The City of National City is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by FEMA. The City of National City manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements, State of



California Department of Water Resources Model Floodplain. Management Ordinance and the City of National City Floodplain Ordinance, and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Any proposed changes to these maps are processed by the City through FEMA.

#### City of Oceanside

The City of Oceanside participates in FEMA's National Flood Insurance Program. The program is monitored through our City Engineering Department which manages the permitting of developments and improvements in the floodplain areas. These areas are identified by Flood Maps that are updated by FEMA. The City has been part of this program since 1991 with our last assessment in 1996.

#### City of Poway

The City of Poway participates in the National Flood insurance Program (NFIP). Participation in the NFIP is required to provide our citizens with Federally-subsidized flood insurance. The City's responsibility, as a NFIP participant, is to adopt a floodplain ordinance regulate development in the 100 year floodplain. Any development in the floodplain requires a Floodplain Development permit issued by the City. They estimate there are over 900 residential structures located in the 100-year floodplain. The City of Poway also participates in the Community Rating System (CRS) program which provides our citizens with a 10% reduction in their flood insurance premiums. The amount of reduction is based on our floodplain management activities that are over and above the minimum required by FEMA.

#### City of San Diego

The City of San Diego is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by FEMA. The City of San Diego manages the permitting of any proposed developments and improvements within the floodplain areas per the FEMA guidelines and requirements and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Any proposed changes to these maps are processed by the City through FEMA.

#### City of San Marcos

The City of San Marcos is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by FEMA. The City of San Marcos has adopted a floodplain management ordinance in accordance with the FEMA's rules and regulations. The City manages the permitting of any proposed developments and improvements within the floodplain areas per the guidelines and requirements provided in said ordinance and keeps up to date copies of the Flood Insurance Rate Maps (FIRM). These maps are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Any proposed changes to these maps are processed by the City through FEMA.

#### City of Santee

The City of Santee is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by

FEMA. The City of Santee manages the permitting of any proposed developments and improvements within the floodplain areas per the City's Flood Damage Prevention Ordinance that meets or exceeds FEMA guidelines and requirements. The City of Santee keeps up to date copies of the Flood Insurance Rate Maps (FIRM) that are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Any proposed changes to these maps are processed by the City through FEMA.

#### City of Solana Beach

The City of Solana Beach is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by FEMA. The City also has a Municipal Code (Chapter 17.80; FLOOD DAMAGE PREVENTION OVERLAY ZONE). This ordinance references the Federal Flood Insurance Rate Maps. The City of Solana Beach is currently working with FEMA to ensure their program remains current.

#### City of Vista

The City of Vista is a participant in FEMA's National Flood Insurance Program (NFIP). This program provides flood insurance for structures located within the floodplain areas in the city and as designated by FEMA. The City of Vista manages the permitting of any proposed developments and improvements within the floodplain areas per the City's Flood Damage Prevention Ordinance that meets or exceeds FEMA guidelines and requirements. The City of Vista keeps up to date copies of the Flood Insurance Rate Maps (FIRM) that are used to assist constituents in answering their questions regarding the 100-year flood elevations and boundaries within the floodplain areas. Any proposed changes to these maps are processed by the City through FEMA.

#### County of San Diego

The County of San Diego participates in the National Flood Insurance Program (NFIP) managed by the Federal Emergency Management Agency (FEMA). To qualify for flood insurance, new construction and substantial improvement to structures located in the Special Flood Hazard Area (SFHA) within the County must meet minimum standards established by the NFIP. Additionally, FEMA's Community Rating System (CRS) program enables communities to earn credits for tasks and activities above and beyond minimum NFIP standards. The County has been a participating member under the CRS since September 2007, and has twice successfully reduced insurance premiums in San Diego by five percent. To ensure that the County's Flood Damage Prevention Ordinance reflects the most current standards set forth by the NFIP and to implement higher regulations for development of new or substantially improved structures located within the SFHA, the County's DPW Flood Control Engineering Group has begun the process of updating the Flood Damage Prevention Ordinance.

#### Fire Protection Districts and Municipal Water Districts

Special districts do not directly participate in the National Flood Insurance Program. Residents of the Fire protection Districts or Water Agencies participate in the NFIP through the process set up by the jurisdiction (City or County) they reside in.

**Table 4.4-13  
Potential Exposure and Losses from 100-Year Flood Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	6,906	3,045	\$857,168	102	\$457,133
Chula Vista	5,947	2,395	\$674,193	153	\$685,700
Coronado	2,853	1,227	\$345,401	30	\$134,451
Del Mar	813	435	\$122,453	42	\$188,231
El Cajon	1,870	657	\$184,946	36	\$161,341
Encinitas	653	234	\$65,871	22	\$98,597
Escondido	8,367	2,599	\$731,619	101	\$452,652
Imperial Beach	1,206	408	\$114,852	14	\$62,744
La Mesa	0	0	\$0	0	\$0
Lemon Grove	105	34	\$9,571	2	\$8,963
National City	2,854	893	\$251,380	118	\$528,841
Oceanside	19,007	6,715	\$1,890,273	217	\$972,529
Poway	2,518	814	\$229,141	47	\$210,640
San Diego (City)	36,042	12,191	\$3,431,767	523	\$2,343,929
San Marcos	2,377	794	\$223,511	70	\$313,719
Santee	1,873	572	\$161,018	46	\$206,158
Solana Beach	1,124	574	\$161,581	13	\$58,262
Unincorporated - Rural	7,276	3,661	\$1,030,572	137	\$613,993
Unincorporated - Urban Core	10,125	3,358	\$945,277	195	\$873,932
Vista	1,988	635	\$178,753	94	\$421,280
<b>Total</b>	<b>113,904</b>	<b>41,241</b>	<b>\$11,609,342</b>	<b>1,962</b>	<b>\$8,793,095</b>

**Table 4.4-14  
Potential Exposure to Critical Facilities and Infrastructure  
from 100-Year Flood Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	6	0	0	0	0	0	0	20	0	0	0	0	1	27
	Exposure (x\$1000)	0	1,150	0	0	0	0	0	0	20	0	0	0	0	1,000	2,169
Chula Vista	Number	0	12	0	0	0	1	1	1	13	0	0	0	0	1	29
	Exposure (x\$1000)	0	2,299	0	0	0	2,000	2,000	100,000	25	0	0	0	0	1,000	107,324
Coronado	Number	0	1	0	0	0	0	1	0	2	0	0	0	0	0	4
	Exposure (x\$1000)	0	192	0	0	0	0	2,000	0	7	0	0	0	0	0	2,198
Del Mar	Number	0	3	0	0	0	0	0	0	4	0	0	0	0	0	7
	Exposure (x\$1000)	0	575	0	0	0	0	0	0	3	0	0	0	0	0	578
El Cajon	Number	0	2	0	0	0	0	0	0	3	0	0	0	0	5	10
	Exposure (x\$1000)	0	383	0	0	0	0	0	0	4	0	0	0	0	5,000	5,387
Encinitas	Number	0	4	0	0	0	0	0	0	5	0	1	0	0	0	10
	Exposure (x\$1000)	0	766	0	0	0	0	0	0	4	0	100,000	0	0	0	100,771
Escondido	Number	0	4	0	0	0	0	0	0	6	0	0	0	0	5	15
	Exposure (x\$1000)	0	766	0	0	0	0	0	0	15	0	0	0	0	5,000	5,781
Imperial Beach	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
National City	Number	0	8	0	0	0	0	1	0	9	1	0	0	0	1	20
	Exposure (x\$1000)	0	1,533	0	0	0	0	2,000	0	24	20,000	0	0	0	1,000	24,557
Oceanside	Number	1	17	0	1	0	2	3	0	28	0	0	0	0	5	57
	Exposure (x\$1000)	200,000	3,257	0	2,000	0	4,000	6,000	0	53	0	0	0	0	5,000	220,310
Poway	Number	0	7	0	0	0	1	0	0	1	0	0	0	0	0	9
	Exposure (x\$1000)	0	1,341	0	0	0	2,000	0	0	2	0	0	0	0	0	3,343
San Diego (City)	Number	0	74	1	3	0	0	2	1	66	49	0	0	1	3	200
	Exposure (x\$1000)	0	14,178	2,000	6,000	0	0	4,000	100,000	99	980,000	0	0	2,000	3,000	1,111,278
San Marcos	Number	0	3	0	0	0	0	0	2	6	0	0	0	0	2	13
	Exposure (x\$1000)	0	575	0	0	0	0	0	200,000	14	0	0	0	0	2,000	202,589
Santee	Number	0	9	0	0	0	0	0	0	3	0	0	0	0	0	12
	Exposure (x\$1000)	0	1,724	0	0	0	0	0	0	1	0	0	0	0	0	1,726
Solana Beach	Number	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	0	0	0	0	0	0	192
Unincorporated Rural	Number	3	36	0	1	0	4	0	0	51	0	0	0	0	12	107
	Exposure (x\$1000)	600,000	6,898	0	2,000	0	8,000	0	0	175	0	0	0	0	12,000	629,073
Unincorporated Urban Core	Number	0	14	0	0	0	1	1	0	18	0	0	0	0	0	34
	Exposure (x\$1000)	0	2,682	0	0	0	2,000	2,000	0	50	0	0	0	0	0	6,733
Vista	Number	0	0	0	0	0	1	1	0	2	0	1	0	1	0	5
	Exposure (x\$1000)	0	0	0	0	0	2,000	2,000	0	5	0	0	0	2,000	0	6,005
<b>Total Number</b>		<b>4</b>	<b>201</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>10</b>	<b>10</b>	<b>4</b>	<b>239</b>	<b>50</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>35</b>	<b>562</b>
<b>Total Exposure (x\$1000)</b>		<b>800,000</b>	<b>38,512</b>	<b>2,000</b>	<b>10,000</b>	<b>0</b>	<b>20,000</b>	<b>20,000</b>	<b>400,000</b>	<b>504</b>	<b>1,000,000</b>	<b>100,000</b>	<b>0</b>	<b>4,000</b>	<b>35,000</b>	<b>2,430,016</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-15  
Potential Exposure and Losses from 500-Year Flood Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	6,996	3,086	\$868,709	104	\$466,097
Chula Vista	25,564	9,180	\$2,584,170	405	\$1,815,089
Coronado	3,868	1,715	\$482,773	46	\$206,158
Del Mar	1,062	567	\$159,611	47	\$210,640
El Cajon	17,608	6,457	\$1,817,646	278	\$1,245,913
Encinitas	678	243	\$68,405	23	\$103,079
Escondido	32,516	9,994	\$2,813,311	336	\$1,505,851
Imperial Beach	3,408	1,178	\$331,607	35	\$156,860
La Mesa	0	0	\$0	0	\$0
Lemon Grove	131	41	\$11,542	2	\$8,963
National City	8,584	2,735	\$769,903	259	\$1,160,760
Oceanside	37,323	12,878	\$3,625,157	368	\$1,649,266
Poway	4,690	1,540	\$433,510	79	\$354,054
San Diego (City)	85,289	28,438	\$8,005,297	1,126	\$5,046,394
San Marcos	2,609	875	\$246,313	77	\$345,091
Santee	2,994	967	\$272,211	60	\$268,902
Solana Beach	1,250	648	\$182,412	16	\$71,707
Unincorporated - Rural	8,950	4,426	\$1,245,919	151	\$676,737
Unincorporated - Urban Core	11,357	3,785	\$1,065,478	213	\$954,602
Vista	4,639	1,553	\$437,170	144	\$645,365
<b>Total</b>	<b>259,516</b>	<b>90,306</b>	<b>\$25,421,139</b>	<b>3,769</b>	<b>\$16,891,527</b>

**Table 4.4-16  
Potential Exposure to Critical Facilities and Infrastructure  
from 500-Year Flood Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	6	0	0	0	0	0	0	20	0	0	0	0	1	27
	Exposure (x\$1000)	0	1,150	0	0	0	0	0	0	20	0	0	0	0	1,000	2,169
Chula Vista	Number	0	18	0	0	1	1	1	1	30	1	0	0	0	3	56
	Exposure (x\$1000)	0	3,449	0	0	10,000	2,000	2,000	100,000	48	20,000	0	0	0	3,000	140,497
Coronado	Number	0	1	0	0	0	0	1	0	2	0	0	0	0	0	4
	Exposure (x\$1000)	0	192	0	0	0	0	2,000	0	7	0	0	0	0	0	2,198
Del Mar	Number	0	3	0	0	0	1	0	0	4	0	0	0	0	0	8
	Exposure (x\$1000)	0	575	0	0	0	2,000	0	0	4	0	0	0	0	0	2,578
El Cajon	Number	0	13	1	0	1	2	3	3	9	0	0	0	0	8	40
	Exposure (x\$1000)	0	2,491	2,000	0	10,000	4,000	6,000	300,000	19	0	0	0	0	8,000	332,510
Encinitas	Number	0	4	0	0	0	0	0	0	6	0	1	0	0	0	11
	Exposure (x\$1000)	0	766	0	0	0	0	0	0	5	0	100,000	0	0	0	100,771
Escondido	Number	0	20	0	0	0	2	5	2	14	0	0	0	0	11	54
	Exposure (x\$1000)	0	3,832	0	0	0	4,000	10,000	200,000	31	0	0	0	0	11,000	228,863
Imperial Beach	Number	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
National City	Number	0	12	0	0	0	1	2	0	11	1	0	0	0	2	29
	Exposure (x\$1000)	0	2,299	0	0	0	2,000	4,000	0	27	20,000	0	0	0	2,000	30,327
Oceanside	Number	1	21	0	2	0	4	4	1	37	0	0	0	1	6	77
	Exposure (x\$1000)	200,000	4,024	0	4,000	0	8,000	8,000	100,000	77	0	0	0	2,000	6,000	332,100
Poway	Number	0	8	0	0	0	1	0	0	1	0	0	0	0	1	11
	Exposure (x\$1000)	0	1,533	0	0	0	2,000	0	0	3	0	0	0	0	1,000	4,535
San Diego (City)	Number	0	119	2	3	0	2	8	3	122	49	1	0	1	5	315
	Exposure (x\$1000)	0	22,800	4,000	6,000	0	4,000	16,000	300,000	229	980,000	100,000	0	2,000	5,000	1,440,030
San Marcos	Number	0	4	0	0	0	0	0	2	6	0	0	0	0	2	14
	Exposure (x\$1000)	0	766	0	0	0	0	0	200,000	14	0	0	0	0	2,000	202,781
Santee	Number	0	9	0	2	0	0	1	0	5	0	0	0	0	0	17
	Exposure (x\$1000)	0	1,724	0	4,000	0	0	2,000	0	4	0	0	0	0	0	7,729
Solana Beach	Number	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	0	0	0	0	0	0	192
Unincorporated Rural	Number	3	39	0	1	0	4	1	0	56	0	0	0	0	13	117
	Exposure (x\$1000)	600,000	7,472	0	2,000	0	8,000	2,000	0	193	0	0	0	0	13,000	632,665
Unincorporated Urban Core	Number	0	15	0	0	0	1	1	0	20	0	0	0	0	1	38
	Exposure (x\$1000)	0	2,874	0	0	0	2,000	2,000	0	58	0	0	0	0	1,000	7,932
Vista	Number	0	1	0	0	0	2	2	0	4	0	0	0	1	4	14
	Exposure (x\$1000)	0	192	0	0	0	4,000	4,000	0	10	0	0	0	2,000	4,000	14,202
<b>Total Number</b>		<b>4</b>	<b>294</b>	<b>3</b>	<b>8</b>	<b>2</b>	<b>21</b>	<b>29</b>	<b>12</b>	<b>349</b>	<b>51</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>57</b>	<b>835</b>
<b>Total Exposure (x\$1000)</b>		<b>800,000</b>	<b>56,330</b>	<b>6,000</b>	<b>16,000</b>	<b>20,000</b>	<b>42,000</b>	<b>58,000</b>	<b>1,200,000</b>	<b>753</b>	<b>1,020,000</b>	<b>200,000</b>	<b>0</b>	<b>6,000</b>	<b>57,000</b>	<b>3,482,083</b>

Refer to Table 4.4-1 for abbreviation definition

**4.4.2.6 Rain-Induced Landslide**

Steep slope and soils data from SANDAG, as well as data from the State of California, U.S. Geological Survey and HAZUS for all of San Diego County were combined and modeled to determine areas susceptible to rain-induced landslides. Soils that are prone to movement were determined from the database, and combined with areas that have greater than 25% slope, which are prone to sliding. The combination of these two factors gives a general idea of landslide susceptibility. Localized hard copy maps developed by Tan were also reviewed. The TAN landslide susceptibility modeling takes into account more information, such as past landslides, landslide-prone formations, and steep slope. The identified vulnerable assets were superimposed on top of this information, resulting in three risk/exposure estimates: 1) the aggregated exposure and building count (both dollar exposure and population) at the census block level for residential and commercial occupancies, 2) the aggregated population at risk at the census block level, and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). These results were then aggregated and presented by hazard risk level per jurisdiction.

Table 4.4-17 provides a breakdown of potential exposure for high-risk rain-induced landslide hazard by jurisdiction, and Table 4.4-18 provides a breakdown of infrastructure and critical facility exposure for high risk. Table 4.4-19 provides a breakdown of potential exposure for moderate risk rain-induced landslide by jurisdiction, and Table 4.4-20 provides a breakdown of potential infrastructure and critical facility exposure for moderate risk. Approximately 505,000 people may be at risk from the rain-induced landslide hazard. In addition, special populations at risk that may be impacted by the rain-induced landslide hazard in San Diego County include 22,346 low-income households and 57,564 elderly persons.

**Table 4.4-17**  
**Potential Exposure from Rain-Induced Landslide Hazard (High Risk) by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	455	204	\$57,426	2	\$8,963
Chula Vista	0	0	\$0	0	\$0
Coronado	0	0	\$0	0	\$0
Del Mar	0	0	\$0	0	\$0
El Cajon	35	22	\$6,193	0	\$0
Encinitas	24	7	\$1,971	0	\$0
Escondido	751	295	\$83,043	2	\$8,963
Imperial Beach	0	0	\$0	0	\$0
La Mesa	0	0	\$0	0	\$0
Lemon Grove	2	0	\$0	0	\$0
National City	0	0	\$0	0	\$0
Oceanside	0	0	\$0	0	\$0
Poway	2	0	\$0	0	\$0
San Diego (City)	137,095	48,049	\$13,525,794	1,072	\$4,804,382
San Marcos	1,441	457	\$128,646	4	\$17,927
Santee	35	12	\$3,378	0	\$0
Solana Beach	0	0	\$0	0	\$0
Unincorporated - Rural	9,130	3,573	\$1,005,800	93	\$416,798
Unincorporated - Urban Core	1,509	314	\$88,391	4	\$17,927
Vista	92	32	\$9,008	1	\$4,482
<b>Total</b>	<b>150,571</b>	<b>52,965</b>	<b>\$14,909,648</b>	<b>1,178</b>	<b>\$5,279,443</b>



Table 4.4-18

Potential Exposure to Critical Facilities and Infrastructure from Rain-Induced Landslide Hazard (High Risk) by Jurisdiction

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chula Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escondido	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	17	0	10	0	6	4	0	93	0	0	0	0	22	152
	Exposure (x\$1000)	0	3,257	0	20,000	0	12,000	8,000	0	221	0	0	0	0	22,000	65,478
San Marcos	Number	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	2,000	0	0	0	0	0	0	0	0	2,000
Santee	Number	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	2,000	0	0	0	0	0	0	0	0	0	0	2,000
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	0	3	0	2	0	3	1	0	26	0	0	0	0	0	35
	Exposure (x\$1000)	0	575	0	4,000	0	6,000	2,000	0	82	0	0	0	0	0	12,657
Unincorporated Urban Core	Number	0	0	0	0	0	0	0	0	2	0	0	0	0	8	10
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	3	0	0	0	0	8,000	8,003
Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Number</b>		<b>0</b>	<b>20</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>121</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>199</b>
<b>Total Exposure (x\$1000)</b>		<b>0</b>	<b>3,832</b>	<b>0</b>	<b>26,000</b>	<b>0</b>	<b>20,000</b>	<b>10,000</b>	<b>0</b>	<b>306</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30,000</b>	<b>90,138</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-19**  
**Potential Exposure to Rain-Induced Landslide Hazard (Moderate Risk) by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	57	30	\$8,445	0	\$0
Chula Vista	2	1	\$282	1	\$4,482
Coronado	0	0	\$0	0	\$0
Del Mar	0	0	\$0	0	\$0
El Cajon	39	13	\$3,660	1	\$4,482
Encinitas	6	1	\$282	0	\$0
Escondido	171	71	\$19,987	2	\$8,963
Imperial Beach	0	0	\$0	0	\$0
La Mesa	0	0	\$0	0	\$0
Lemon Grove	0	0	\$0	0	\$0
National City	7	2	\$563	0	\$0
Oceanside	0	0	\$0	0	\$0
Poway	0	0	\$0	0	\$0
San Diego (City)	10	3	\$845	0	\$0
San Marcos	970	286	\$80,509	0	\$0
Santee	0	0	\$0	0	\$0
Solana Beach	0	0	\$0	0	\$0
Unincorporated - Rural	23,197	4,188	\$1,178,922	89	\$398,871
Unincorporated - Urban Core	35,499	11,039	\$3,107,479	389	\$1,743,381
Vista	11	2	\$563	0	\$0
<b>Total</b>	<b>59,969</b>	<b>15,636</b>	<b>\$4,401,534</b>	<b>482</b>	<b>\$2,160,179</b>

**Table 4.4-20  
Potential Exposure to Critical Facilities and Infrastructure from  
Rain-Induced Landslide Hazard (Moderate Risk) by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chula Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escondido	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	0	0	0	0	0	0	192
Oceanside	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Marcos	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santee	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	1	20	0	0	0	3	0	0	39	0	0	0	0	4	67
	Exposure (x\$1000)	200,000	3,832	0	0	0	6,000	0	0	108	0	0	0	0	4,000	213,940
Unincorporated Urban Core	Number	0	29	0	0	0	8	2	1	36	0	0	0	2	12	90
	Exposure (x\$1000)	0	5,556	0	0	0	16,000	4,000	100,000	71	0	0	0	4,000	12,000	141,628
Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Number</b>		<b>1</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>2</b>	<b>1</b>	<b>75</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>16</b>	<b>158</b>
<b>Total Exposure (x\$1000)</b>		<b>200,000</b>	<b>9,580</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>22,000</b>	<b>4,000</b>	<b>100,000</b>	<b>179</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,000</b>	<b>16,000</b>	<b>355,759</b>

#### 4.4.2.7 Wildfire/Structure Fire

Wildfire loss estimates were determined using the USGS LANDFIRE model because data for the CDF-FRAP model was being revised and would not be available for this revision. The LANDFIRE model provides five different Fire Regimes. In the model, fire threat is a combination of factors including; 1) historical fire regime and fire regime condition class, 2) existing vegetation, and 3) topography. These factors were combined to create five fire regime classes ranging from little or no threat to extreme. The regime classes are:

Fire Regime I - 0-35 year frequency and low to mixed severity

Fire Regime II - 0-35 year frequency and high severity

Fire regime III - 35-100+ year frequency and mixed severity

Fire Regime IV - 35-100 + year frequency and high severity

Fire Regime V - 200+ year frequency and high severity

The model uses spatial data in the ARC Grid format which includes existing vegetation types, historical vegetation data, and fire behavior fuel models. It also incorporates natural and human-caused changes. Fuel is considered to be any material that can burn and is further defined as live and dead biomass. Fuel loading is the dry weight of a fuel component per unit area, typically kilogram per square meter. Other factors such as surface-to-volume ratio, packing ratio and heat content are also considered<sup>42</sup>.

LANDFIRE uses the Fuel Characterization Classification System (FCCS) developed by Sandberg and others (2001) which summarizes fuel loading using canopy, shrub, surface and ground fuel stratifications. It also uses a fuel loading model developed specifically for LANDFIRE. This uses a broad classification of fuel beds based on fuel loading that accounts for variability of loading within fuel components<sup>43</sup>.

Wildfire can create a multi-hazard effect, where areas that are burned by wildfire suddenly have greater flooding risks because the vegetation that prevented erosion is now gone. Watershed from streams and rivers will change and floodplain mapping may need to be updated. Also, air quality issues during a large-scale fire would cause further economic losses than only the structural losses described below. Road closures and business closures due to large-scale fires would also increase the economic losses shown below. Areas burned during the 2007 firestorm that are susceptible to flooding or debris flow as a result of a significant rain event have been mapped and these maps have been provided to the appropriate jurisdictions.

Tables 4.4-21 and 4.4-22 provide a breakdown of potential exposure to Fire Regimes II and IV. These two regimes provide the greatest risk to the San Diego region.

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<sup>42</sup> Keane, Robert F., Tracey Frescino, Matthew C. Reeves, and Jennifer L. Long, Mapping Wildland Fuel Across Large Regions for the LANDFIRE prototype Project, USDA Forest Service Gen. Tech. Rep. RMRS-GTR-175. 2006

<sup>43</sup> Ibid.

Table 4.4-21

by

FIRE REGIME GROUPS II AND IV - POPULATION						
Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk		TOTAL Buildings at Risk
		Building Count	Exposure (x\$1,000)	Square Footage	Exposure (x\$1,000)	Exposure (x\$1,000)
Carlsbad	99,892	43,157	12,148,696	29,541	10,339,342	22,488,038
Chula Vista	227,269	72,446	20,393,549	24,923	8,722,910	29,116,459
Coronado	22,740	9,263	2,607,535	3,372	1,180,036	3,787,571
Del Mar	3,791	2,288	644,072	2,055	719,363	1,363,435
El Cajon	96,248	32,872	9,253,468	18,121	6,342,347	15,595,815
Encinitas	57,529	23,980	6,750,370	15,107	5,287,475	12,037,845
Escondido	134,425	43,388	12,213,722	20,384	7,134,378	19,348,100
Imperial Beach	25,831	9,466	2,664,679	1,477	517,032	3,181,711
La Mesa	56,037	24,608	6,927,152	10,150	3,552,605	10,479,757
Lemon Grove	25,538	8,689	2,445,954	2,777	971,934	3,417,887
National City	57,267	15,144	4,263,036	9,300	3,255,165	7,518,201
Oceanside	157,029	60,356	16,990,214	17,827	6,239,477	23,229,691
Poway	43,624	15,054	4,237,701	12,366	4,328,138	8,565,839
San Diego (City)	1,244,722	486,276	136,886,694	262,238	91,783,418	228,670,112
San Marcos	79,610	25,994	7,317,311	14,638	5,123,300	12,440,611
Santee	45,353	16,283	4,583,665	5,307	1,857,498	6,441,162
Solana Beach	12,004	5,986	1,685,059	5,292	1,852,269	3,537,328
Vista	89,520	29,418	8,281,167	18,919	6,621,623	14,902,790
Unincorporated-Rural	88,262	27,785	7,821,478	12,481	4,368,416	12,189,894
Unincorporated-Urban	335,301	111,685	31,439,328	29,983	10,494,099	41,933,427
Padre Dam MWD	83,399	30,088	8,469,772	11,692	4,092,373	12,562,145
Valley Center MWD	22,390	7,410	2,085,915	3,023	1,058,187	3,144,102
Alpine FPD	12,885	4,814	1,355,141	1,355	474,178	1,829,319
Rancho Santa Fe FPD	24,260	10,052	2,829,638	4,463	1,562,217	4,391,855
San Miguel FPD	114,949	39,482	11,114,183	9,036	3,162,580	14,276,763
<b>TOTAL<sup>1</sup></b>	<b>2,901,990</b>	<b>1,064,138</b>	<b>299,554,847</b>	<b>516,259</b>	<b>180,690,824</b>	<b>480,245,671</b>

<sup>1</sup>Total includes municipalities and unincorporated area only; FPDs and MWDs are excluded from the total to avoid multiple counting of items.

Potential Exposure from Extreme Wildfire Hazard Jurisdiction

**Table 4.4-22  
Potential Exposure from Very High Wildfire Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	3,219	1,294	\$364,261	33	\$147,896
Chula Vista	9,048	2,795	\$786,793	3	\$13,445
Coronado	19	0	\$0	0	\$0
Del Mar	7	5	\$1,408	0	\$0
El Cajon	97	36	\$10,134	2	\$8,963
Encinitas	1,267	424	\$119,356	14	\$62,744
Escondido	846	328	\$92,332	14	\$62,744
Imperial Beach	65	0	\$0	0	\$0
La Mesa	0	0	\$0	0	\$0
Lemon Grove	188	79	\$22,239	1	\$4,482
National City	0	0	\$0	0	\$0
Oceanside	1,402	470	\$132,305	7	\$31,372
Poway	937	305	\$85,858	17	\$76,189
San Diego (City)	20,153	6,990	\$1,967,685	208	\$932,194
San Marcos	2,236	818	\$230,267	8	\$35,854
Santee	222	89	\$25,054	3	\$13,445
Solana Beach	76	33	\$9,290	1	\$4,482
Unincorporated - Rural	47,816	18,209	\$5,125,834	658	\$2,948,959
Unincorporated - Urban Core	41,461	10,036	\$2,825,134	180	\$806,706
Vista	654	217	\$61,086	7	\$31,372
<b>Total</b>	<b>129,713</b>	<b>42,128</b>	<b>\$11,859,032</b>	<b>1,156</b>	<b>\$5,180,845</b>

**Table 4.4-23  
Potential Exposure from High Wildfire Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	9,255	4,298	\$1,209,887	72	\$322,682
Chula Vista	3,840	1,224	\$344,556	18	\$80,671
Coronado	0	0	\$0	0	\$0
Del Mar	16	9	\$2,534	1	\$4,482
El Cajon	118	42	\$11,823	3	\$13,445
Encinitas	1,159	419	\$117,949	18	\$80,671
Escondido	1,660	654	\$184,101	17	\$76,189
Imperial Beach	37	7	\$1,971	0	\$0
La Mesa	404	177	\$49,826	1	\$4,482
Lemon Grove	0	0	\$0	0	\$0
National City	9	2	\$563	5	\$22,409
Oceanside	2,795	849	\$238,994	21	\$94,116
Poway	3,069	976	\$274,744	55	\$246,494
San Diego (City)	30,997	10,710	\$3,014,865	280	\$1,254,876
San Marcos	11,312	3,578	\$1,007,207	30	\$134,451
Santee	2,658	938	\$264,047	18	\$80,671
Solana Beach	50	22	\$6,193	1	\$4,482
Unincorporated - Rural	8,518	3,197	\$899,956	108	\$484,024
Unincorporated - Urban Core	8,068	2,504	\$704,876	76	\$340,609
Vista	792	277	\$77,976	12	\$53,780
<b>Total</b>	<b>84,757</b>	<b>29,883</b>	<b>\$8,412,065</b>	<b>736</b>	<b>\$3,298,531</b>

**Table 4.4-24**  
**Potential Exposure from Moderate Wildfire Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	76,454	31,464	\$8,857,116	1,229	\$5,508,009
Chula Vista	169,128	57,512	\$16,189,628	1,963	\$8,797,577
Coronado	18,868	8,097	\$2,279,306	428	\$1,918,168
Del Mar	3,332	1,836	\$516,834	178	\$797,743
El Cajon	97,629	35,464	\$9,983,116	1,348	\$6,041,332
Encinitas	55,064	21,388	\$6,020,722	1,103	\$4,943,315
Escondido	134,126	43,671	\$12,293,387	1,745	\$7,820,567
Imperial Beach	26,346	9,139	\$2,572,629	310	\$1,389,327
La Mesa	56,195	25,030	\$7,045,945	946	\$4,239,688
Lemon Grove	25,058	8,606	\$2,422,589	361	\$1,617,894
National City	55,054	15,749	\$4,433,344	881	\$3,948,378
Oceanside	161,361	58,273	\$16,403,850	1,824	\$8,174,621
Poway	43,815	14,007	\$3,942,971	610	\$2,733,837
San Diego (City)	1,251,231	473,008	\$133,151,752	17,500	\$78,429,750
San Marcos	60,659	20,218	\$5,691,367	735	\$3,294,050
Santee	50,473	17,705	\$4,983,958	535	\$2,397,710
Solana Beach	11,413	5,585	\$1,572,178	303	\$1,357,955
Unincorporated - Rural	71,028	24,474	\$6,889,431	792	\$3,549,506
Unincorporated - Urban Core	255,909	86,104	\$24,238,276	2,970	\$13,310,649
Vista	90,913	28,908	\$8,137,602	1,106	\$4,956,760
<b>Total</b>	<b>2,714,056</b>	<b>986,238</b>	<b>\$277,625,997</b>	<b>36,867</b>	<b>\$165,226,834</b>



**Table 4.4-25**  
**Potential Exposure from Wildfire (Moderate, High, Very High, Extreme Combined) Hazard by Jurisdiction**

Jurisdiction	Exposed Population	Residential Buildings at Risk		Commercial Buildings at Risk	
		Building Count	Potential Exposure (x\$1000)	Building Count	Potential Exposure (x\$1000)
Carlsbad	88,928	37,056	\$10,431,264	1,334	\$5,978,588
Chula Vista	182,033	61,536	\$17,322,384	1,984	\$8,891,693
Coronado	18,887	8,097	\$2,279,306	428	\$1,918,168
Del Mar	3,355	1,850	\$520,775	179	\$802,224
El Cajon	97,844	35,542	\$10,005,073	1,353	\$6,063,740
Encinitas	57,495	22,232	\$6,258,308	1,135	\$5,086,730
Escondido	136,697	44,680	\$12,577,420	1,776	\$7,959,499
Imperial Beach	26,448	9,146	\$2,574,599	310	\$1,389,327
La Mesa	56,599	25,207	\$7,095,771	947	\$4,244,170
Lemon Grove	25,246	8,685	\$2,444,828	362	\$1,622,375
National City	55,063	15,751	\$4,433,907	886	\$3,970,786
Oceanside	165,558	59,592	\$16,775,148	1,852	\$8,300,108
Poway	47,823	15,289	\$4,303,854	682	\$3,056,519
San Diego (City)	1,302,402	490,708	\$138,134,302	17,989	\$80,621,301
San Marcos	74,207	24,614	\$6,928,841	773	\$3,464,354
Santee	53,353	18,732	\$5,273,058	556	\$2,491,825
Solana Beach	11,539	5,640	\$1,587,660	305	\$1,366,919
Unincorporated - Rural	140,648	51,134	\$14,394,221	1,745	\$7,820,567
Unincorporated - Urban Core	307,689	99,272	\$27,945,068	3,249	\$14,561,043
Vista	92,372	29,407	\$8,278,071	1,125	\$5,041,913
<b>Total</b>	<b>2,944,186</b>	<b>1,064,170</b>	<b>\$299,563,855</b>	<b>38,970</b>	<b>\$174,651,849</b>

**Table 4.4-26  
Potential Exposure to Critical Facilities and Infrastructures from Extreme Wildfire Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chula Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encinitas	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Escondido	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poway	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego (City)	Number	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6
San Marcos	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santee	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	2	22	1	14	0	5	0	0	114	0	0	0	0	2	160
	Exposure (x\$1000)	400,000	4,215	2,000	28,000	0	10,000	0	0	415	0	0	0	0	2,000	446,630
Unincorporated Urban Core	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Vista	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Number</b>		<b>2</b>	<b>22</b>	<b>1</b>	<b>14</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>166</b>
<b>Total Exposure (x\$1000)</b>		<b>400,000</b>	<b>4,215</b>	<b>2,000</b>	<b>28,000</b>	<b>0</b>	<b>10,000</b>	<b>0</b>	<b>0</b>	<b>426</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,000</b>	<b>446,641</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-27  
Potential Exposure to Critical Facilities and Infrastructures from Very High Wildfire Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	RAIL	SCH	Total
Carlsbad	Number	0	1	0	0	0	0	1	1	2	0	0	0	2	7
	Exposure (x\$1000)	0	192	0	0	0	0	2,000	100,000	3	0	0	0	2,000	104,195
Chula Vista	Number	0	0	0	0	0	0	0	0	3	0	0	0	1	4
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	1	0	0	0	1,000	1,001
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Encinitas	Number	0	1	0	0	0	0	0	0	1	0	0	0	0	2
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	1	0	0	0	0	193
Escondido	Number	0	1	0	0	0	0	0	0	2	0	0	0	0	3
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	4	0	0	0	0	196
Imperial Beach	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oceanside	Number	0	0	0	0	0	0	0	0	2	0	0	0	0	2
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	4	0	0	0	0	4
Poway	Number	0	0	0	0	0	0	0	0	3	0	0	0	1	4
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	8	0	0	0	1,000	1,008
San Diego (City)	Number	0	8	0	2	0	0	1	0	58	0	0	0	3	72
	Exposure (x\$1000)	0	1,533	0	4,000	0	0	2,000	0	134	0	0	0	3,000	10,667
San Marcos	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Santee	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Solana Beach	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Unincorporated Rural	Number	13	105	2	34	0	50	0	5	665	0	0	0	23	897
	Exposure (x\$1000)	2,600,000	20,118	4,000	68,000	0	100,000	0	500,000	2,173	0	0	0	23,000	3,317,291
Unincorporated Urban Core	Number	0	9	0	0	0	6	1	2	75	0	0	0	6	99
	Exposure (x\$1000)	0	1,724	0	0	0	12,000	2,000	200,000	82	0	0	0	6,000	221,806
Vista	Number	0	0	0	0	0	0	0	0	1	0	0	0	1	2
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	1,000	1,000
<b>Total Number</b>		<b>13</b>	<b>125</b>	<b>2</b>	<b>36</b>	<b>0</b>	<b>56</b>	<b>3</b>	<b>8</b>	<b>815</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>37</b>	<b>1,095</b>
<b>Total Exposure (x\$1000)</b>		<b>2,600,000</b>	<b>23,950</b>	<b>4,000</b>	<b>72,000</b>	<b>0</b>	<b>112,000</b>	<b>6,000</b>	<b>800,000</b>	<b>2,417</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>37,000</b>	<b>3,657,367</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-28  
Potential Exposure to Critical Facilities and Infrastructures from High Wildfire Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	0	0	0	0	0	0	0	0	19	0	0	0	0	3	22
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	27	0	0	0	0	3,000	3,027
Chula Vista	Number	0	1	0	0	0	0	0	0	2	0	0	0	0	1	4
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	4	0	0	0	0	1,000	1,195
Coronado	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Del Mar	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
El Cajon	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Encinitas	Number	0	3	0	0	0	0	0	0	3	0	1	0	0	0	7
	Exposure (x\$1000)	0	575	0	0	0	0	0	0	1	0	100,000	0	0	0	100,576
Escondido	Number	0	0	0	1	0	0	0	0	7	0	0	0	0	0	8
	Exposure (x\$1000)	0	0	0	2,000	0	0	0	0	5	0	0	0	0	0	2,005
Imperial Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Mesa	Number	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemon Grove	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City	Number	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Exposure (x\$1000)	0	192	0	0	0	0	0	0	0	0	0	0	0	0	192
Oceanside	Number	0	1	0	0	0	0	1	0	8	0	0	0	0	0	10
	Exposure (x\$1000)	0	192	0	0	0	0	2,000	0	16	0	0	0	0	0	2,208
Poway	Number	0	2	0	0	0	0	0	0	7	0	0	0	0	1	10
	Exposure (x\$1000)	0	383	0	0	0	0	0	0	22	0	0	0	0	1,000	1,405
San Diego (City)	Number	0	13	0	3	0	0	0	0	51	0	0	0	0	8	75
	Exposure (x\$1000)	0	2,491	0	6,000	0	0	0	0	92	0	0	0	0	8,000	16,582
San Marcos	Number	0	1	0	2	0	1	0	0	2	0	0	0	0	0	6
	Exposure (x\$1000)	0	192	0	4,000	0	2,000	0	0	4	0	0	0	0	0	6,196
Santee	Number	0	0	0	1	0	0	0	0	2	0	0	0	0	0	3
	Exposure (x\$1000)	0	0	0	2,000	0	0	0	0	5	0	0	0	0	0	2,005
Solana Beach	Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exposure (x\$1000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated Rural	Number	4	17	0	2	0	3	1	0	136	0	0	0	0	2	165
	Exposure (x\$1000)	800,000	3,257	0	4,000	0	6,000	2,000	0	446	0	0	0	0	2,000	817,703
Unincorporated Urban Core	Number	0	6	0	0	0	1	0	2	16	0	0	1	0	0	26
	Exposure (x\$1000)	0	1,150	0	0	0	2,000	0	200,000	21	0	0	100,000	0	0	303,171
Vista	Number	0	0	0	0	0	1	0	0	2	0	0	0	0	1	4
	Exposure (x\$1000)	0	0	0	0	0	2,000	0	0	1	0	0	0	0	1,000	3,001
<b>Total Number</b>		<b>4</b>	<b>45</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>255</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>16</b>	<b>341</b>
<b>Total Exposure (x\$1000)</b>		<b>800,000</b>	<b>8,622</b>	<b>0</b>	<b>18,000</b>	<b>0</b>	<b>12,000</b>	<b>4,000</b>	<b>200,000</b>	<b>648</b>	<b>0</b>	<b>100,000</b>	<b>100,000</b>	<b>0</b>	<b>16,000</b>	<b>1,259,270</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-29  
Potential Exposure to Critical Facilities and Infrastructures from Moderate Wildfire Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOVT	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	1	19	0	2	1	7	4	1	89	0	1	0	0	18	143
	Exposure (x\$1000)	200,000	3,640	0	4,000	10,000	14,000	8,000	100,000	153	0	100,000	0	0	18,000	457,793
Chula Vista	Number	0	39	2	2	1	11	8	7	85	0	1	0	0	59	215
	Exposure (x\$1000)	0	7,472	4,000	4,000	10,000	22,000	16,000	700,000	165	0	100,000	0	0	59,000	922,638
Coronado	Number	0	1	0	1	0	3	4	1	12	0	0	0	0	9	31
	Exposure (x\$1000)	0	192	0	2,000	0	6,000	8,000	100,000	12	0	0	0	0	9,000	125,204
Del Mar	Number	0	5	0	0	0	1	2	0	10	0	0	0	0	2	20
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	7	0	0	0	0	2,000	8,965
El Cajon	Number	1	37	1	2	1	8	7	6	61	0	0	0	0	47	171
	Exposure (x\$1000)	200,000	7,089	2,000	4,000	10,000	16,000	14,000	600,000	153	0	0	0	0	47,000	900,242
Encinitas	Number	0	11	0	1	0	6	3	3	72	0	0	0	7	23	126
	Exposure (x\$1000)	0	2,108	0	2,000	0	12,000	6,000	300,000	127	0	0	0	14,000	23,000	359,235
Escondido	Number	0	67	1	1	0	6	8	8	68	0	1	0	1	43	204
	Exposure (x\$1000)	0	12,837	2,000	2,000	0	12,000	16,000	800,000	187	0	100,000	0	2,000	43,000	990,024
Imperial Beach	Number	0	1	0	0	0	2	2	2	3	0	0	0	0	8	18
	Exposure (x\$1000)	0	192	0	0	0	4,000	4,000	200,000	2	0	0	0	0	8,000	216,194
La Mesa	Number	0	36	0	1	0	4	4	2	52	0	0	0	0	25	124
	Exposure (x\$1000)	0	6,898	0	2,000	0	8,000	8,000	200,000	112	0	0	0	0	25,000	250,010
Lemon Grove	Number	0	8	0	0	0	2	3	0	23	0	0	0	0	10	46
	Exposure (x\$1000)	0	1,533	0	0	0	4,000	6,000	0	58	0	0	0	0	10,000	21,591
National City	Number	0	46	1	1	2	4	4	7	37	0	1	0	2	20	125
	Exposure (x\$1000)	0	8,814	2,000	2,000	20,000	8,000	8,000	700,000	87	0	100,000	0	4,000	20,000	872,901
Oceanside	Number	1	37	2	4	0	10	9	11	103	0	1	0	7	37	222
	Exposure (x\$1000)	200,000	7,089	4,000	8,000	0	20,000	18,000	1,100,000	206	0	100,000	0	14,000	37,000	1,508,295
Poway	Number	0	40	1	0	0	3	1	1	22	0	0	1	0	22	91
	Exposure (x\$1000)	0	7,664	2,000	0	0	6,000	2,000	100,000	60	0	0	100,000	0	22,000	239,724
San Diego (City)	Number	4	445	12	22	8	85	95	49	750	3	2	2	5	339	1,821
	Exposure (x\$1000)	800,000	85,262	24,000	44,000	80,000	170,000	190,000	4,900,000	1,686	60,000	200,000	200,000	10,000	339,000	7,103,948
San Marcos	Number	0	11	0	0	0	7	3	2	54	0	0	0	2	20	99
	Exposure (x\$1000)	0	2,108	0	0	0	14,000	6,000	200,000	136	0	0	0	4,000	20,000	246,244
Santee	Number	0	14	1	1	0	3	2	0	27	0	1	0	0	15	64
	Exposure (x\$1000)	0	2,682	2,000	2,000	0	6,000	4,000	0	60	0	100,000	0	0	15,000	131,742
Solana Beach	Number	0	5	0	0	0	1	1	0	27	0	0	0	1	9	44
	Exposure (x\$1000)	0	958	0	0	0	2,000	2,000	0	44	0	0	0	2,000	9,000	16,002
Unincorporated Rural	Number	13	72	0	5	3	35	2	5	383	0	0	1	0	38	557
	Exposure (x\$1000)	2,600,000	13,795	0	10,000	30,000	70,000	4,000	500,000	1,289	0	0	100,000	0	38,000	3,367,085
Unincorporated Urban Core	Number	0	96	0	1	0	30	7	6	194	0	1	1	2	100	438
	Exposure (x\$1000)	0	18,394	0	2,000	0	60,000	14,000	600,000	415	0	100,000	100,000	4,000	100,000	998,808
Vista	Number	0	12	0	0	0	8	4	3	48	0	0	0	9	38	122
	Exposure (x\$1000)	0	2,299	0	0	0	16,000	8,000	300,000	95	0	0	0	18,000	38,000	382,394
<b>Total Number</b>		<b>20</b>	<b>1,002</b>	<b>21</b>	<b>44</b>	<b>16</b>	<b>236</b>	<b>173</b>	<b>114</b>	<b>2,118</b>	<b>3</b>	<b>9</b>	<b>5</b>	<b>36</b>	<b>882</b>	<b>4,679</b>
<b>Total Exposure (x\$1000)</b>		<b>4,000,000</b>	<b>191,983</b>	<b>42,000</b>	<b>88,000</b>	<b>160,000</b>	<b>472,000</b>	<b>346,000</b>	<b>11,400,000</b>	<b>5,056</b>	<b>60,000</b>	<b>900,000</b>	<b>500,000</b>	<b>72,000</b>	<b>882,000</b>	<b>19,119,039</b>

Refer to Table 4.4-1 for abbreviation definition

**Table 4.4-30  
Potential Exposure to Critical Facilities and Infrastructures from  
(Moderate, High, Very High, Extreme Combined) Wildfire Hazard by Jurisdiction**

Jurisdiction	Data	AIR	BRDG	BUS	COM	ELEC	EMER	GOV'T	HOSP	INFR	PORT	POT	WWTR	RAIL	SCH	Total
Carlsbad	Number	1	20	0	2	1	7	5	2	110	0	1	0	0	23	172
	Exposure (x\$1000)	200,000	3,832	0	4,000	10,000	14,000	10,000	200,000	183	0	100,000	0	0	23,000	565,015
Chula Vista	Number	0	40	2	2	1	11	8	7	95	0	1	0	0	61	228
	Exposure (x\$1000)	0	7,664	4,000	4,000	10,000	22,000	16,000	700,000	185	0	100,000	0	0	61,000	924,849
Coronado	Number	0	1	0	1	0	3	4	1	12	0	0	0	0	9	31
	Exposure (x\$1000)	0	192	0	2,000	0	6,000	8,000	100,000	13	0	0	0	0	9,000	125,204
Del Mar	Number	0	5	0	0	0	1	2	0	10	0	0	0	0	2	20
	Exposure (x\$1000)	0	958	0	0	0	2,000	4,000	0	7	0	0	0	0	2,000	8,965
El Cajon	Number	1	37	1	2	1	8	7	6	63	0	0	0	0	47	173
	Exposure (x\$1000)	200,000	7,089	2,000	4,000	10,000	16,000	14,000	600,000	159	0	0	0	0	47,000	900,248
Encinitas	Number	0	15	0	1	0	6	3	3	76	0	1	0	6	25	136
	Exposure (x\$1000)	0	2,874	0	2,000	0	12,000	6,000	300,000	130	0	100,000	0	12,000	25,000	460,004
Escondido	Number	0	68	1	2	0	6	8	8	76	0	1	1	1	43	214
	Exposure (x\$1000)	0	13,029	2,000	4,000	0	12,000	16,000	800,000	197	0	100,000	100,000	2,000	43,000	1,092,226
Imperial Beach	Number	0	1	0	0	0	2	2	2	4	0	0	0	0	8	19
	Exposure (x\$1000)	0	192	0	0	0	4,000	4,000	200,000	2	0	0	0	0	8,000	216,194
La Mesa	Number	0	36	0	1	0	4	4	2	53	0	0	0	0	25	125
	Exposure (x\$1000)	0	6,898	0	2,000	0	8,000	8,000	200,000	113	0	0	0	0	25,000	250,010
Lemon Grove	Number	0	8	0	0	0	2	3	0	23	0	0	0	0	10	46
	Exposure (x\$1000)	0	1,533	0	0	0	4,000	6,000	0	58	0	0	0	0	10,000	21,591
National City	Number	0	47	1	1	2	4	4	7	37	0	1	0	2	20	126
	Exposure (x\$1000)	0	9,005	2,000	2,000	20,000	8,000	8,000	700,000	87	0	100,000	0	4,000	20,000	873,093
Oceanside	Number	1	38	2	4	0	10	10	11	112	0	1	0	7	37	233
	Exposure (x\$1000)	200,000	7,281	4,000	8,000	0	20,000	20,000	1,100,000	226	0	100,000	0	14,000	37,000	1,510,506
Poway	Number	0	42	1	0	0	3	1	1	31	0	0	1	0	24	103
	Exposure (x\$1000)	0	8,047	2,000	0	0	6,000	2,000	100,000	89	0	0	100,000	0	24,000	242,137
San Diego (City)	Number	4	466	12	27	8	85	96	49	859	3	2	3	5	350	1,966
	Exposure (x\$1000)	800,000	89,286	24,000	54,000	80,000	170,000	192,000	4,900,000	1,912	60,000	200,000	300,000	10,000	350,000	7,231,198
San Marcos	Number	0	12	0	2	0	8	3	2	56	0	0	0	2	20	105
	Exposure (x\$1000)	0	2,299	0	4,000	0	16,000	6,000	200,000	142	0	0	0	4,000	20,000	252,441
Santee	Number	0	14	1	2	0	3	2	0	30	0	1	0	0	15	68
	Exposure (x\$1000)	0	2,682	2,000	4,000	0	6,000	4,000	0	65	0	100,000	0	0	15,000	133,748
Solana Beach	Number	0	5	0	0	0	1	1	0	28	0	0	0	1	9	45
	Exposure (x\$1000)	0	958	0	0	0	2,000	2,000	0	46	0	0	0	2,000	9,000	16,004
Unincorporated Rural	Number	30	194	2	41	3	88	3	10	1,184	0	0	3	0	63	1,618
	Exposure (x\$1000)	6,000,000	37,170	4,000	82,000	30,000	176,000	6,000	1,000,000	3,908	0	0	300,000	0	63,000	7,702,078
Unincorporated Urban Core	Number	0	111	0	1	0	37	8	10	285	0	1	2	2	106	561
	Exposure (x\$1000)	0	21,268	0	2,000	0	74,000	16,000	1,000,000	518	0	100,000	200,000	4,000	106,000	1,523,785
Vista	Number	0	12	0	0	0	9	4	3	50	0	0	0	9	40	127
	Exposure (x\$1000)	0	2,299	0	0	0	18,000	8,000	300,000	96	0	0	0	18,000	40,000	386,395
<b>Total Number</b>		<b>37</b>	<b>1,172</b>	<b>23</b>	<b>89</b>	<b>16</b>	<b>298</b>	<b>178</b>	<b>124</b>	<b>3,192</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>35</b>	<b>937</b>	<b>6,114</b>
<b>Total Exposure (x\$1000)</b>		<b>7,400,000</b>	<b>224,555</b>	<b>46,000</b>	<b>178,000</b>	<b>160,000</b>	<b>596,000</b>	<b>356,000</b>	<b>12,400,000</b>	<b>8,136</b>	<b>60,000</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>70,000</b>	<b>937,000</b>	<b>24,435,691</b>

Refer to Table 4.4-1 for abbreviation definition

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**4.4.2.8 Manmade Hazards**

Vulnerability assessment information for manmade hazards is considered sensitive homeland security information and is provided in a separate confidential document (Attachment A).

**4.5 Multi-Jurisdictional Assessment**

It should be noted that individual risk assessment maps were completed for each of the 18 participating incorporated cities as well as the unincorporated County. Hazard profile maps were created at a local (1:2,000) scale, complete with land use information, critical facility information, infrastructure and hazard areas for each of the 19 jurisdictions. Jurisdictional HMWG leads were presented copies of these maps to provide to their Local Mitigation Planning teams. The local teams utilized these maps to help identify their jurisdictional Goals, Objectives, and Mitigation Measures. Several of the local goals, objectives, and action items identified in the proceeding section (Section 5) relate directly to these risk assessment maps. Due to concern of sensitivity of information depicted on these localized maps, only the County-scale maps are included in the Plan.

**4.5.1 Analysis of Land Use**

San Diego County covers 4,264 square miles and is located in the southernmost corner of the state, bordering Mexico and the Pacific Ocean. There are 18 jurisdictions in the County with a total of over 888 thousand households in the region and a total population of 2,813,833 (2000 Census Bureau data). Existing land use data (Figure 4.5.1) was utilized in the hazard profiling process. Forecast land use information for 2030 from the Regional Economic Development Information system (REDI) was evaluated in analyzing future development trends. Existing land use consists of mainly residential, commercial and industrial in the western (urban core) portion of the county. The eastern area (unincorporated rural) is spotted with residential surrounded by park and ‘not in use’ areas. The forecast land use describes residential land use becoming the most predominant land use in the urban core of the county and expanding largely into the eastern portion of the county. In the eastern portion of the county, Native American Reservations and parks will make up the rest of the land use designations.

Within the county, there are 18 incorporated jurisdictions and the County jurisdiction, all of which contributed to the risk assessment analyses for the San Diego County Hazard Mitigation Plan. Wildfire and flood were identified as the most significant risks to the County, however, all hazards are addressed in the Mitigation Plan. Each jurisdiction has unique hazard situations that require additional or unique mitigation measures. The loss estimates are summarized above in tables that show potential total exposure and/or losses for each jurisdiction. The Mitigation Strategy (Section 5) approaches each jurisdiction separately.

**4.5.2 Analysis of Development Trends**

The San Diego Association of Governments (SANDAG) is a regional planning body whose membership includes all 18 incorporated cities and the County of San Diego. SANDAG plays a key role in regional coordination efforts. In 2004 the SANDAG Board of Directors adopted a Regional Comprehensive Plan (RCP) that provides a strategic framework for the San Diego Region. It encourages cities and the county to increase residential and employment concentrations in areas with the best existing and future transit connections, and to preserve important open spaces “Smart Growth”). City general plans are being aligned with the RCP as they are revised.

Many of the jurisdictions in San Diego County are close to being “built-out” under their general plans. A few representative examples will illustrate the trends throughout the region:

- The City of San Diego has less than four percent (4%) of its land available for development. For the City of San Diego this means that the focus is now on how to reinvest in existing communities (City of San Diego General Plan, March 2008). The City’s General Plan takes hazard mitigation into consideration in the Public Facilities, Services and Safety Element by discussing disaster preparedness (preparation for natural and man-made disasters as well as preparations for restoration of municipal services) and seismic safety.
- The City of Poway’s Plan calls for the preservation of open space and the maintenance of the City’s rural character. (Poway Comprehensive Plan: General Plan). Accordingly, future development “in Poway should be concentrated in parts of the City other than the rural hillside areas and existing open space should be protected.” This is intended to limit growth to the “enhancement of existing developed and developing areas.”
- The City of National City has only 0.8% (113 acres) of land vacant and available for development. It has adopted the SANDAG Smart Growth concept. Additional opportunities for future development may include a change to an existing use within a built-up area, rebuilding sites with more intense uses or building on under-utilized sites. (City of National City General Plan, Chapter 2 Land Use).
- The City of Chula Vista also subscribes to the SANDAG Smart Growth concept. Chula Vista was one of the fastest growing cities in the State during the 1990s and the early initial years of the 21st century. This growth occurred mostly in the eastern portion of the City on large, vacant tracts of land. Western Chula Vista is for the most part already developed. Chula Vista’s emphasis is shifting from the development of vacant lands in the eastern portion of the City to revitalizing the already developed areas. “Redevelopment will play a prominent role in the City’s evolution” (City of Chula Vista General Plan, Chapter Five, Land Use Element).
- The City of Encinitas still contains a number of underdeveloped or undeveloped areas that can accommodate additional homes or businesses. It is the intent of the City to achieve a balanced and functional mix of development consistent with the long-range goals, objectives and values of the City (City of Encinitas General Plan April, 2013). Among the things the City seeks to accomplish with this plan the “reduction of loss of life, injury, and property damage that might result from flooding, seismic hazards and other natural and man-made hazards that need to be
- The County of San Diego will manage growth in the unincorporated areas through the use of zoning regulations, building codes and the permit process (San Diego County General Plan). Hazard mitigation measures to minimize landslides, flooding, and other natural and man-made hazards are found in the plan. The 2010 Multi-Jurisdictional Hazard Mitigation Plan has been included into the General Plan by reference.

The result of this is that much of the new development in the near term will occur in the unincorporated portion of San Diego County. In the near future development trends will shift towards the redevelopment of urban cores. Hazards mapped in these areas include wildfire, flood, earthquake, and dam failure. The two most prevalent hazards related to development trends appear to be the increasing density in downtown San Diego near the Rose Canyon Fault Zone (earthquake and liquefaction hazard) and the expansion of the urban/wildland interface by new development throughout the county, but especially in east and south county (wildfire hazard). It should also be noted that high-rise residential and commercial development has



increased significantly in the downtown San Diego and Golden Triangle areas and these developments present a potential new type of structural fire hazard risk.

The population is estimated to increase to approximately 4.4 million by 2050 (SANDAG, 2010). The forecast land use describes residential land use becoming the most predominant land use in the urban core of the county and expanding largely into the eastern portion of the county.

The original plan predicted that near term development (that development that would occur over the course of the four year life of the plan) would be concentrated mostly in the unincorporated urban core and the southeastern portion of San Diego County in and around the City of Chula Vista. For the first few years this prediction appeared to be accurate. Beginning in 2008, the economic downturn resulted in a significant slow-down within the region in terms of growth and caused a very large downturn in median home prices. It is estimated that the downturn resulted in a \$4 billion loss to San Diego County as a result of the change it caused in consumer spending habits. The median price of a home in San Diego County dropped from approximately \$600,000 in 2006 to approximately \$400,000 in 2012. The current median price of home is \$488,000 up approximately since 2014.

2008 saw the unemployment rate rise to 7.6% in San Diego with the loss of 56,500 jobs by January of 2009. This was the worst job loss in San Diego since 1974. In 2008 there were fewer than 3000 residential building permits issued. The normal average is 14,000. By April of 2009 the total number of unemployed in San Diego had reached 135,000, for an unemployment rate of 8.6%. (National Association of Counties “A Snapshot of Large, Urban Counties” April, 2009). Current unemployment rate for the San Diego region is 4.6%, down from 5.1% in August 2015. Since September 2014 there has been an increase of 46,900 nonfarm jobs in San Diego.

#### **4.5.2.1 Data Limitations**

It should be noted that the analysis presented here is based upon “best available data”. See Appendix B for a complete listing of sources and their unique data limitations (if any). Data used in updates to this plan should be reassessed upon each review period to incorporate new or more accurate data if/when possible.

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## 5.1 Overview

After each participating jurisdiction reviewed the Risk Assessment (Section 4), jurisdictional leads met with their individual Local Planning Groups (LPG) to identify appropriate jurisdictional-level goals, objectives, and mitigation action items. This section of the Plan incorporates 1) mitigation goals and objectives, 2) mitigation actions and priorities, 3) an implementation plan, and 4) documentation of the mitigation planning process for each of the twenty one (21) participating jurisdictions. Each of these steps is described as follows.

### 5.1.1 Develop Mitigation Goals and Objectives

Each jurisdiction reviewed hazard profile and loss estimation information presented in Section 4 and utilized this as a basis for developing mitigation goals and objectives. 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. Objectives are statements that detail how each jurisdiction's goals will be achieved, and typically define strategies or implementation steps to attain identified goals. Other important inputs to the development of jurisdiction-level goals and objectives include performing reviews of existing local plans, policy documents, and regulations for consistency and complementary goals, as well as soliciting input from the public.

### 5.1.2 Identify and Prioritize Mitigation Actions

Mitigation actions that address the goals and objectives developed in the previous step were identified, evaluated, and prioritized. These actions form the core of the mitigation plan. Jurisdictions conducted a capabilities assessment, reviewing existing local plans, policies and regulations for any other capabilities relevant to hazard mitigation planning. An analysis of their capability to carry out these implementation measures with an eye toward hazard and loss prevention was conducted. The capabilities assessment required an inventory of each jurisdiction's legal, administrative, fiscal and technical capacities to support hazard mitigation planning. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigations.

As part of this process, each city and the County reviewed the actions detailed in the 2010 plan to see if they were completed, had been dropped due to issues such as lack of political support or lack of funding or were on-going and should be continued in the new plan. The status of each jurisdiction's action items is detailed in Appendix C. Also considered were changes in development, mitigation efforts and priorities.

Each participant used their local planning group to evaluate alternative mitigation actions by considering the implications of each action item. One potential method available to the cities to accomplish this was the STAPLEE method. The STAPLEE criteria are a tool used to assist communities in deciding which actions to include in their implementation strategy. The criteria are designed to account for a wide range of factors that affect the appropriateness of an action. STAPLEE considers the following criteria:

- **Social:** Community acceptance, public support, adverse effects on population segments, health/welfare/safety impacts, and financial effects
- **Technical:** Technical feasibility, long term effectiveness, and secondary impacts
- **Administrative:** Staff, funding, and maintenance capabilities
- **Political:** Political support, local champion, and public support
- **Legal:** State authority, existing local authority, and potential opposition
- **Economic:** Benefits, costs, and availability of outside funding
- **Environmental:** impact on environment and endangered species, local regulations and California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) considerations.

Local planning groups are comprised of individuals from the various jurisdictional departments bringing their experience and knowledge of the region, the jurisdiction and local constraints to assist in the evaluation of the hazards and the development of mitigations strategies, goals and objectives. Individual LPG membership is discussed in each jurisdictions section of this chapter.

Each jurisdiction also considered the following: ease of implementation; multi-objective actions; time for implementation and post-disaster mitigation feasibility. Utilizing the above information, each community ranked the possible action items on a prioritization scale of high, medium, and low. A High ranking indicated that the hazard has a high probability of occurrence and/or a severe impact on the community. The Medium ranking indicated a moderate potential for occurrence or impact. Those hazards with a low probability of occurrence but with a potentially high impact were also ranked as medium. The Low ranking indicates that the potential for the event to occur is remote and/or the impact of the event is minimal to the community. Only those hazards that received a high or moderate ranking were considered in the mitigation planning process.

Many of these hazards were ranked differently by individual jurisdictions. For example, tsunamis received a relatively high ranking among coastal jurisdictions while inland jurisdictions did not consider them for mitigation action. All jurisdictions rated wildfire high (based on the firestorms of 2003 and 2007). Flooding and Earthquake (based on the known faults within the County) were also rated high by all participants. Table 5.X-1 *Summary of Potential Hazard-Related Exposure/Loss* formed the initial ranking basis for the individual participants. The hazards selected by each jurisdiction for mitigation actions are included in their section of this Chapter. In all cases the actions selected are prioritized based on the benefit of the action compared to the cost (in terms of funding, staff time, time to complete) of conducting that action. Those actions that will provide the most benefits in the least amount of time with available resources were selected as the highest priorities. That is not to say the other actions are not considered important. It merely indicates that we set out to complete what we could with current resources. The other actions will be completed as additional resources become available.

There were nine Goals established by the HMWG. They are listed below (in the order of importance assigned by the jurisdictions):

1. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to geologic hazards (includes Earthquakes, landslides, liquefaction, etc.).
2. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to structure fire/wildfire.

3. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to flooding/dam failure.
4. Increase public understanding and support for effective hazard mitigation.
5. Improve hazard mitigation coordination and communication with federal, State, local and tribal governments.
6. Promote disaster resistant existing and future development.
7. Build and support local capacity and commitment to continuously become less vulnerable to hazards.
8. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to coastal erosion/coastal bluff failure/storm surge/Tsunami.
9. Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to severe weather.

Each jurisdiction then identified and prioritized actions. They listed those with the highest short to medium term priorities. Not all jurisdictions included all the goals. Some jurisdictions included unique goals (such as minimizing losses by prompt resumption of City operations and restoration of City services). Others split the goals into multiple ones (i.e., some have a separate earthquake goal as opposed to a geologic hazard goal). An implementation schedule, funding source and coordinating individual or agency are identified for each prioritized action item.

Each jurisdiction prepared a strategy for implementing the mitigation actions identified in the previous step. The implementation strategies identify who is responsible for which action, what kind of funding mechanisms and other resources are available or will be pursued, and when the strategies will be completed.

In combination, the goals, objectives, actions and implementation strategies form the body of each jurisdiction's Plan. The following subsections present individual Plans for each of the 19 jurisdictions as well as the Fire Protection District.

## 5.2 Regional Considerations

The Risk Assessment (Section 4) indicates that each participating jurisdiction is susceptible to a variety of potentially serious hazards in the region. This had been recognized and formally addressed as early as the 1960s. At that time all of the cities and the County formed a Joint Powers Agreement which established the Unified San Diego County Emergency Services Organization (Organization) and the Unified Disaster Council (UDC) which is the policy making group of the Organization. It also created the Office of Disaster Preparedness (now OES), which is staff to the Organization.

The Organization's approach to emergency planning has been comprehensive, i.e., planned for and prepared to respond to all hazards: natural disasters, man-made emergencies, and war-related emergencies, utilizing the State of California's Standardized Emergency Management System

(SEMS), the National Incident Management System (NIMS) as well as a coordinated Incident Command System. OES is the agency charged with developing and maintaining the San Diego County Operational Area Emergency Plan, which is considered a preparedness document.

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 taken before a hazard event occurs that would help minimize the damage to life and property. The UDC assigned OES the role of coordinating the development of the Plan as a multi-jurisdictional plan.

The Plan includes specific goals, objectives, and mitigation action items each of the participating jurisdictions developed that will help minimize the effects of the specified hazards that potentially affect their jurisdiction. Some overall goals and objectives shared some commonalities (including promoting disaster-resistant future development; increasing public understanding, support, and demand for effective hazard mitigation; building and supporting local capacity and commitment to continuously becoming less vulnerable to hazards; and improving coordination and communication with federal, state, local and tribal governments). However, the specific hazards and degree of risk vary greatly between the different jurisdictions; and the mix of other goals and objectives, and most action items are unique to each jurisdiction. Consequently, the goals, objectives and action items in this Plan are presented by individual jurisdiction and special district.

It is also envisioned that these mitigation actions will be implemented on a jurisdiction-by-jurisdiction basis. However, UDC and OES will provide general oversight to this process to help reduce duplication of efforts between jurisdictions as appropriate, and to spearhead coordination of initiatives and action items that could be accomplished more efficiently on a regional level.

## 5.21 County of San Diego

The Unincorporated portion of the County of San Diego (County) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. In addition, LPGs were supplied with exposure/loss estimates for the County summarized in Tables 5.21-1a and 5.21-1b. See Section 4.0 for additional details.

**Table 5.21-1a**  
**Summary of Potential Hazard-Related Exposure/Loss in the County (Urban)**

Hazard Type	Exposed Population	Residential		Commercial		Critical Facilities	
		Number of Residential Buildings	Potential Exposure/Loss for Residential Buildings (x\$1,000)	Number of Commercial Buildings	Potential Exposure/Loss for Commercial Buildings (x\$1,000)	Number of Critical Facilities	Potential Exposure for Critical Facilities (x\$1,000)
Coastal Storm / Erosion	0	0	0	0	0	0	0
Sea Level Rise	0	0	0	0	0	0	0
Dam Failure	21,862	7,304	2,056,076	277	1,241,431	123	235,356
Earthquake (Annualized Loss - Includes shaking, liquefaction and landslide components)	333,626*	108,042*	8,963*	3,560*	15,954,852*	290*	820,725*
<b>Flood (Loss)</b>							
100 Year	10,125	3,358	945,277	195	873,932	34	6,733
500 Year	11,357	3,785	1,065,478	213	954,602	38	7,932
<b>Rain-Induced Landslide</b>							
High Risk	1,509	314	88,391	4	17,927	10	8,003
Moderate Risk	35,499	11,039	3,107,479	389	1,743,381	12	141,628
Tsunami	35	11	3,097	1	4,482	1	2
<b>Wildfire / Structure Fire</b>							
Fire Regime II & IV	335,301	111,685	31,439,328	29,983	10,494,099	561	1,523,785

\* Represents 250-year earthquake value under three earthquake scenarios (shake only, shake and liquefaction, and shake and landslide).

**Table 5.21-1b****Summary of Potential Hazard-Related Exposure/Loss in the County (Rural)**

Hazard Type	Exposed Population	Residential		Commercial		Critical Facilities	
		Number of Residential Buildings	Potential Exposure/ Loss for Residential Buildings (x\$1,000)	Number of Commercial Buildings	Potential Exposure/ Loss for Commercial Buildings (x\$1,000)	Number of Critical Facilities	Potential Exposure for Critical Facilities (x\$1,000)
Coastal Storm / Erosion	0	0	0	0	0	0	0
Dam Failure	14,512	3,686	1,037,609	135	605,030	123	325,258
Earthquake (Annualized Loss - Includes shaking, liquefaction and landslide components)	168,254*	60,561*	17,047,922*	2,177*	9,756,661*	1,554*	7,942,838*
<b>Flood (Loss)</b>							
100 Year	7,276	3,661	1,030,572	137	613,993	107	629,073
500 Year	8,950	4,426	1,245,919	151	676,737	117	632,685
<b>Rain-Induced Landslide</b>							
High Risk	9,130	3,573	1,005,800	93	416,798	35	12,657
Moderate Risk	23,197	4,188	1,178,922	89	398,871	67	213,940
Tsunami	5,154	95	26,743	0	0	5	768
<b>Wildfire / Structure Fire</b>							
Fire Regime II & IV	88,262	27,785	7,821,478	12,481	4,368,416	1,618	7,702,078

\* Represents 500-year earthquake value under three earthquake scenarios (shake only, shake and liquefaction, and shake and landslide).



After reviewing the localized hazard maps and exposure/loss table above, the following hazards were identified by the County LPG as their top five.

- **Fire**
- **Hazardous Materials Release**
- **Flood**
- **Earthquake**
- **Manmade Hazards**

### **5.21.1 Capabilities Assessment**

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides the County's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### **5.21.2 Existing Institutions, Plans, Policies and Ordinances**

The following is a summary of existing departments in the County and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of the County, as shown in Table 5.21-2, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

- **San Diego County Planning Development Services**

Maintain and protect public health, safety and well-being. Preserve and enhance the quality of life for County residents by maintaining a comprehensive general plan and zoning ordinance, implementing habitat conservation programs, ensuring regulatory conformance and performing comprehensive community outreach.

Advanced Planning Division: Provides land use and environmental review, maintains a comprehensive general plan and zoning ordinance, issues land use and building permits, and enforces building and zoning regulations. It is also responsible for long-range planning through development and implementation of a comprehensive County General Plan.

Building Division: Review site and building plans for compliance with all applicable codes.

Code Compliance Division: Enforces building, grading, zoning, brushing and clearing, junk, graffiti, signs, abandoned vehicle complaints and noise control.

Land Development Division: Provides engineering and review services for construction and development projects throughout the unincorporated areas of San Diego County.

Project Planning Division: reviews “discretionary” projects. Those are projects that builders and homeowners cannot do “by right,” but which may be approved by PDS’s director, the Zoning Administrator, the Planning Commission or the Board of Supervisors if the projects meet certain conditions. Discretionary projects include lot splits, major subdivisions and conditionally-permitted uses. They also process applicants' requests for General Plan Amendments and Zoning changes.

- San Diego County Department of Public Works

Preserve, enhance and promote quality of life and public safety through the responsible development of reliable and sustainable infrastructure and services.

Land Development Division: Provides engineering and review services for construction and development **projects throughout the unincorporated areas of San Diego County. Services such as Stormwater, Flood Control, Map Processing, Cartography, Surveys, the Geographic and Land Information Systems and dealing with land development issues are the daily job of this division. The division processes more than 5,000 permits each year.**

Transportation Division: Roads Section is the most visible part of DPW, responding to requests for services ranging from pothole repair to tree trimming. Traffic Engineering provides traffic management and determines the need for stop signs and traffic lights. Route Locations updates the County’s General Plan Circulation Element, provides transportation planning support and more. County Airports include eight unique facilities scattered throughout the area. McClellan-Palomar Airport provides commercial service to Los Angeles and Phoenix; Ramona Airport is home to the busiest aerial firefighting base in the USA; and, the County Sheriff's air force, ASTREA, is based at Gillespie Field.

Engineering Services Division: The division includes Wastewater, Flood Control, Design Engineering, Environmental Services, Construction Engineering, Materials Lab, Project Management and Flood Control Engineering and Hydrology. The Director of Public Works has assigned the Deputy Director of Engineering Services as the County Engineer and Flood Control Commissioner.

Management Services Division: This division provides a variety of services to department employees and the public. It includes Personnel, Financial Services, Communications, Recycling, Inactive Landfills and Management Support. Special Districts serve small areas in unincorporated areas providing a variety of services to residents in rural areas.

- San Diego County Housing & Community Development

Improve the quality of life in our communities – helping needy families find safe, decent and affordable housing and partnering with property owners to increase the supply and availability of

affordable housing. The Department provides many valuable services to both property owners and tenants and strives to create more livable neighborhoods that residents are proud to call home.

Key service programs include: improving neighborhoods by assisting low-income residents, increasing the supply of affordable, save housing and rehabilitating both business and residential properties in San Diego County. They serve the communities of: Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, Lemon Grove, Poway, San Marcos, Santee, Solana Beach, Vista, and the unincorporated areas of San Diego County.

The Community Development Block Grant Program (CDBG) provides funding to agencies or businesses that provide a benefit to low and moderate income persons, prevent or eliminate slums and blight, or meet needs having a particular urgency.

In addition to funding housing and shelter programs, the County also allocates grant funds toward various community improvements in the Urban County area. These include Developer Incentive programs, Housing Opportunity for Persons with AIDS and the Emergency Solutions Grant program. Participating cities, community residents, nonprofit organizations and other county departments may submit grant proposals.

- County of San Diego Emergency Medical Services (EMS)

**Mission:** To ensure that all residents of and visitors to San Diego County receive timely and high quality emergency medical services, specialty care, prevention services, disaster preparedness and response. Emergency Medical Services (EMS) is a branch of the Health and Human Services Agency's Public Health Services. It is the 'local EMS agency' (LEMSA) as defined in California law.

Part of San Diego County EMS is the Disaster Medical Health Emergency Preparedness unit. This unit coordinates with emergency management agencies, community organizations, medical providers, prehospital provider agencies (fire/EMS), hospitals, clinics, skilled nursing facilities, businesses and other partners in developing public health and disaster preparedness by dissemination of risk assessments, trainings and public health guidance.

- County of San Diego Office of Emergency Services

The Office of Emergency Services (OES) coordinates the overall county response to disasters. OES is responsible for alerting and notifying appropriate agencies when disaster strikes; coordinating all agencies that respond; ensuring resources are available and mobilized in times of disaster; developing plans and procedures for response to and recovery from disasters; and developing and providing preparedness materials for the public.

**Function:** To protect life and property within the San Diego County Operational Area in the event of a major emergency or disaster by: 1) Alerting and notifying appropriate agencies when disaster strikes; 2) Coordinating all Agencies that respond; 3) Ensuring resources are available and mobilized in times of disaster; 4) Developing plans and procedures for response to and recovery from disasters and 5) Developing and providing preparedness materials for the public.

- County of San Diego Sheriff's Department

The San Diego County Sheriff's Department is the chief law enforcement agency in San Diego County. The department is comprised of approximately 4,000 employees, both sworn officers and professional support staff. The department provides general law enforcement, detention and court services for the people of San Diego County in a service area of approximately 4,200 square miles. In addition, the department provides specialized regional services to the entire county, including the incorporated cities and the unincorporated areas of the county.

The San Diego County Sheriff's Department provides contract law enforcement services for the cities of Del Mar, Encinitas, Imperial Beach, Lemon Grove, Poway, San Marcos, Santee, Solana Beach and Vista. In these cities the Sheriff's Department serves as their police department, providing a full range of law enforcement services including patrol, traffic and investigative services.

In the unincorporated (non-city) areas, the Sheriff's Department provides generalized patrol and investigative services. The California Highway Patrol has the primary jurisdiction for traffic services in unincorporated areas.

The San Diego County Sheriff's Department operates seven detention facilities. Male arrestees are booked at the San Diego Central Jail and Vista Detention Facility, while female arrestees are booked at the Las Colinas and Vista Detention Facilities. The remaining jails house inmates in the care of the Sheriff.

- California Department of Forestry and Fire Protection

CalFIRE is an emergency response and resource protection department that responds to more than 5,600 wildland fires that burn over 172,000 acres in the State each year. In addition, department personnel respond to more than 350,000 other emergency calls, including structure fires, automobile accidents, medical aid, swift water rescues, civil disturbance, search and rescue, floods, and earthquakes. CalFIRE is the State's largest fire protection organization, whose fire protection team includes extensive ground forces, supported by a variety of fire-fighting equipment. CalFIRE has joined with Federal and local agencies to form a statewide mutual aid system. This system insures a rapid response of emergency equipment by being able to draw on all available resources regardless of jurisdiction. CalFIRE is responsible for wildland fire protection within the District's State Responsibility Areas, even though the Fire District is the first responder to an incident.

**Table 5.21-2  
County of San Diego: Administrative and Technical Capacity**

Staff/Personnel Resources	Y/N	Department/Agency and Position
A. Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Department of Planning & Land Use (DPLU)/ Lead Planner
B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Y	DPLU/Building Inspectors
C. Planners or Engineer(s) with an understanding of natural and/or manmade hazards	Y	
D. Floodplain manager	Y	
E. Surveyors	Y	DPLU & Department of Public Works (DPW)/ Surveyor, Lead
F. Staff with education or expertise to assess the community's vulnerability to hazards	Y	
G. Personnel skilled in GIS and/or HAZUS	Y	DPLU GIS Manger and DPW GIS Manager
H. Scientists familiar with the hazards of the community	Y	County Science Advisory Board
I. Emergency manager	Y	Office of Emergency Services / Emergency Services Coordinator
J. Grant writers	N	Departments determine their own level of service.

The legal and regulatory capabilities of the County are shown in Table 5.21-3, which presents the existing ordinances and codes that affect the physical or built environment of the County. Examples of legal and/or regulatory capabilities can include: the County's building codes, zoning ordinances, subdivision ordnances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.21-3  
County of San Diego: Legal and Regulatory Capability**

Regulatory Tools (ordinances, codes, plans)	Local Authority (Y/N)	Does State Prohibit (Y/N)
A. Building code	Y	N
B. Zoning ordinance	Y	N
C. Subdivision ordinance or regulations	Y	N
D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Y	N
E. Growth management ordinances (also called "smart growth" or anti-sprawl programs)	Y	N
F. Site plan review requirements	Y	N
G. General or comprehensive plan	Y	N
H. A capital improvements plan	Y	N
I. An economic development plan	Y	
J. An emergency response plan	Y	N
K. A post-disaster recovery plan	Y	
L. A post-disaster recovery ordinance	N	
M. Real estate disclosure requirements	Y	N

### 5.21.3 Fiscal Resources

Table 5.21-4 shows specific financial and budgetary tools available to the County such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.21-4  
County of San Diego: Fiscal Capability**

Financial Resources	Accessible or Eligible to Use (Yes/No)
A. Community Development Block Grants (CDBG)	Yes
B. Capital improvements project funding	Yes
C. Authority to levy taxes for specific purposes	Yes
D. Fees for water, sewer, gas, or electric service	Yes
E. Impact fees for homebuyers or developers for new developments/homes	Yes
F. Incur debt through general obligation bonds	Yes
G. Incur debt through special tax and revenue bonds	Yes
H. Yes Incur debt through private activity bonds	Yes
I. Withhold spending in hazard-prone areas	Yes

#### **5.21.4 Goals, Objectives and Actions**

Listed below are the County's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the County has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the County's planning documents, codes, and ordinances. In addition, County representatives met with consultant staff and/or OES to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Representatives of numerous County departments involved in hazard mitigation planning, including Fire, Police, and Public Works provided input to the County LPG. The County LPG members were:

- Tom Amabile, County OES
- Dave Cammal, DEH
- Jason Batchelor, Planning and Development Services
- Gitanjali Shinde, DPW
- Lisa Prus, San Diego County Water Authority
- Donna Johnson, HHSA, EMS

Once developed, County staff submitted the plan to Governor's Office of Emergency Services and FEMA for approval. Once approved the plan will be taken to the Unified Disaster Council and then to the San Diego County Board of Supervisors for adoption.

A public survey was posted on all participating agencies websites from March through July 2014. Over 500 responses were received. The survey results are in Appendix D. An email address was also provided on the webpage to allow the public to submit questions and/or suggestions. This email address was checked daily.

The following sections present the hazard-related goals, objectives and actions as prepared by the County's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials and residents.

#### **5.21.4.1 Goals**

The County of San Diego has developed the following 13 Goals for their Hazard Mitigation Plan (See Attachment A for Goals 12, and 13).

- Goal 1. Promote Disaster-resistant future development.
- Goal 2. Increase public understanding and support for effective hazard mitigation.
- Goal 3. Build and support local capacity and commitment to become less vulnerable to hazards.
- Goal 4. Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.

“Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County-owned facilities, due to”:

- Goal 5. Dam Failure
- Goal 6. Earthquakes and Liquefaction
- Goal 7. Coastal Storm/Erosion/Tsunami
- Goal 8. Landslides
- Goal 9. Floods
- Goal 10. Structural Fire/Wildfire
- Goal 11. Extreme Weather and Drought
- Goal 12. Manmade Hazards
- Goal 13. Hazardous Materials Release

#### **5.21.4.2 Objectives and Actions**

The County of San Diego developed the following broad list of objectives and actions to assist in the implementation of each of their 11 identified goals. The County of San Diego developed objectives to assist in achieving their hazard mitigation goals. For each of these objectives, specific actions were developed



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## Goals, Objectives and Actions

that would assist in their implementation. A discussion of the prioritization and implementation of the action items is provided in Section 5.21.5.

<b>Goal 1: Promote disaster-resistant future development.</b>		<b>New, Existing or Both</b>
<i>Objective 1.A: Facilitate the development or updating of general plans and zoning ordinances to limit development in hazard areas.</i>		
Action 1.A.1	Update General Plan as necessary.	Both
Action 1.A.2	Attract and retain qualified, professional and experienced staff.	Both
Action 1.A.3	Continue to identify high hazard areas using GIS.	Both
<i>Objective 1.B: Facilitate the adoption of building codes that protect existing assets and restrict new development in hazard areas.</i>		
Action 1.B.1	Review Codes as necessary.	New
<i>Objective 1.C: Facilitate consistent enforcement of general plans, zoning ordinances, and building codes.</i>		
Action 1.C.1	Staff enforcement personnel to a level to ensure compliance.	Both
Action 1.C.2	Develop and coordinate permits for all agencies.	Both
Action 1.C.3	Continue to utilize multi-agency permitting and enforcement team.	Both
<i>Objective 1.D: Limit future development in hazardous areas</i>		
Action 1.D.1	Development should be in harmony with existing topography.	Both
Action 1.D.2	Development patterns should respect environmental characteristics.	New
Action 1.D.3	Clustering should be encouraged.	New
Action 1.D.4	Development should be limited in areas of known geologic hazards.	New
Action 1.D.5	Development in floodplains shall be limited to protect lives and property.	New
Action 1.D.6	High fire hazard areas shall have adequate access for emergency vehicles.	Both
<i>Objective 1.E: Address identified data limitations regarding the lack of information about new development and build-out potential in hazard areas.</i>		
Action 1.E.1	Continue to utilize Geographic Information Systems (GIS) capabilities to identify hazards.	Both
Action 1.E.2	Continue to develop and update data sets that are necessary to test hazard scenarios and mitigation tools.	Both
<i>Objective 1.F: Increase public understanding, support and demand for hazard mitigation for new developments.</i>		
Action 1.F.1	Continue to gain public acceptance for avoidance policies in high hazard areas.	Both
Action 1.F.2	Continue public education efforts to publicize and adopt the appropriate hazard mitigation measures.	Both
Action 1.F.3	Help create demand for hazard resistant construction and site planning.	Both

<b>Goal 2: Increase public understanding and support for effective hazard mitigation.</b>		<b>New, Existing or Both</b>
<i>Objective 2.A: Educate the public to increase awareness of hazards and opportunities for mitigation actions.</i>		
Action 2.A.1	Publicize and encourage the adoption of appropriate hazard mitigation actions.	Both
Action 2.A.2	Continue to provide information to the public on the County website.	Both
Action 2.A.3	Heighten public awareness of hazards by using the County Communications Office.	Both
Action 2.A.4	Gain public acceptance for avoidance policies in high hazard areas.	Both
Action 2.A.5	Identify hazard specific issues and needs.	Both
Action 2.A.6	Help create demand for hazard resistant construction and site planning.	Both
Action 2.A.7	Promote partnerships between the state, counties, local and tribal governments to identify, prioritize and implement mitigation actions.	Both
Action 2.A.8	Promote County's "Know Your Hazards" app.	Both
<i>Objective 2.B: Promote partnerships between the state, counties, local and tribal governments to identify, prioritize, and implement mitigation actions.</i>		
Action 2.B.1	Develop, maintain and improve lasting partnerships.	Both
Action 2.B.2	Support the County Fire Safe Council.	Both
Action 2.B.3	Promote cooperative vegetation Management Programs that incorporate hazard mitigation.	Both
<i>Objective 2.C: Promote hazard mitigation in the business community.</i>		
Action 2.C.1	Increase awareness and knowledge of hazard mitigation principles and practices.	Both
Action 2.C.2	Encourage businesses to develop and implement hazard mitigation actions.	Both
Action 2.C.3	Identify hazard-specific issues and needs.	Both
<i>Objective 2.D: Monitor and publicize the effectiveness of mitigation actions implemented countywide.</i>		
Action 2.D.1	Continue to use the County website to publicize mitigation actions.	Both
Action 2.D.2	Continue to create marketing campaigns.	Both
Action 2.D.3	Continue to determine mitigation messages to convey.	Both
Action 2.D.4	Continue to establish budget and identify funding sources for mitigation outreach.	Both
Action 2.D.5	Continue to develop and distribute brochures, CDs and other publications.	Both
<i>Objective 2.E: Provide education on hazardous conditions.</i>		
Action 2.E.1	Continue to support public and private sector symposiums.	Both
Action 2.E.2	Coordinate production of brochures, informational packets and other handouts.	Both
Action 2.E.3	Develop partnerships with the media on hazard mitigation.	Both

<b>Goal 3: Build and support local capacity and commitment to become less vulnerable to hazards.</b>		<b>New, Existing or Both</b>
<i>Objective 3.A: Increase awareness and knowledge of hazard mitigation principles and practice among local officials.</i>		
Action 3.A.1	Use County Communications Office/County News Center to promote mitigation actions.	Both
Action 3.A.2	Conduct meetings with key elected officials to determine local issues and concerns.	Both
Action 3.A.3	Continuously demonstrate the importance of pre-disaster mitigation planning to the Board of Supervisors and other public officials.	Both
<i>Objective 3.B: Develop hazard mitigation plan and provide technical assistance to implement plan.</i>		
Action 3.B.1	Coordinate the update of the multi-jurisdictional plan.	Both
Action 3.B.2	Continue to have the County Working Group update and monitor the plan.	Both
<i>Objective 3.C: Limit growth and development in hazardous areas.</i>		
Action 3.C.1	Update GIS mapping to identify hazardous areas.	Both
Action 3.C.2	Continue to enforce trespassing regulations in high-risk areas.	Both
Action 3.C.3	Update General Plan and zoning regulations to reflect hazardous areas.	Both
Action 3.C.4	Support transfer of development rights in hazard prone areas.	Both
<i>Objective 3.D: Management of wildland vegetative communities to promote less hazardous conditions.</i>		
Action 3.D.1	Continue to use GIS to inventory by type and vegetation age class.	Both
Action 3.D.2	Continue to define target class ranges.	Both
Action 3.D.3	Continue to develop partnerships within the communities to fix age class ranges.	Both
<i>Objective 3.E: Improve the County's ability to manage in pre and post-disaster scenarios as well as respond effectively during the event.</i>		
Action 3.E.1	Train multiple staff members for each position in the Op Area EOC	Both

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<b>Goal 4: Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.</b>		<b>New, Existing or Both</b>
<i>Objective 4.A: Establish and maintain closer working relationships with state agencies, local and tribal governments.</i>		
Action 4.A.1	Continue the program of multi-jurisdictional/multi-functional training and exercises to enhance hazard mitigation.	Both
Action 4.A.2	Leverage resources and expertise that will further hazard mitigation efforts.	Both
Action 4.A.3	Update the multi-jurisdictional/multi-hazard mitigation plan to include tribal governments and special districts.	Both
Action 4.A.4	Maintain multi-jurisdictional/multi-functional training and exercises to enhance hazard mitigation.	Both
<i>Objective 4.B: Encourage other organizations to incorporate hazard mitigation activities.</i>		
Action 4.B.1	Continue to encourage tribal governments to become part of the HIRT JPA.	Both
Action 4.B.2	Establish and maintain lasting partnerships.	Both
Action 4.B.3	Continue to streamline policies to eliminate conflicts and duplication of effort.	Both
<i>Objective 4.C: Improve the County's capability and efficiency at administering pre- and post-disaster mitigation.</i>		
Action 4.C.1	Maintain consistency with the State in administering recovery programs.	Both
Action 4.C.2	Continue to work to establish a requirement that all hazard mitigation projects submitted to the State must be reviewed by the County.	Both
Action 4.C.3	Continue to improve coordination with the State Hazard Mitigation Office in dealing with local issues.	Both
<i>Objective 4.D: Support a coordinated permitting activities process.</i>		
Action 4.D.1	Develop notification procedures for all permits that support affected agencies.	Both
Action 4.D.2	Continue to streamline policies to eliminate conflicts and duplication of effort.	Both
Action 4.D.3	Continue to exchange resources and work with local and regional partners.	Both
<i>Objective 4.E: Coordinate recovery activities while restoring and maintaining public services.</i>		
Action 4.E.1	Maintain two damage assessment teams.	Both
Action 4.E.2	Maintain activation and reporting procedures for the damage assessment teams.	Both

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<b>Goal 5: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>dam failure</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 5.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to dam failure</i>		
Action 5.A.1	Update dam inundation plans, at a minimum every ten years.	Both
Action 5.A.2	Continue to participate in community awareness meetings	Both
Action 5.A.3	Continue to develop and distribute printed publications to the communities concerning hazards.	Both
<i>Objective 5.B: Protect existing assets with the highest relative vulnerability to the effects of a dam failure.</i>		
Action 5.B.1	Continue to identify hazard-prone structures.	Existing
Action 5.B.2	Continue to construct barriers around structures.	Both
Action 5.B.3	Encourage structural retrofitting.	Existing
<i>Objective 5.C: Coordinate with and support existing efforts to mitigate dam failure (e.g., US Army Corps of Engineers, US Bureau of Reclamation, and California Department of Water Resources).</i>		
Action 5.C.1	Continue to revise development ordinances to mitigate effects of development on wetland areas.	Both
Action 5.C.2	Incorporate and maintain valuable wetlands in open space preservation programs.	Both
Action 5.C.3	Review and revise, as necessary, sediment and erosion control regulations.	Both
<i>Objective 5.D: Protect floodplains from inappropriate development.</i>		
Action 5.D.1	Strengthen existing development regulations to discourage land uses and activities that create hazards.	New
Action 5.D.2	Plan and zone for open space, recreational, agricultural, or other low-intensity uses within floodway fringes.	New

<b>Goal 6: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>earthquakes and liquefaction</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 6.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to earthquakes.</i>		
Action 6.A.1	Update Building Codes to reflect current earthquake standards.	Both
Action 6.A.2	Continue to participate in community awareness meetings.	Both
Action 6.A.3	Continue to develop and distribute printed publications to the communities concerning hazards.	Both

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<b>Goal 6: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>earthquakes and liquefaction</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 6.B: Protect existing assets with the highest relative vulnerability to the effects of earthquakes.</i>		
Action 6.B.1	Continue to identify hazard-prone structures through GIS modeling.	Both
Action 6.B.2	Ensure new construction critical facilities are designed to function after a major earthquake.	New
Action 6.B.3	Continue to study ground motion, landslide, and liquefaction.	Both
<i>Objective 6.C: Coordinate with and support existing efforts to mitigate earthquake hazards.</i>		
Action 6.C.1	Identify projects for pre-disaster mitigation funding.	Both
Action 6.C.2	Continue to implement an ongoing public seismic risk assessment program.	Both
Action 6.C.3	Continue to collaborate with Federal, State and local agencies' mapping efforts.	Both
<i>Objective 6.D: Address identified data limitations regarding the lack of information about the relative vulnerability of assets from earthquakes.</i>		
Action 6.D.1	Continue to assess countywide utility infrastructure with regard to earthquake risk.	Both
Action 6.D.2	Develop and implement an incentive program for seismic retrofits.	Existing
Action 6.D.3	Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.	Both
<i>Objective 6.E: Protect existing assets with the highest relative vulnerability to the effects of liquefaction.</i>		
Action 6.E.1	Identify hazard-prone structures through GIS modeling.	Existing
Action 6.E.2	Build critical facilities that function after a major earthquake.	New
Action 6.E.3	Study ground motion, landslide and liquefaction.	Both
<b>Goal 7: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>coastal storm/erosion/tsunami</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 7.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to coastal storms/erosion.</i>		
Action 7.A.1	Continue to coordinate with coastal cities to develop a comprehensive plan.	Both
Action 7.A.2	Participate in community awareness meetings.	Both
Action 7.A.3	Develop and distribute printed publications to the communities concerning hazards.	Both

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<b>Goal 7: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>coastal storm/erosion/tsunami</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 7.B: Protect existing assets with the highest relative vulnerability to the effects of coastal storms/erosion.</i>		
Action 7.B.1	Retrofit structures to strengthen resistance to damage.	Existing
Action 7.B.2	Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.	Both
Action 7.B.3	Seek pre-disaster mitigation funding for coastal erosion projects.	Both
<i>Objective 7.C: Coordinate with and support existing efforts to mitigate severe coastal storms/erosion.</i>		
Action 7.C.1	Continue to review and update plans that would include coordination with cities, special districts and county departments.	Both
Action 7.C.2	Continue to streamline policies to eliminate conflicts and duplication of effort.	Both
Action 7.C.3	Continue to develop and publish evacuation procedures to the public.	Both
<i>Objective 7.D: Address identified data limitations regarding the lack of information about the relative vulnerability of assets from coastal storms/erosion.</i>		
Action 7.D.1	Using GIS continue to identify hazard-prone structures.	Both
Action 7.D.2	Continue to incorporate information and recommendations from coastal cities into the hazard mitigation plan.	Both
<b>Goal 8: Reduce the possibility of damage and losses to existing assets, including people, critical facilities /infrastructure, and public facilities due to <u>landslide</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 8.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to landslide.</i>		
Action 8.A.1	Continue to identify potential areas based upon historical data.	Both
Action 8.A.2	Continue to participate in community awareness meetings.	Both
Action 8. A.3	Continue to develop and distribute printed publications to the communities concerning hazards.	Both
<i>Objective 8.B: Protect existing assets with the highest relative vulnerability to the effects of landslide.</i>		
Action 8.B.1	Study and improve storm drains for landslide prone areas.	Both
Action 8.B.2	Develop, adopt and enforce effective building codes and standards.	New
Action 8.B.3	Seek pre-disaster mitigation funding for landsides prevention projects.	Both
<i>Objective 8.C: Coordinate with and support existing efforts to mitigate landslide.</i>		
Action 8.C.1	Continue to review and update plans that would include coordination with cities, special districts and county departments.	Both

<b>Goal 8: Reduce the possibility of damage and losses to existing assets, including people, critical facilities /infrastructure, and public facilities due to <u>landslide</u>.</b>		<b>New, Existing or Both</b>
Action 8.C.2	Continue to streamline policies to eliminate conflicts and duplication of effort.	Both
Action 8.C.3	Develop and publish evacuation procedures to the public.	Both
<i>Objective 8.D: Address identified data limitations regarding the lack of information about the relative vulnerability of assets from landslide.</i>		
Action 8.D.1	Identify hazard-prone structures through GIS modeling.	Both
Action 8.D.2	Implement hazard awareness program.	Both

<b>Goal 9: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>floods</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 9.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to floods.</i>		
Action 9.A.1	Continue to review and compare existing flood control standards, zoning and building requirements.	Both
Action 9.A.2	Identify flood-prone areas by using GIS.	Both
Action 9.A.3	Adopt policies that discourage growth in flood-prone areas.	Both
<i>Objective 9.B: Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.</i>		
Action 9.B.1	Assure adequate funding to restore damaged facilities to 100-year flood design.	Both
Action 9.B.2	Update storm water system plans and improve storm water facilities in high-risk areas.	Both
Action 9.B.3	Plan for evacuation in case of major hazard event.	Both
<i>Objective 9.C: Coordinate with and support existing efforts to mitigate floods (e.g., US Army Corps of Engineers, US Bureau of Reclamation, and California Department of Water Resources).</i>		
Action 9.C.1	Develop a flood control strategy that ensures coordination with Federal, State and local agencies.	Both
Action 9.C.2	Improve hazard warning and response planning.	Both
<i>Objective 9.D: Minimize repetitive losses caused by flooding.</i>		
Action 9.D.1	Identify those communities that have recurring losses.	Both
Action 9.D.2	Develop project proposals to reduce flooding and improve control in flood prone areas.	Both
Action 9.D.3	Acquire properties, when feasible, on floodway to prevent development.	Both



<b>Goal 9: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>floods</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 9.D: Minimize repetitive losses caused by flooding.</i>		
Action 9.D.4	Seek pre-disaster mitigation funding.	Both
<i>Objective 9.E: Address perceived data limitations regarding the lack of information about the relative vulnerability of assets from flooding.</i>		
Action 9.E.1	Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.	Both
Action 9.E.2	Increase participation and improve compliance with the National Flood Insurance Program (NFIP).	Both
Action 9.E.3	Develop and implement hazard awareness program.	Both
<b>Goal 10: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to <u>structural fire/wildfire</u>.</b>		<b>New, Existing or Both</b>
<i>Objective 10.A: Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.</i>		
Action 10.A.1	Update the County Consolidated Fire Code as necessary.	Both
Action 10.A.2	Develop model Weed Abatement and Fuel Modification Ordinances.	Both
Action 10.A.3	Utilize GIS as an information tool.	Both
Action 10.A.4	Coordinate with and support existing efforts to mitigate structural fire/wildfire.	Both
Action 10.A.5	Continue to develop partnerships for a countywide vegetation management program.	Both
<i>Objective 10.B: Protect existing assets with the highest relative vulnerability to the effects of structural fire/wildfire.</i>		
Action 10.B.1	Enforce standardized Defensible Space Clearance distances.	Both
Action 10.B.2	Work with community-based groups to pilot chipping programs.	Both
Action 10.B.3	Continue to research options to provide low cost insurance to cover landowners who allow prescribed burning on their lands.	Both
<i>Objective 10.C: Coordinate with and support existing efforts to mitigate structural fire/wildfire.</i>		
Action 10.C.1	Establish a continuing wildland fire technical working group.	Both
Action 10.C.2	Continue to develop partnerships for a countywide vegetation management program.	Both

<b>Goal 10: Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to structural fire/wildfire.</b>		<b>New, Existing or Both</b>
<i>Objective 10.C: Coordinate with and support existing efforts to mitigate structural fire/wildfire.</i>		
Action 10.C.3	Report annually to the Board of Supervisors on the progress of fire mitigation strategies.	Both
<i>Objective 10.D: Address identified data limitations regarding the lack of information about the relative vulnerability of assets from structural fire/wildfire.</i>		
Action 10.D.1	Identify Urban/wildland fire interface areas.	Both
Action 10.D.2	Use GIS to map fire risk areas.	Both
Action 10.D.3	Implement public education program to address fire dangers and corrective measures.	Both

<b>Goal 11: Reduce the possibility of damage and losses to existing assets, including people, critical facilities /infrastructure, and public facilities due to extreme weather and drought.</b>		<b>New, Existing or Both</b>
<i>Objective 11.A: Educate the community about drought, its potential impacts and individual mitigation techniques that they can engage in to help prevent drought or reduce the impact of drought.</i>		
Action 11.A.1	Encourage residents to adopt drought tolerant landscaping or xeriscape practices.	Both
Action 11.A.2	Promote use of reclaimed water for all landscaping efforts.	Both
Action 11.A.3	Support groundwater recycling efforts.	Both
<i>Objective 11.B: Protect vulnerable populations from the effects of extreme heat</i>		
Action 11.B.1	Support regional efforts to prepare for excessive heat events	Both
Action 11.A.2	Participate in “Excessive Heat Emergency Awareness” events and exercise heat emergency plans as established by HHSA, AIS, EMS, and PHS.	Both
Action 11.A.3	Continue to provide “Cool Zones” during excessive heat events.	Both

### 5.21.5 Prioritization and Implementation of Action Items

Once the comprehensive list of jurisdictional goals, objectives, and action items listed above was developed, the proposed mitigation actions were prioritized using STAPLEE criteria. This step resulted in a list of acceptable and realistic actions that address the hazards identified in each jurisdiction. This prioritized list of action items was formed by the LPG.

The prioritized actions below reflect progress in local mitigation efforts as well as changes in development.

The Disaster Mitigation Action of 2000 (at 44 CFR Parts 201 and 206) requires the development of an action plan that not only includes prioritized actions but one that includes information on how the prioritized

## SECTION FIVE

## Goals, Objectives and Actions

actions will be implemented. Implementation consists of identifying who is responsible for which action, what kind of funding mechanisms and other resources are available or will be pursued, and when the action will be completed.

The top 11 prioritized mitigation actions as well as an implementation strategy for each are:

- Action Item #1:** Update Operational Area Emergency Operational Plan and associated Annexes  
**Coordinating Individual/Organization:** The Office of Emergency Services (OES) will work with the 18 incorporated cities and participating special districts to revise and update the Plan  
**Potential Funding Source:** FEMA Grants/ General Funds for County and Cities.  
**Implementation Timeline:** January 2019 – January 2020
- Action Item #2:** Develop and maintain public education and outreach programs related to actions residents can take to mitigate hazards they may face. (Annual defensible space education/outreach; terrorism prevention; erosion control, etc.)  
**Coordinating Individual/Organization:** OES and County Communications Office (CCO)  
**Potential Funding Source:** General Fund/Federal or State Grants  
**Implementation Timeline:** January 2018 – January 2023
- Action Item #3:** Review the County Consolidated Fire Code annually and update as necessary  
**Coordinating Individual/Organization:** Planning and Developmental Services and County Fire Authority  
**Potential Funding Source:** General Fund/Federal or State Grants  
**Implementation Timeline:** January 2018 - January 2023
- Action Item #4:** Streamline policies to eliminate conflicts and duplication of effort in regional planning efforts by coordinating emergency management activities with regional stakeholders by facilitating meetings on a regular basis with regional emergency managers, campus emergency managers, DOD partners, Voluntary Agencies Active in Disaster, and faith-based partners.  
**Coordinating Individual/Organization:** OES, County Departments, local military, healthcare agencies and the 18 incorporated cities  
**Potential Funding Source:** General Fund/Federal or State grants  
**Implementation Timeline:** January 2018 – January 2023
- Action Item #5:** Publicize and encourage the adoption of appropriate hazard mitigation actions throughout the region  
**Coordinating Individual/Organization:** OES/PDS/County Fire Authority/CCO/County Technology Office (CTO)  
**Potential Funding Source:** General Fund/Federal or State grants.  
**Implementation Timeline:** January 2018 – January 2023
- Action Item #6:** Review Building Codes to reflect current earthquake standards annually and update as necessary  
**Coordinating Individual/Organization:** Planning and Developmental Services  
**Potential Funding Source:** General Fund/Federal or State Grants.

**Implementation Timeline:**

January 2018 – January 2023

**Action Item #7:** Support public and private sector symposiums that emphasize hazard mitigation planning

**Coordinating Individual/Organization:** OES/County Departments/Cities/Private Sector

**Potential Funding Source:** General Fund/Federal or State Grants

**Implementation Timeline:** January 2018 – January 2023

**Action Item #8:** Maintain multi-jurisdictional/multi-functional training and annual exercises to enhance hazard mitigation

**Coordinating Individual/Organization:** OES/County Departments/All 18 Cities/appropriate Private Sector Agencies

**Potential Funding Source:** Grant Funded

**Implementation Timeline:** January 2018 – January 2023

**Action Item #9:** Review and update annually regional emergency plans, Concept of Operation plans, protocols, and standard operational processes.

**Coordinating Individual/Organization:** OES/appropriate county Departments/All 18 Cities/Special Districts

**Potential Funding Source:** General Fund/Federal or State grants.

**Implementation Timeline:** January 2018 – January 2023

**Action Item #10:** Encourage the public to prepare and maintain a 3-day preparedness kit for home and work through outreach events, social media, paid media and earned media.

**Coordinating Individual/Organization:** OES/CCO/CTO

**Potential Funding Source:** General Fund/Federal or State grants

**Implementation Timeline:** January 2018 – January 2023

**Action Item #11:** Develop a Climate Action Plan.

**Coordinating Individual/Organization:** Land Use and Environment Group/OES

**Potential Funding Source:** General Fund/Federal or State grants

**Implementation Timeline:** January 2018 – January 2023

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 county and cities will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how jurisdictions intend to incorporate the mitigation strategies outlined in this plan into existing planning mechanisms such as the County Comprehensive Land Use Plan, Capital Improvement Plans, and Building Codes.

## **6.1 Monitoring, Evaluating and Updating the Plan**

### **6.1.1 Plan Monitoring**

The HMWG participants will be responsible for monitoring the plan annually for updates to jurisdictional goals, objectives, and action items. If needed, these participants will coordinate through the County OES to integrate these updates into the Plan. County OES will be responsible for monitoring the overall Plan for updates on an annual basis.

### **6.1.2 Plan Evaluation**

The Plan is evaluated by County OES and by each participating jurisdiction annually to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. This includes re-evaluation by HMWG leads (or their select jurisdictional representative) based upon the initial STAPPLEE criteria used to draft goals, objectives, and action items for each jurisdiction. County OES and city representatives 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. County OES and jurisdictional representatives review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items 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 County OES for inclusion in further updates to the Plan. The HMWG and each Local Mitigation Planning Team meet annually to discuss the status of the Plan.

### **6.1.3 Plan Updates**

Since the plan's original adoption in 2005 the HMWG has participated in an annual review. This process was continued after the adoption of the 2010 plan. The review details all mitigation actions that were deferred, begun, continued or completed during that calendar year. In the past five years there has been considerable progress made with the successful completion of the vast majority of the action items developed by the participating jurisdictions. Appendix C details the status of the action items from the 2010 plan.

This review process has been effective in identifying gaps and shortfalls in funding, support, and other resources. It has also allowed for the re-prioritization of specific actions as circumstances change. It allows each participating jurisdiction to maintain the plan as a living document. This review process has enabled the HMWG to improve the document by eliminating actions that have been completed, adding new actions that have been identified since the plans adoption and reprioritizing other actions to reflect new priorities

and/or constraints. The negative side of this review process is that it is time consuming, pulling staff away from their day-to-day responsibilities.

County OES will continue to be the responsible agency for updates to the Plan. All HMWG participants will continue to be responsible to provide OES with jurisdictional-level updates to the Plan annually or when/if necessary as described above. Every five years the plan will be updated and submitted to Cal OES and FEMA for review.

#### **6.1.4 Implementation through Existing Programs**

County and local jurisdictions have implemented many of the recommended action items through existing programs and procedures. Participants use the Plan as a baseline of information on the natural hazards impacting their jurisdictions. They have also been able to refer to existing institutions, plans, policies and ordinances defined for each jurisdiction in Section 5 of the Plan (e.g., General Plan, Comprehensive Plan). Participants are incorporating the Hazard Mitigation Plan into their General Plans and/or Comprehensive Plans as those plans come up for review and revision.

#### **6.1.5 Continued Public Involvement**

The 2010 was posted on the Hazard Mitigation page of the San Diego County Office of Emergency Services webpage. The public was encouraged to comment on the plan online. Once approved, the revised plan will be posted on the hazard mitigation page of the County website. A dedicated email address is provided to the public to provide comments on the plan.

In addition, at the beginning of the revision process a survey was posted on all participating jurisdiction's webpages to determine the best way to meet the needs and desires of the community. The survey results are in Appendix D.

The participating jurisdictions and special districts continue to be dedicated to involving the public directly in the review process and updates of the Plan. A maintenance committee made up of a representative from County OES and a representative from each participating jurisdiction is 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.

A copy of the Plan is available for review on the County OES website. Participating jurisdictions also have links from their website to the Plan. In addition, hard copies of the plan are catalogued and kept at all of the appropriate agencies in the county. The existence and location of these copies is also posted on the county website. To facilitate public comments, the site contains an email address for the public's use which is monitored on a daily basis by County OES. Any questions or comments received on this website are forwarded to the appropriate member(s) of the HMWG for their review and response. County OES also tracks these public comments on the plan.

A press release requesting public comments is also issued for each update, and after each evaluation. We are also using social media (Facebook, Twitter, etc.) to notify the public of any changes they should be aware of. These notifications direct people to the website where the public can review proposed changes. Coupled with the dedicated email address for comments, this provides the public a simple and easily accessible to allow them to express their concerns, opinions, or ideas about any updates/changes that are proposed to the Plan. The County OES will continue to be responsible for publicize any changes to the Plan and maintaining public involvement.



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## APPENDIX A: HAZARD MITIGATION WORKING GROUP MEETING AGENDAS AND SUMMARIES

### Group Meeting #1: Wednesday February 11, 2014, 9:00 AM

#### Meeting Summary

Tom Amabile (TA) gave an introduction that discussed the working group goals. The group went around and identified themselves and their agencies. The audience consisted of representatives from the 18 incorporated cities, the County of San Diego and various local water agencies as well as from several fire protection districts. Special Districts represented were:

- Alpine Fire Protection District
- Lakeside Fire Protection District
- Padre Dam Municipal Water District
- Rancho Santa Fe Fire Protection District
- San Diego County Water Authority
- Sweetwater Authority
- Valley Center Water District
- Vista Irrigation District

TA gave a PowerPoint™ presentation discussing the goals of the San Diego County Multi-Jurisdiction Multi-Hazard Mitigation Plan (Plan), the objectives of DMA 2000, the hazard mitigation planning process and the steps involved in developing the Plan achieving the goals.

The presentation included a discussion of the methodology that will be used to revise the Plan for San Diego County. It was stressed that participation from special districts, especially fire protection districts and water districts was strongly encouraged and welcome.

As explained in the PowerPoint presentation the goals of the hazard mitigation planning process consists of:

1. Identifying
  - a. Risk of loss of life and property damage due to man-made and natural disasters
  - b. Options for mitigation to lower or eliminate those risks
  - c. Available resources and capabilities to implement mitigation actions
  - d. Risks to San Diego County:
    - i. Coastal storms/erosion
    - ii. Dam Failure
    - iii. Drought
    - iv. Earthquakes
    - v. Flooding
    - vi. Hazardous Materials\
    - vii. Landslides
    - viii. Terrorism
    - ix. Tsunamis

## x. Wildfires

## 2. Planning Process

## a. Basic Steps

- i. Establish planning area
  - a. Identify partnerships
    - i. Regional organizations
    - ii. Local governments
    - iii. Special Districts
    - iv. Tribal governments
- ii. Build the planning team
  - a. Identify Team Members
    - i. Board of Supervisors/City Councils
    - ii. Code Enforcement
    - iii. Community Development
    - iv. Fire
    - v. Law Enforcement
    - vi. Emergency Management
    - vii. Floodplain Administrators
    - viii. GIS
    - ix. Public Information
    - x. Public Works
    - xi. Special Districts
    - xii. Stormwater Management
    - xiii. Special Districts
    - xiv. Transportation
  - b. Each participating jurisdiction will have a local planning team
    - i. Focus on issues specific to that jurisdiction
    - ii. One or two members will also be part of the regional planning team
  - c. Responsibilities include:
    - i. Attend meetings
    - ii. Collect data
    - iii. Make decisions on the planning process and content
    - iv. Submit required worksheets
    - v. Review plan drafts
    - vi. Assist with coordination of public involvement and plan adoption
- iii. Create an outreach strategy
  - a. Three tiers
    - i. Planning Team
    - ii. Stakeholders

- iii. General Public
  - b. Successful Outreach
    - i. Informs and educates
    - ii. Invites interested parties to contribute
    - iii. Identifies conflicts
    - iv. Incorporated different perspectives
    - v. Provides data and information that improves the final plan
    - vi. Ensures transparency and builds trust
    - vii. Maximizes opportunities
  - c. Outreach Methods
    - i. Community Events
    - ii. News articles
    - iii. Presentations to local governments
    - iv. Questionnaires/Surveys
    - v. Public forums
    - vi. Social media
    - vii. Community specific meetings
    - viii. Website
  - d. Document the process
- iv. Review community capabilities
  - a. Existing authorities, policies, programs and resources
  - b. Core Capabilities
    - i. Planning
    - ii. Public information and warning
    - iii. Operational coordination
    - iv. Community resilience
    - v. Long-term vulnerability reduction
    - vi. Risk and disaster resilience assessment
    - vii. Threats and hazards identification
  - c. National Flood Insurance Program
  - d. Community Capabilities
    - i. Plans
    - ii. Studies
    - iii. Reports
    - iv. Technical Information
    - v. For each jurisdiction
- v. Conduct risk assessment
  - a. Describe hazards
  - b. Identify community assets
    - i. People
    - ii. Economic
    - iii. Built Environment
    - iv. Cultural resources

- v. Future development
    - vi. Natural Environment
  - c. Analyze Risk
    - i. Exposure Analysis
    - ii. Historical Analysis
    - iii. Scenario Analysis
    - iv. GIS Hazard Mapping
  - d. Summarize vulnerability
- vi. Develop a mitigation strategy
  - a. Goals –What we want to achieve
  - b. Actions – Specific projects and activities to meet those goals\
  - c. Action Plan – Describes how mitigation actions will be implemented
  - d. Develop the Plan
    - i. Finalize goals and objectives
    - ii. Identify mitigation measures
    - iii. Evaluate mitigation measures
    - iv. Prioritize mitigation measures
  - e. Document the plan
- vii. Keep the plan current
- viii. Adopt the plan
- ix. Create a safe and resilient community
  - a. Focus on quality, not quantity
  - b. Develop strong messaging
  - c. Encourage local champions
  - d. Identify funding and assistance

The presentation also entailed an explanation of the benefits and requirements of participating in the Hazard Mitigation Plan process. The special districts were told that this was an excellent time for them to become engaged with the hazard mitigation planning process. Because the plan was set for revision, they could become part of the process and have their plans incorporated into the multi-jurisdictional plan by simply participating and developing a plan. TA went on to describe the benefits of having a plan, specifically the ability to apply for hazard mitigation grants. He explained that the grant process was competitive and having a hazard mitigation plan did not guarantee a grant award.

The schedule of work group meeting was discussed. The work group will meet monthly to begin with. The next meeting date was schedule for March 5, 2014. At that meeting all participating jurisdictions (cities, county and special districts) will begin the actual process of updating and revising the multi-jurisdictional hazard mitigation plan.

**Group Meeting #2: Thursday May 28, 2009, 10:00 AM****A G E N D A**

Introductions

Schedule

GIS's Role in the Planning Process

Planning Process – Where Are We Now?

GIS – Assessing Risks – Step 1/Identify Hazards

What's Next?

Next Meeting – Time and Location

June 25, 2009 0900 – 1200

OES

Tom Amabile (TA) gave an introduction that discussed the working group goals. The group went around and identified themselves and their agencies. The audience consisted of representatives from the incorporated cities, the County of San Diego, various local water agencies and fire protection districts. Agencies represented at the meeting were:

**City of Poway****City of El Cajon****City of La Mesa****City of Lemon Grove****City of San Diego****City of San Marcos****City of Vista****Alpine FPD****Lakeside FPD****Rancho Santa Fe FPD****San Miquel FPD****Padre Dam MWD****San Diego County Water Authority****Sweetwater Authority****Valley Center MWD****Vista Irrigation District****GIS' Role in the Planning Process**

Geographic Information System (GIS) is essential for hazard mitigation planning. It can incorporate multiple and diverse data sources and provide an easily understood visual presentation of even the most complex data. GIS provides a modeling capability, allowing us to ask "What If" questions. Finally, it allows the data to be easily disseminated in the form of tables, maps, charts, etc.

It works by putting the available data in layers that can then be rectified and so they will overlay and allow queries to be run.



We need to identify all available data sources. There is a listing of sources in Appendix B of the current Hazmit plan. Please review them and if you have additional appropriate data files that are not currently being used for this project, please let Tom Amabile know so they can be incorporated in to the HAZUS modeling that will be done. If there are data layers identified that are no longer valid, please let Tom know that was well.

### **Planning Process**

We have organized our resources by establishing a planning team, and are working towards assessing community support and engaging the public. Currently, we are assessing our risk. This is accomplished by identifying hazards and profiling them to assess likely hood of occurrence and potential severity. We can eliminate hazards with a low risk (little chance of occurrence or for damage from the event), those with little potential for mitigation and those that already have mitigation efforts underway.

We will look at events that have resulted in a Local Proclamation of Emergency, a Gubernatorial Proclamation or a Presidential Declaration. They will be categorized by:

Type  
Date  
Location  
Expenditures  
Damages  
Description

We will also look at undeclared events looking for the same data above. Once that is complete we can inventory assets to determine their vulnerability to these hazards and identify potential loses.

Once that is complete we will develop the mitigation plan. To do this we will identify goals and objectives, establish and prioritize mitigation measures, prepare an implementation strategy and document the plan.

The final step will be to implement the plan. That will require adoption of the approved plan by all participating jurisdictions and implementation of plan recommendations. Each year we will evaluate the results and modify the recommendations to reflect completed tasks adding new tasks to the prioritized list as appropriate.

It is anticipated that we will begin the next revision of the complete plan in 2019.

**Assessing Risk**

Hazards currently addressed in the plan are:

- Earthquakes
- Wildfires
- Flooding
- Landslide
- Drought
- Tsunami
- Hazardous materials
- Coastal storm/erosion
- Dam failure
- Terrorism

Potential additions to the 2015 plan are:

- Drought/Water Supply
- Extreme Heat
- Other extreme weather events

A discussion of the identified hazards and potential new hazards took place. The consensus was that we would merge liquefaction with earthquake and merge radioactive materials release with hazardous materials release. There will also be a new hazard listed to encompass potential impacts from climate change that was identified as “Extreme Weather/Drought”.

OES is finishing up a survey on Survey Monkey that will be released to the public by the end of March and will be available to them for six weeks (FEMA requires a minimum response time of four weeks). This will be the start of the Public Outreach effort. We will conduct the survey upfront, before making/finalizing the plan, so ideas/comments from the public can be incorporated into the planning process and the draft plan. Each jurisdiction is requested to provide a link to the survey on their website, to allow for as much public outreach as possible. The County of San Diego will issue a press release to notify the public and encourages each jurisdiction to do the same. The County’s press release will be made available to all participating jurisdictions.

**What’s Next?**

It is expected that each jurisdiction will, with the assistance of their local hazard working group, begin to focus on aspects specific to their jurisdiction. Part of this process will be “Ground-truthing,” I.e., each individual jurisdiction must confirm the data being used is accurate and acceptable to them.

Part of this process will be to profile the hazards. While the County's GIS staff will model this, each city/special district will need to review the results to ensure they are appropriate for that jurisdiction.

## **Homework**

Everyone is requested to:

Review the data matrix in Appendix B

Review the hazard maps

Review FEMA Local Mitigation Planning Handbook (on the CD provided last meeting. It is also available on line at:

<http://www.fema.gov/media-library/assets/documents/31598?id=7209>

Complete the 4 Worksheets form the handbook

## **Group Meeting #3: June 24, 2014, A G E N D A**

### **Introductions**

#### **Schedule**

#### **Mitigation Strategy**

Goals,- Consistent with hazards identified

Goals from 2010 Plan

#### **Actions**

Local Plans and regulations

Structure/Infrastructure projects

Natural Systems protection

Education & Awareness programs

Preparedness Actions

Mitigating Actions

Action Prioritization

### **Implementation**

Incorporate into existing plans & Policies

Integrate with other community objectives, using existing mechanisms.

Think pre and post-disaster mitigation

### **Updating Mitigation Strategy**

Evaluate implementation progress

Explain changes in priorities

### **Communicating Mitigation Action Plan to the Public**

#### **What's Next ?**

Run HAZUS analysis

Develop Maps and Tables

Begin development of mitigation strategy  
Homework  
Review goals and objectives in 2010 plan  
Begin update local goals, objectives and actions.

Next Meeting – August 26, 2014 10 AM

### Meeting Summary

Tom Amabile gave an introduction that discussed the working group goals. Members went around the room and introduced themselves.

Tom Amabile reviewed the time-line for the project. He then reviewed the goals, objects and actions that will be listed in the plan;

Goals are guidelines that explain what you want to achieve. They must be consistent with the hazards identified.

Objectives connect actions to the goals, and

Actions are specific measurable projects and activities that help achieve the goal.

Mitigation actions which include changes to local plans and regulations, structure/infrastructure projects, natural systems protection and education and awareness programs.

Preparedness actions to reduce or eliminate long-term risk and lessen the need for preparedness and/or response resources in the future. These actions include mutual aid agreements, purchasing communications equipment and developing mass notification capabilities.

The **Action Plan** describes how mitigation actions will be prioritized and implemented.

Goals and Objectives identified in the current plan were presented. They are:

Reduce the possibility of damage and losses to existing assets due to geologic hazards

Reduce the possibility of damage and losses to existing assets due to structure fire/wildfire

Reduce the possibility of losses to existing assets due to flooding/dam failure

Increase public understanding and support for effective hazard mitigation

Improve hazard mitigation coordination and communication with federal, State, local and tribal governments

Reduce the possibility of damage and losses to existing assets due to geologic hazards

Reduce the possibility of damage and losses to existing assets due to structure fire/wildfire

Reduce the possibility of losses to existing assets due to flooding/dam failure

Increase public understanding and support for effective hazard mitigation

Improve hazard mitigation coordination and communication with federal, State, local and tribal governments

There was discussion regarding changing or modifying these goals and objectives. Each participating jurisdiction is free to modify them to meet their needs.

The process for identifying mitigation actions was discussed. It includes:

Review of the risk assessment

Capabilities assessment  
 Evaluation and prioritization of mitigation actions  
 Implementation  
 Updating mitigation strategy  
 Communicating the action plan to key officials and the public

### **Action Items**

OES/County:

Run HAZUS analysis  
 Develop maps and tables.

All jurisdictions:

Begin development of Mitigation Strategy.

All other meetings between individual jurisdictions were conducted via telephone or in person between the city/special district and OES.

### **Group Meeting #4: September 16, 2014, A G E N D A**

Introductions

Schedule

Survey results

Review of Hazards

Review of Over-arching Mitigation Goals

Development of Additional Goals

Homework Assignment

What's Next?

### **Meeting Summary**

Tom Amabile gave an introduction that discussed the working group goals. Members went around the room and introduced themselves.

Tom Amabile reviewed the time-line for the project.

The results of the on-line survey were discussed:

534 people responded to the survey.

Carlsbad - 44 National City - 2

Coronado - 1 Oceanside - 14

Chula Vista - 31 Poway - 28

Del Mar - 28 San Diego - 69

El Cajon -	13	San Marcos -	76
Encinitas -	17	Santee -	13
Escondido -	5	Solana Beach -	109
Imperial Beach -	0	Vista -	29
La Mesa -	9	Unincorporated -	41
Lemon Grove -	4	Other -	1

75% were unaware a regional HazMit plan exists  
 61% had been impacted by a disaster  
 86% said they were concerned about being impacted.

Biggest hazards:

- Wildfire/Structure Fire – 41%
- Earthquake - 31%
- Drought – 8%
- Climate Change – 4%
- Coastal Storm/Erosion – 3%

Next biggest hazards:

- Earthquake – 33%
- Wildfire/Structure Fire – 17%
- Drought – 16%
- Terrorism – 3%
- Climate Change – 3%

6.87 % live or have a business in a flood plain  
 9.23 % have flood insurance, 10.17 % aren't sure if they do or not  
 If they don't have flood insurance it is because  
 Not in flood plain – 58%  
 Home/business elevated or protected – 19%  
 Never floods – 4%  
 Too expensive – 5%

3 Most common steps local government can take  
 Increase awareness  
 Conduct more exercises/drills  
 Add resources (more fire assets, helicopters, CERT, etc.)

Other concerns  
 Getting emergency information  
 Government needs to be eco-friendly  
 Rated six categories on level of importance:

Category	Importance		
	Very	Somewhat	Not
Prevention	76%	21%	2%
Property Protection	55%	39%	6%
Public Awareness	77%	21%	2%

Nat. Resources	65%	29%	6%
Emerg. Services	88%	11%	1%
Structural Projects	54%	38%	8%

#### Review of Hazards

Tom Amabile reviewed the hazards in the revised plan:

Coastal Storm/Erosion/Tsunami/Sea Level Rise

8 local proclamations of emergencies

Coastline heavily developed/populated

Prone to erosion

Sea level rise predicted to be between 3 and 12 inches by 2030.

Dam Failure

Over 30 significant dams in the County

Most over 35 years old

Increased downstream development

Drought

Not originally in plan (reliance on imported water reduces our risk from local drought)

State-wide drought puts us at risk

Floods

Large portions of the County within 100 year flood plain

2 proclaimed emergencies in last 15 years

Moderate rainfall results in urban/flash floods on routine basis

Hazardous Materials

Over 100 licensed sites within the region

Regional HazMat team responds to hundreds of calls each year.

Landslide

Landslide prone areas found throughout the county

Most recent damaging landslide was 2007 in La Jolla. 111 homes evacuated, 40 found to be uninhabitable due to ground instability and 7 suffered significant damage.

Terrorism

Every major metropolitan area is susceptible to a terrorist event

Wildfire/Structure Fire

Occur frequently – significant wildfires breakout routinely

5 proclaimed emergencies due to wildfire between 2003 and 2014

Drought increases the risk due to low fuel moisture.

#### Hazards Not in the Plan

Avalanche

Hailstorm

Nuclear Materials Release (removed due to SONGS decommissioning)

Severe Winter Storms

Volcano

## Windstorm

## Existing Objectives:

## Reduce vulnerability to:

- Geologic hazards (earthquake, landslides, liquefaction, etc.)

- Wildfires/structure fires

- Flooding/dam failure

- Coastal erosion/coastal bluff failure/storm surge/tsunami/sea level rise

- Severe Weather (including extreme heat)

- Increase public support for hazard mitigation

- Improve hazard mitigation coordination between all levels of government

- Promote disaster resistant existing and future development

- Build and support local capacity

- Need to develop a goal for drought

## Homework

- Review current goals and objectives for your jurisdiction

- Delete completed items

- Add new items

- Identify 5 to 10 priority action items

- Start Date

- Agency/department responsible

- Cost/Funding source

- Estimated completion date

- Short description of the project

- Please provide to Tom by 10/15/14

Next Meeting date to be determined.



Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 1



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 1



February 11, 2014

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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 2

3/11/2014



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 2

3/11/2014



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 3

6/24/2014



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 3

6/24/2014



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014

Working Group Meeting # 4

11/18/2014



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Multi-jurisdiction Hazard Mitigation Plan Update  
2014  
Working Group Meeting # 4

6/24/2014



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**APPENDIX B: DATA MATRIX**

NAME	SOURCES	QUERY (IF ANY)	NOTES (INCL. CREDITS)
Coastal Storm/Erosion	HYD_FLOODPL	FLD_ZONE = 'VE'	Federal Emergency Management Agency (FEMA)
Tsunami	HYD_TSUNAMI_INUNDATION_AREA		California Emergency Management Agency (CalEMA), University of Southern California (USC) and California Geological Survey (CGS)
Dam Failure	HYD_DAM_INUNDATION		California Office of Emergency Services and County of San Diego
100-Year Earthquake	HAZUS, USGS		Federal Emergency Management Agency (FEMA; HAZUS); soil from U.S. Geological Survey VS30 data - <a href="http://earthquake.usgs.gov/hazards/apps/vs30/custom.php">http://earthquake.usgs.gov/hazards/apps/vs30/custom.php</a>
500-Year Earthquake	HAZUS, USGS		Federal Emergency Management Agency (FEMA; HAZUS); soil from U.S. Geological Survey VS30 data - <a href="http://earthquake.usgs.gov/hazards/apps/vs30/custom.php">http://earthquake.usgs.gov/hazards/apps/vs30/custom.php</a>
Rose Canyon M6.9 Scenario	USGS		U.S. Geological Survey
100-Year Flood	HYD_FLOODPL	FLOOD_PLAI = 'FP100' OR FLOOD_PLAI = 'FW100'	Federal Emergency Management Agency (FEMA)
500-Year Flood	HYD_FLOODPL	FLOOD_PLAI = 'FP500'	Federal Emergency Management Agency (FEMA)
Rain-Induced Landslide (High Risk)	GEO_LANDSLIDE_CN	soil_slip_risk = 'High' OR state_landslide_cat = 'Most Susceptible' OR GABRO_SLOPE = 'YES'	State of California, U.S. Geological Survey, Federal Emergency Management Agency (FEMA; HAZUS) and County of San Diego
Rain-Induced Landslide (Moderate Risk)	GEO_LANDSLIDE_CN	(soil_slip_risk = 'Moderate' OR state_landslide_cat = 'Marginally Susceptible') AND GABRO_SLOPE = ''	State of California, U.S. Geological Survey, Federal Emergency Management Agency (FEMA; HAZUS) and County of San Diego
Fire Regime Group II	LANDFIRE	<= 35 Year Fire Return Interval, Replacement Severity	U.S. Department of Agriculture Forest Service and U.S. Department of the Interior
Fire Regime Group IV	LANDFIRE	35 - 200 Year Fire Return Interval, Replacement Severity	U.S. Department of Agriculture Forest Service and U.S. Department of the Interior
Extreme Heat	Cal-Adapt	Maximum temperature - MONTHLY - August 2020 - A2 GFDL	California Energy Commission (CEC) - <a href="http://cal-adapt.org/">http://cal-adapt.org/</a>
Sea Level Rise (Coastal Flooding)	Areas inundated by unimpeded Pacific coastal flooding under a scenario of 1.4-meter (55-inch) sea-level rise		Pacific Institute -- <a href="http://www2.pacinst.org/">http://www2.pacinst.org/</a>
Sea Level Rise (MHHW)	Area inundated by mean higher high water (MHHW) under 1.4-meter (55-inch) sea-level rise scenario		Pacific Institute -- <a href="http://www2.pacinst.org/">http://www2.pacinst.org/</a>

**APPENDIX C: IMPLEMENTATION STATUS****County of San Diego**

<b>Priority</b>	<b>Action Item Number</b>	<b>Description</b>	<b>Status</b>
1.	3.B.1	Update Operational Area Plan.	Completed.
2.	2.D.4	Continue to develop and maintain public education and outreach programs.	Completed. On-going.
3.	10.A.1	Update the County Consolidated Fire Code every three years.	On-going.
4.	4.B.3	Continue to streamline policies to eliminate conflicts and duplication of efforts.	On-going.
5.	2.A1	Publicize and encourage the adoption of appropriate hazard mitigation actions.	Completed. On-going.
6.	6.A.1	Update Building Codes to reflect current earthquake standards.	Completed. On-going
7.	2.E.1	Support public and private sector symposiums.	On-going.
8.	4.A.4	Maintain multi-jurisdictional/multi-functional training and exercises to enhance hazard mitigation.	Completed. On-going
9.	4.A.3	Continue to review and update plans that would include coordination with cities, special districts and County departments.	Completed, on-going.
10.	Attach A 1.E.1	Continue to encourage the public to prepare and maintain a 3-day preparedness kit for home and work.	Completed, on-going.

## APPENDIX D: SURVEY RESULTS FOR SD MULTIJURISDICTIONAL HAZARD MITIGATION PLAN REVISION

There were 532 respondents for this survey. Of those people:

- 271 chose to provide their name
- 267 provided their e-mail
- 222 provided their phone number

All of the 532 Respondents provided the cities or communities in which they live and work. Although there were respondents from all areas of the county:

- The majority of people stated they live and/or work in the northern part of the county (Example: Solana Beach, Del Mar, Carlsbad, Encinitas, etc.)
- Western and Central San Diego (Example: City of San Diego, Point Loma, etc.) had many respondents, but much less than North County
- There was only a handful of Respondents who claimed to be from the South Bay and Eastern area of the county (Example: Chula Vista, Bonita, Lakeside, Lemon Grove, etc.).

Almost everyone stated they were responding to this survey as a Resident. (524 Answered; 8 Skipped)

- 96.56% (506 Responders) responded as a Resident.
- 2.67% (14 Responders) responded as a Community Organization.
- 0.57% (3 Responders) responded as a Local Business.
- 0.19% (1 Responders) responded as a Non-profit Organization.

According to the responses to question 4, “Are you aware of the San Diego Multijurisdictional Hazard Mitigation Plan developed in 2004 and revised in 2010?” (529 Answered; 3 Skipped)

- 25.52% YES
- 74.48% NO.

When asked, “Have you ever experienced or been impacted by a disaster?” (529 Answered; 3 Skipped)

- 4.54% answered YES
- 38.94% answered NO.
- 56.52% answered YES and explained what the disaster was. Of those people who provided details, earthquakes and having to evacuate their homes due to wild fires was the most common answer.

Question 6 asked, “How concerned are you about the possibility of your community being impacted by a disaster?” (527 Answered; 5 Skipped)

- 18.41% are Extremely Concerned
- 31.31% are Very Concerned

- 35.86% are Moderately concerned
- 13.09% are only Slightly concerned
- 1.33% are Not at all concerned

Question 7 asked people to select the one hazard they think is the highest threat to their neighborhood. (523 Answered; 9 Skipped):

- 41.49% - Structure/Wild Land Fires
- 31.17% - Earthquake
- 8.03% - Drought
- 5.54% - Other (Examples: too much government regulation, Tornadoes, Power outage)
- 3.63% - Climate change
- 2.87% - Coastal Storms/Erosion
- 1.34% - Tsunami
- 1.15% - Extreme heat
- 0.96% - Pandemic
- 0.96% - Landslide
- 0.76% - Severe Winter Storm
- 0.76% - Terrorism
- 0.38% - Extreme Wind
- 0.19% - Nuclear accident
- 0.19% - Hazardous Materials Incident
- 0.19% - Dam Failure
- 0.19% - Flood
- 0.19% - Oil or Gas line failure
- 0.00% - Liquefaction.

Question 8 had people choose the hazard they think is the second highest threat to their neighborhood. (513 Answered; 19 Skipped):

- 32.55% - Earthquake
- 16.96% - Structure/Wild Land Fire
- 16.37% - Drought
- 3.70% - Other
- 3.31% - Terrorism
- 3.31% - Climate Change
- 3.12% - Coastal Storms/Erosion
- 2.73% - Extreme Heat
- 2.73% - Severe Winter Storm
- 2.53% - Landslide
- 2.53% - Pandemic
- 2.14% - Extreme Wind

- 1.95% - Oil or Gasoline Failure
- 1.95 – Tsunami
- 1.56% - Flood
- 0.78% - Hazardous Materials Incident
- 0.78% - Dam Failure
- 0.58% - Nuclear Accident
- 0.39% - Liquefaction

In reference to the question, “Is your home or business located in a flood plain?” (524 Answered; 8 Skipped)

- 6.87% of people have a home or business that is located in a floodplain
- 93.13% said they do not have a home or business in a flood plain

The following question asked, “Do you have flood insurance?” (531 Answered; 1 Skipped)

- 9.23% of people said they do have flood insurance
- 60.80% said they do not have flood insurance
- 10.17% of people said they do not know if they have flood insurance

When asked people why they do not have flood insurance (469 Answered; 63 Skipped)

- 58.21% said they do not have flood insurance because their home or business is not located in a flood plain
- 18.76% of people do not have flood insurance because their home/business is elevated or otherwise protected
- 4.26% claim it is not necessary because it never floods
- 4.90% said flood insurance is too expensive
- 3.10% said they have never really considered getting flood insurance
- 5.76% have “other reasons”. The majority of people who chose other as their answer explained they do not have flood insurance because they rent or because flood insurance is too expensive.

When asked, “Have you taken any actions to make your home, business or neighborhood more resistant to hazards?”(526 Answered; 6 Skipped)

- 60.27% of people who answered said they have taken actions to make their home, business, or neighborhood more resistant to hazards
- 39.73% have not taken any action

The following question asked if they are interested in making their home, business or neighborhood more resistant to hazards (523 Answered; 9 Skipped)

- 85.09% of people are interested in making their home, business, or neighborhood more resistant to hazards
- 14.91% are not interested

When people were asked what the most effective way to receive information about how to make their home, business, or neighborhood more resistant to hazards (520 Answered; 12 Skipped):

- 52.12% said email
- 13.08% answered internet
- 8.85% answered Mail
- 7.88% said Television
- 7.88% Public workshops
- 4.81% selected Social Media
- 3.65% said Newspaper
- 1.73% said Radio

The follow up question was, “Do you require assistance in receiving information?” (528 Answered; 4 Skipped)

- 97.92% Do not require assistance in receiving information
- 2.08% Require assistance

Question 16 asks people to give their opinion in reference to what are some steps the local government could take to reduce or eliminate the risk of future hazard damages in their neighborhood. (405 Answered; 127 Skipped)

- The 3 most common answers people gave were: Increase public emergency awareness/education, conduct more mock disaster drills, and increase emergency resources and equipment (more fire depts., helicopters, C.E.R.T., etc.).
- Other steps which were suggested were: improve AlertSanDiego.org, monitor people’s water usage and inspect homes for safe property practices, and for the cities and county to better maintain land/forestry.

When asked if there are any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that are important, many people continue to comment about how they are not well informed on how to react in the event of an emergency or disaster (234 Answered; 298 Skipped):

- People feel there is not an effective means to disseminate emergency information.
- Another common topic in people’s response to this question is their concern as to what the cities/county is doing to be eco-friendly.

The final question asks people, in their opinion, to rate the level of importance of the six broad categories of community-wide activities. (529 Answered; 3 Skipped)

1. Prevention – Administrative or regulatory actions that influence the way land is developed and buildings are constructed. (Example – Planning and zoning building codes, etc.)
  - a. Very Important: 76.15%
  - b. Somewhat Important: 21.56%
  - c. Not Important: 2.29%

2. Property Protection – Actions that involve the modification of existing buildings or structures to protect them from a hazard area (Example – Retrofits, relocation, acquisition, etc.)
  - a. Very Important: 55.05%
  - b. Somewhat Important: 39.43%
  - c. Not Important: 5.52%
3. Public Education and Awareness – Actions to inform and educate residents, elected officials and property owners about the hazards and potential ways to mitigate them (Example – Outreach, real estate disclosure, school-age and adult education.)
  - a. Very Important: 76.57%
  - b. Somewhat Important: 21.71%
  - c. Not Important: 1.71%
4. Natural Resources Protection – Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems (Examples – Erosion control, stream restoration, etc.)
  - a. Very Important: 64.63%
  - b. Somewhat Important: 29.25%
  - c. Not Important: 6.12%
5. Emergency Services – Actions that protect people and property during and immediately after a disaster or hazard event (Example – Warning systems, protection of official facilities, etc.)
  - a. Very Important: 88.80%
  - b. Somewhat Important: 10.63%
  - c. Not Important: 0.57%
6. Structural Projects – Actions that involve the construction of structures to reduce the impact of a hazard (Example – Dams, floodwalls, seawalls, etc.)
  - a. Very Important: 53.82%
  - b. Somewhat Important: 37.98%
  - c. Not Important: 8.21%

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## **APPENDIX G**

### Reporting of Energy Intensity

**Urban Water Supplier:** Vista Irrigation District

**Water Delivery Product** (If delivering more than one type of product use Table O-1C)

Retail Potable Deliveries

**Table O-1A: Recommended Energy Reporting - Water Supply Process Approach**

Enter Start Date for Reporting Period	7/1/2019		Urban Water Supplier Operational Control							
End Date	6/30/2020									
<input type="checkbox"/> Is upstream embedded in the values reported?			Water Management Process					Non-Consequential Hydropower (if applicable)		
		Water Volume Units Used	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process		AF	751	0	0	0	16415.7	16415.7	0	16415.7
Energy Consumed (kWh)		N/A	237413	0	0	0	895313	1132726		1132726
Energy Intensity (kWh/vol.)		N/A	316.1	0.0	0.0	0.0	54.5	69.0	0.0	69.0

**Quantity of Self-Generated Renewable Energy**

0 kWh

**Data Quality** (Estimate, Metered Data, Combination of Estimates and Metered Data)

Metered Data

**Data Quality Narrative:**

**Water:** Extract & Divert = Wellfield pumping (no losses). Distribution = metered into system w/exchanges. **Energy:** Extract & Divert = Energy consumed wellfield only (Building & grounds excluded). Distribution = All intown energy consumed minus headquarters.

**Narrative:**

Water is extracted (pumped) from the wellfield into Lake Henshaw. Distribution system energy includes: reservoirs, pump stations, flow control facilities and cathodic protection. Note: Bear Valley Power Plant, Escondido-Vista WTP and solar at VID headquarters were not included as they are not under our operational control.