San Diego County Water Authority

San Diego County Water Authority
Final 2015 Urban Water Management Plan

Prepared by:

SAN DIEGO COUNTY WATER AUTHORITY
Water Resources Department
4677 Overland Avenue
San Diego, CA 92123

June 2016

Final 2015 Urban Water Management Plan

Prepared by:

San Diego County Water Authority
Water Resources Department

With assistance provided by the following departments:

Colorado River Program
Finance
General Counsel
General Manager's Office
MWD Program
Operations and Maintenance
Public Outreach and Conservation

June 2016

San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 9123
858-522-6600
www.sdcwa.org

TABLE OF CONTENTS

Section **Page**

Section **Page**

LIST OF APPENDICES

LIST OF FIGURES

LIST OF FIGURES
(Cont'd.)

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

µg/l	micrograms per liter
2005 Plan	Updated 2005 Urban Water Management Plan
2010 Plan	Updated 2010 Urban Water Management Plan
2015 Plan	2015 Urban Water Management Plan
AAC	All-American Canal
AB	Assembly Bill
Act	Urban Water Management Planning Act
AF	acre-feet
AF/YR	acre-feet per year
AWE Tool	Alliance for Water Efficiency Water Conservation Tracking Tool
AWE	Alliance for Water Efficiency
AWT	Advanced Water Treatment
AWWA	American Water Works Association
Banks Pumping Plant	Harvey O. Banks Pumping Plant
Basin Study	San Diego Watershed Basin Study
BCCA	Bias-Corrected Constructed Analog
BDCP	Bay Delta Conservation Plan
BiOp	Biological Opinion
BMP	best management practices
Board	Board of Directors
CAP	Climate Action Plan
Carlsbad Desalination Plant	Claude “Bud” Lewis Carlsbad Desalination Plant
CC	Coachella Canals
CDPH	California Department of Public Health
CEC	constituents of emerging concern
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CII	Commercial, Industrial, and Institutional
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Program
CMIP5	Coupled Model Intercomparison Project phase 5
CRA	Colorado River Aqueduct
CSP	Carryover Storage Project
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVWD	Coachella Valley Water District
CVWD	Coachella Valley Water District
D/DBP	Disinfectant and Disinfection Byproducts
DBP	Disinfection byproduct
DDW	Division of Drinking Water
DEH	Department of Environmental Health
Delta Plan	Bay-Delta management plan
Delta Reform Act	Sacramento-San Joaquin Delta Reform Act
Delta	Sacramento–San Joaquin River Delta
DMM	demand management measure

DOE	Department of Energy
DWA	Desert Water Agency
DWR	Department of Water Resources
EIR/EIS	environmental impact report and environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESP	Emergency Storage Project
FOA	Funding Opportunity Announcement
GCM	General Circulation Model
GHG	greenhouse gas
GPCD	gallons per capita per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCP	Habitat Conservation Plan
ICP	Integrated Contingency Plan
ID	Irrigation District
IID	Imperial Irrigation District
IRWM	Integrated Regional Water Management
lb/day	pounds per day
LWSD	Local Water Supply Development
M&I	municipal and industrial
MAIN	Municipal and Industrial Needs
MCB Camp Pendleton	Marine Corps Base Camp Pendleton
MCL	maximum contaminant level
MFRO	microfiltration/reverse osmosis
mg/l	milligrams per liter
MGD	million gallons per day
MOU	Memorandum of Understanding
MSCP	Multi-Species Conservation Program
MW	megawatts
MWD	Metropolitan Water District
MWELO	Model Water Efficient Landscape Ordinance
NCCP	Natural Community Conservation Plan
NDMA	nitrosodimethylamine
NSDCRRWP	North San Diego County Regional Recycled Water Project
pCi/l	picocuries per liter
PHG	public health goal
PL	Public Law
Poseidon	Poseidon Water
PPCP	pharmaceuticals and personal care product
PUMA	Piloting Utility Modeling Applications
QSA	Quantification Settlement Agreement
QWEL	Qualified Water Efficient Landscaper
RAC	Regional Advisory Committee
RCP	representative concentration pathway
Recycled Water Policy	State Water Resources Control Board Recycled Water Policy
Resources Agency	California Natural Resources Agency

RF	radiative forcing
RSF	Rate Stabilization Fund
RWMG	Regional Water Management Group
San Diego Water Board	San Diego Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCSC	Southern California Salinity Coalition
SDG&E	San Diego Gas & Electric
SDWA	Safe Drinking Water Act
SGMA	Sustainable Groundwater Management Act
SLRWRF	San Luis Rey Water Reclamation Facility
SWA	Source Water Assessment
SWAT	Smart Water Application Technologies
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TOC	total organic carbon
Transfer Agreement	Water Authority–IID Water Conservation and Transfer Agreement
TSAWR	Transitional Special Agricultural Water Rate
UCMR	unregulated contaminant monitoring rule
USFWS	U.S. Fish and Wildlife Service
UWMP	Urban Water Management Plan
Water Authority	San Diego County Water Authority
Water Board	Regional Water Quality Control Board
WD	Water District
WPDP	Water Purification Demonstration Project
WSAP	Water Supply Allocation Plan
WSDRP	Water Shortage and Drought Response Plan
WTP	Water Treatment Plant
WUCA	Water Utility Climate Alliance

Section 1

Introduction

The San Diego County Water Authority's (Water Authority) 2015 Urban Water Management Plan (2015 Plan) was prepared in accordance and compliance with the Urban Water Management Planning Act (Act) (Water Code Sections 10610 through 10656) and includes the conservation measures, programs and policies required by Water Code Section 10608.36.

Urban water suppliers are required by the Act to update their Urban Water Management Plan (UWMP) and submit a complete version to the California Department of Water Resources (DWR) every five years. The plan serves as the Water Authority's long-term planning document to ensure a reliable water supply for the region. In accordance with its Administrative Code, the Water Authority prepares annual water supply reports to provide updated information on development of local and imported water supplies. New for the 2015 UWMP (also referred to in this document as 2015 Plan) are the following sections:

- Details on the unprecedented multi-year drought affecting California since 2012 and the state's Emergency Regulation, included in **Section 11**
- Information on the Water Authority's distribution system water losses, included in **Appendix J**
- Voluntary reporting of energy intensity associated with the Water Authority's sources of water, included in **Appendix K**
- Standardized forms and tables (as specified by DWR) included in **Appendix L**

The Water Authority's mission is to provide a safe and reliable supply of water to its member agencies serving the San Diego region. The 2015 Plan identifies a diverse mix of water resources projected to be developed over the next 25 years to ensure long-term water supply reliability for the region.

Since adopting the Updated 2010 Urban Water Management Plan (2010 Plan), the Water Authority and its member agencies have made great strides in developing a more drought-resilient mix of water resources, thereby increasing the region's ability to manage and avoid shortage situations. In partnership with and support of its member agencies, the region has conserved an average of 72,710 acre-feet per year (AF/YR) of water over the last five years when compared to the benchmark year of demand in 1991, when the population was 27 percent less. Since the 2010 Plan, the Water Authority entered into a Water Purchase Agreement to purchase supplies from the 50 million gallons per day (MGD) Claude "Bud" Lewis Carlsbad Desalination Plant (Carlsbad Desalination Plant). This project is the largest seawater desalination facility in North America and came on-line in December 2015. The Carlsbad Desalination Plant provides a long-term drought-resilient water supply for the San Diego region. The San Vicente Dam raise was also completed in the last five years, providing both additional emergency storage and carryover storage for the region. The carryover storage capacity is critical to having a drought-resilient resource mix. It allows the region to store water in years when supplies are available and then utilize those supplies during times of shortage. Over the last five years, deliveries of conserved agricultural transfer water from the Imperial Valley increased by 30,000 AF/YR to 100,000 AF/YR in 2015. Deliveries of conserved transfer water will reach a maximum of 200,000 AF/YR by 2021. The Water Authority also continued to take delivery of 77,700 AF/YR of conserved water from projects to line the All-American Canal and Coachella Canal (AAC and CC, respectively).

In addition, the Water Authority's member agencies continue to evaluate, plan and implement local supply development, through recycled water, brackish groundwater recovery and potentially potable reuse. In the 2015 Plan, the next increment of supply to reduce reliance on imported sources and ensure drought-resilient supplies is expected to come from their efforts.

1.1 California Urban Water Management Planning Act

The Act requires all urban water suppliers in the state to prepare UWMPs and update them every five years. The Water Authority utilized DWR's *2015 Urban Water Management Plans Guidebook for Urban Water Suppliers* in preparation of this 2015 Plan.

Major amendments made to the Act since preparation of the Water Authority's 2010 Plan include the following:

- Water Code Section 10621 (d) changed the deadline for water suppliers to submit their 2015 UWMPs, which are now due to DWR by July 1, 2016.
- Water Code Section 10631(e)(1)(J) adds "distribution system water loss" to the list of past, present, and projected future water uses that is to be quantified in the UWMP to the extent that records are available and over the same five-year increments described in Water Code Section 10631(a). For the 2015 UWMP, the distribution system water loss must be quantified for the most recent 12-month period available. Water Code Section 10631(e)(3)(a) requires that for all subsequent updates, the distribution system water loss must be quantified for each of the five years preceding the plan update. The distribution system water loss quantification must be reported in accordance with a worksheet approved or developed by DWR through a public process. Water Code Section 10631(e)(3)(b) requires that the water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association (AWWA).
- Water Code Section 10631(e)(4)(a) deems that, if available and applicable to an urban water supplier, water-use projections may 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. Water Code Section 10631(e)(4)(b) states that, to the extent that an urban water supplier reports the information, an urban water supplier shall do both of the following: (1) provide citations of the various codes, standards, ordinances, or transportation and land use plans used in making the projections; and (2) 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 note that fact.
- Water Code Section 10631(f)(1)(a) requires plans by retail water suppliers to include a narrative description that addresses the nature and extent of each water demand management measure (DMM) implemented over the past five years. The narrative must describe the water DMMs that the supplier plans to implement to achieve its water-use targets pursuant to Water

Code Section 10608.20. Water Code Section 10631(f)(1)(b) requires that the narrative must also include descriptions of the following water DMMs: water waste prevention ordinances, metering, conservation pricing, public education and outreach, programs to assess and manage distribution system real loss, water conservation program coordination and staffing support, and other DMMs that have a significant impact on water use as measured in gallons per capita per day (GPCD), including innovative measures, if implemented.

- Water Code Section 10631(f)(2) requires plans by wholesale water suppliers to include a narrative description of metering, public education and outreach, water conservation program coordination and staffing support, and other DMMs that have a significant impact on water use as measured in GPCD, including innovative measures, if implemented, as well as a narrative description of their distribution system asset management and wholesale supplier assistance programs.
- Water Code Section 10631.2(a) adds the voluntary reporting in the UWMP of the estimated amount of energy used: (1) to extract or divert water supplies; (2) to convey water supplies to water treatment plants or distribution systems; (3) to treat water supplies; (4) to distribute water supplies through the distribution system; (5) for treated water supplies in comparison to the amount used for non-treated water supplies; and (6) to place water into or to withdraw water from storage; and (7) any other energy-related information the urban water supplier deems appropriate. DWR's 2015 UWMP Guidebook included a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems (Water Code Section 10631.2(b)).
- Water Code Section 10644(a)(2) requires urban water suppliers to submit plans, or amendments to plans, electronically and to include any standardized forms, tables, or displays specified by DWR.

Water Code Section 10631.5 addresses conditions of eligibility for grants or loans from DWR. 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 DWR.

According to Water Code Section 10610.2(2), "[t]he 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." **Appendix A** includes text changes made to the Act.

1.2 Senate Bill 7 of the Seventh Extraordinary Session of 2009

The California State Legislature passed Senate Bill 7 as part of the Seventh Extraordinary Session, referred to as SBX7-7, on November 10, 2009, which became effective February 3, 2010. This law was the water conservation component to the Sacramento-San Joaquin River Delta (Delta) legislation package, and seeks to achieve a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. The law requires each urban retail water supplier to develop urban water-use targets to help meet the 20 percent goal by 2020, and an interim water reduction target by 2015.

An urban retail water supplier may update its 2020 urban water-use target in its 2015 UWMP (Water Code Section 10608.20). Wholesale water suppliers must include in their 2015 Plans an assessment of their present and proposed future measures, programs and policies to help retail agencies achieve their water-use reduction targets (Water Code Section 10608.36). **Appendix A** also contains the text of SBX7-7.

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 SB 610 and SB 221, respectively) amended state law to improve the link between information on water supply availability and certain land use decisions made by cities and counties. 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.

Section 4, "San Diego County Water Authority Supplies," and **Appendix E** of the 2015 Plan contain documentation on the existing and planned water supplies being developed by the Water Authority. This documentation may be used by the Water Authority's member agencies in preparing the water supply assessments and written verifications required under state law. Specific documentation on member agency supplies and Metropolitan Water District (Metropolitan) supplies may be found in their respective plans.

1.4 Water Authority's 2015 Plan Preparation and Implementation

To adequately demonstrate regional water supply reliability over the next 25 years, the 2015 Plan quantifies the regional mix of existing and projected local and imported supplies necessary to meet future retail demands within the Water Authority's service area. Although the 2015 Plan includes specific documentation regarding development of the Water Authority's supplies, the plans submitted by the member agencies and Metropolitan will provide details on their supplies that contribute to the diversification and reliability of supplies for the San Diego region.

Reasonable consistency among the plans of Metropolitan, the Water Authority, and the Water Authority's member agencies is important to accurately identify the projected supplies available to meet regional demands. To facilitate coordination within the Water Authority's service area, the Water Authority formed an Urban Water Management Plan Working Group made up of staff from the Water Authority and its member agencies. This group provided a forum for exchanging demand and local supply information. In addition, Water Authority staff participated in Metropolitan's Regional Urban Water Management Plan member agency coordination meetings to discuss and share information pertaining to demands and supplies within their service areas. The Water Authority participated in a DWR hosted webinar on September 3, 2014, and a special workshop on November 19, 2015, to review the requirements of the Act.

An administrative draft of the 2015 Plan was distributed to the Water Authority's member agencies for technical review, and their comments were incorporated into the public review draft 2015 Plan prior to release. Providing member agencies with an administrative draft Plan, which included water supply projections, satisfies Water Code Section 10631(j).

In accordance with the Act, the Water Authority notified the land use jurisdictions within its service area 60 days prior to a public hearing that it was preparing the 2015 Plan (Water Code Section 10635(b)). In addition, the Water Authority encouraged active involvement within its service area prior to and during preparation of the draft 2015 Plan (Water Code Section 10642). The public review draft of the 2015 Plan was distributed to the Water Authority Board of Directors and public for review and comment on April 29, 2016. The 2015 Plan was available during public review at the Water Authority's office and on the Water Authority's website at www.sdcwa.org/uwmp. The deadline for receipt of comments on the draft 2015 Plan was June 6, 2016. A public hearing to receive comments on the draft 2015 Plan was held on May 26, 2016. Notice of the Public Hearing was published in two separate publications of the San Diego Union-Tribune, the newspaper designated by the Water Authority for publications of notices, as required by Government Code Section 6066 and Water Code Section 10642. The Water Authority reviewed all of the comments received and revised the plan accordingly. On June 23, 2016, the Board adopted the 2015 Plan. The Water Authority submitted an electronic copy of the adopted 2015 Plan to DWR by July 1, 2016 (Water Code Section 10621(d) and Water Code Section 10644(a)(2)). A copy of the adopted 2015 Plan was submitted to the California State Library, the County of San Diego, and the cities within the Water Authority's service area within 30 days of adoption (Water Code Section 10644(a)(1)). In addition, a copy of the adopted 2015 Plan is available for review at the Water Authority's office during normal business hours, and a copy of the adopted plan has been posted on the Water Authority's website at www.sdcwa.org/uwmp (Water Code Section 10645). A copy of the resolution adopting the 2015 Plan, along with copies of notifications, mailing lists, and other Water Authority 2015 Plan implementation documents, is provided in **Appendix B**.

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 Water Authority has completed the checklist, referencing the sections and appendices included in the 2015 Plan. The completed checklist is included in **Appendix C.**

1.5 History and Description of the Water Authority

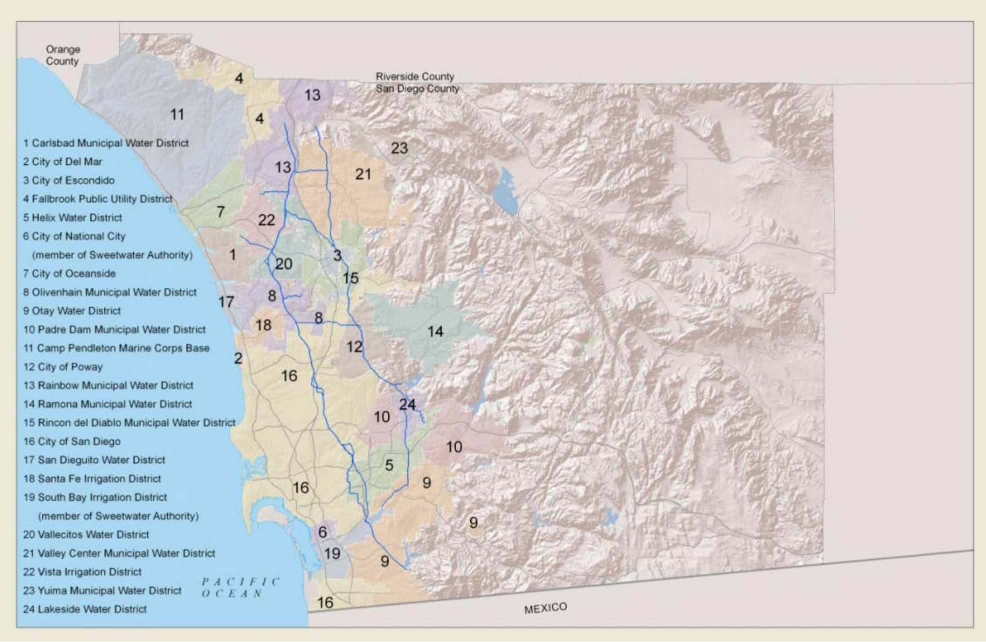
1.5.1 History

The Water Authority was established pursuant to legislation adopted by the California State Legislature in 1943 to provide a supplemental supply of water as the San Diego region's civilian and military population expanded to meet wartime activities. Because of the strong military presence, the federal government arranged for supplemental supplies from the Colorado River in the 1940s. In 1947, water began to be imported from the Colorado River via a single pipeline that connected to Metropolitan's Colorado River Aqueduct (CRA) located in Riverside County. To meet the water demand for a growing population and economy, the Water Authority constructed four additional pipelines between the 1950s and early 1980s that are all connected to Metropolitan's distribution system and deliver water to San Diego County. The Water Authority is now the county's predominant source of water, supplying from 75 to 95 percent of the region's needs depending upon weather conditions and yield/production from surface supplies, as well as recycled, groundwater, and desalination projects.

1.5.2 Service Area

The Water Authority's boundaries extend from the border with Mexico in the south, to Orange and Riverside counties in the north, and from the Pacific Ocean to the foothills that terminate the coastal plain in the east. With a total of 951,000 acres (1,486 square miles), the Water Authority's service area encompasses the western third of San Diego County. Figure 1-1 shows the Water Authority's service area, its member agencies, and aqueducts (shown as blue lines).

Figure 1-1
Water Authority Service Area and Member Agencies



1.5.3 Member Agencies

The Water Authority's 24 member agencies purchase water from the Water Authority for retail distribution within their service territories. A 36-member Board of Directors consisting of member agency representatives governs the Water Authority. The member agencies' six cities, five water districts, eight municipal water districts, three irrigation districts, a public utility district, and a federal military reservation have diverse and varying water needs.

In terms of land area, the City of San Diego is the largest member agency with 210,726 acres. The smallest is the City of Del Mar, with 1,159 acres. Some member agencies, such as the cities of National City and Del Mar, use water almost entirely for municipal and industrial purposes. Others, including Valley Center, Rainbow, and Yuima Municipal Water Districts (MWDs), deliver water that is used mostly for agricultural production.

1.6 Water Authority Physical Water Delivery System

The Water Authority was organized for the primary purpose of supplying imported water to San Diego County for wholesale distribution to its member agencies. These imported water supplies consist of water purchases from Metropolitan, core water transfers from Imperial Irrigation District (IID) and canal lining projects that are wheeled through Metropolitan's conveyance facilities, and spot water transfers that are pursued on an as-needed basis to offset reductions in supplies from Metropolitan. The largest single-year of imported water sales recorded by the Water Authority was 661,300 AF in fiscal year 2007.

Since December 2015, the Water Authority has begun delivering regional supplies from the Carlsbad Desalination Plant (refer to **Section 4.1**). The Water Authority takes delivery of the desalinated water at the desalination plant. A 10-mile-long pipeline delivers water from the plant to the Water Authority's Second Aqueduct. The Second Aqueduct conveys desalinated water to the Water Authority's Twin Oaks Valley Water Treatment Plant (WTP), where it is mixed with existing drinking water supplies for regional distribution.

1.6.1 Aqueduct System

Imported water supplies are delivered to the Water Authority member agencies through a system of large-diameter pipelines, pumping stations, and reservoirs. The pipelines that deliver supplies from Metropolitan are divided into two aqueduct alignments, both of which originate at Lake Skinner in southern Riverside County and run in a north to south direction through the Water Authority service area. Metropolitan's ownership of these pipelines extends to a "delivery point" six miles into San Diego County. From there, Pipelines 1 and 2 compose the First San Diego Aqueduct, which reaches from the delivery point to San Vicente Reservoir. These two pipelines share five common tunnels and operate as a single unit to provide 180 cubic feet per second (cfs) of conveyance capacity. Pipelines 3, 4, and 5 form the Second San Diego Aqueduct. These pipelines, which are located several miles to the west of the First San Diego Aqueduct, have delivery point capacities as follows: Pipeline 3 provides 280 cfs; Pipeline 4 provides 470 cfs; and Pipeline 5 provides 500 cfs.

In addition to the above north–south pipelines, there are several east–west pipelines that extend service to multiple member agencies. A listing of the pipelines owned and operated by the Water Authority is provided in Table 1-1, with the pipeline locations shown in Figure 1-1.

Table 1-1. Water Authority Pipelines

Pipelines	Length (miles)	Diameter (inches)
First San Diego Aqueduct:		
La Mesa-Sweetwater Extension	16.4	18–42
Pipeline 1 and Pipeline 2	64.4	48–72
Moreno-Lakeside Pipeline	4.5	54–60
Second San Diego Aqueduct:		
Tri-Agencies Branch Pipeline	6.4	21–42
Ramona Pipeline	7.2	36–57
Carlsbad Desal Conveyance Pipeline	10	54
Crossover Pipeline	7.5	66
Valley Center Pipeline	4.5	66
Pipeline 3	57	66–75
Pipeline 4	75	69–108
North County Distribution Pipeline	4.5	72
Olivenhain Pipeline	4.5	78
Pipeline 5	33.3	96–108
San Vicente Pipeline	11	102
Olivenhain-Hodges Pipeline	1.5	120

Although most of the water conveyed through the aqueduct system is by gravity flow, the Water Authority also maintains several pumping stations that enhance the operational flexibility of the pipeline system to meet daily, seasonal, and emergency needs. The Water Authority-owned pump stations are listed in Table 1-2.

Table 1-2. Water Authority Pump Stations

Pump Stations	Capacity (cfs)
Escondido Pump Station	20
Valley Center Pump Station	41
Miramar Pump Station [1]	60
Olivenhain Pump Station	314
San Vicente Pump Station	444
Olivenhain-Hodges Pumped Storage	760

[1] Rehabilitating pump station to establish 60cfs capacity

Three of the water pump stations are for untreated water and are sized to protect the region from potential disruptions of imported water supplies. If a supply disruption occurs, the untreated water pump stations will deliver emergency water supplies from newly expanded or existing local storage reservoirs. For more information on emergency facilities and a description of the Emergency Storage Project (ESP), refer to **Section 11.1.2**.

At other times, except for the Miramar Pump Station, all the Water Authority–owned pumping stations can be used to move water supplies into and out of storage reservoirs to meet seasonal delivery needs and to augment daily supplies to the member agencies. The Miramar Pump Station is mainly used to deliver treated water via the aqueduct system from the City of San Diego's Miramar WTP to municipal service connections south of the treatment plant.

1.6.2 Storage Facilities

Storage facilities are used by the Water Authority to both manage daily operations and provide reserves for seasonal, drought, and emergency storage needs. System Regulatory Storage facilities, which consist of enclosed reinforced concrete storage tanks, are available to manage the daily balance of treated and untreated water deliveries. System Regulatory Storage within the aqueduct system currently totals 56 million gallons, with the bulk of this amount in storage tanks located in Twin Oaks Valley and Mission Trail Regional Park.

Water Authority seasonal, drought, and emergency storage capacity currently includes 24,300 AF of in-region surface water storage at the Olivenhain Reservoir, 152,000 AF at the San Vicente Dam, and 70,000 AF of out-of-region leased groundwater storage in the San Joaquin Valley. The groundwater storage includes 30,000 AF of storage and capacity rights acquired in June 2008 in the Semitropic Water Bank, and 40,000 AF of storage provided by the Semitropic-Rosamond Water Bank Authority that was acquired in August 2008. Refer to **Section 5.2.1** for specific information on the ESP and Carryover Storage Project (CSP).

1.6.3 Water Treatment

The Water Authority owns the 100-MGD Twin Oaks Valley WTP and has agreements with the Helix Water District (WD) securing 36 MGD of treatment capacity from the R.M. Levy WTP. Water from the Levy plant supplements treated water service to eastern San Diego County. The balance of treated water supplies comes from water treatment plants owned and operated by member agencies. A list of all in-region water treatment plants is shown in Table 1-3.

In 2012, the Water Authority entered into a formal Water Purchase Agreement with Poseidon Water detailing commercial and financial terms for the purchase of desalinated ocean water produced at the Carlsbad Desalination Plant and delivered to the Water Authority's regional aqueduct system. The Carlsbad Desalination Plant became operational in 2015 and provides, on average, about 50 MGD of high-quality drinking water.

1.6.4 Capital Improvement Program

The Water Authority's Capital Improvement Program (CIP) can trace its beginnings to a report approved by the Board in 1989 entitled *The Water Distribution Plan, a Capital Improvement Program through the Year 2010.* The Water Distribution Plan included 10 projects designed to increase the capacity of the aqueduct system, increase the yield from existing water treatment plants, obtain additional supplies from Metropolitan, and increase the reliability and flexibility of the aqueduct system. Since that time, the Water Authority has made numerous additions to the list of projects included in its CIP as the region's infrastructure needs and water supply outlook have changed.

Table 1-3. In-Region Treatment Plant Capacity

Member Agency	Water Treatment Plant	Capacity (MGD)
Escondido, City of/Vista ID	Escondido/Vista	90
Helix WD	Levy	106
Olivenhain MWD	Olivenhain	34
Oceanside, City of	Weese	25
Poway, City of	Berglund	24
Ramona MWD	Barger	5
San Diego, City of	Alvarado	120
San Diego, City of	Miramar	144
San Diego, City of	Lower Otay	34
San Diego County Water Authority	Twin Oaks Valley	100
San Dieguito WD/Santa Fe ID	Badger	40
Sweetwater Authority	Perdue	30
Total In-Region Treatment Plant Capacity		**752**

ID = Irrigation District; MWD = Municipal Water District; PUD = Public Utility District;
WD = Water District

The current list of projects included in the CIP is based on the results of planning studies, including the 2010 UWMP and the 2013 Regional Water Facilities Optimization and Master Plan Update. These CIP projects, which are most recently described in the Water Authority's *Adopted Multi-Year Budget, Fiscal Years 2016 and 2017*, include 39 projects valued at $2.75 billion. These 39 CIP projects are designed to meet projected water supply and delivery needs of the member agencies through 2035. The projects include a mix of new facilities that will add capacity to existing conveyance, storage, and treatment facilities, as well as repair and replace aging infrastructure, and can be grouped into the following categories:

- **Asset Management** – The Water Authority's emphasis has transitioned from a large-scale capital intensive program to an operations-based organization with a focus on effective asset management. The primary components of asset management projects include relining and replacing existing pipelines and infrastructure rehabilitation.

- **Mitigation Program** – The Mitigation Program was established by the Board in September 1992 to provide coordinated permitting and mitigation for environmental impacts resulting from the construction, operation, and maintenance of CIP projects.

- **Approved Master Plan Update Projects** – Near-term projects identified in the Master Plan Update, and added to the CIP, address untreated water capacity constraints and operational flexibility, build-out of the final ESP phase (including the ESP North County Pump Station and upgrades at San Vicente Pump Station), add system isolation valves for more efficient operation of the aqueduct system, and provide for a structural assessment of existing infrastructure.

- **North County Projects** – Improvements to both the First Aqueduct and Second Aqueduct in north San Diego County are required to complete delivery capabilities related to the ESP and maximize production of the Twin Oaks Valley WTP. The projects include the ESP – North County Pump Station (planning phase) and Valley Center Pump Station expansion (on-line).

The CIP will be revised following completion of the 2015 Plan as part of the fiscal years 2018 and 2019 Water Authority budget setting process.

1.6.5 Renewable Energy Resources

The Water Authority has long supported efforts to develop renewable energy resources that are compatible with water operations. This has included investments to improve operational effectiveness, reduce greenhouse gases (GHGs), and reduce Water Authority and member agency energy costs, in turn helping to stabilize the cost of water. The Water Authority has adopted an Energy Management Policy, which is intended to provide direction in the implementation and administration of energy efficiency projects and programs. In addition, the Energy Management Policy addresses the consideration of cost-effective energy generation at the Water Authority's existing and planned facilities.

In 2014, the Water Authority became one of the first water agencies in California to voluntarily adopt a Climate Action Plan (CAP) to address carbon footprint and GHG. The goal of the CAP is to minimize Water Authority GHG emissions through the implementation of GHG reduction measures focused on energy efficiency and opportunities to develop renewable energy.

Hydroelectric Facilities

The Water Authority's in-line conduit hydroelectric facility at Rancho Peñasquitos is able to generate electricity from the available elevation gradient in the aqueduct system to produce an environmentally friendly, clean and sustainable energy supply. The Rancho Peñasquitos facility, with a rated output of 4.5 megawatts (MW), has been in continuous operation since 2006 and typically generates enough power to meet the needs of nearly 5,000 county households. The Water Authority's Lake Hodges facility provides the region with 40 MW of energy storage, making this power supply available to meet peak demands during high energy use periods. These facilities generate additional revenues that help offset the cost of imported water supplies.

Solar Facilities

Solar generating facilities were constructed in 2011 at three Water Authority facilities – The Kearny Mesa Headquarters, Escondido satellite office, and Twins Oaks Valley WTP. Together, these locations produce approximately 2,900 megawatt hours of renewable energy annually.

1.7 Service Area Characteristics

The Water Authority's service area characteristics have undergone significant changes over the last several decades. Driven by an average annual population increase of 50,000 people per year, large swaths of rural land were shifted to urban uses to accommodate the growth in population. This shift in land use has resulted in the region's prominent urban and suburban character. San Diego County also has a rich history of agriculture, beginning with the large cattle ranches established in the 18th century and continuing through the diverse range of crops and products grown today. Although the total number of agricultural acres under production has declined, the region maintains a significant number of high value crops, such as cut-flowers, ornamental trees and shrubs, nursery plants, avocados, and citrus. Based on the 2014 Crop Statistics and Annual Report published by the San Diego County Department of Agricultural Weights and Measures, the region has 5,732 farms – more than any other county in the nation. San Diego County agriculture is a $1.85 billion per year industry, ranking it as the 20th largest agricultural economy in the nation. It ranks among the top five counties, statewide, for production of nursery products, oranges, chickens, flowers and foliage, fresh-market tomatoes, lemons, avocados, eggs, mushrooms, and grapefruit.

1.7.1 Regional Economy and Demographics

The San Diego region’s economy, as shown by the indicators referenced below, has improved considerably the past few years as interest rates have remained low and the national economy continues to perform well. Coming out of the depths of a sharp national recession due to a housing-finance bubble and wars in Iraq and Afghanistan, San Diego has since experienced strong growth in health care, education, construction and retail over the past few years. Defense and education spending have contributed to a broad recovery. Housing prices have continued to recover as unemployment has dropped and economic output has increased.

The University of San Diego Index of Leading Economic Indicators, the San Diego region’s broadest measure of economic activity, continues to reflect strong economic conditions, up 30 to 35 percent at the beginning of 2015 compared with the last cyclical low point in early 2009.

According to data from the U.S. Bureau of Labor Statistics, the San Diego region ranked eighth in the nation among the largest 342 U.S. counties for jobs growth in the year ended September 2015 (the federal government fiscal year), adding 38,700 jobs for a total of 1.384 million.

The San Diego-Carlsbad Metropolitan Statistical Area has seen regional personal income and per capita incomes increase 25 percent and 17 percent, respectively, to $168 billion and $51,460, in the five years ended in 2014, according to the U.S. Bureau of Economic Analysis. Over that time, the region added another 200,000 residents.

As of January 2016, the Case-Shiller Index of Home Prices for the San Diego area, for changes in composite prices over the previous five years, has remained in positive territory since mid-2012, posting steady single-digit increases every month since mid-2014.

The San Diego region’s job market continues to tighten, with the unemployment rate decreasing to 4.7 percent in early 2016, lower than both the state and federal unemployment rates and almost a percentage-point better than the year before. Over the 12 months ended in February 2016, the region has posted strong gains in almost all sectors of the economy, most notably construction, business services, health care, hospitality, and manufacturing.

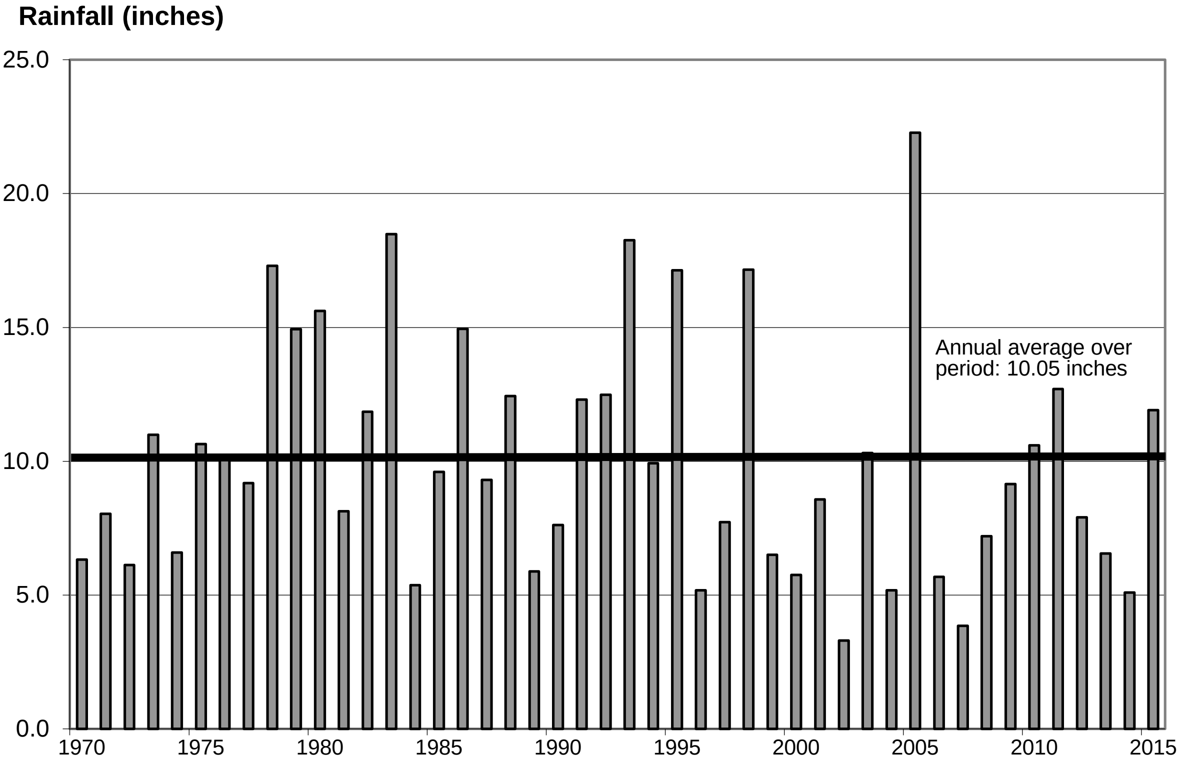
San Diego’s economy is, today, more diversified than ever. Key transportation links have been added to its urban transportation system, including expansion of its regional airport, Lindbergh Field. Three major campuses in the University of California and California State University system serve as a springboard for urban development and biotech sector jobs growth. Meanwhile, San Diego’s linchpin industry, defense, has maintained a large presence in the region with fully operational bases at Marine Corps Air Station Miramar, Naval Air Station North Island, Naval Base San Diego, and Marine Corps Base Camp Pendleton (MCB Camp Pendleton).

1.7.2 Climate

Climatic conditions within the county area are characteristically Mediterranean along the coast, with mild temperatures year-round. Inland area weather patterns are more extreme, with summer temperatures often exceeding 90 degrees Fahrenheit and winter temperatures occasionally dipping below freezing. Average annual rainfall is approximately 10 inches per year on the coast and in excess of 33 inches per year in the inland mountains. More than 80 percent of the region's rainfall occurs between December and March.

Variations in weather patterns affect regional short-term water requirements, causing reductions in water use during wet cycles and demand spikes during hot, dry periods. However, since a regional drought began gripping the American Southwest in 2002, only five water years (year ending September 30) have experienced above-average rainfall locally: 2003, 2005, 2010, 2011 and 2015 (Figure 1-2). Temperatures have also been above average for the past few years, with new record-warm years attained in 2014 and 2015 for the coastal region of Southern California, which includes the Water Authority service area, according to the California Climate Tracker. While water use typically has increased in accordance with the prevailing warmer, drier weather patterns, recent patterns show a divergence from the past, as drought restrictions statewide contributed to a year-over-year decrease in fiscal year 2015 and are likely to contribute to an expected decrease in use in the current fiscal year 2016.

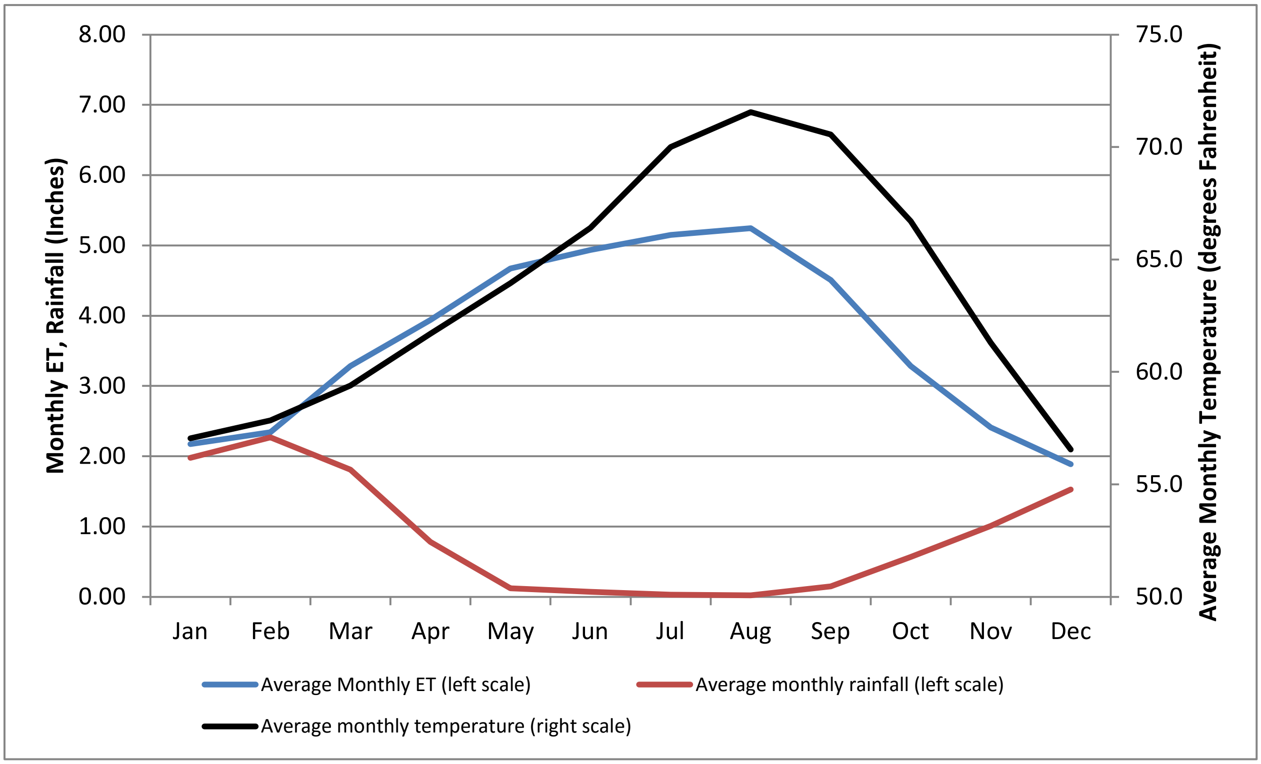
Figure 1-2
Lindbergh Field Annual Rainfall
Water Years 1970–2015



Source: Western Regional Climate Center.

Average monthly rainfall, temperatures and evapotranspiration for Lindbergh Field, San Diego's municipal airport located on its harbor, is shown in Figure 1-3. The graph shows how precipitation diminishes to near-zero during the peak irrigation-demand summer months.

Figure 1-3
Average Monthly Variables
Average Monthly Rainfall, Temperature and Evapotranspiration
(Lindbergh Field, CIMIS Station #184)



Sources: California Irrigation Management Information System (CIMIS), Western Regional Climate Center

1.7.3 Climate Change Research Efforts and Greenhouse Gas Mitigation

This section provides an overview of the Water Authority's efforts regarding studies and research on climate change, as well as GHG mitigation measures. The Scenario Planning process outlined in **Section 10** deals with adapting to potential supply and demand impacts due to climate change. Climate change is an increasingly important issue to water utilities and both state and federal legislators. Changes in weather patterns that deviate from historical cycles could significantly affect water supply planning. Irrespective of the debate associated with the sources and cause of increasing concentrations of GHGs, climate research has identified potential future risks to water resources. The Water Authority recognizes the importance of adapting to climate change and being a leader in sustainability and natural resource stewardship. Since 2008, the Water Authority's business plan has included a climate change and sustainability management strategy within the core Water Resources Planning Program business area. The key issues identified within this program include advocating for improvement in modeling to provide precipitation data on a local and regional scale, encouraging focused scientific research on climate change to identify the impacts on the region's water supply, and partnering with other water utilities to incorporate the impacts of climate change on water supply planning and the development of decision support tools. The Water Authority recognizes the challenges that climate change poses to our region and is committed to proactively addressing the issue.

San Diego County Water Authority's Activities Related to Climate Change Concerns

Knowledge Sharing and Research Support

The Water Authority is an active and founding member of the Water Utility Climate Alliance (WUCA). WUCA consists of 10 of the nation's largest water providers collaborating on climate change adaptation and GHG mitigation issues. As part of this effort, WUCA pursues a variety of activities on multiple fronts. WUCA monitors development of climate change-related research, technology, programs, and federal legislation. Activities to date include such things as:

- Letter of support for the California Nevada Applications Program branch of the Regional Integrated Science and Assessments team under the National Oceanic and Atmospheric Administration
- Comments provided on U.S. Global Change Research Program, National Global Change Research Plan
- Regular communication and consultations with federal agencies on the U.S. Environmental Protection Agency's Climate Ready Water Utility Working Group
- Participation in the International Water and Climate Forum, December 2015

In addition to supporting federal and regional efforts, WUCA released a white paper entitled "Actionable Science in Practice: Co-producing Climate Change Information for Water Utility Vulnerability Assessments, Final Report of the Piloting Utility Modeling Applications (PUMA) Project" in May 2015. The purpose of the PUMA project is to produce actionable science through close collaboration between climate experts and utility personnel to meet the needs of the four water utilities profiled in the report. WUCA utilities forged partnerships with scientific institutions to explore how to integrate climate considerations into their specific management context. A fundamental goal of this report was to draw lessons from these four distinct projects regarding best practices in the co-production of actionable science.

To address water provider–specific needs, WUCA focused on how best to incorporate knowledge gained from preparation of the above white paper into water planning, which was more thoroughly explored in a second white paper entitled "Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning." This paper assessed five known decision support tools for applicability in incorporating climate change uncertainty in water utility planning and identified additional research needs in the area of decision support methodologies. The Water Authority utilized and modified one of these decision support tools, "Scenario Planning" in its long-range planning process for the 2015 Plan, which was the basis of **Section 10**, "Scenario Planning – Managing an Uncertain Future."

The Water Authority and the other member agencies of WUCA routinely share individual agency actions to mitigate GHG emissions to facilitate further implementation of these programs. At a December 2015 International Water and Climate Forum, WUCA members met with global climate modelers, along with federal agencies, academic scientists, and climate researchers to discuss climate adaptation and mitigation strategies for water utilities, gather lessons learned, and advance proven best practices and stimulated thinking about future solutions. The Water Authority, through its membership with WUCA, continues to pursue these opportunities and partnerships with other water providers, climate scientists, state and federal agencies, research centers, academia, and key stakeholders.

Ongoing Research

The Water Authority has partnered on several research projects to better understand the uncertainties and impacts associated with climate change on water demand and local water resources in the San Diego region. Participating in a multi-agency project through the Water Research Foundation, the Water Authority collaborated on a study to evaluate potential demand-side impacts of climate change by examining ways to model the effects of climate and weather on water use. A methodological framework was developed to prepare downscaled climate projections and identify specific climate scenarios. Through this effort, an ensemble of six case studies was developed to estimate a range of potential demand-side impacts. This methodology is described in **Section 2.4.4** and used to model regional demands under the influence of climate change.

The Water Authority also partnered with the City of San Diego and U.S. Bureau of Reclamation on a San Diego Watershed Basin Study (Basin Study) to examine supply-side climate change impacts. The Basin Study is intended to examine the potential influence of climate change on local water resources in the San Diego region. Climate impacts on local surface water and groundwater were downscaled and the Variable Infiltration Capacity hydrologic model was used to obtain local streamflow values. Results from this analysis will be used in the next phase of the Basin Study to assess potential changes in structural responses and operational concepts due to potential changes in local streamflow.

Implementation of Programs and Policies

The Water Authority has made great strides in implementing GHG mitigation programs and policies for its facilities and operations. To date, these programs and policies have focused on the following:

- Adopting a CAP to address carbon footprint and GHG emissions
- Pursuing water supply/energy relationships and opportunities to increase efficiencies to lower GHG emissions, including the 40-MW Lake Hodges Pumped Storage project in operation and a potential 500-MW San Vicente Pumped Storage project
- Participating in the Climate Registry; the Water Authority developed its initial baseline GHG inventory from calendar year 2009 and refined its inventory calculation in an update conducted in 2014.
- Reducing the number of vehicles in the fleet and replacing vehicles with hybrids when possible
- Generating solar power at three Water Authority sites, including the Twin Oaks Valley WTP, the Escondido Operations Center, and the San Diego Headquarters, cumulatively generating an estimated 2.9 million kilowatt-hours each year

1.7.4 Population

When the Water Authority was formed in 1944, the population within its service area was estimated at roughly 260,000 people. From approximately 3.2 million residents at the beginning of 2015, the population of San Diego County is projected to increase by an additional 698,000 by 2040, for a total county population of roughly 3.9 million. This change represents an average annual increase of about 27,900 people, or an average annual growth rate of less than one percent. Approximately 95 percent of the population of San Diego County is within the Water Authority's service area. The City of San Diego represents the largest population of all Water Authority member agencies, with about 1.3 million people in 2015. Of the Water Authority member agencies, Yuima MWD has the smallest population at approximately 1,900 people. (These regional growth projections are based on the San Diego Association of Governments [SANDAG] 2050 Regional Growth Forecast, accepted by its board for planning purposes on October 15, 2013.)

Water Authority service area population projections are also based on SANDAG's 2050 Regional Growth Forecast and are presented in Table 1-4. These projections represent a subset of SANDAG's County-level population estimates, since the Water Authority's service area encompasses only the western one-third of San Diego County. Water Authority member agencies are projected to have varying future growth. Some, such as the Santa Fe Irrigation District (ID) and the City of Del Mar, are expected to experience relatively modest growth. Others, including the Otay WD and the City of San Diego, anticipate sizable increases in population.

Table 1-4. Water Authority Service Area Population Forecast (2020–2040)

Year	Population
2020	3,340,594
2025	3,495,978
2030	3,630,542
2035	3,745,684
2040	3,825,041
Average Annual Growth	24,222

Sources: SANDAG 2050 Regional Growth Forecast (Series 13); "Fast Facts–San Diego Region (SANDAG, October 2011); "Demographics in the San Diego Region," (SANDAG, January 2016)

This page intentionally left blank.

Section 2
Water Demands

Demand for water in the Water Authority's service area falls into two classes of service: municipal and industrial (M&I), and agricultural demand. In fiscal year 2015, total water demand was 539,361 AF, of which 92 percent was for M&I use and 8 percent was for agricultural water use, primarily for irrigation of nurseries, groves, and crops. This section describes these use categories along with the total historic, current, and projected water demands. By 2040, total normal water demands are projected to reach 718,773 AF (including future conservation, demand associated with projected near-term annexations, and accelerated forecasted growth), which represents a 29 percent increase from the average 557,271 AF of demand that occurred over the period 2010–2015.

2.1 Municipal and Industrial Water Demand

Total retail M&I demand encompasses a wide range of water uses that include residential demand (water used for human consumption in the home, domestic purposes, and outdoor residential landscaping) and water used for commercial, industrial, and institutional purposes.

2.1.1 Residential Demand

Residential water consumption covers both indoor and outdoor uses. Indoor water uses include sanitation, bathing, laundry, cooking, and drinking. Most outdoor water use entails landscaping irrigation requirements. Other minor outdoor uses include car washing, surface cleaning, and similar activities. For single-family homes, outdoor demands may constitute up to 60 percent of total residential use.

The estimated composition of San Diego’s 2015 regional housing stock was approximately 60 percent single-family homes, 36 percent multi-family homes, and 4 percent mobile homes. Single-family residences generally contain larger landscaped areas and require more water for outdoor application in comparison to other types of housing. The general characteristics of multi-family and mobile homes limit outdoor landscaping and water use, although some condominium and apartment developments do contain green belt areas.

2.1.2 Commercial and Industrial Demand

Commercial water demands generally consist of uses that are necessary for the operation of a business or institution, such as drinking, sanitation, and landscape irrigation. Major commercial water users include service industries, such as restaurants, car washes, laundries, hotels, and golf courses. Economic statistics developed by the San Diego Regional Chamber of Commerce indicate that almost half of San Diego's residents are employed in commercial (trade and service) industries.

Industrial water consumption consists of a wide range of uses, including product processing and small-scale equipment cooling, sanitation, and air conditioning. Water-intensive industrial uses in the region, such as electronics manufacturing and aerospace manufacturing, typically require smaller amounts of water when compared to other water-intensive industries found elsewhere in Southern California, such as petroleum refineries, smelters, chemical processors, and canneries.

The tourism industry in San Diego County affects water usage within the Water Authority's service area not only by the number of visitors, but also through expansion of service industries and attractions, which tend to be larger outdoor water users. Tourism is primarily concentrated in the summer months and affects seasonal demands and peaking. The SANDAG regional population forecasts do not specifically account for tourism, but tourism is reflected in the economic forecasts and affects per capita water use.

2.2 Agricultural Water Demand

The moderate and virtually frost-free coastal and inland valley areas of the county are able to support a wide variety of subtropical crops, making the San Diego region a unique agricultural region. The introduction of relatively low-cost water supplies in the 1950s allowed significant growth to occur in this sector. Agricultural water use within the Water Authority's service area is now concentrated mainly in the north county, and includes member agencies such as the Rainbow MWD, Valley Center MWD, Ramona MWD, and Yuima MWD; the Fallbrook (PUD); and the City of Escondido. The primary crops grown for local, national, and international markets are avocados, citrus, cut flowers, and nursery products.

Starting in calendar year 2008 through April 2011, member agency customers that were voluntarily receiving discounted agricultural water were required to implement a 30 percent cutback in agricultural demand from their fiscal year 2007 baseline. In response to supply cutbacks from Metropolitan, allocations for agricultural program participants were imposed for fiscal year 2016 at 15 percent. To comply with the mandatory supply allocations that resulted from drought conditions and judicial restrictions on State Water Project supply availability, growers implemented various actions that included tree stumping and plant stock reduction. As a result, agricultural demand dropped from 98,262 AF in fiscal year 2007 to 41,055 AF in fiscal year 2015, a 58 percent drop in program agricultural demand.

2.3 Total Current and Historic Water Use

Water use in the San Diego region is closely linked to the local economy, population, and weather. Over the last several decades, a prosperous economy stimulated local development and population growth, which in turn produced a relatively steady increase in water demand. However, starting in the late-2000s, the combination of economic recession, Metropolitan supply allocations, implementation of member agency mandatory water-use restrictions, and, more recently, state-mandated emergency water regulations culminated in a dramatic multi-year decrease in total water demand. In fiscal year 2007, water demand in the Water Authority's service area reached a record level of 741,893 AF, before dropping roughly 27 percent to 539,361 AF by fiscal year 2015. The 202,532 AF reduction in demand represents the largest volumetric decline over an eight-year period in the Water Authority's history. Despite record-breaking temperatures and below-average rainfall, this drop is attributable to a combination of factors, including mandatory water-use restrictions, a growing conservation ethic, greater consumer price response to the retail cost of water, the national recession, and state-mandated emergency water regulations. Table 2-1 shows the historic water demand within the Water Authority's service area.

Table 2-1. Historic Water Demand within Water Authority Service Area (2000–2015)

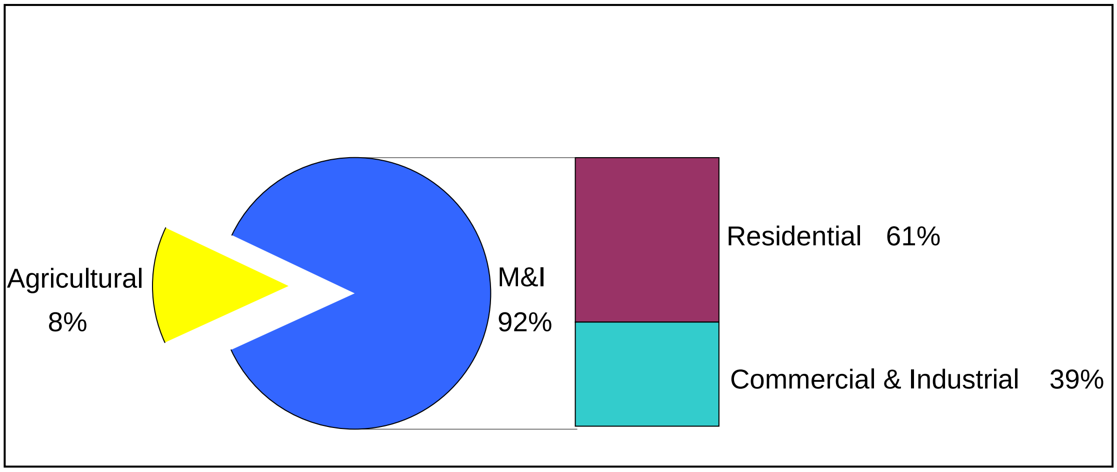
Fiscal Year[1]	Water Use (AF)
2000	694,995
2001	646,387
2002	686,530
2003	649,622
2004	715,763
2005	642,152
2006	687,253
2007	741,893
2008	691,931
2009	643,900
2010	566,443
2011	526,945
2012	542,438
2013	573,901
2014	594,535
2015	539,361

Source: Water Authority Annual Reports

[1] The Water Authority's fiscal year begins July 1.

Figure 2-1 shows the estimated relative percentages of various categories of water demand within the Water Authority's service area for fiscal year 2015. In this figure, residential demand includes single-family residential and multi-family residential.

Figure 2-1
Estimated Type of Water Use Fiscal Year 2015



2.4 Projected Water Demands

Since the mid-1990s, the Water Authority has utilized an econometric model to develop its long-range M&I demand forecasts. This computer model is based on the U.S. Army Corps of Engineers Municipal and Industrial Needs (MAIN) model, which has over a quarter of a century of practical application and is used by many cities and water agencies throughout the United States. The Water Authority's version of the model, known as CWA-MAIN, was modified by a consultant to reflect the San Diego region's unique parameters. The CWA-MAIN model relates historic water demand patterns to variables, such as household income, consumer response to the price of water, and weather, to predict future M&I water demands. These datasets are compiled from various sources, including SANDAG, Water Authority member agencies, and the National Aeronautics and Space Administration. Under the terms of a 1992 Memorandum of Agreement (MOU) between the Water Authority and SANDAG, the Water Authority utilizes SANDAG's official forecast, which is based on the general plans and policies of local land use jurisdictions, to project consumptive water demands for the region. This coordination ensures linkage between local jurisdictions' general plans and the Water Authority's projected water demands.

In October 2013, SANDAG's Board approved the Series 13: 2050 Regional Growth Forecast for planning analysis purposes, also referred to as SANDAG Series 13 forecast. Two key refinements of the 2050 Regional Growth Forecast include integration of 2010 Census counts and an economic outlook that factors in the ”Great Recession.” These refinements result in slower regional growth in the near term and lower water demands over the long-term planning horizon compared to SANDAG's previous forecast. Lower forecasted water demands are directly linked to SANDAG's smaller estimated growth in overall housing units— with approximately 18,500 fewer units projected over the 2020–2040 timeframe compared to the previous Series 12 forecast. Additionally, the mix of new housing units is more heavily weighted toward multi-family structures that traditionally use less water than single-family units. The demographic and economic projections contained in SANDAG's Series 13 forecast (that is, housing units, household density, household size, and employment counts) were incorporated into the CWA-MAIN model. It should be noted that SANDAG does not forecast land use on MCB Camp Pendleton. Therefore, demand projections for MCB Camp Pendleton were developed outside of the CWA-MAIN model and were based on projections provided by base staff.

Agricultural demand projections were developed through a cooperative effort between Water Authority staff, Water Authority member agencies, SANDAG, County of San Diego Agricultural Weights and Measures, and the California Avocado Commission. Forecast driver variables include irrigated acreage within the Water Authority's service area, estimated crop type distribution, and calculated historic water-use factors. SANDAG's projection of agricultural land conversions to other land use categories provides the long-term trend in acreage used to forecast agricultural water use. The total agricultural forecast is then separated into two categories: (1) projected demands in the Water Authority's Transitional Special Agricultural Water Rate (TSAWR) program and (2) demands under the Water Authority M&I rate or agricultural demands met through local supplies. It should be emphasized that the delineation between these two categories is a rough estimate based on professional judgment and takes into account the potential future acreage in the TSAWR program.

2.4.1 Projected Normal Water Demands

Table 2-2 shows projected normal year total water demand for the Water Authority service area through 2040. Baseline regional demand projections exclude future additional conservation savings but reflect historic passive conservation. In addition, to fully quantify potential demands served by the Water Authority, a small increment of water use associated with known future potential annexations and accelerated forecasted growth was incorporated into the demand forecast. Beginning with the 2005 Plan, an increment of demand related to potential near-term annexations was added to the baseline M&I forecast and assumed to be fully on-line by 2025. Estimated demands for these parcels were provided to the Water Authority by the associated member agency. However, incorporation of these demands provides no assurance of annexation. Approval by the Water Authority Board is still required before water service may be provided to these lands.

Table 2-2. Total Regional Baseline Demand Forecast (Excludes Future Conservation) (AF)[1]

	2020	2025	2030	2035	2040
Baseline M&I Demand[2,3]	602,100	673,886	715,690	744,370	781,433
Baseline Agricultural Demand	52,961	51,379	49,897	48,460	47,214
Near-Term Annexations[4]	4,029	7,162	7,162	7,162	7,162
Accelerated Forecasted Growth	2,632	4,807	6,806	9,038	11,186
Total Baseline Demand Forecast[5]	661,722	737,234	779,555	809,030	846,995

[1] Normal water year demands based on 1960 – 2013 hydrology.

[2] Includes approximately 11,000 AF of demand for MCB Camp Pendleton – provided by base staff.

[3] Reflects passive historic conservation savings.

[4] Known near-term annexation demands include Safari Highlands (694 AF), Yerba Valley (5 AF), Otay Ranch Village 13 and parcels East of Village 13 (2,361 AF), Peaceful Valley Ranch (70 AF), Sycuan Reservation (392 AF), Stoddard Parcel (2 AF), San Ysidro Mt. Parcel Village 17 (148 AF), Viejas and Ewiaapaayp (2,307 AF), I-8 corridor near Viejas boundary (81 AF), Rincon (417 AF), Warner Ranch (519 AF), Shadow Run/Schoepe (15 AF), and Warner Ranch/Sycamore Ranch (151 AF). Including the demands for these parcels does not limit the Board's discretion to deny or approve these or other annexations not contemplated at this time.

[5] Based on an assumed wholesale nominal (above inflation) rate increase of 2 percent per year between 2016 and 2020, 1 percent per year from 2021 to 2025, and a 3 percent rate of inflation post-2025.

To provide for a more comprehensive planning analysis, the 2015 Plan includes water use associated with accelerated forecasted growth in residential housing development as part of the M&I sector demand projections. These forecasted housing units were identified by SANDAG in the course of producing its 2050 Regional Growth Forecast (Series 13) and are based on existing local jurisdictions' general plans. The demand associated with accelerated forecasted growth is intended to account for a portion of SANDAG's estimated residential land use development currently projected to occur beyond the Water Authority's 2040 planning horizon, but has the potential to move forward on an accelerated schedule. SANDAG estimates that general plan amendments, allowing this accelerated residential development, could happen within the planning horizon of the 2015 Plan update. Demands associated with accelerated housing development are calculated based on efficient residential water use—consistent with anticipated future levels of conservation savings described in Section 2.4.2. Since this increment of projected demand is not broken out by member agency, the accelerated forecasted growth component is incorporated into the demand forecast at a regional level.

Water Code Section 10631.1 states that UWMP demand projections shall include water-use estimates for low-income single-family and multi-family residential households. Regional water demand projections listed in Table 2-2 represent water-use estimates for all income levels included in SANDAG's 2050 Regional Growth Forecast.

The Water Authority has implemented programs and procedures to proactively maintain its water distribution system and minimize system losses. For demand forecasting purposes, Water Authority system losses were set at 1 percent of annual baseline water demands. Using these factors, the Water Authority's system losses were estimated as follows: Year 2020 – 6,600 AF, Year 2025 – 7,400 AF, Year 2030 – 7,800 AF, Year 2035 – 8,000 AF, and Year 2040 – 8,500 AF.

2.4.2 Projected Future Conservation Savings

With the regional baseline forecast established, the next step is to account for future water conservation savings. Conservation is an important resource strategy for ensuring a cost-effective reliable supply of water for the region. For the 2015 Plan, future water conservation savings were not fixed at the 20 percent per-capita urban use reduction targets established under the Water Conservation Act of 2009 and used in the 2010 Plan. Instead, estimates of water conservation savings were developed for each member agency using the Alliance for Water Efficiency Water Conservation Tracking Tool (AWE Tool), listed in DWR's 2015 UWMP Guidebook as an application to assist water purveyors in developing savings estimates. This industry standard planning tool provides granular estimates of existing and future "passive" or code-based water savings and "active" savings resulting from the implementation of demand management programs. Key water savings assumptions are derived based on historical program efficiencies, current regional water savings assumptions that serve as the basis for regional incentives, and efficiency estimates by activity type that are contained in the AWE Tool Library. Future active conservation savings are set at the 2015 level of conservation program activity moving forward, absent the recent large-scale turf replacement program and the current State Water Resources Control Board (SWRCB) state-mandated water-use reductions. The passive conservation element includes estimated future savings from appliance standards and code changes, as well as savings from the 2015 Model Water Efficient Landscape Ordinance (MWELO). An 80 percent MWELO compliance level was assumed on new residential development and a majority of this savings was assumed to continue over the UWMP planning horizon. To capture anticipated market transformation on existing homes, the passive conservation total includes savings from landscape conversion on a portion of current single-family homes. Conservation savings projections assume a quarter of existing single-family homes will convert to efficient landscapes over the UWMP planning horizon (approximately 150,000 homes). Based on these assumptions, computed conservation savings for member agencies may surpass levels required under SBX7-7.

These savings are deducted from the baseline demand forecast to generate the long-term water demand projection for the region. Table 2-3 contains total future regional conservation savings projections.

Table 2-3. Projected Future Conservation Savings (AF)

	2020	2025	2030	2035	2040
Active Conservation	34,653	28,184	25,474	25,063	25,620
Passive Conservation (Post-FY2013)	39,488	60,926	77,360	89,536	102,602
Total Additional Conservation Savings	74,141	89,110	102,834	114,599	128,222

These conservation savings projections are then subtracted from the projected baseline demands derived from the Water Authority's CWA-MAIN model to give the long-range demand forecast (see Table 2-4).

Table 2-4. Normal Year Regional Water Demand Forecast Adjusted for Water Conservation (AF)

	2020	2025	2030	2035	2040
Total Regional Baseline Demand	661,722	737,234	779,555	809,030	846,995
Additional Conservation	-74,141	-89,110	-102,834	-114,599	-128,222
Total Long-Range Demand Forecast with Conservation	587,581	648,124	676,721	694,431	718,773

SBX7-7 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 (Water Code Section 10608.20) and report progress in meeting water-use targets (Water Code Section 10608.40). The Water Authority is a wholesale agency not subject to these requirements. However, it is critical for planning purposes that retail compliance with SBX7-7 and corresponding demand reduction be reflected in the Water Authority's 2015 Plan. To assess retail compliance, agencies' SBX7-7 AF potable demand targets were calculated based on gallons per capita per day (GPCD) targets provided by the agencies and SANDAG population projections (see Table 2-5). These target demands were compared to the long-range demand forecast, net of conservation, to confirm each agency is on track to meet or exceed their SBX7-7 demand target and to determine the regional demand. Additionally, because SBX7-7 compliance rests at the retail level, member agency demand projections exclude the increment of regional water use attributed to accelerated forecast growth.

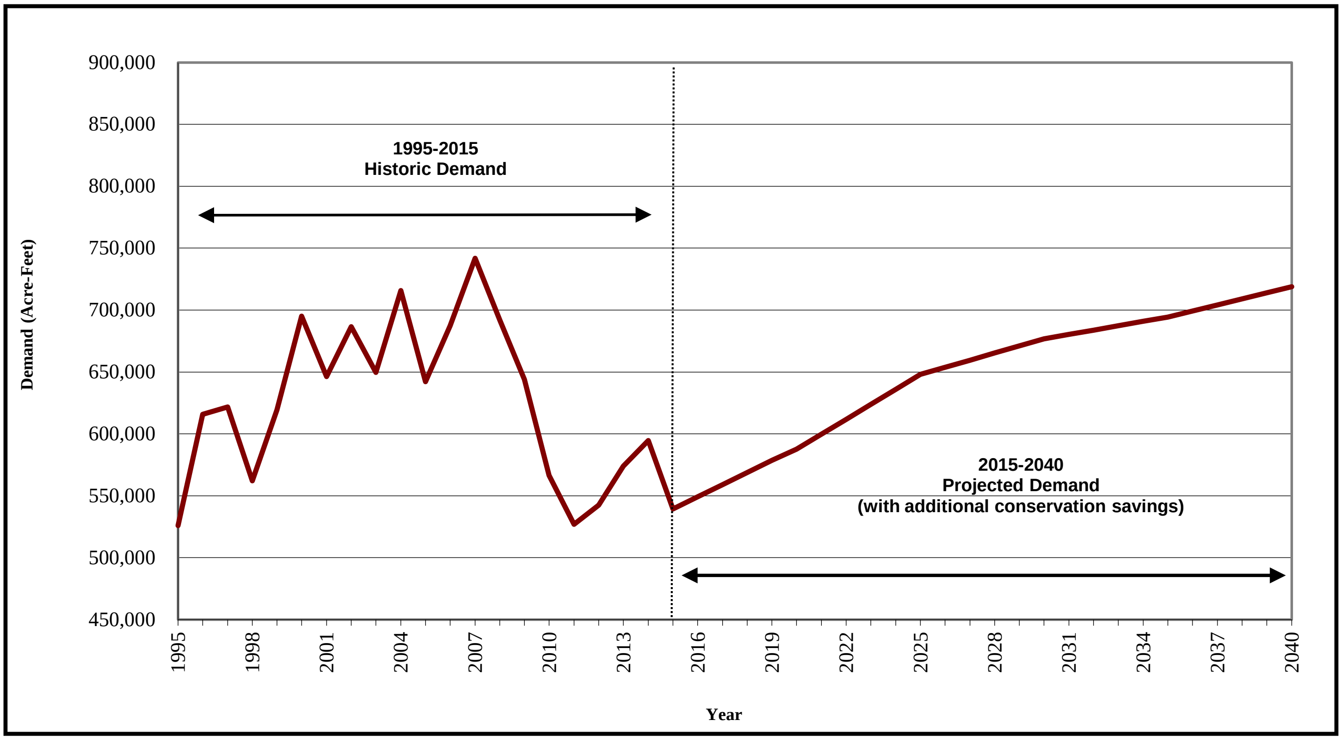
Table 2-5. Member Agency Compliance with SBX7-7 Demand Targets (AF)[1]

	2020	2025	2030	2035	2040
Total Long-Range Demand Forecast with Conservation	584,949	643,317	669,915	685,393	707,587
SBX7-7 Potable Demand Target	619,323	649,998	673,128	693,017	707,823
SBX7-7 Targets Exceeds Long-Range Demand Forecast with Conservation	-34,374	-6,681	-3,213	-7,624	-236

[1] Demands associated with accelerated forecasted growth were developed at a regional level; they are excluded from the Total Long Range Demand Forecast.

Figure 2-2 illustrates the forecasted trend in projected water demands over the 2015 to 2040 time period. This figure combines historic water use and forecasted normal year demands reduced by future additional conservation savings.

Figure 2-2
Regional Historic and Projected Normal Water Demands (AF)



2.4.3 Projected Dry-Year Water Demands

In addition to a baseline normal demand projection, the Act also requires single dry-year and multiple dry-year demand estimates to evaluate water service reliability during dry-year events. Based on observed historic demand impacts associated with each of these events, separate approaches were taken to forecast single and multiple dry-year conditions.

To develop single dry-year projections, a demand response index formula was used to identify the historic high temperature and low rainfall weather parameters that resulted in the maximum impact. Using this index, a representative single dry-year was selected. For this forecast, the year 2015 was selected. The monthly weather patterns associated with 2015 were then substituted into the CWA-MAIN model to generate dry-year demand projections. By holding all non-weather-related predictive variables constant, the model produces an annual forecast of dry-year weather-driven demand. Projected single dry-year demands are shown in Table 2-6.

Table 2-6. Single Dry-Year Regional Water Demand Forecast Adjusted for Water Conservation (AF)[1]

	2020	2025	2030	2035	2040
Single Dry-Year Demand	703,339	783,257	827,840	858,589	898,987
Future Conservation Savings	-74,141	-89,110	-102,834	-114,599	-128,222
Total Demands with Conservation	629,198	694,147	725,006	743,990	770,765

In accordance with the Act, agencies are also required to prepare additional dry period scenarios spanning multiple consecutive years. Similar to the 2010 UWMP dry-year analysis, a series of three-year periods were used to establish multiple dry-year scenarios. Water demands for the first year of each period were forecasted using the methodology described above for single dry-years. Demands for the next two consecutive years, over each period, were calculated based on a 1 percent annual increase in water use. This approach to multiple dry-year scenario development was used to account for assumed Water Authority and member agencies' demand management measures implemented in the second and third years of drought-like conditions that would result in lower demand increases than those normally associated with hot/dry weather. Multiple dry-year demand projections net of future conservation savings are shown in Table 2-7.

Table 2-7. Multiple Dry-Year Water Demand Forecast Including Future Conservation Savings (AF)[1]

	2021	2022	2023
Total Estimated Demands	640,932	647,342	653,815
	2026	**2027**	**2028**
Total Estimated Demands	699,895	706,894	713,963
	2031	**2032**	**2033**
Total Estimated Demands	728,330	735,613	742,969
	2036	**2037**	**2038**
Total Estimated Demands	749,030	756,521	764,086

[1] Weather for multiple dry water years based on years 2013-2015.

2.4.4 Projected Climate Change Impact on Water Demands

Although not currently required by the Act, evaluation of potential climate change impacts on water demand represents a prudent water resources planning exercise. However, definitive projections on the timing and magnitude of climate change–initiated variations to local temperature and precipitation patterns are still forthcoming. The body of work currently available from national and international research contains a wide spectrum of possible outcomes based on numerous climate forcing scenarios run through an assortment of General Circulation Models (GCMs). In the absence of research consensus, the Water Authority has adopted a qualitative evaluation approach that uses a manageable number of climate change scenarios to develop a range of potential demands.

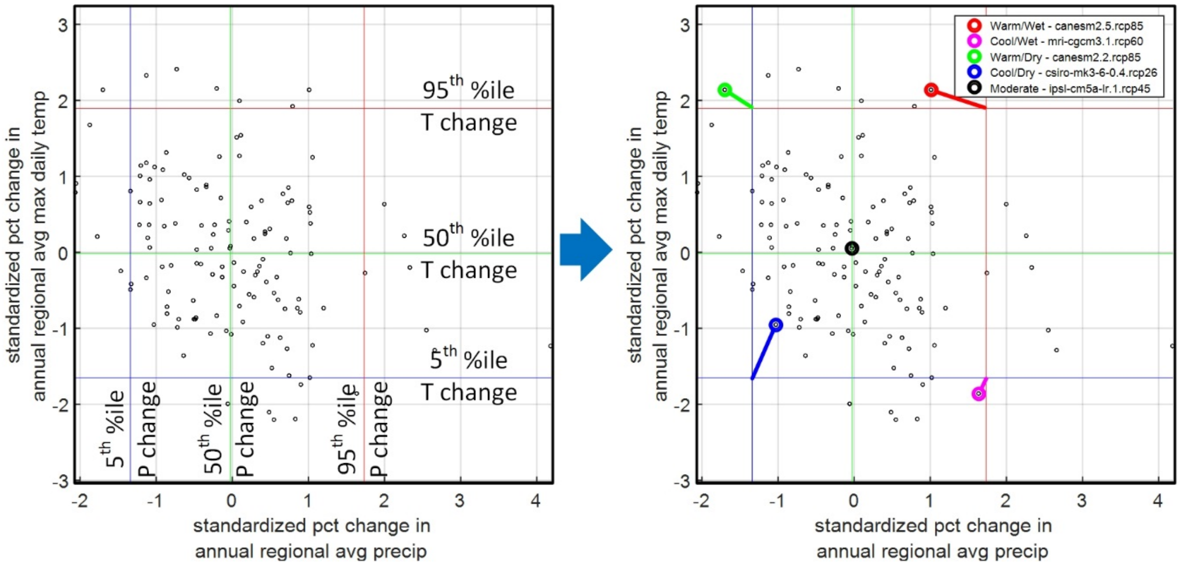
A number of advances in climate modeling have occurred since the release of the 2010 UWMP, including fine-scale precipitation and temperature projections based on GCM forecasts. These projections are based on Bias-Corrected Constructed Analog (BCCA) climate projections from the World Climate Research Program's Coupled Model Intercomparison Project phase 5 (CMIP5). The CMIP5 dataset consists of simulations of historical and future climate using 20 different GCMs. In

CMIP5, GCMs are paired with four different climate forcing scenarios, or representative concentration pathways (RCPs). The RCPs, named RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5, reflect new projected scenarios of future global GHG emissions. Each RCP is based on an assumed "radiative forcing" or RF. Radiative forcing is the change in net radiative flux (expressed in watts per square meter) at the upper atmosphere due to a change in an external driver, such as a change in the concentration of carbon dioxide. Thus, RF expresses the change in energy in the atmosphere due to GHG emissions. The following is a brief description of each RCP scenario:

- RCP 8.5 – High emissions scenario is consistent with no policy changes to reduce emissions and rising radiative forcing pathway leading to 8.5 watts per square meter in 2100. It was developed by the International Institute for Applied System Analysis in Austria.
- RCP 6.0 – Intermediate emissions scenario was developed by the National Institute for Environmental Studies in Japan and is consistent with the application of a range of technologies and strategies for reducing GHG emissions in which radiative forcing is stabilized to 6 watts per square meter shortly after year 2100.
- RCP 4.5 – Intermediate emissions scenario was developed by the Pacific Northwest National Laboratory in the United States, and radiative forcing stabilized shortly after year 2100 at 4.5 watts per square meter.
- RCP 2.6 – Low emissions scenario was developed by PBL Netherlands Environmental Assessment Agency and assumes RF reaches 3.1 watts per square meter before it returns to 2.6 watts per square meter by 2100. To reach such forcing levels, ambitious GHG emissions reductions would be required over time.

A total of 134 BCCA downscaled climate projections are available from CMIP5 that represent various combinations of GCMs and RCP scenarios. The development of demand forecasts based on alternative climate scenarios for the Water Authority's service area began by selecting BCCA scenarios reflecting central tendencies and extremes of climate projections. For each scenario, an "ideal" pairing of temperature and precipitation projection values was identified from the distribution of results across all models. First, the temperature and precipitation dimensions are evaluated separately, ranking projected annual changes in temperature and average precipitation, from smallest to largest and identifying the 95th, and 5th and 50th percentile values for each variable. Next, each "ideal" scenario is defined by a pairing– for instance, the warm/dry scenario might contain the 95th percentile value for temperature and the 5th percentile value for precipitation. The final step of the scenario selection process involves the identification of individual model projections that have temperature and precipitation projections that are closest in values to the "ideal" scenario description (for example, the model projection that has a pairing of temperature and precipitation that is nearest to the "ideal" 95th percentile temperature change and 5th percentile precipitation change). Model projections that are the closest to "ideal" conditions were chosen as the representative climate change scenarios. Figure 2-3 shows an example scatter plot of modeling results along with percentile bracketing and identification of "ideal" climate change scenarios.

Figure 2-3
Climate Change Modeling Results and "Ideal" Climate Scenarios



Example of selecting five climate change scenarios from 134 available climate projections by first identifying "ideal" extremes and then choosing individual model projections closest to those ideals.

Five climate change scenarios were selected in this manner for the entire region using regional-average projections of changes in precipitation and temperature for two future climate projection periods (2040 to 2060 and 2080 to 2099). In general, all projections indicated increases in average temperatures in the future, while various projections indicated increases or decreases in average precipitation. These five scenarios are identified as:

- Relatively large increases in both average temperature and precipitation (Warm/Wet)
- Relatively large increases in average temperature and relatively large *decreases* in average precipitation (Warm/Dry)
- Relatively small increases in average temperature and relatively large increases in precipitation (Cool/Wet)
- Relatively small increases in average temperature and relatively large *decreases* in precipitation (Cool/Dry)
- Moderate increases in average temperature and moderate changes in precipitation (Moderate)

No dramatic shifts in seasonal patterns of precipitation and average maximum daily temperature for the San Diego region were observed under any of the five scenarios. However, on average, annual amounts of precipitation tend to be more concentrated in the winter, with lesser proportions of total annual precipitation occurring in the spring and fall. Two of the climate scenarios resulted in average annual precipitation estimates lower than the historic average under both the 2040–2060 and 2080–2099 climate projection periods. As mentioned above, all selected scenarios indicate warming on average relative to historical climate conditions, and the interaction of temperature and precipitation projections dictate the estimated impact on the baseline demand forecasts.

The range of climate change impacts on Water Authority demands was calculated by substituting the five climate scenarios into the CWA-MAIN model. Under the 2040–2060 climate projection period, all scenarios resulted in higher estimates of total water use above the baseline normal weather demands. The average climate change impact ranged from negligible under the Cool/Wet scenario to about a 9 percent increase in the Warm/Dry scenario based on RCP 8.5. Using 2080–2099 climate projections, average projected impacts range from a 2 percent decrease in demands relative to historical normal weather conditions to about a 16 percent increase under the Warm/Dry scenario. The results suggest that more significant water demand impacts associated with the forecasted trend toward warmer and drier climate conditions may occur on a time-step beyond the 2015 UWMP planning horizon.

2.4.5 Member Agency Demand on the Water Authority

Table 2-8 shows the Water Authority’s projected water demands (sales) by member agency. Water demands were calculated using SBX7-7-compliant baseline demands for each member agency, as forecasted in **Section 2.4.2**, minus verifiable local supply projections. Therefore, the projected imported demands are directly tied to the success of local supply development in **Section 5**, “Member Agency Supplies,” and compliance with SBX7-7 conservation savings requirements discussed in **Section 3, “**Demand Management.”

Table 2-8. Member Agency Normal Year Demand on the Water Authority (AF)[1,2,3,4]

	Historical	Projected				
Member Agency	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Carlsbad MWD	16,403	15,507	16,677	16,965	17,244	17,268
Del Mar, City of	961	1,008	1,014	1,020	1,036	1,040
Escondido, City of	21,062	13,340	14,109	13,900	14,505	15,210
Fallbrook PUD	11,729	10,834	12,384	12,863	13,047	13,148
Helix WD	30,852	27,886	29,066	29,158	29,550	29,928
Lakeside WD	2,858	3,410	3,885	4,023	4,071	4,169
Oceanside, City of	23,082	23,605	23,428	22,418	22,806	23,166
Olivenhain MWD	19,549	19,986	20,655	21,232	21,539	21,749
Otay WD	30,299	37,050	42,530	44,891	45,501	51,082
Padre Dam MWD	10,437	10,519	14,033	14,214	14,445	14,800
Pendleton, MCB Camp	220	220	230	230	230	230
Poway, City of	10,660	12,459	13,081	13,594	13,618	14,037
Rainbow MWD	20,173	19,925	20,917	21,001	21,146	21,466
Ramona MWD	5,492	7,328	7,716	7,734	7,696	7,747
Rincon del Diablo MWD	5,744	7,120	7,825	8,271	8,709	9,591
San Diego, City of[5]	184,493	168,970	197,104	212,053	219,560	224,652
San Dieguito WD	5,749	3,300	3,629	3,718	3,806	4,364
Santa Fe ID	9,865	7,210	7,560	7,620	7,726	8,259
Sweetwater Authority	13,954	4,554	6,147	7,800	9,450	10,503
Vallecitos WD	15,297	15,896	19,227	20,687	21,914	25,701
Valley Center MWD	25,598	24,957	25,987	25,987	26,176	26,354
Vista ID	16,216	14,682	16,258	17,567	18,255	19,085
Yuima MWD	4,470	3,804	3,771	3,861	3,995	4,030
Sub-Total	**485,163**	453,570	507,233	530,807	546,025	567,579
Accelerated Forecast Growth[6]	--	2,632	4,807	6,806	9,038	11,186
Total	**485,163**	**456,202**	**512,040**	**537,613**	**555,063**	**578,765**

[1] Based on SANDAG 2050 Regional Growth Forecast.

[2] Includes historic and projected water conservation.

[3] Includes demands associated with member agency known near-term annexations.

[4] Assumes member agency implementation of verifiable local supply projections.

[5] Excludes City of San Diego's wholesale demands.

[6] Demands associated with accelerated forecasted growth are not attributed to individual member agencies and are listed for regional planning purposes.

ID = Irrigation District; MWD = Municipal Water District; PUD = Public Utility District;
WD = Water District

This page intentionally left blank.

Section 3
Demand Management

3.1 Introduction

Demand management, or water-use efficiency, is an important ongoing component of the Water Authority's long-term strategy to increase the reliability of the San Diego region's water supply through diversifying its water supply portfolio. Since 1991, in partnership with and support of its member agencies, the Water Authority's programs and initiatives cumulatively have conserved more than 1 million AF of water. In fact, per capita potable water use in the San Diego region has decreased 39 percent between fiscal year 1990 and fiscal year 2015. The savings were achieved through various measures, including incentives for water-efficient devices, legislative efforts, code changes, outreach campaigns and programs, and more recently through water-use restrictions due to drought. In 2012, the Water Authority Board of Directors adopted water-use efficiency policy principles. The policy principles are organized into five areas that address member agency support, funding and resources, program performance, outreach and education, and regulation and legislation. The policy principles provide long-term, strategic direction to Water Authority staff for the evaluation, prioritization, development and implementation of water-use efficiency projects, programs, and other efforts.

SBX7-7 was enacted in 2009 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 (Water Code Section 10608.20). The Water Authority is a wholesale agency not directly subject to these requirements. However, the law requires that the Water Authority, as the wholesale supplier, support its retail member agencies' efforts to comply with SBX7-7 through a combination of regionally and locally administered active and passive water conservation measures, programs, and policies, as well as the use of recycled water (Water Code Section 10608.36).

Examples of active measures and programs include residential and commercial water-use surveys and education programs. Active water-use efficiency management strategies cited in the Water Authority's *2014–2019 Business Plan* include participation in Metropolitan's regional programs and coordination of the programs on behalf of the member agencies, partnerships with San Diego Gas & Electric (SDG&E) on water and energy programs, and offering tools and resources that improve water users' knowledge of how to effectively make sustainable reductions in outdoor water use. Passive water-use efficiency management strategies cited in the business plan include programs that encourage market transformation and long-term behavior changes that increase acceptance and use of water-efficient designs, products, and services; increase the landscape industry's basic knowledge regarding the interdependency between water efficiency design, irrigation design, and maintenance; and participation on statewide, national, and industrial committees to advance behavior-based conservation strategies. Additional passive programs and policies include outreach activities, code changes, legislation, and conservation-based rate structures.

As one of the original signatories to the California Urban Water Conservation Council's (CUWCC) MOU, the Water Authority has been in full compliance with the Wholesaler Best Management Practices Reports since 1992. Most of the Water Authority's member agencies are signatories to the MOU and submit biennial best management practice (BMP) reports to show compliance with the appropriate retail water agency BMPs. **Appendix D** contains the Water Authority's 2013 and 2014 BMP coverage reports from the CUWCC that document the Water Authority's compliance for the 2013 and 2014 reporting period. The Water Authority has been represented on the CUWCC board, as well as the Utility Operations, Landscape, and Database Development committees.

3.2 Water-Use Efficiency Achievements

The Water Authority is a leader in water-use efficiency. This section provides information on the Water Authority's achievements in water-use efficiency, including grant funding, partnerships, education and outreach programs, local and regional rebate and incentive programs, tools, and resources that exist to accelerate the acceptance of water-efficient technologies and practices. These programs and outreach activities provide a foundation for the existing and future measures, programs, and policies discussed in the sections below that support the member agencies' efforts to comply with the requirements of SBX7-7 and any state-mandated drought restrictions. For more information on the programs, go to www.watersmartsd.org.

3.2.1 Grant Funding

The Water Authority supplements funding of its water-use efficiency programs through the use of grant funding. The Water Authority was awarded federal, state, local, and private grants with a cumulative value of more than $7.7 million for the period of fiscal year 2012 through fiscal year 2017. Grant funding sources include the U.S. Bureau of Reclamation, DWR, SDG&E, and the Hans and Margaret Doe Charitable Trust. Examples of the types of programs awarded grant funding are shown in Table 3-1.

Table 3-1. Grant Funded Programs

WaterSmart Landscape Makeover Program	Sustainable Landscapes Program
Landscape Water Use Evaluations	School Education Program
Drought Response Outreach and Communications	Agricultural Irrigation Efficiency Program
WaterSmart Turf Replacement Program	Detention Facility Retrofits Program

3.2.2 Water Authority Staffing

The Water Authority's Public Outreach and Conservation Department has full-time staff of 19. These staff members design, implement and manage regional water-use efficiency and public outreach programs; develop and support water-use efficiency policy; manage the Water Authority's Small Contractor Outreach and Opportunities Program; provide technical assistance to its 24 member agencies; implement regional programs to support member agency compliance with SBX7-7; and perform grant acquisition and administration duties.

3.2.3 Regional WaterSmart Turf Replacement Program

The Water Authority implemented a regional, grant-funded turf replacement rebate program from December 2012 to January 2016 that provided financial incentives to participants who replaced existing turf with water-efficient landscaping.

The WaterSmart Turf Replacement Program promoted outdoor water-use efficiency through financial incentives of $1.50 per square foot to participants who replaced existing water-intensive turf grass with WaterSmart landscapes that included climate-appropriate plants and water-efficient irrigation systems. Turf replacement projects had to be in front or side yards and visible to the public and had to inspire others to pursue landscape conversions. Eligible residential sites received up to $3,000 in incentives; eligible commercial, institutional, and industrial sites received up to $9,000. The program's rebates were funded with more than $1.7 million in grants from a combination of state and federal sources.

3.2.4 SoCal Water$mart Residential Program

The SoCal Water$mart regional residential program offers rebates for turf removal, high-efficiency clothes washers and toilets, weather-based irrigation controllers, rotating nozzles, and rain barrels for stormwater capture. Since the Water Authority joined the program in 2008, more than 52,000 high-efficiency clothes washers and 29,000 high-efficiency toilets were installed in the region through the program. In addition, more than 6.6 million square feet of turf grass was removed. The estimated lifetime water savings for these measures exceeds 59,000 AF.

3.2.5 SoCal Water$mart Commercial, Industrial, and Institutional Program

The SoCal Water$mart Commercial, Industrial, and Institutional (CII) program offers an incentive to eligible CII customers to remove existing water-intensive turf grass and replace it with water-efficient landscaping. Through this program, more than 6 million square feet of turf grass was replaced with water-efficient landscapes with a lifetime water savings of more than 8,000 AF. The SoCal Water$mart CII program offered rebates to replace select, older, inefficient devices with water-efficient devices, including enhanced rebates for fixtures for fitness centers and rebates for public agencies for landscape devices. Since 2012, more than 105,000 water-efficient devices were installed in the region through the program with a lifetime water savings of more than 10,000 AF. Examples of the types of efficient water-use devices are shown in Table 3-2.

Table 3-2. Water-Efficient Devices Available through the SoCal Water$mart CII Program

Plumbing Fixtures • High-efficiency toilets • Ultra low and zero water urinals • Plumbing control valves	Landscape Equipment • Irrigation controllers • Rotating and large rotary nozzles • In-stem flow regulators • Soil moisture sensor systems
Food Equipment • Connectionless food steamers • Air-cooled ice machines	HVAC Equipment • Cooling tower conductivity controllers • Cooling tower ph controllers
Medical and dental equipment • Dry vacuum pumps	

HVAC = heating, ventilating, and air conditioning

3.2.6 Public Agency Landscape Program

The Public Agency Landscape Program offers enhanced incentives for public agencies to install water-efficient landscape devices at their facilities. The program pays incentives up-front to encourage public agencies to install water-efficient landscape equipment. Examples of the types of devices eligible for an incentive include soil moisture sensors and rotary nozzles.

3.2.7 Fitness Center Program

The Fitness Center Program offers businesses, whose primary function is fitness, enhanced incentives for replacing older toilets and urinals with new, high-efficiency models. Due to the high volume of use of these types of devices in fitness facilities, significant water savings potential exists.

3.2.8 Water Savings Incentive Program

The Water Savings Incentive Program targets commercial, industrial, institutional and agricultural customers with high water use to improve water-use efficiency through financial incentives for customized water efficiency projects. Previous program projects included changing an industrial process water system to capture, treat and reuse process wastewater; installing new, water-efficient equipment in commercial kitchens and laundries; and contracting with a qualified water manager to improve landscape irrigation efficiency.

3.2.9 On-Site Recycled Water Conversions Program

The On-Site Recycled Water Conversions Program provides financial incentives to property owners to convert sites irrigated with potable water or industrial water systems to recycled water service. Items eligible for incentives included project design, permitting, construction costs associated with the retrofit of potable to recycled water systems, connection fees, and recycled water signage.

3.2.10 Audits and Surveys

WaterSmart Checkups

The Water Authority and its member agencies offer WaterSmart Checkups to assist single- and multi-family customers and businesses to identify water-saving opportunities specific to their site. Certified landscape irrigation auditors evaluate a site's landscape and irrigation system and provide the customer with a list of recommendations to improve water efficiency, including plant alternatives and a proposed watering schedule. Residential sites also receive an indoor evaluation that identifies water-wasting fixtures and practices. The service is provided at no cost to the customer.

Landscape Irrigation Surveys

Landscape Irrigation Surveys provide no-cost, site-specific water-saving recommendations from certified irrigation professionals to CII sites with one or more acres of irrigated landscape. Eligible landscapes include commercial and industrial sites; homeowner association common areas; and institutional sites such as schools, parks, and government facilities.

Agricultural Water Management Program

The Water Authority's Agricultural Water Management Program has provided agricultural water management services since 1990. Over that period, more than 1,900 agricultural irrigation system evaluations on more than 32,000 acres of avocados, citrus, field flowers, and other fruits and ornamentals were performed. The program provides technical assistance to growers to enable them to irrigate crops as efficiently as possible to obtain the maximum economic benefit from limited water resources.

The program provides additional assistance through visual observations of the irrigation system, an examination of soil and crop materials, pump testing, and answering questions. A written report summarizes the irrigation system's hydraulic characteristics and soil profiles, and provides recommendations to improve the overall system efficiency. Local weather data and crop water demand information are also provided. Potential improvements in crop yield and water savings realized from improvements in irrigation efficiency are explained to the grower. Follow-up service is provided to determine if system improvements were implemented, and if not, to encourage implementation of the recommendations.

The program also includes an agricultural recycled water retrofit project and an electrical conductivity mapping and soil sensor installation program. The agricultural recycled water retrofit project supports conversions from potable water to recycled water for agricultural irrigation. The electrical conductivity mapping and soil sensor installation program allows growers to identify soil properties that can affect crop production. Both programs utilize DWR grant funding.

3.2.11 Water and Energy Efficiency Programs

For more than 25 years, the Water Authority and SDG&E have partnered on a variety of programs and projects to generate significant water and embedded energy savings. Highlights from the Water Authority and SDG&E partnership include showerhead distributions, pre-rinse spray valve installations, high-efficiency clothes washer rebates, energy efficiency assessments for water agencies, home energy and water savings kit distributions, joint marketing strategies, and a water-energy pilot program that evaluated embedded energy use in the water sector.

Over the last five years, the focus on the relationship between water use and energy use in California increased and the California Public Utilities Commission directed energy utilities to form partnerships with water agencies to reduce embedded energy use through water efficiency programs. Moving forward, Water Authority and SDG&E partnership activities include a continuation of the joint rebate for residential high-efficiency clothes washers, collaboration with SDG&E on its residential Energy Savings Assistance Program, cross-marketing of water and energy efficiency programs, and an assessment of additional joint program opportunities. Information on existing and previous partnership programs is shown below.

WaterSmart Landscape Efficiency Program

The WaterSmart Landscape Efficiency Program targeted a 20 percent reduction in water use at sites with multiple acres of irrigated landscape. The program achieved a portion of the water savings through a pre-implementation audit of the site's irrigation system to identify and fix any malfunctioning and broken irrigation components, and a portion of the water savings through services provided by a water management service company that adjusted the site's irrigation schedule to match the site's irrigation demand. The program is being redesigned to address the reduction of stormwater runoff associated with dry weather flows and inefficient irrigation.

Leak Loss Control Program

The Leak Loss Control Program saved water and embedded energy through top-down water audits of retail water agency distribution systems. The water audits were available at no cost to the Water Authority's member agencies. The top-down water audits were performed by a third-party contractor and balanced the total volume of water entering a retail water system against authorized consumption and water losses. The program also identified opportunities for the Water Authority's member agencies to implement pressure management measures to reduce or eliminate water loss due to leaks.

Detention Facility Retrofits Program

The Detention Facility Retrofits Program at the Vista Detention Facility and Kearny Mesa Juvenile Detention Facility saved water and embedded energy through the installation of water-efficient devices, including electronic flush valves, low-flow showerheads, and aerators. The County of San Diego, the facility's owner and operator, provided financial and in-kind services to support the program.

3.2.12 WaterSmart Customer Education and Workforce Training

Consistent with its focus to promote the long-term market transformation of conventional urban landscapes to more water-efficient and sustainable landscapes, the Water Authority offers a variety of education and training opportunities for customers and landscape industry professionals, respectively. Course content is designed to promote best practices for landscape water-use efficiency while empowering customers to take action and make informed purchasing decisions when upgrading their landscapes. The following are offered in partnership with the Water Authority's 24 member agencies.

WaterSmart Landscape Makeover Series

The series of four workshops provides homeowners an overview and the basic skills necessary for the successful conversion of a traditional turf grass yard into a WaterSmart landscape. Participants receive technical assistance that includes a professional site inspection and development of a base plan to scale, in addition to a professional design consultation. Upon completion of the course, participants have a landscape design with planting and irrigation plans that are ready for implementation. Recent program upgrades include providing stormwater retention plans based on "first flush" calculations. The average size of the turf replacement projects planned by participants is more than 1,000 square feet.

WaterSmart Landscape Design for Homeowners Workshop

To accommodate homeowners who prefer an abbreviated version of the WaterSmart Landscape Makeover Series of classes, the Water Authority developed a three-hour version of the classes. This short-format workshop accommodates higher numbers of participants per session, which helps to accelerate the number of homeowners who will be empowered to convert existing water-intensive yards into landscapes that can achieve significant water savings through climate-appropriate plant choices, irrigation efficiency upgrades and stormwater runoff prevention.

WaterSmart Landscape Makeover Videos on Demand

To help make the main content of the WaterSmart Landscape Makeover Series even more widely available and convenient for homeowners to access, the Water Authority transformed the program into a series of online videos. These videos, as well as links to a variety of resources, take the participant through the steps to achieve a WaterSmart landscape. The steps include identification of their landscape target, creation of a basic plot plan, an evaluation of their site, soil analysis, landscape design, irrigation retrofit and landscape maintenance. Future videos will address sustainable landscape concepts such as capturing rainwater to prevent urban stormwater runoff.

California-Friendly Landscape Training

The Water Authority and its member agencies partner with Metropolitan to offer free introductory training classes on WaterSmart landscaping. The classes introduce a holistic approach to landscape design and maintenance that emphasizes water-use efficiency.

The three-hour classes are fast-paced and informative and offer solutions to common landscape problems. Participants learn to think about landscapes from the soil up. In addition, they learn how to design landscapes that are sustainable in the region's climate. Class topics include how to make the best use of the region's limited rainfall, irrigate efficiently, and choose the best plants for the site.

Ad Hoc Training Events

The Water Authority periodically sponsored training events as a technical outreach activity to target landscape industry professionals. The objective was to create new educational opportunities to help empower the regional workforce to follow best practices for sustainable landscape design, installation and maintenance. Events included "Get Ahead or Get Parched: Six Ways to Survive the Drought," and "When in Drought: Irrigation and Tree Care Workshop for Landscape Professionals."

Qualified Water Efficient Landscaper (QWEL) Training

The Water Authority introduced this robust training program to San Diego County as a workforce training opportunity to help landscape industry professionals learn the latest techniques for landscape water-use efficiency. Originally developed by the Sonoma-Marin Saving Water Partnership, QWEL is recognized by U.S. Environmental Protection Agency (EPA) as a WaterSense-labeled Professional Certification Program for Irrigation System Audits.

3.2.13 WaterSmart Tools and Resources

Feedback from polls and focus groups indicates the public understands the need for water-use efficiency and wants to do the right thing, but is often overwhelmed by how to accomplish it. In response, tools and resources were developed to inspire, educate and empower residents and business to take a water-efficient action, then another, and so on. In addition, these tools and resources foster long-term behavioral change and market transformation by showcasing the beauty and value of WaterSmart landscapes, products and services. The tools and resources developed by the Water Authority are described below.

WaterSmartSD Website

In 2013, the Water Authority launched a comprehensive water conservation website as an online resource to inspire, educate, and empower the region's residents to make water-efficient lifestyle choices. The website, WaterSmartSD.org, features information about conservation incentives, tools and programs designed to make the most of the region's limited water supplies. The site is organized to provide content relevant to the residential and business sectors.

The website also features news items and events, videos, a photo gallery highlighting successful WaterSmart landscaping projects, case studies and other information about indoor and outdoor water-use efficiency. It includes conservation tips and answers to frequently asked questions, along with links to helpful tools such as a residential water-use calculator, free garden design software and residential landscape design templates. The Water Authority updates WaterSmartSD.org regularly and visitors can sign up for automatic notifications relevant to their areas of interest.

eGuide to a WaterSmart Lifestyle

The eGuide to a WaterSmart Lifestyle is an online magazine that covers a wide array of topics, including landscape design, water-efficient plants, outdoor rooms, finding and fixing leaks, healthy soil, smart buys on plumbing fixtures, landscape maintenance and drought survival for gardens. It offers everything from design ideas for creating themed planting zones to strategies for using graywater at homes and irrigating efficiently.

A Homeowner's Guide to a WaterSmart Landscape

A Homeowner's Guide to a WaterSmart Landscape is the companion guide to the Water Authority's award-winning WaterSmart Landscape Makeover Series. This no-cost guide offers instructions for homeowners who want to make their landscapes more water-efficient. The guide reflects the state's Model Water-Efficient Landscape Ordinance standards and explains the principles of a WaterSmart landscape design and irrigation, climate-appropriate plants and BMPs.

Residential Landscape Design Templates

Professionally drawn, water-efficient landscape plans are available online to provide ideas and inspiration for single-family homeowners, particularly for do-it-yourselfers. San Diego landscape architects designed four templates that support the state's Model Water Efficient Landscape Ordinance. Plans are themed to fit common family audiences, including Empty Nesters, Entertainer Landscape, Pet Friendly Landscape, Children Friendly Landscape, and Native/Wildlife Friendly Landscape.

Online Residential Water-Use Calculator

The Water Authority launched its online Residential Water-Use Calculator (watersmartsd.org/water-calculator) in April 2013 in partnership with the Alliance for Water Efficiency. The objective of the residential water-use calculator is to assess and educate homeowners about their indoor and outdoor water use and inspire them to make changes in their behavior, fixtures or landscape that will make their home more water-efficient.

Smart Water Application Technologies

The Water Authority collaborated with industry for many years to promote the research and application of the best practices and technologies to save water. Under the auspices of the Irrigation Association, water utilities, irrigation product manufacturers and other landscape professionals collaborated in the Smart Water Application Technologies (SWAT) committee. SWAT's achievements include the development of a standardized testing protocol for weather-based irrigation controllers to help water utilities establish product eligibility standards for rebates. The standardized testing protocol was also a precursor to the establishment of EPA's ongoing WaterSense product labeling standards. Looking ahead, SWAT testing protocols under development include pressure-regulating spray heads, spray head sprinkler nozzles, pop-up sprinkler head check valves, rain sensors, weather-based irrigation controllers, and soil moisture–based irrigation controllers. The test results will provide valuable information in the development of the next generation of water-efficient products.

San Diego County Fair

The San Diego County Fair is one of the most popular county fairs on the West Coast with more than 1 million attendees each year. The Water Authority uses the fair to reach residents from throughout the region and to partner with regional horticultural gardens to sponsor award-winning landscape exhibits. While following previous fair themes such as "A Fair to Remember: Celebrate The World's Fairs & Balboa Park" and "The Fab Fair," the Water Authority's exhibits continue to demonstrate a beautiful, low-water-use display that can be integrated into a residential setting.

In addition, each year, the Water Authority presents an award to the fair's garden show exhibit that best exemplified a WaterSmart landscape through eye-catching colors, textures, and designs. The award and its monetary prize encourage landscape exhibitors to install water-efficient gardens, thus increasing the public's exposure to the beauty and potential of a WaterSmart landscape. Judging criteria include design, plant choice, maintenance and use of water-efficient irrigation components.

Water Conservation Garden

The Water Conservation Garden opened in 1999 to educate the public about the steps they can take to conserve water in landscapes. It occupies nearly six acres adjacent to Cuyamaca College in the eastern part of the Water Authority's service area. The Garden showcases 16 different mini-gardens and exhibits and provides school-education programs and outreach, low-water-use classes and workshops, and community events. The Water Authority joined the Garden's Joint Powers Authority in 2001 and continues to support its efforts to promote water efficiency in the landscape sector.

San Diego Botanic Garden

The San Diego Botanic Garden is located in the north-coastal area of San Diego County. The Water Authority supports its vision through a corporate sponsorship. The mission of the Botanic Garden is to promote sustainable use of natural resources. Low-water-use plants and water-saving technologies and displays make up the majority of the Botanic Garden. In an effort to reduce outdoor water use in the region, the Botanic Garden also provides classes on water conservation and garden tours throughout the year in an effort to reduce outdoor water use in the region.

San Diego County Garden Friendly Plant Fairs

The region's residents who are interested in making their yards and gardens more attractive and water-efficient have a great opportunity to get information from gardening experts and receive significant discounts on varieties of low-water-use plants at San Diego County Garden Friendly Plant Fairs. The events are held annually in the spring and fall at select The Home Depot locations.

Plant fairs feature discounts on more than 20 types of plants, preselected by a panel of experts as water-efficient for the San Diego region. Industry experts are available to provide customers with information on water-efficient irrigation supplies and how to select and plant low-water-use plants. The Home Depot-certified nursery consultants host informative how-to workshops and local retail water agencies provide customers with information on water conservation programs and services.

Artificial Turf Discount Program

In response to drought conditions in 2015, the Water Authority launched an artificial turf discount pilot program to reduce the cost to replace water-intensive grass with artificial turf. Under this public-private partnership, participating artificial turf companies provide customers with a 10 percent discount on products and services. The discount is available whether the installation was performed by the artificial turf company or by a do-it-yourself customer who purchased only materials. The program is available to residential, commercial and public sector customers. The discount is provided directly by the participating artificial turf company.

WaterSmart Landscaping in San Diego County

The WaterSmart Landscape web portal links viewers to an extensive plant database, inspirational gardens, tips and other landscape-related resources.

3.3 Public Outreach

The Water Authority has consistently promotes water-use efficiency programs through its communications and outreach channels as part of its overall long-term strategy to improve the reliability of the region's water supplies by diversifying its water supply sources and advancing conservation. In addition, during times of shortage or drought, the Water Authority dedicates additional resources to public awareness campaigns that call upon the public to take more immediate actions to save water.

"20-Gallon Challenge" Campaign

In response to worsening water supply conditions that began in 2007 and lasted until April 2011, the Water Authority conducted an aggressive outreach campaign branded as the "20-Gallon Challenge." The campaign's name reflected the initial call to cut urban water use voluntarily by 10 percent, or about 20 gallons per capita per day (GPCD). The outreach campaign was a multi-faceted approach to educate the community on short- and long-term water supply challenges, specific tips to save water, and resources available to assist customers. Tactics to help the region meet an 8 percent overall shortage allocation between July 2009 and April 2011 included traditional advertising, media relations, online communications, water agency relations, education curriculum and contests, government relations, and community outreach via presentations and events. The campaign, combined with the ongoing implementation of other Water Authority conservation programs and outreach efforts conducted by the Water Authority's member agencies, helped achieve water savings well above the allocation target. Total potable water use dropped from 211 gallons per person per day in fiscal year 2007 to 140 gallons per person per day in fiscal year 2011.

Promoting WaterSmart Programs

Since the end of shortage allocations in 2011, the Water Authority has been focusing outreach efforts on building awareness and public acceptance for water-use efficiency as a desirable lifestyle and permanent civic responsibility through promoting the Water Authority's WaterSmart-branded conservation programs and classes. Staff promotes these resources primarily through ongoing media relations, community relations activities (such as attending special events and making presentations to community groups), targeted advertising, promotional materials, videos, electronic newsletters, innovative public-private partnerships such as the water-efficient plant fairs with local The Home Depot stores, and through tools such as social media (primarily Facebook, Twitter and YouTube) and the WaterSmartSD.org website.

"When in Drought" Campaign

In early 2014, water supply conditions worsened to the point where it again became necessary to launch an urgent drought-response outreach campaign as called for under the Water Authority's Water Shortage and Drought Management Plan. Since April 2014, the Water Authority has executed an aggressive drought response outreach campaign themed "When in Drought: Save Every Day, Every Way," to help achieve increased water conservation by the public, and to enhance public understanding of how ratepayers' investments in projects and their commitment to water conservation have reduced the region's vulnerability to shortages from drought conditions. The campaign was partially supported in 2014 and 2015 by state Proposition 50 grant funds. In May 2015, the Board authorized an additional $1 million to support enhanced outreach and water conservation programs designed to help the Water Authority's member agencies comply with state-mandated water-use reduction targets. In anticipation of continued drought conditions in 2016, the Water Authority was awarded $1.1 million in Proposition 84 Final Round grant funds to sustain enhanced drought response outreach efforts in 2016 and potentially beyond.

The campaign employed a wide array of communications tactics, including paid advertising, ongoing media relations, website communications, electronic newsletters, social media posts, videos, a speakers' bureau, school education programs, community partnerships and promotions, and government relations. Ads and messages were translated into Spanish, and advertising and community event schedules were constructed to ensure reach into a diverse set of audiences around the region. The Water Authority also launched a "When in Drought" smartphone app in August 2015 to make it more convenient for the region's residents to report potential incidents of water waste to local water districts. The Water Authority also used public opinion polls and other research opportunities to test messages and tactics and revise them as needed to increase effectiveness.

As regulatory and water supply conditions improved in spring 2016, the Water Authority, in coordination with its member agencies, began transitioning to a new drought-awareness outreach effort that is designed to advocate water-use efficiency as a desirable and permanent way of life in the San Diego region. Overall goals of this ongoing effort include promoting greater public awareness and use of regionally available water-use efficiency programs, tools and other resources, and encouraging residents and businesses to continue to exhibit "watersmart" behaviors and avoid water-wasting practices prohibited statewide.

Other Outreach Efforts

In addition, the Water Authority consistently promotes conservation activities and programs through a range of activities, including the following:

- Conducting research on the public's knowledge of water issues and attitudes toward water-efficient landscaping
- Supporting water conservation and other supply management and development strategies
- Using social media, electronic newsletters, community events, and speaker's bureau presentations
- Supporting regional water-efficiency demonstration gardens, such as the Water Conservation Garden and the San Diego Botanic Garden
- Developing and providing school education materials, assemblies, and an exhibit at the Reuben H. Fleet Science Center in Balboa Park
- Administering a Citizens Water Academy that educates emerging leaders on regional water issues, including the importance of water-use efficiency and prudent investments in water supply reliability, through in-depth and engaging interactions with senior Water Authority staff and tours of key regional water facilities
- Sharing updates on local water issues, fact sheets, and information on Board meetings via a Water News smartphone app for Apple and Android devices

Water-Use Efficiency Legislative Sponsorship

The Water Authority has been a statewide leader in sponsoring legislation to improve water-use efficiency standards since 1991. Many bills sponsored by the Water Authority have set precedent and been instrumental in the development of new strategies in water resource management, including advancement of standards for high-efficiency toilets and residential clothes washers, and water-efficient landscapes. Most recently, the Water Authority sponsored Assembly Bill 349, which prohibits common interest developments from banning artificial turf. This landmark water conservation legislation was signed into law in 2015 and will enhance outdoor water conservation opportunities statewide. Water Authority-sponsored landmark water-use efficiency laws are shown in Table 3-3.

Table 3-3. Water Authority Sponsored Landmark Water-Use Efficiency Laws

Toilets and Clothes Washer Standards • SB 1224 (Killea, 1991) • AB 952 (Kelley, 2001) • AB 1561 (Kelley, 2002)	Statewide Requirement for Water Meters • AB 514(Kehoe, 2003) • AB 2572 (Kehoe, 2004) • SB 1050 (NR&W, 2007)
Statewide Landscape Irrigation Standards • AB 2717 (Laird, 2004) • AB 1881 (Laird, 2006)	Statewide Conservation Best Management Practices • SB 553 (Kelley, 2000) • AB 1465 (Hill, 2009)
Artificial Turf in Home Owners Associations • AB 349 (Gonzales, 2015)	Urban Water Management Plans • AB 2067 (Weber, 2014)

3.4 Conclusion

Water-use efficiency will continue to play a central role in the Water Authority's efforts to maximize the reliability of the region's water supply through diversification. The achievements in water conservation discussed in this section provide a foundation for the existing and future measures, programs, and policies. Moving forward, the Water Authority will support its member agencies' efforts to comply with the GPCD reductions required under SBX7-7 and any future long-term state water-use efficiency framework in effect through various means, including a continued emphasis on behavioral change and market transformation.

This page intentionally left blank.

Section 4
San Diego County Water Authority Supplies

4.1 Introduction

Historically, the Water Authority has relied on imported water supplies purchased from Metropolitan to meet the needs of its member agencies. Metropolitan's supplies come from two primary sources, the State Water Project 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. Comprehensive supply and facility planning over the last 20-plus years provided the direction for implementation of these actions.

This section provides specific documentation on the Water Authority's existing and projected supply sources. For purposes of analysis in the 2015 Plan, supplies are separated into one of three categories: verifiable, additional planned, or conceptual. "Verifiable" projects are those with substantial evidence and adequate documentation regarding implementation and supply utilization. They have been identified by the Water Authority or member agencies as having achieved a level of certainty in their planning and implementation. Verifiable supplies are included in water supply assessments and verifications prepared by retail water agencies and used by the cities and county in their land use decisions regarding available water supplies for growth under SB 221 and SB 610. These projects are used in the Water Authority's reliability assessment in **Section 9**, "Water Supply Reliability." "Additional planned" projects are those that the Water Authority or member agencies are actively pursuing and currently funding, but do not rise to the level of *verifiable* for implementation. Agencies have completed the feasibility phase for these projects and continue to fund advanced planning efforts. Additional planned projects are utilized in **Section 10**, "Scenario Planning – Managing an Uncertain Future," as potential strategies to manage future supply uncertainty planning scenarios. "Conceptual" projects are those considered to be in the pre-planning and pre-feasibility analysis phase, where the projects have not progressed to a point where the project yield can be factored into reliability assessments or uncertainty planning for this 2015 Plan.

A Water Resources Plan developed in 1993 and updated in 1997 emphasized the development of local supplies and core water transfers. Consistent with the direction provided in the 1997 plan, the Water Authority entered into a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, in 1998. Through the transfer agreement, the Water Authority received 100,000 AF in 2015, with the volume increasing until it reaches 200,000 AF/YR in 2021. The IID Water Conservation and Transfer Agreement supply source is considered a verifiable Water Authority supply.

In 2003, as part of the execution of the Quantification Settlement Agreement (QSA) on the Colorado River, the Water Authority contracted for 77,700 AF/YR of conserved water from projects to line the AAC and CC. Deliveries of this conserved water from the CC reached the region in 2007, and deliveries from the AAC reached the region in 2010. Supplies from the canal lining projects are considered verifiable Water Authority supplies.

To further diversify regional supplies, the Water Authority's 2005 Plan and 2010 Plan identified seawater desalination as a potential supply for meeting future demands. In keeping with the objective of these plans, the Water Authority entered into a formal Water Purchase Agreement with Poseidon Water, a private investor-owned company, in November 2012. The Water Purchase Agreement details commercial and financial terms for the development and purchase of desalinated ocean water produced at the Carlsbad Desalination Plant. Construction began in 2012 and commercial operation began in December 2015. This facility is currently in commercial operation and is capable of producing up to 56,000 AF/YR. The Carlsbad Desalination Plant is a verifiable supply.

4.2 Water Authority – IID Water Conservation and Transfer Agreement

On April 29, 1998, the 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 U.S. history. Colorado River water is conserved by Imperial Valley farmers who voluntarily participate in the program by fallowing and implementing on-farm conservation projects that conserve water, which is then transferred to the Water Authority for use in San Diego County. Additionally, the Imperial Irrigation District is developing distribution system efficiency improvements to conserve water, which are planned to increase over time as the transfer volume ramps up. Through this transfer agreement, the Water Authority is entitled to Priority 3(a) water, which is a higher priority water right than Metropolitan's Priority 4 apportionment.

4.2.1 Implementation Status

On October 10, 2003, the Water Authority and IID executed an amendment to the original 1998 Transfer Agreement. This amendment modified certain aspects of the Transfer 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. **Section 6.2.1**, "Colorado River," contains details on the QSA.

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, Coachella Valley Water District (CVWD), Metropolitan, the Water Authority, and the state defended these suits that sought 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 had 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.

4.2.2 Expected Supply

Deliveries into San Diego County from the transfer began in 2003 with an initial transfer of 10,000 AF. The Water Authority receives transfer water each year according to a water delivery schedule contained in the transfer agreement. In 2015, the Water Authority received 100,000 AF. The quantities are scheduled to ramp up to 200,000 AF by 2021 and then remain fixed for the duration of 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 would suffer greater delivery cutbacks when supplies are limited from Metropolitan.

4.2.3 Transportation

The Water Authority entered into a water exchange agreement with Metropolitan on November 10, 1998, to transport the Water Authority–IID transfer water from the Colorado River to San Diego County. The exchange agreement was amended and restated as part of the QSA on October 10, 2003. Under the exchange agreement, Metropolitan takes delivery of the transfer water through its Colorado River Aqueduct. In exchange, Metropolitan delivers to the Water Authority a like quantity and quality of water. The Water Authority agrees to pay Metropolitan's lawful wheeling rate for each acre-foot of exchange water delivered. Under the terms of the water exchange agreement, Metropolitan will make delivery of the transfer water for 35 years, unless the Water Authority elects to extend the agreement another 10 years, for a total of 45 years.

4.2.4 Cost/Financing

The costs associated with the transfer are financed through the Water Authority's rates and charges. In the agreement between the Water Authority and IID, the price for the transfer water started at $258/AF and increased by a set amount for the first seven years. In December 2009, the Water Authority and IID executed a fifth amendment to the water transfer agreement that set the price per acre-foot for transfer water for calendar years 2010 through 2015, beginning at $405/AF in 2010 and increasing to $624/AF in 2015. For calendar years 2016 through 2034, the unit price will be adjusted using an agreed-upon index. The amendment also required the Water Authority to pay IID $6 million at the end of calendar year 2009 and another $50 million by October 2010. Beginning in 2035, either the Water Authority or IID can, if certain criteria are met, elect a market rate price through a formula described in the water transfer agreement.

The Water Authority provided $10 million to help offset potential socioeconomic impacts associated with temporary land fallowing. IID will credit the Water Authority for these funds during years 16 through 45. In 2007, the Water Authority prepaid IID an additional $10 million for future deliveries of water. IID will credit the Water Authority for this up-front payment during years 16 through 30.

As part of implementation of the QSA and water transfer, the Water Authority also entered into an environmental cost-sharing agreement. Under this agreement, the Water Authority is contributing a total of $64 million to fund environmental mitigation projects and the Salton Sea Restoration Fund.

The October 2003 Exchange Agreement between Metropolitan and the Water Authority provides for transportation of Colorado River water from the Canal Lining Projects and the IID water transfer through Metropolitan facilities. Under the Exchange Agreement, the initial price to transport the Colorado River water was set at $253/AF. Thereafter, the Water Authority agreed to pay Metropolitan's lawful wheeling rate for transportation of these water supplies at a price equal to the charge or charges set by Metropolitan's Board of Directors pursuant to applicable laws and regulation, and generally applicable to the conveyance of water by Metropolitan on behalf of its member agencies. Metropolitan's published transportation charge in 2015 was $424/AF.

After the completion of its 2010 UWMP, the Water Authority took legal action challenging Metropolitan's rates for calendar years 2011 through 2018. On November 19, 2015, a final judgment was entered in San Francisco Superior Court invalidating Metropolitan's transportation rates for 2011 through 2014. The judgment also determined that Metropolitan has under-calculated the Water Authority's preferential right to Metropolitan water by tens of thousands of AF of water per year. Metropolitan has appealed the judgment and has not changed its cost allocation or rate setting to be consistent with the Court's ruling. The case challenging the rates set in 2014 for the 2015 and 2016 calendar years has been stayed pending appeal. A lawsuit challenging Metropolitan's 2017 and 2018 rates that were set in April 2016 was recently filed by the Water Authority.

4.2.5 Written Contracts or Other Proof

Appendix E contains a list of the specific written contracts, agreements, and environmental permits associated with implementation of the Water Authority–IID Transfer.

4.2.6 Existing and Future Supplies

Based on the terms and conditions in the Transfer Agreement, Table 4-1 shows the anticipated delivery schedule of the conserved transfer water in five-year increments. There is adequate documentation to demonstrate the availability of this supply; therefore, the supply yields shown in Table 4-1 will be included in the reliability analysis found in **Section 9**, "Water Supply Reliability."

Table 4-1. Existing and Projected Water Authority–IID Transfer Supplies (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
100,000	190,000	200,000	200,000	200,000	200,000

4.3 All-American Canal 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 AAC and 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 million AF over the 110-year life of the agreement.

4.3.1 Implementation Status

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 began 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.

4.3.2 Expected Supply

The AAC lining project makes 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 makes 26,000 AF of Colorado River water available each year 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. The remaining amount, 77,700 AF/YR, is to be available to the Water Authority, with up to an additional 4,850 AF/YR available to the Water Authority, depending on environmental requirements from the CC lining project. For planning purposes, the Water Authority assumes that 2,500 AF of the 4,850 AF will be available each year for delivery, for a total of 80,200 AF/YR of that supply. 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. The term of the QSA is for up to 75 years.

4.3.3 Transportation

The October 2003 Exchange Agreement between the Water Authority and Metropolitan provides for the delivery of the conserved water from the canal lining projects. The Water Authority pays Metropolitan's applicable wheeling rate for each acre-foot of exchange water delivered. In the Agreement, Metropolitan will deliver the canal lining water for the term of the Allocation Agreement (110 years).

4.3.4 Cost/Financing

Under California Water Code Section 12560 et seq., the Water Authority received $200 million in state funds for construction of the canal lining projects. In addition, $20 million was made available from Proposition 50 and $36 million from Proposition 84. The Water Authority was responsible for additional expenses above the funds provided by the state.

In accordance with the Allocation Agreement, the Water Authority is responsible for a portion of the net additional Operation, Maintenance, and Repair costs for the lined canals. Any costs associated with the lining projects are to be financed through the Water Authority's rates and charges.

4.3.5 Written Contracts or Other Proof

Appendix E contains a list of the specific written contracts, agreements, and environmental permits associated with implementation of the canal lining projects.

4.3.6 Future Supplies

Table 4-2 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; therefore, the reliability analysis found in **Section 9**, "Water Supply Reliability," will show the supply yields presented in Table 4-2.

Table 4-2. Projected Supply from Canal Lining Projects (Normal Year – AF/YR)

	2015	2020	2025	2030	2035	2040
CC Lining Project [1]	24,000	24,000	24,000	24,000	24,000	24,000
AAC Lining Project [2]	56,200	56,200	56,200	56,200	56,200	56,200
Total:	80,200	80,200	80,200	80,200	80,200	80,200

[1] The project was completed in 2006, and deliveries started in 2007. Includes 21,500 AF + 2,500 AF environmental water deliveries.

[2] The project was completed and deliveries started in 2010.

4.4 Metropolitan Water District of Southern California

The Water Authority's imported water supply sources include purchases from Metropolitan. This is separate from and in addition to the Water Authority-IID Transfer supplies and CC and AAC Lining Projects supplies. **Section 6** contains detailed information on Metropolitan's supplies, and information on Water Authority projected demands on Metropolitan, provided by Metropolitan, can be found in **Appendix I**.

4.5 Carlsbad Desalination Plant

Development of seawater desalination in San Diego County assists the region in diversifying its water resources; reduces dependence on imported supplies; and provides a new drought-proof, locally treated water supply. The Carlsbad Desalination Plant is a fully operational seawater desalination plant and conveyance pipeline developed by Poseidon, a private investor–owned company that develops water and wastewater infrastructure. The Carlsbad Desalination Plant, located at the Encina Power Station in Carlsbad, began commercial operation on December 23, 2015, and can provide a highly reliable local supply of up to 56,000 AF/YR for the region. Of the total Carlsbad Desalination Plant production, 6,000 AF is considered a "member agency local supply," described further in **Section 5.6.1**.

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 will require transitioning from co-located operations with the Encina Power Station to permanent stand-alone operations. This will necessitate changes to the existing intake and discharge operations that will likely include direct lagoon intake, construction of new 1 mm screens for seawater process water or brine dilution water, construction of new fish-friendly pumps, and process efficiency modifications. 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 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.

4.5.1 Transportation

A 54-inch-diameter pipeline was constructed to convey product water from the desalination plant 10.5 miles east to the Water Authority's Second Aqueduct. The water is then conveyed five miles north to the Water Authority's Twin Oaks Valley WTP facility, where it is blended with treated imported water and subsequently distributed into the Water Authority's existing aqueduct system.

4.5.2 Cost/Financing

The Water Purchase Agreement between the Water Authority and Poseidon provides the terms whereby the Water Authority purchases the entire output from the Carlsbad Desalination Plant at a price based on the cost of production. The initial contract year unit cost is estimated to be $2,307 per AF. The Water Authority's water purchase costs are financed through Water Authority rates and charges.

4.5.3 Written Contracts or Other Proof

Appendix E contains a list of the specific written contracts, agreements, and environmental permits associated with implementation of the Carlsbad Desalination Plant.

4.5.4 Future Supplies

Table 4-3 shows the anticipated delivery schedule of supplies from the Carlsbad Desalination Plant in five-year increments. Adequate documentation exists to demonstrate the availability of this supply; therefore, the reliability analysis found in **Section 9**, "Water Supply Reliability," will show the supply yields presented in Table 4-3.

Table 4-3. Projected Supply from Carlsbad Desalination Plant (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
--	50,000	50,000	50,000	50,000	50,000

4.6 Other Water Authority Seawater Desalination Efforts

4.6.1 Potential MCB Camp Pendleton Seawater Desalination Project

The feasibility of a potential seawater desalination facility located on MCB Camp Pendleton is being evaluated as a long-term resource strategy to manage future supply uncertainties. Moving forward with development of the project would take further actions by the Water Authority's Board of

Directors and the action would be considered in the context of member agency implementation of local supplies, such as potable reuse, as well as future changes to imported supply reliability.

The MCB Camp Pendleton desalination project is not considered a verifiable supply and is therefore not included in the reliability assessment contained in **Section 9**. The project is categorized as an additional planned project based on level of project documentation, and is used in **Section 10**, "Scenario Planning – Managing an Uncertain Future," as a potential strategy to manage future uncertainty planning scenarios. As an adaptive management supply project, any future decisions regarding further development of a Camp Pendleton seawater desalination project will be based on water supply reliability factors including implementation of planned local supply projects, as well as future changes to imported supply reliability. In June 2009, the Water Authority, in collaboration with MCB Camp Pendleton, completed a feasibility study for a potential 50-MGD to 150-MGD seawater desalination project on MCB Camp Pendleton. The following year, an MOU between the Water Authority and MCB Camp Pendleton was executed to establish the framework for cooperation between the two parties during the performance of additional technical and environmental studies. The MOU did not commit either party to advance the project beyond the planning studies contemplated in the MOU.

In October 2013, these additional planning-level studies and field investigations were finalized to further define project requirements, including the feasibility of subsurface and screened open ocean intake alternatives, brine discharge methods, treatment processes and plant configurations, power supply requirements, alternative conveyance alignments, the integration of new supplies into the regional aqueduct system, and impacts to MCB Camp Pendleton operations. The results further validated overall project feasibility, including the viability of both the screened open ocean and subsurface intakes, and the practicality of a diffuser type brine discharge system.

The project was also considered in the 2013 Regional Water Facilities Optimization and Master Plan Update as a new supply alternative ("Supply from the West" option) capable of addressing the region's long-term need for new supply development. As noted in the 2013 Master Plan Update, the need for new regional supply development will increase in the years beyond 2025 in correlation with projected population increases. The Master Plan Update recommended an adaptive management approach for a future MCB Camp Pendleton project whereby future major decisions affecting project implementation would need to consider, among other factors, the implementation of the City of San Diego's Pure Water Program, the progress of the Bay Delta Conservation Plan (BDCP), and other local reuse and desalination supplies currently in development, along with future changes to imported supply reliability.

The 2013 Master Plan Update further noted that timely regulatory review and successful permitting may hinge on the viability of the open-ocean or subsurface intake options to provide feedwater for the reverse osmosis membranes, and that as an initial incremental development step, intake studies should be performed to physically demonstrate the two seawater intake technologies. In March 2015, the Board approved the intake studies and awarded a contract in September 2015 to execute the Intake Testing Program. This testing program was initiated in late 2015 and is anticipated to take approximately two years to complete.

4.6.2 Rosarito Beach Binational Desalination Plant Feasibility Evaluation and Preliminary Design

Currently, the Rosarito Beach Binational Desalination Project is considered a conceptual-level project and is therefore not included in the reliability assessment in **Section 9**. The Water Authority is participating with U.S. and Mexican agencies in a binational review of potential water management and water supply programs that could benefit Colorado River water users of both countries. As part of this effort, a binational workgroup formed to study potential new water supplies and recommended the evaluation and preliminary design of an initial 25-MGD (expandable to 50 MGD) seawater desalination plant that would be located at Rosarito Beach in Baja California, Mexico.

If built, product water from the plant would be available to both U.S. and Mexican water users. For U.S. water users, the water could be delivered either directly to the San Diego region, using a cross-border pipeline, or possibly by exchange, with Mexican users taking delivery of the product water and leaving an equivalent amount of Colorado River water available for U.S. users. A separate local seawater desalination project is being pursued by Otay WD at the same location and is described in **Section 5.6.2**.

Existing funding was sufficient to complete the first phase of the project, which provided a feasibility evaluation of the site, assessment of water demand, and a review of environmental permitting requirements. The first phase confirmed that the site and the existing infrastructure were adequate to support up to a 50-MGD seawater desalination facility. Subsequent phases of the project would confirm conceptual treatment process requirements, confirm plant size and physical layout, further assess permitting and regulatory issues, define full-scale plant costs, and operate a pilot plant for various test purposes.

4.7 Water Authority Dry-Year Supplies

In addition to Water Authority supplies expected during a normal water year, the Water Authority also has also invested in carryover storage supplies to assist in achieving reliability in dry years and multiple dry years, as discussed in **Section 9.3**, "Dry Water Year Assessment." The Water Authority's carryover storage supply program includes both in-region surface water storage and out-of-region groundwater storage in California's Central Valley. These verifiable dry-year storage supplies are described in detail in **Section 11**, "Shortage Contingency Analysis," and a list of the specific written contracts, agreements, and environmental permits associated with implementation of the Carryover Storage Program is contained in **Appendix E**.

This page intentionally left blank.

Section 5
Member Agency Supplies

5.1 Introduction

Local resources developed and managed by the Water Authority's member agencies are critical to securing a diverse and reliable supply for the region. Local projects reduce demands for imported water and provide agencies with a drought-resilient supply. This section provides general information on the local resources being developed and managed by the member agencies. These supplies include surface water, groundwater, recycled water, potable reuse and desalinated seawater.

The Water Authority, working closely with its member agencies, took the following steps to update the yields anticipated from the member agencies' local supplies:

1. Provided the member agencies with the projected supply numbers included in the Water Authority's Updated 2010 Plan and requested they update the figures for their specific project(s) and separate the projects into three project categories: "verifiable," "additional planned," and "conceptual." These categories are based on the stages of development, as defined in the introduction of **Section 4**, "San Diego County Water Authority Supplies."
2. Prepared revised projections based on input from agencies.
3. Presented revised supply numbers to member agencies at several meetings and continued working with them to ensure the figures accurately reflected their project implementation efforts.
4. Distributed the administrative draft of the 2015 Plan to member agencies for their review, providing the agencies another opportunity to review and revise the updated local supply figures prior to Water Authority Board approval.

Before 1947, the San Diego region relied on local surface water runoff in normal and wet weather years and on groundwater pumped from local aquifers during dry years when stream flows were reduced. As the economy and population grew, local resources became insufficient to meet the region's water supply needs. From the 1950s onward, the region became increasingly reliant on imported water supplies. Since 1980, a range of 5 to 36 percent of the water used within the Water Authority's service area has come from local sources, primarily from surface water reservoirs with yields that vary directly with annual rainfall. A small but growing share of local supply comes from recycled water and groundwater recovery projects, with additional local supply planned from potable reuse and seawater desalination. Yield from these projects is considered drought-resilient since the projects are primarily independent of precipitation. In fiscal year 2015, total local water sources provided 10 percent of the water used in the Water Authority's service area.

5.2 Surface Water

5.2.1 Description

The regional surface water yield is supported by 24 surface reservoirs with a combined capacity of 746,385 AF (see Table 5-1 and Figure 5-1). These reservoirs are located in seven of San Diego County's nine coastal watersheds. Runoff in these watersheds occurs at the crest of the county's Peninsular Range and drains into the Pacific Ocean. The oldest of these reservoirs, Cuyamaca, was constructed in 1887. Table 5-1 lists the 24 reservoirs, together with their operating agency and storage capacity.

Olivenhain Reservoir, completed in 2003, is the region's newest reservoir. It is part of the Water Authority's ESP and has a storage capacity of 24,789 AF. The ESP adds 90,100 AF of additional storage capacity and is designed to protect the region from disruptions in the water delivery system. In addition, the 2002 Regional Water Facilities Master Plan identified an opportunity to augment the ESP with a carryover storage component at San Vicente. The Water Authority completed the ESP and CSP portion of the San Vicente Dam Raise in mid-2014, which provides an additional 152,000 AF of water storage capacity. Refer to **Section 11.1.2** and **Section 11.2.4** for additional information on the Water Authority's emergency and carryover storage.

5.2.2 Issues

Management

The Water Authority's member agencies manage most of the region's reservoirs. The San Vicente Dam Raise was completed in mid-2014 and CSP water began to be stored a year later. Together with the city of San Diego, the Water Authority coordinates San Vicente operations to optimize the use of their respective storage pools. The Water Authority also coordinates storage in Lake Hodges with the City of San Diego in order to manage its pumped storage project. The Lake Hodges Pumped Storage Project delivers water uphill to Olivenhain Reservoir in off-peak hours, generating electricity during peak demand periods through a coordinated release schedule. Also, in coordination with its member agencies, the Water Authority manages the imported conveyance system to achieve the optimal use of local and imported water resources, which include the local reservoirs. To reduce the need for imported water purchases, the reservoirs are operated to maximize the use of this local supply. Local surface water supplies can also offset dry-year shortfalls in imported water. Maximizing local yield reduces losses due to evaporation and spills, but it also results in increased demands for imported water during dry years when imported water is more likely in short supply. Most member agencies maintain some portion of their storage capacity for emergency storage. To optimize the use of local storage, the Water Authority works with its member agencies through periodic storage agreements and through its annual Aqueduct Operating Plan. Storage agreements allow for carryover storage to be placed in member agency reservoirs and to provide increased local storage capacity, which can be used during peaks on the aqueduct system. The aqueduct operating plans coordinate imported water deliveries and optimize reservoir fill opportunities. Local yield is maximized by the member agencies that operate the reservoirs.

Table 5-1. Major San Diego County Reservoirs

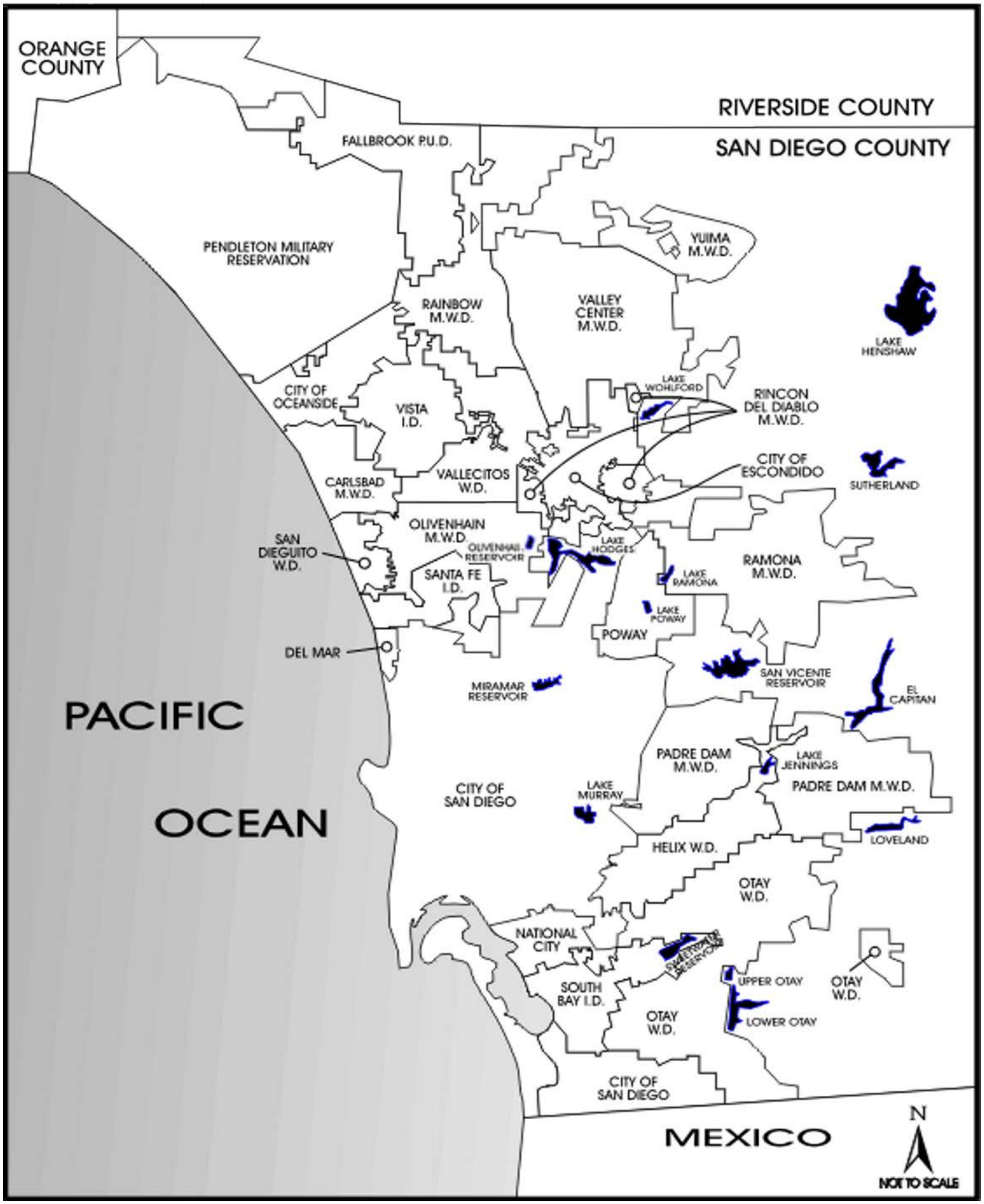
Agency (Owner)	Reservoir	Capacity (AF)
💧 Carlsbad MWD	Maerkle	600
💧 Escondido, City of	Dixon	2,606
Escondido, City of	Wohlford	6,506
💧 Fallbrook PUD	Red Mountain	1,335
Helix WD	Cuyamaca	8,195
💧 Helix WD	Jennings	9,790
💧 Poway, City of	Poway	3,330
💧 Rainbow MWD	Morro Hill	465
💧 Ramona MWD	Ramona	12,000
San Diego, City of	Barrett	34,806
💧 San Diego, City of	El Capitan	112,807
💧 San Diego, City of	Hodges	30,633
💧 San Diego, City of	Lower Otay	49,849
💧 San Diego, City of	Miramar	6,682
San Diego, City of	Morena	50,694
💧 San Diego, City of	Murray	4,684
💧 San Diego, City of	San Vicente [1]	249,358
San Diego, City of	Sutherland	29,508
💧 San Dieguito WD/Santa Fe ID	San Dieguito	883
💧 San Diego County Water Authority	Olivenhain	24,789
Sweetwater Authority	Loveland	25,400
💧 Sweetwater Authority	Sweetwater	28,079
Valley Center MWD	Turner	1,612
Vista ID	Henshaw	51,774
Total Capacity		746,385

💧 = Connected to Water Authority aqueduct system.

[1] The Water Authority has storage rights to 152,100 AF of capacity in San Vicente Reservoir (100,000 AF is designated as carryover storage; 52,100 AF is designated as emergency storage).

ID = Irrigation District; MWD = Municipal Water District; PUD = Public Utility District;
WD = Water District

Figure 5-1
Major San Diego County Reservoirs



Water Quality

See **Section 7**, "Water Quality," for a relevant discussion of water quality issues related to the region's water supply.

5.2.3 Projected Surface Water Supplies

Surface water supplies can represent the largest single local resource in the Water Authority's service area. However, annual surface water yields can vary substantially due to fluctuating hydrologic cycles. Since 1990, annual surface water yields have ranged from a low of 4,100 AF in fiscal year 2015 to a high of 140,300 AF in fiscal year 1984. Water Authority member agencies project average annual surface water use to decrease slightly, from 51,580 AF in 2020 to 51,180 AF in 2040.

A list of the individual reservoirs, expected yield, and basis for the supply figure can be found in **Appendix F**, Table F-1. Table 5-2 shows the projected average surface water supply within the Water Authority's service area, and the yields are utilized in the reliability analysis included in **Section 9**, "Water Supply Reliability."

Member agencies expect to include specific information on the projected yields from local reservoirs in 2015 plans.

Table 5-2. Projected Surface Water Supply (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
51,680	51,580[1]	51,480	51,380	51,280	51,180

[1] Post-2015 supply adjusted downward to account for increase in California American Water Company demands from City of San Diego.

5.3 Groundwater

One of the elements identified in the Water Authority's resource mix is the use and optimization of groundwater supplies by member agencies. The Water Authority does not currently hold groundwater basin rights, nor does it own or operate groundwater facilities within San Diego County. Although opportunities are limited, groundwater is currently used to meet a portion of the municipal water demands throughout the Water Authority's service area from MCB Camp Pendleton in the north to National City in the south. This section provides a general description of municipal groundwater development within the Water Authority's service area, the issues associated with development of this supply, and projected agency yields. Inclusion of specific information required under the Act on groundwater basins and projects is expected in member agency 2015 plans.

5.3.1 Description

Within the past five years, water supply agencies within the Water Authority's service area have produced an annual average of approximately 18,944 AF of potable water supplies from groundwater. This total represents production from both brackish groundwater desalination facilities and municipal wells producing groundwater not requiring desalination. It does not include production from privately owned water wells used for irrigation and domestic purposes, or several thousand AF of groundwater produced annually from the Warner Basin by the Vista ID. This groundwater is discharged into Lake Henshaw and reported as local surface water supply by the City of Escondido and Vista ID.

In addition to providing a local supply to water agencies, groundwater is also a source of supply for numerous private well owners, who draw on groundwater to help meet their domestic and agriculture water needs. In the Ramona area alone, over 1,000 privately owned wells provide a supplementary source of water for Ramona Municipal Water District (MWD) customers. Similar domestic uses occur throughout the Water Authority's service area. These domestic supplies help to offset demand for imported water provided by the Water Authority and its member agencies. Although significant, the amount of groundwater pumped by private wells cannot be accurately quantified nor estimated within the Water Authority's entire service area. One agency, the Yuima MWD, did begin to report yield from its mutual water companies located within their service area in 2015, which totaled approximately 6,000 AF in normal year deliveries.

Groundwater production in the Water Authority's service area is limited by a number of factors, including the limited geographic extent of the more productive sand and gravel (alluvial) aquifers; the relatively shallow nature of most of the alluvial aquifers; lack of rainfall and groundwater recharge; and degraded water quality resulting from human activities, such as septic tank use.

Shallow and narrow river valleys filled with alluvial sand and gravel deposits are characteristic of the more productive groundwater basins in the San Diego region. Outside of these more productive aquifers, groundwater is developed from fractured crystalline bedrock and semi-consolidated sedimentary deposits that occur throughout the region. However, these aquifers have limited yield and storage and are best suited for meeting domestic water needs that do not require higher flow rates. Figure 5-2 shows the locations of the principal alluvial groundwater basins within the Water Authority's service area.

Although groundwater supplies are less plentiful in the San Diego region than in some other areas of California, such as the Los Angeles Basin in Southern California and the Central Valley in Northern California, the Water Authority believes that sufficient undeveloped brackish groundwater supplies exist that could help meet a greater portion of the region's future water demand. Several agencies within the Water Authority's service area have identified potential projects that may provide several thousands of AF of additional groundwater production in the coming years. A general summary and description of these projects are presented below.

Groundwater Extraction and Disinfection Projects

Groundwater that can be extracted and used as a potable water supply, with little more than disinfection, generally occurs outside the influence of human activities and within the upper reaches of the east-west–trending watersheds. Wells producing higher-quality water are operated by MCB Camp Pendleton (Santa Margarita River watershed) and the Sweetwater Water Authority (San Diego Formation aquifer). The Vista ID also operates numerous high-quality extraction wells in the Warner Basin, located in the upper San Luis Rey River watershed. The water from these wells is discharged to Lake Henshaw and eventually to the San Luis Rey River where it is then diverted farther downstream for use in Escondido and elsewhere. The unit cost of water produced from simple groundwater extraction and disinfection projects is low and generally well below the cost of

Figure 5-2
Alluvial Groundwater Basins

imported water. Although a substantial amount of the higher-quality groundwater within the Water Authority's service area is already utilized, the primary focus for future local groundwater development is brackish groundwater recovery and recharge projects.

Brackish Groundwater Recovery Projects

Groundwater high in salts and total dissolved solids (TDS) and other contaminants, that requires advanced treatment prior to potable use, is typically found in shallow basins in the downstream portions of watersheds. Brackish groundwater recovery projects use membrane technology, principally reverse osmosis, to treat extracted groundwater to potable water standards. The City of Oceanside's 6.37-MGD capacity Mission Basin Desalter and the Sweetwater Authority's existing 4.0-MGD Richard A. Reynolds Groundwater Desalination Facility are the only currently operating brackish groundwater recovery and treatment facilities within the Water Authority's service area. The Richard A. Reynolds Groundwater Desalination Facility is currently undergoing an expansion that will increase its capacity to 8,800 AF. The expansion is expected to be completed in 2017 and will provide potable water to the Sweetwater Authority and the City of San Diego. Several member agencies are also considering the feasibility of new groundwater recovery and treatment facilities. Unit costs for brackish groundwater recovery projects are considerably higher than those for simple groundwater extraction and disinfection projects due to the additional treatment requirements and the cost of concentrate (brine) disposal. However, where economical options exist for disposal of brine, this type of groundwater project has proven to be an economically sound water-supply option.

Groundwater Recharge and Recovery Projects

Artificial recharge and recovery projects, also referred to as conjunctive-use projects, can increase groundwater basin yields by supplementing the natural recharge process. Conjunctive-use projects divert water supplies to percolation basins or injection wells to supplement natural rainfall runoff recharge. Captured rainfall runoff, recycled water, imported water, or a combination thereof, can be used to recharge groundwater basins when water levels have been lowered sufficiently by pumping. Groundwater basins can be operated similar to surface water reservoirs to supply stored water to the region if imported deliveries are limited due to high demand, supply and facility constraints, or a combination thereof. The Fallbrook PUD and MCB Camp Pendleton are currently planning such a project.

5.3.2 Issues

Local water agencies often need to consider a multitude of issues during the planning, permitting, design, construction and operation of a groundwater project. The issues can include dealing with hydrogeological uncertainties, high upfront study and subsurface investigation costs, higher unit costs association with brackish groundwater recovery and treatment, project funding considerations, water rights, regulatory and environmental concerns, and possible contamination of groundwater that might occur after the project is constructed and facilities are brought online. Although these issues in the past have discouraged decision makers and have limited groundwater development in San Diego County, state-wide drought conditions and water supply reliability concerns are prompting renewed consideration of the viability of local groundwater development and cleanup projects for this region.

Hydrogeological and Environmental Impact Uncertainty

In groundwater basins not recently used as a source of a municipal water supply by an agency, and where a general lack of information exists regarding issues such as the physical nature of the aquifer materials, existing wells and groundwater production, water quality, and potential impact of pumping to riparian habitat, significant resources must be expended prior to determining the feasibility of a project. Subsurface exploration and field investigations are costly and time consuming. In addition, data management and utilization generally require the development of costly large-scale numerical models. These issues, in conjunction with financial considerations, often dictate that groundwater projects be developed, and production increased incrementally, in a planned and managed fashion.

Economic and Financial Considerations

Because of the saline nature of the water and the presence of other contaminants in many of the groundwater basins in San Diego County, the cost of groundwater development often requires demineralization and brine disposal facilities, which can be costly to construct and operate.

Institutional, Legal, and Regulatory Issues

Institutional and legal issues can also impact project development. Because groundwater basins often involve multiple water agencies and/or numerous private wells and water-right holders, water rights and management authority should be addressed before a project progresses beyond the planning stage. Agencies are often reluctant to initiate groundwater development projects that go beyond the feasibility study stage unless jurisdiction and water rights issues are resolved beforehand. As challenging as those issues may be, recent drought conditions have prompted local agencies to attempt to resolve or overcome those barriers to groundwater development and proceed to groundwater project implementation. In September 2014, Gov. Jerry Brown signed a package of three bills known as the Sustainable Groundwater Management Act (SGMA), which sought to provide local agencies with a framework for managing groundwater basins in a manner that ensured basin resiliency, recognized that groundwater is most effectively managed at the local level, and empowered local agencies to achieve basin sustainability within 20 years. The SGMA further respected regional differences and provided for a tailored approach to planning. Other goals of the SGMA included:

- Established minimum standards for sustainable groundwater management
- Improved coordination between land use and groundwater planning
- Provided state technical assistance
- Created a mechanism for state intervention if, and only if, a local agency was not managing its groundwater sustainably
- Protected water rights

DWR Bulletin 118 identified 515 alluvial groundwater basins in California. DWR conducted an initial prioritization of the identified 515 basins, and those basins deemed high- and medium-priority basins are required by SGMA to develop Groundwater Sustainability Plans (GSPs) via a designated Groundwater Sustainability Agency (GSA). A GSA can be a local agency, a combination of local agencies, or a county. It is the GSA’s responsibility to develop and implement a GSP that considers all beneficial uses and users of groundwater in the basin. GSAs must be formed by June 30, 2017. In the San Diego region, four local basins were deemed medium priority:

- San Luis Rey Valley
- San Pasqual Valley

- Santa Margarita Valley
- San Diego River Valley

Regional and local agencies impacted by this requirement are taking steps to ensure SGMA compliance within the allotted timeframe. Uncertainty over future regulatory requirements for drinking water supplies can also pose additional barriers to project development. When developing facilities and compliance plans for groundwater development and/or groundwater recharge projects, agencies must take into account proposed or potential regulatory changes related to water quality issues. Some of the regulations for which changes are expected over the next decade include state and federal drinking water standards and State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) groundwater recharge regulations.

Environmental Regulatory Constraints

Issues related to the environmental impacts that could potentially result from the fluctuation of groundwater levels when large quantities of groundwater are extracted are common to many of the groundwater projects proposed within the principal alluvial aquifers in the Water Authority's service area. These issues include potential impacts on endangered species habitat and groundwater-dependent vegetation. Impacts may occur if a project results in seasonal or long-term decreases in the depth of the groundwater. Although potential environmental impacts can generally be mitigated, mitigation costs can reduce the cost-effectiveness of a project.

Water Quality

Remediation of groundwater contamination presents a significant, ongoing operations and maintenance cost that presents barriers to project implementation. See **Section 7.5**, "Groundwater," for additional information on water quality for groundwater supplies.

Funding

Grant funding for groundwater development has been steadily increasing. Title XVI of Public Law (PL) 102-575, the Reclamation Wastewater and Groundwater Study and Facilities Act, initially authorized the federal government to fund up to 25 percent of the capital cost of authorized recycling projects. PL 104-266, the Reclamation Recycling and Water Conservation Act of 1996, authorized two additional projects. One of those projects included funding for the City of Oceanside's Mission Basin Brackish Groundwater Desalting Demonstration Project (additional detailed Title XVI funding information can be found in **Section 5.4.3**).

Since 1994, this project, along with the Sweetwater Authority's groundwater desalination facility, also benefitted from receiving Groundwater Recovery Program Funding from Metropolitan. To date, over $13.9 million has been received from this funding source for both the City of Oceanside's and Sweetwater Authority's groundwater brackish projects.

Along with local and federal funding sources, in 2007, the San Diego Integrated Regional Water Management (IRWM) Program submitted a grant proposal to DWR for Proposition 50 funds. As a result of this grant award, the Santa Margarita Conjunctive Use Project was awarded grant funding to enhance groundwater basin recharge and recovery to provide water supplies for both MCB Camp Pendleton and Fallbrook PUD, which also resolved a long-standing water rights dispute. The project will provide approximately 3,100 AF/YR of new local supply from the Santa Margarita River by conjunctively managing the groundwater basin. Additionally, 1,380 acres of sensitive habitat will also be preserved along the river as a result of this project. In Southern California, wastewater, brackish water and urban runoff are high in TDS and other impurities that require advanced treatment to allow beneficial reuse.

The North San Diego County Cooperative Demineralization Project funded under Proposition 84 - Round 1 Implementation Grant, focuses on developing new local water supplies and managing water quality issues by constructing an advanced water treatment facility (San Elijo Water Reclamation Facility) to mitigate high TDS sources, increase beneficial reuse, and study the feasibility of brackish to potable water desalination in north San Diego County.

In 2014, also with Proposition 84 grant funding awarded through the San Diego IRWM, the Sweetwater Authority will be able to expand their production of potable water from desalinated brackish groundwater through expansion of the Richard A. Reynolds Groundwater Desalination Facility for an additional 5,200 AF/YR. The project involved drilling five new wells in the San Diego Formation, construction of an additional 20,000 linear feet of conveyance and potable pipelines, and facility modifications. The desalinated groundwater produced by the project will be added directly into the potable water supply, which will offset imported water purchases. Brine discharge from this project will also help to maintain the brackish quality in the Sweetwater River estuary, protecting against incursion by non-native freshwater species. The project was implemented by the Sweetwater Authority, in partnership with the City of San Diego. This multi-year project is expected to be completed in 2017.

5.3.3 Projected Groundwater Supply Yield

The Water Authority has worked closely with its member agencies to develop groundwater yield projections. The most reliable projections have been developed by considering only existing (verifiable) groundwater projects, which include planned expansions to existing projects.

Table 5-3 shows the projected annual yield from verifiable groundwater projects in five-year increments, based on projections and implementation schedules or existing projects and planned expansions provided by the member agencies. These are included in the reliability analysis found in **Section 9**, “Water Supply Reliability.” Table F-2, **Appendix F** contains a list of the projects and the projected supplies.

Table 5-3. Projected Groundwater Supply (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
23,773	30,040	31,630	32,670	32,670	32,670

An overall projected increase in groundwater production from 2020 and beyond is due primarily from expansion of the brackish groundwater recovery and treatment project currently operated by the Sweetwater Authority. As previously described in **Section 5.3.2**, the Sweetwater Authority and the City of San Diego have joined together to expand the capacity of the Richard A. Reynolds Groundwater Desalination Facility (owned by the Sweetwater Authority), and share in the cost of the project and the total 8,800 AF of water produced. The Reynolds Desalination Facility treats a local groundwater supply that has previously been non-potable or unusable. The facility was initially designed and constructed to accommodate an expansion in the production capacity.

Additional Planned Projects – Groundwater

Maximizing groundwater development is critical to diversifying the region's water supply portfolio. Beyond the projections of the more reliable and verifiable projects included in Table 5-3, member agencies have also identified two additional planned projects, with an estimated total of 3,600 AF/YR of additional yield in 2040. The Otay WD Rancho Del Rey Groundwater Well Development Project is expected to yield 500 AF/YR by 2030. Fallbrook PUD/MCB Camp Pendleton's Santa Margarita Conjunctive-Use Project is projected to yield an additional 3,100 AF/YR by 2020. These additional yields are considered additional planned supplies and are reflected in **Section 10**, "Scenario Planning – Managing an Uncertain Future," as potential strategies to manage future uncertainty planning scenarios. These additional planned projects, as well as the conceptual projects provided by the member agencies, are also included in **Appendix F**, Table F-2.

5.4 Water Recycling

Another local supply identified in the Water Authority's resource mix is the optimization of recycled water use. Every gallon of recycled water used within the region reduces the need to import or develop other water supplies. This section provides a general description of recycled water development within the Water Authority's service area, the issues associated with developing this supply, and projected regional yield. Documentation on specific existing and future recycling projects is expected to be part of the 2015 plans for those agencies that include water recycling as a supply. The Water Authority coordinated the preparation of this section with its member agencies and those wastewater agencies that operate water recycling facilities within the Water Authority's service area.

5.4.1 Description

Water may be recycled for non-potable or potable purposes. This section considers non-potable recycling. Non-potable water recycling is the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-drinking uses. Non-potable water recycling in the San Diego Region started back in the 1960s when Padre Dam MWD began recycling water for use in Santee Lakes. Water recycling started to increase significantly in the 1990s. Today agencies in San Diego County use recycled water to fill lakes, ponds, and ornamental fountains; to irrigate parks, campgrounds, golf courses, freeway medians, community greenbelts, school athletic fields, food crops, and nursery stock; and to control dust at construction sites. Recycled water can also be used in certain industrial processes, in cooling towers, and for flushing toilets and urinals in non-residential buildings. Recycled water is also used for street sweeping and firefighting purposes.

Local agencies must consider a number of issues when developing recycled water projects, including economic and financial considerations; regulatory, institutional, and public acceptance issues; and water quality concerns related to unknown or perceived health and environmental risks. These issues, if unresolved, can limit the amount of recycled water use in San Diego County. The following sections discuss some of the specific challenges associated with recycled water development.

With additional water treatment, recycled water can also be treated to drinking (potable) water standards. Additional information on this highly treated water source (termed "potable reuse") can be found in **Section 5.5**.

Economic and Financial Considerations

The capital-intensive cost of constructing recycled water projects and managing a dual distribution system has traditionally been a barrier to project implementation. The upfront capital costs for construction of treatment facilities and recycled water distribution systems can be high, while full market implementation is usually phased in over a number of years, resulting in very high initial unit costs that affect cash flow in the early project years. Some local agencies have been successful in expanding recycled water by requiring developers to install dual plumbed systems as new development infrastructure is built. Otay WD, Carlsbad MWD, and the City of San Diego have all been successful utilizing this approach.

The high costs associated with converting existing water customers to non-potable recycled water use have also been challenging. This situation is compounded by the seasonal nature of recycled water demands, a lack of seasonal storage and the lack of large industrial water users in San Diego County that can use recycled water. Projects that serve a large portion of irrigation demands, like the majority of the projects in the Water Authority's service area, often use only half of their annual production capacity due to these seasonal demand patterns. The unit costs associated with these projects are generally higher than those of projects that serve year-round demands, since the project facilities must be sized to accommodate seasonal peaking. Projects that serve mostly irrigation demands also tend to have less stable revenue bases because irrigation demands are heavily influenced by hydrologic conditions.

Recycled water is typically stored in storage tanks and ponds. Availability of seasonal and operational storage can help ensure a continuous demand and production of recycled water throughout the year, thus making projects more cost-effective. To be economically feasible, a project's benefits must offset or exceed its associated costs. Project benefits can take the form of (1) revenues from the sale of recycled water; (2) increased supply reliability; (3) increased control over the cost of future water supplies; and (4) avoided water and wastewater treatment, storage, and conveyance costs. Agencies developing recycled water projects must be able to quantify these benefits to determine the economic feasibility of a project. In addition, financial incentives and grant funding from federal and state agencies are critical to offsetting project costs and project implementation.

Regulatory

Two state agencies have primary responsibility for regulating the application and use of recycled water: the SWRCB DDW and the California Regional Water Quality Control Boards (Water Boards). As of July 1, 2014, the administration of the Drinking Water Program transferred from the California Department of Public Health (CDPH) to the SWRCB. That reorganization specifically created the new DDW. This transfer of responsibility aligned the state's drinking water and water quality programs in an integrated organizational structure that positioned the state to both protect water quality and the public health as related to water quality, while meeting current needs and future demands on water supplies. Planning and implementing water recycling projects entails numerous interactions with these regulatory agencies prior to project approval.

DDW is responsible for establishing statewide criteria for recycled water uses in Title 22 of the California Administrative Code. Under Title 22, the standards are established for each general type of use based on the potential for human contact with recycled water. The highest degree of standards for recycled water is for unrestricted body contact.

The San Diego Water Board is charged with issuing permits and enforcing requirements for the application and use of recycled water for each recycled operation, which ensures compliance with basin plan objectives and incorporates recommendations from DDW. As part of the permit application process, applicants must demonstrate that the proposed recycled water operation will meet the ground and surface water quality objectives in the basin management plan, and will comply with Title 22 requirements. With the consent of the recycled water supplier, the San Diego Water Board and DDW may delegate review of individual non-potable use sites to the County of San Diego Department of Environmental Health (DEH).

Coordination between the regulatory agencies responsible for monitoring development of recycled water is important, along with the development of a reasonable and consistent application of regulations. Project proponents need to work closely and cooperatively with regulatory agencies in their efforts to satisfy the regulations and still be able to develop much needed, cost-effective water recycling projects. To address regulatory gaps, the Water Authority and its member agencies met with local regulators in 2012 to tackle some of these regulatory concerns. This resulted in the drafting and execution of Consent Agreements between the DEH (with consent from DDW) and the member agencies that helped to target and focus limited regulatory staff resources to new sites and higher risk, complicated recycled water sites. Ongoing oversight of recycled water sites deemed low risk is now handled internally by experienced, water agency staff. Cost savings and expedited recycled water hook-ups have resulted.

More recently, Water Authority staff provided direct technical assistance to local agencies by coordinating ad-hoc committee meetings and drafting technical documents to assist agencies to expedite the approval and installation of hauled recycled water fill stations and use of hauled recycled water for the following recycled water uses:

1. Street sweeping and cleaning of sidewalks and outdoor work areas
2. Dust control, soil compaction, and construction
3. Sewer flushing
4. Pressure testing of newly constructed tertiary recycled water or sewer force main pipelines and gas pipelines
5. Use of recycled water for irrigation of commercial and residential landscapes, crops, and nursery stock
6. Fire protection

Acting regionally has simplified and expedited local agencies' efforts to offer their customers the option to use recycled water for these approved uses. This, in turn, has helped reduce demand on potable water systems.

Institutional

The primary institutional issue related to the development of water recycling in San Diego County is interagency coordination, such as when the wastewater agency that produces the recycled water is not the water purveyor within the reuse area. At those times, effective communication and cooperation between both agencies regarding the distribution of recycled water and providing service to the water customer are vital and should begin early in the planning process.

These institutional arrangements require contracts and/or agreements between the parties and/or agencies involved, the terms of which must be established on a case-by-case basis. The agreements usually define the reporting and compliance responsibilities, the amount of recycled water deliveries, water pricing, and a financing plan that identifies which agency will receive the financial incentives. Many local entities in the San Diego region have responsibilities to provide both water and wastewater services. Where the water and wastewater agencies are not the same, close collaboration takes place for planning, permitting and operating recycled water facilities. These close relationships have helped to advance recycled water in the San Diego region.

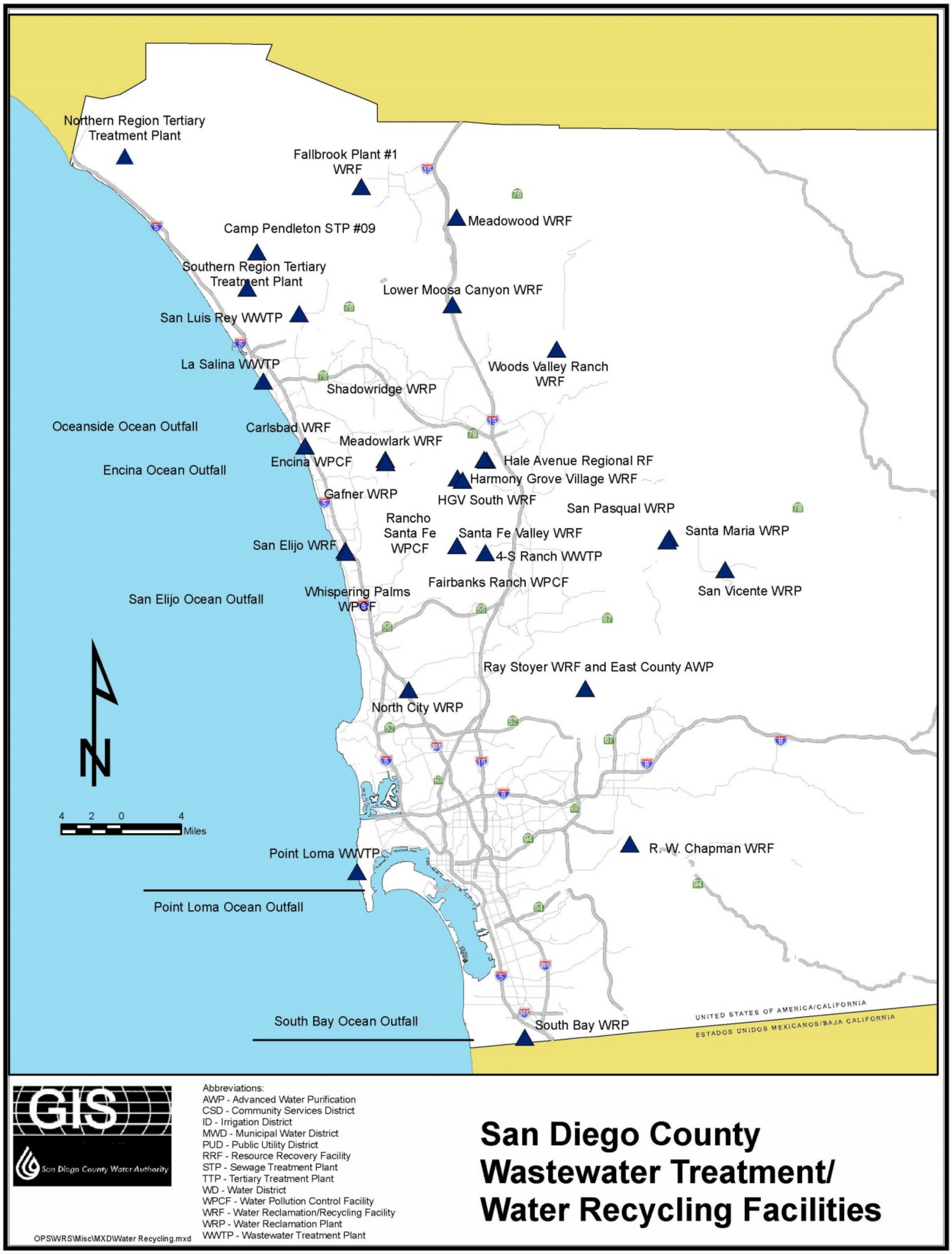
Public Acceptance

Without public acceptance, siting, financing, constructing, and operating a water-recycling project becomes increasingly difficult. For many in the public, a general sense of water quality and safety concerns exists due to a lack of understanding regarding the water recycling treatment process. The most successful means to obtaining public acceptance is through education and involvement. Recent focus group findings indicate that the public is now more accepting of the safety and beneficial use of recycled water for non-potable uses, particularly during drought events.

5.4.2 Wastewater Generation, Collection, Treatment, and Disposal

Approximately 200 MGD of wastewater is currently generated, collected, treated, and disposed of within the Water Authority’s service area and provides significant potential for recycled water use. Most of the large wastewater treatment plants are located along the coast for easy and convenient access to an ocean outfall. These plants serve most of the San Diego region’s highly urbanized areas. Figure 5-3 identifies the location of the wastewater treatment plants and the associated outfall systems. The coastal location of the plants is not always conducive to development of recycled water. Most of the market for recycled water is located at higher elevations, making distribution systems costly. However, recycled water costs could be offset by possible savings on wastewater treatment costs where those savings are available. Table F-3, **Appendix F** shows a detailed list of the wastewater treatment plants within the county, their capacities at various levels of treatment, and the type of disposal. In addition, according to the County of San Diego, approximately 10 to 15 MGD of wastewater within the Water Authority’s service area is generated and disposed of through private systems, such as septic tanks.

Figure 5-3
Wastewater Treatment and Water Recycling Facilities



5.4.3 Encouraging Recycled Water Development

The Act requires agencies to describe in their plan the actions, including financial incentives, that agencies may take to encourage the use of recycled water. Table 5-4 summarizes the existing funding programs used by the Water Authority's member agencies. Water and wastewater agencies develop some of the programs, while others are developed or funded by other water providers and agencies, such as the Water Authority, Metropolitan, and state and federal agencies. In addition to helping with funding, regional coordination on planning and regulatory issues can also reduce costs associated with development of recycled water.

Table 5-4. Programs to Encourage Recycled Water Use

Incentive Programs Local Water Supply Development (Water Authority – existing executed agreements) Local Resources Program (Metropolitan – existing executed agreements) On-site Retrofit Program provides financial incentives directly to public or private property owners to convert potable water irrigation or industrial water systems to recycled water service. (Metropolitan)
Grants Title XVI Funding Program (U.S. Bureau of Reclamation) Recycled Water Retrofit Assistance Program provides grant funding assistance for site retrofits and construction costs to increase recycled water use. (administered by Water Authority, funded through Proposition 50 grant funding, State of California) Proposition 84 Planning Grants and Implementation (State of California)
Low Interest Loans Clean Water State Revolving Fund Program (State of California)
Long-Term Contracts to Ensure Price and Reliability
Funding Assistance to State Water Resources Control Board to fund staff position(s) to expedite water recycling projects (Water Authority)
Regional Planning and Regulatory Assistance Regional coordination with member agencies and regulatory agencies such as the San Diego Regional Board, Division of Drinking Water, and the San Diego County Department of Environmental Health on recycled water issues Initiate, review, and comment on statewide regulatory developments and legislation to support local projects Preparation of guidelines and Engineering reports in conjunction with member agencies, such as Recycled Water Fill Stations

Funding Programs

Another important component of a successful recycling project is securing diversified funding and establishing funding partnerships. The Water Authority has focused on providing and facilitating the acquisition of outside funding for water recycling projects.

Financial assistance programs that have been utilized by San Diego County agencies include the Water Authority's Local Water Supply Development Program, Metropolitan's Local Resources Program, the U.S. Bureau of Reclamation Title XVI Grant Program, the SWRCB low-interest loan programs and the IRWM Plan Grant Program. Together, these programs offer funding assistance for all project phases, from initial planning and design, to construction and operation. Financial assistance programs administered by the Water Authority and Metropolitan have provided $7.7 million to San Diego County agencies during fiscal year 2015.

Local Water Supply Development Program

The Water Authority administers the Local Water Supply Development (LWSD) Program (formerly referred to as the Recycled Water Development Fund Program initially adopted by the Board in April 1991), which is designed to ensure the financial feasibility of local water recycling projects during their initial years of operation. To date, the Water Authority has entered into LWSD agreements with 11 water and wastewater agencies for a combined project yield of over 30,000 AF/YR. Over $40 million in Water Authority incentive funding has been awarded to program participants. In fiscal year 2015, the Water Authority provided local agencies with $3.7 million in LWSD incentives for agencies with existing executed agreements.

The Reclamation Wastewater and Groundwater Study and Facilities Act – Title XVI

Since 1995, the Title XVI Grant Program has been a significant source of funding for San Diego area water recycling projects. Title XVI of PL 102-575, the Reclamation Wastewater and Groundwater Study and Facilities Act, authorized the federal government to fund up to 25 percent of the capital cost of authorized recycling projects, including the San Diego Area Water Reclamation Program, an inter-connected system of recycling projects serving the Metropolitan Sewage System service area. PL 104-266, the Reclamation Recycling and Water Conservation Act of 1996, authorized two additional projects in northern San Diego County: the North San Diego County Area Water Recycling Project and the Mission Basin Brackish Groundwater Desalting Demonstration Project. The North San Diego County project received its final federal funding in 2008 when it reached its maximum federal funding limit of $20 million. The City of Oceanside’s Mission Basin project was also completed and received final funding totaling $3,484,000. To date, San Diego agencies have been authorized to receive more than $110.8 million under the Title XVI grant program. The funding mechanism for the San Diego area projects (and all other authorized Title XVI projects) was changed from direct appropriations to a competitive process that requires applications to be submitted in response to an annual Funding Opportunity Announcement (FOA). In June 2016, Sweetwater Authority was successful for the third time in obtaining Title XVI grant funding for their Richard A. Reynolds Groundwater Desalination Facility expansion project. Under the San Diego Area Water Reclamation Program, Sweetwater Authority was awarded $3.7 million in Title XVI grant funding for their expansion project; the City of San Diego was awarded $5 million for their Pure Water San Diego Program; and Padre Dam MWD was awarded $4.5 million for their Water Recycling Facilities – Phase 1 Project Expansion.

Clean Water State Revolving Fund/Water Recycling Grants

The SWRCB, through the Division of Financial Assistance, offers low interest financing agreements for water quality projects and water reclamation facilities. For fiscal years 2014 and 2015, the SWRCB made 33 binding commitments totaling over $789 million in low cost financing to eligible projects. The Clean Water State Revolving Fund offers agencies a below-market interest rate that can result in substantial savings on debt service. Approximately $69 million was appropriated to the SWRCB in fiscal year 2016 for funding water recycling projects. An example of funding awarded to one of the Water Authority’s member agencies is a $29.5 million funding commitment to the Carlsbad MWD for advanced treatment, storage, and recycled water distribution costs. Additional construction funding can be obtained through Water Recycling Grants that provide up to 35 percent of actual eligible construction costs incurred up to a maximum of $15 million, including construction allowances. Planning grants of up to $75,000 maximum are also provided for eligible facilities planning/feasibility study costs.

Integrated Regional Water Management Plan Grant Funding: Propositions 50 and 84

In 2007, the San Diego IRWM program submitted a grant proposal to DWR for Proposition 50 grant funds and was awarded $25 million in grant funding. **Section 8** describes the IRWM program in more detail. Operation of the Recycled Water Retrofit Assistance Program, managed and administered by Water Authority staff on behalf of its member agencies, continues to provide Proposition 50 grant funding to the Water Authority's member agencies and their customers. Project grant funding facilitated the retrofitting of user sites to receive recycled water and provided direct funding to water and wastewater agencies to make the required alterations and distribution system expansions to bring recycled water to their respective customer base.

In 2011, the San Diego IRWM program was awarded $7.9 million in Proposition 84 Round 1 grant funds. One of the projects funded through this source was the Phase I North San Diego County Regional Recycled Water Project (NSDCRRWP). This project is an effort by North San Diego County water and wastewater agencies to regionalize recycled water systems by identifying new agency interconnections, seasonal storage opportunities, and indirect potable water use that would maximize supplies, reduce wastewater discharges to the ocean, reduce energy consumption due to diminished delivery of imported water, and allow recycled water to play an even more significant role in meeting the region's future water needs. This project involved the support of many partners, including the Olivenhain MWD, Carlsbad MWD, Vallecitos WD, Santa Fe ID, City of Oceanside, Leucadia WD, City of Vista/Buena Sanitation District, San Elijo Joint Powers Authority, City of Escondido, and Rincon del Diablo MWD.

In 2013, the San Diego IRWM program was awarded approximately $10 million in grant funds made available through Proposition 84 Round 2. One of the selected projects helped to implement the 10 priority sub-projects identified in Phase I of the NSDCRRWP. The Phase II NSDCRRWP helped to increase connectivity between recycled water facilities in north San Diego County. This effort increased the use of recycled water by allowing it to be distributed across the North County region, and produced an estimated 6,790 AF/YR of recycled water. Project benefits included reducing imported water dependency, reducing discharge of recycled water to the ocean, reducing energy consumption from pumping imported water, and providing more recycled water for future water needs. The agencies involved with this effort were the Leucadia Wastewater District, Vallecitos WD, Vista ID, Rincon del Diablo MWD, Olivenhain MWD, Santa Fe ID, Carlsbad MWD, the City of Escondido, the City of Oceanside, and the San Elijo Joint Powers Authority. Grant funding totals are listed in Table 5.4.1.

Optimizing the Use of Recycled Water – Regional Coordination

In support of the SWRCB call for salinity and nutrient planning, the Water Authority, in cooperation with the Southern California Salinity Coalition (SCSC), worked in partnership with the San Diego Water Board staff to develop guidelines for the development of salt and nutrient management plans. The SWRCB Recycled Water Policy (Recycled Water Policy) encouraged a stakeholder-driven process for the development of plans for the management of salt and nutrients on a basin-wide basis, as opposed to an individual discharge permit level. The San Diego region was unique in that the planning process encompassed 17 fairly small groundwater basins with varying levels of use and variable water quality. Consistent with the Recycled Water Policy, the SCSC and the Water Authority worked with local stakeholders and San Diego Water Board staff to develop agreed-upon guidelines for development of salt and nutrient management plans within the region.

Table 5.4.1. Recycled Water Grant Sources

	Lead Agency	**Grant Award**
Proposition 50		
Ray Stoyer Water Recycling Facility Demo. Plant for AWT	Padre Dam MWD	$3,000,000
Recycled Water Retrofit Assistance Program	SDCWA	$800,000
Recycled Water Distribution System Expansion	City of San Diego	$4,765,146
Proposition 84 Round 1		
North San Diego County Regional Recycled Water Project	Olivenhain MWD	$1,455,000
North San Diego County Demineralization Project	San Elijo JPA	$1,018,500
Proposition 84 Round 2		
No. S. D. County Regional Recycled Water Project Phase II	Olivenhain MWD	$3,452,000
Failsafe Potable Reuse at the Advanced Water Purification Facility	WateReuse Research Foundation	$2,113,000
Proposition 84 Drought Round		
Fallbrook Plant Nurseries Recycled Water System Expansion	Fallbrook PUD	$772,000
Carlsbad Recycled Water Plant and Distribution System	Carlsbad MWD	$4,000,000
Proposition 84 Final Round		
Padre Dam AWT Phase I Expansion	Padre Dam MWD	$6,000,000
Safari Park Drought Response and Outreach	Zoological Society of San Diego	$2,900,000
Integrated Water Resource Solutions for the Carlsbad Watershed	San Elijo JPA	$2,500,000
Escondido AWT for Agriculture	City of Escondido	$2,000,000
UC San Diego Water Conservation and Watershed Protection Project	UC San Diego	$1,435,000
	TOTAL	**$36,210,646**

AWT = advanced water treatment; ID = Irrigation District; JPA = Joint Powers Authority;
MWD = Municipal Water District; PUD = Public Utility District

The guidelines established priorities and recommended levels of effort for the plans depending on the size and importance of each basin within the region. Other key components of the guidelines were the recommended technical approaches for completing the salt and nutrient management plans and suggested strategies for managing salts. These guidelines were supported by both the stakeholders and the Water Board staff. The final guidelines were endorsed by the San Diego Water Board through a resolution adopted at their November 2010 board meeting. The agreement between the Water Board and local stakeholders provided regulatory certainty for stakeholders and helped expedite the development of these plans within the region. Also with support from the San Diego Water Board, IRWM grant funding was secured to help fund the development of five local salt and nutrient management plans. The following water agencies were awarded Proposition 84 grant funding and developed salt and nutrient management plans for the following basins:

- City of San Diego for the Hodges/San Pasqual Basin
- Padre Dam MWD for the Santee Basin
- Rincon del Diablo MWD for the Escondido Basin
- Fallbrook PUD for the Middle Santa Margarita Basin
- Ramona MWD for the San Vicente/Gower Basin

Of the basins listed above, three fell under the higher-priority Tier A basin category as defined in the Salt and Nutrient Management Plan Guidelines. One fell under Tier B, and another was listed as a Tier C basin. The salt and nutrient management plans were completed and submitted to the State of California in October 2013. The implementation of these plans will improve overall water quality and use of groundwater resources within the San Diego region.

5.4.4 Projected Recycled Water Use

The Water Authority worked closely with its member agencies to determine the projected yield from existing and planned recycled water projects. Table 5-5 shows the estimated annual yield from the projects in five-year increments based on the implementation schedules provided by the member agencies and the likelihood of development. These projected supply yields will be included in the reliability analysis found in **Section 9**, "Water Supply Reliability." Table F-4, **Appendix F** contains a detailed list of the projects and projected supplies.

Table 5-5. Projected Recycled Water Use (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
29,095	40,459	43,674	45,758	46,118	46,858

The Water Authority's 2010 Plan projected a verifiable water yield of 38,660 AF/YR in the year 2015. As shown in Table 5-5 above, the projected normal year yield for 2015 is 29,095 AF/YR. The increase in projected recycled water use shown in Table 5-5 in 2020 and beyond is primarily from the expansion of existing facilities.

For example, the City of Oceanside is in the process of expanding their current recycled water system with a tertiary treatment capacity expansion of 0.8 MGD at the San Luis Rey Water Reclamation Facility (SLRWRF) in addition to the construction of a 1.5-MGD tertiary treatment train, existing pump station upgrades, construction of a 1-million-gallon recycled water reservoir, and construction of over 4,500 linear feet of recycled water pipeline to serve approximately 3,500 AF/YR of recycled water demand. Another San Diego North County agency, the Carlsbad MWD, will be expanding its water recycling facility's capacity to 7 MGD from its current 4 MGD, a 75 percent capacity increase. The expansion project includes adding 18 miles of new pipe to the existing recycled water distribution system for irrigation and other non-drinking purposes, and building a new 1.5-million-gallon reservoir for recycled water storage. It is projected that, by 2020, one-third of the City of Carlsbad's total water supplies will be recycled water. Recycled water development helps relieve pressure on the region's potable water supplies by providing a drought-proof, locally controlled water supply source.

Further, the City of Escondido's Advanced Water Treatment for Agriculture project, funded under Proposition 84, will construct a new microfiltration/reverse osmosis (MFRO) advanced treatment facility with a total production capacity of 2.0 MGD. Water treated at the MFRO facility will be blended with tertiary treated water from an existing recycled water plant and distributed to agricultural customers in the northern and eastern areas of Escondido. The City of Escondido has partnered with Escondido Growers for Agricultural Preservation, Vista ID, City of San Diego, and Rincon del Diablo MWD to implement this project. This project supports the San Diego region's goals of supply reliability and sustainability, and protects water quality while supporting local agriculture and the economy.

Additional Planned Projects – Recycled Water

Maximizing recycled water development is critical to diversifying the region's water supply portfolio. Beyond the verifiable project yields included in Table 5-5 above, member agencies have also identified additional planned projects. Aside from the Carlsbad MWD and City of Escondido projects described above, Padre Dam MWD, MCB Camp Pendleton, and Santa Fe ID have identified additional planned projects that are projected to yield an additional 2,468 AF/YR by 2035. These yields are considered additional planned supplies and are utilized in **Section 10**, "Scenario Planning – Managing an Uncertain Future." These additional planned projects, as well as the conceptual projects provided by the member agencies, are also included in Table F-4, **Appendix F**.

5.5 Potable Reuse

5.5.1 Background and Description

Recycled water can be further treated for potable reuse through the use of multi-barrier advanced purification treatment processes, which may include technologies such as reverse osmosis and advanced oxidation. The advanced treated water may be passed through a natural barrier, such as a groundwater basin or surface water reservoir, and provided with additional treatment to render wastewater suitable for potable purposes. Projects that include a natural barrier are considered indirect potable reuse. Projects that deliver advanced treated water directly to a raw or treated water pipeline are considered direct potable reuse.

Several Water Authority member agencies are completing studies pertaining to potable reuse in San Diego County through groundwater recharge or reservoir augmentation. Two agencies, the City of San Diego and the Padre Dam MWD, have implemented pilot projects to determine potable reuse project viability. Detailed member agency project information can be found in **Section 5.5.3**.

Currently, numerous drivers make potable reuse an attractive option not only for the San Diego region, but for the state of California as well. Climate change is creating unpredictable weather patterns, which may result in recurring droughts and cause scarcity of water supply. Potable reuse is a renewable resource, which can provide a cost-effective and sustainable, high-quality water supply. Being able to maximize the use of all recycled water can reduce the impacts and costs associated with discharging waste to the ocean. De facto or incidental reuse has taken place for many years as wastes are discharged to rivers and collected and treated for potable water supplies downstream. Clean Water Act standards placed on waste discharges and treatment requirements for water suppliers through the Safe Drinking Water Act have been designed to avoid waterborne disease outbreaks and to ensure a safe and reliable potable water supply for customers. These requirements protect the public from waterborne disease outbreaks and health impacts from chemical constituents and emerging compounds. The longest standing groundwater recharge project in California has been in existence since 1962. Recycled water may be percolated through into the groundwater, or highly treated water can be directly injected into the groundwater basin.

Locally, potable reuse was first considered in the early and mid-1990s. The Water Authority and the City of San Diego proposed a potable reuse project that would deliver advanced treated water from the North City Water Reclamation Plant and convey it to San Vicente Reservoir where it would blend with imported and local surface water prior to being treated at a surface water treatment plant. The Water Authority created a citizens advisory group to advise the Water Authority on the suitability of potable reuse as a water supply for San Diego County. In 1994, the Repurified Water Review Committee recommended that potable reuse be pursued as part of a diversified mix of water supplies. The Water Authority sponsored the work of an Independent Advisory Panel of experts for indirect potable reuse and, along with the City of San Diego, conducted detailed studies that were submitted to state health authorities to determine regulatory guidelines for an indirect potable reuse project blending advanced treated recycled water in San Vicente Reservoir. The CDPH approved this concept of reservoir augmentation in 1996, but no reservoir augmentation project has been built in San Diego or other parts of California. In 1998, the Water Authority co-funded a report by the National Research Council on “Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water,” which concluded that planned indirect potable reuse was a viable option. In 2006, the City of San Diego again began planning for a potable reuse project and, in 2012, CDPH and the San Diego Water Board conceptually approved the City of San Diego’s proposed indirect potable reuse project for surface water augmentation through San Vicente Reservoir.

The SWRCB DDW, formerly CDPH, has the authority to permit direct potable reuse projects, but no projects have been proposed or approved in California. Two direct potable reuse projects have been approved in Texas in response to extreme drought conditions and were placed into operation. The many years of advanced research concerning potable reuse in California and elsewhere have proven that reliable technology is now available to allow agencies to consider direct potable reuse as a potentially viable and acceptable treatment option. A direct potable reuse treatment scheme, if approved by DDW, will permit water suppliers in San Diego to maximize the use of existing infrastructure and produce a new, safe, and viable potable water supply for the San Diego region. As water supplies become scarcer, particularly in the arid west, more such projects will likely be proposed.

Economic and Financial Considerations

Potable reuse projects are being considered when they are deemed more cost-effective and feasible than non-potable recycled water projects. Potable reuse projects have an advantage as they do not require construction of a dual distribution system, and once treatment and conveyance facilities have been constructed, the full amount of water produced can be immediately available to augment local water supplies. Costs for potable reuse are in range with other locally developed supplies. An added cost advantage may result as a potable reuse project may also contribute to meeting waste discharge requirements. Cost of conveyance to move advanced treated water to a local reservoir can be a significant component of a project cost. If the advanced treated water can be delivered to a reservoir closer to the point of production, it can significantly reduce project costs. Regulatory requirements on which reservoirs can be used, and whether direct potable reuse can be permitted by the regulatory agencies, will have a significant impact on overall project costs.

Institutional

The institutional arrangements between wastewater agencies and water suppliers for potable reuse projects in the region will be similar to those for recycled water, as described in **Section 5.4.1**. An additional factor to consider will be the ongoing coordination between operators of advanced treatment facilities and the operators of local surface water treatment facilities for projects with a downstream surface water treatment plant. Increased coordination will be required to ensure a safe reliable drinking water supply.

Public Acceptance

Like recycled water, public acceptance for potable reuse projects is critical for the success of the project. Potable reuse projects are under a high level of public scrutiny to ensure the safety of the drinking water supply. While the technology for potable reuse projects has been proven, these projects must garner public acceptance. In the San Diego region, project proponents have done a significant level of public outreach for potable reuse projects. Tours of demonstration facilities, such as those constructed by the City of San Diego and Padre Dam MWD, have proven highly successful in educating the public on the safety of the product water. Polls in the San Diego region have demonstrated increasing public acceptance of potable reuse as a safe water supply. The Water Authority has worked with the member agencies through the Potable Reuse Coordination Committee to coordinate and develop common language and messaging to be used throughout the region. This ad-hoc committee, consisting of regional agencies interested in developing and promoting potable reuse projects, meets on an as needed basis to engage and keep the member agencies informed on the latest potable reuse regulatory, legislative, and stakeholder outreach efforts at the local and state levels.

Legislative and Regulatory

Legislative Requirements to Develop Potable Reuse Regulations

Potable reuse projects require a high level of regulatory scrutiny and are currently approved on a case-by-case basis. Historically, an expert panel has been convened to look at project specifics and provide recommendations to the project proponent and DDW. While all projects will build on the knowledge and efforts obtained through past indirect potable reuse projects, local reservoir augmentation projects are anticipated as the first to be approved in California. The California Legislature passed SB 918 in 2010 and SB 322 in 2013, legislation sponsored and actively supported by the Water Authority, which expedited specific regulations for indirect potable reuse surface water augmentation. This legislation also sought acknowledgement by the State of California that direct potable reuse was a viable water supply option. Specifically, the bills directed the CDPH to:

1. Adopt regulations for indirect potable reuse through groundwater recharge by December 31, 2013 (later moved to July 1, 2014).
2. Form an expert panel to provide recommendations to DDW on the surface water augmentation regulations and feasibility of direct potable reuse.
3. Form a public advisory group representing diverse water supply, environmental, and business interests to provide input to the expert panel on issues related to direct potable reuse, with all of the public advisory group meetings to be open and transparent public meetings.
4. Adopt regulations for surface water (reservoir) augmentation by December 31, 2016.

5. Report to the legislature by December 31, 2016, on the ability to adopt regulations for direct potable reuse.

Development of Potable Reuse Regulations

In June 2014, CDPH adopted regulatory criteria for approval of groundwater recharge projects. SB 322 was critical in helping move the evaluation of direct potable reuse forward in a timely manner in California.

In February 2014, CDPH formed the Public Advisory Group, which has met regularly. The City of San Diego and Padre Dam MWD are represented on the Public Advisory Group as well as other San Diego interests. In its first meeting, the Public Advisory Group provided recommendations to DDW on the formation of an Expert Panel to provide recommendations on technical issues related to surface water augmentation criteria and the feasibility of adopting regulations for potable reuse. The Expert Panel consists of 12 experts in the fields of toxicology, wastewater treatment, drinking water supplies treatment, drinking water standards, epidemiology, limnology, microbiology, and chemistry. The Public Advisory Group has weighed in on developing common terminology to describe potable reuse and the need and approach for having certified and qualified operators for advanced treatment facilities. The Advisory Group has also expressed interest in economic impacts and viability of implementing potable reuse as well as public health concerns, including emerging contaminants, and will raise issues of public interest that may need to be addressed by the Expert Panel. The Advisory Group has also discussed concerns on how DDW may delineate between surface water augmentation and direct potable reuse. As the State of California develops criteria for surface water augmentation, projects using multi-purpose and smaller reservoirs could be considered direct potable reuse.

The Expert Panel has also been meeting regularly since 2014. The Expert Panel has considered the proposed research agenda of the WateReuse Research Foundation and provided recommendations to DDW regarding possible research gaps. DDW presented for consideration a proposed framework for surface water augmentation, the focus of which will be on multiple treatment barriers for removal of pathogens and chemical constituents and approaches for ensuring the reliable monitoring and operation of the treatment processes. To minimize the need for a case-by-case review of projects, the surface water augmentation criteria should provide for flexibility in the range of reservoir size and configuration that may be acceptable for surface water augmentation projects. The Expert Panel will also develop a white paper with a list of issues as it relates to direct potable reuse. Concepts regarding direct potable reuse are similar to the framework for surface water augmentation with an increased emphasis on reliability, including monitoring, operator qualifications, and response to treatment failures.

Permitting of Potable Reuse Projects

Potable reuse projects require close collaboration between the San Diego Water Board and DDW. Local groundwater recharge projects are permitted by the San Diego Water Board under reclamation criteria or waste discharge requirements. The Water Board will incorporate recommendations from DDW to ensure the protection of public health. Groundwater projects will conform to the groundwater recharge criteria.

Local surface water augmentation projects will be permitted by the San Diego Water Board for the discharge into local reservoirs. For any discharge to waters of the United States, a discharge permit meeting federal Clean Water Act requirements is required. The new advanced treated supply will also be permitted by DDW as a drinking water supply under the Safe Drinking Water Act. While no direct potable reuse projects have been permitted in California, it is expected that these projects, if delivered directly to a piped system, would be permitted by DDW as a drinking water supply. Projects not falling within an existing set of regulations may be reviewed by DDW and the San Diego Water Board on a case-by-case basis. Projects determined protective of public health and the environment would be issued the appropriate permits.

Importance of Science-Based Regulations

The primary obligation of all drinking water suppliers is to protect public health. Regulations and transparency of information ensure that drinking water is safe and that information is available to the public to instill confidence that the public's health is protected. Any potable reuse project will be required to achieve the same high standard of public health protection as any other drinking water supply. Because of the high standard involved in protecting public health and the extensive use of treatment technology to meet drinking water standards for potable reuse, science-based research is essential to the regulatory development process and to instilling public confidence. The Water Authority has been active in promoting the importance of research in regulation development.

In 2012, the WateReuse Association and the WateReuse Research Foundation launched a potable reuse initiative and raised over $6 million to fund the research necessary to overcome any regulatory, scientific, technical and public perception barriers to potable reuse. The San Diego region has been a strong supporter of the direct potable reuse initiative. The Water Authority and several member agencies have directly contributed to this effort. An additional $2.113 million through the San Diego IRWM Program and DWR will fund the WateReuse Research Foundation's "Failsafe Potable Reuse at the Advanced Water Purification Facility" project. The Water Authority supports this effort through its management of the San Diego IRWM grant program. WateReuse Research Foundation project research will be an important part of the State of California's development of indirect and potentially direct potable reuse regulations, and will provide objective, science-based information for the public to understand the levels of protection and safety that contribute to developing this important new water supply.

Funding of Potable Reuse Projects

The primary sources of outside funding available for potable reuse projects include Title XVI, Clean Water State Revolving Funds, and IRWM. These funding sources are described in more detail in **Section 5.4.3**. Propositions 50 and 84 have already provided support for potable reuse through the San Diego IRWM by funding the City of San Diego's water purification demonstration project, Padre Dam MWD's potable reuse demonstration project, and the WateReuse Failsafe Potable Reuse Project. These projects provided the research necessary to move potable reuse forward in the San Diego region and in California. Proposition 84 will also provide funding for the Padre Dam Phase IA recycled water treatment plant expansion, which will increase supply available for potable reuse projects.

5.5.2 Water Authority Activities in Support of Potable Reuse

The Water Authority has been a staunch supporter and an active participant in advancing the goal of implementing potable reuse in San Diego County for over 20 years. The more recent focus of the Water Authority's efforts to advance potable reuse has been through advocacy for legislation and regulations that move projects forward in the near term. Water Authority staff has been prominently involved through participation in the WateReuse Association Potable Reuse Task Force and the WateReuse Legislative and Regulatory Committee, and though other regulatory advocacy venues, including attending and providing comments at Expert Panel meetings by advocating and supporting member agency interests.

The Water Authority has also been able to track trends in public acceptance of recycled water through its public opinion survey. This effort provides a foundation for member agency outreach and measures the effectiveness of those outreach efforts. In 2012, 71 percent of respondents believed that it was possible to further treat recycled water used for irrigation to make the water pure and safe for drinking. This was an increase over the 2011 survey findings where 66 percent of respondents felt that it is possible to further treat recycled water for drinking purposes. However, both the 2011 and 2012 survey results represent a substantial increase over the 2009 survey response where just 53 percent thought it was possible.

Water Authority staff has been supporting member agencies in three key areas: public outreach and messaging, engaging with regulatory agencies and the Expert Panel, and helping secure funding for local projects. While member agencies will lead the development of their own specific projects, the need continues for regional coordination and collaboration on potable reuse issues. Water Authority staff will continue to engage with member agencies and DDW to ensure that the regulatory framework developed by DDW and reviewed by the Expert Panel considers the wide range of approaches expected as part of member agency projects.

In addition, Water Authority staff has supported member agencies by actively engaging in public outreach in support of member agency projects. This support has included:

1. Coordinate with member agencies through the Joint Public Information Committee to develop common outreach messaging that will support potable reuse projects.
2. Coordinate with the member agencies through the Potable Reuse Coordination Committee.
3. Outreach to the general public to increase public acceptance of potable reuse through presentations, development of handout materials for public outreach events and use by the member agencies, and sharing of information through the Water Authority's website.
4. Communicate with regional, local, state, and federal elected officials on the importance of potable reuse for the San Diego region to gain support for potable reuse.
5. Communicate with SWRCB members and staff on the safety and importance of potable reuse.
6. Collaborate with other organizations that support potable reuse including WateReuse, the Water Reliability Coalition, and state and local environmental groups on common outreach to support potable reuse.
7. Advocate at the state and local level for reasonable regulations that will support the safe use of recycled water for local potable reuse projects.

5.5.3 Projected Supply through Potable Reuse

The Water Authority worked closely with its member agencies to determine the projected yield from existing and planned potable water reuse projects. Table 5-6 shows the estimated verifiable annual yield from the projects in five-year increments based on the implementation schedules provided by the member agencies and the likelihood of development. These projected supply yields will be included in the reliability analysis found in **Section 9**, "Water Supply Reliability." **Appendix F** Table F-5 contains a detailed list of the projects and projected supplies.

Table 5-6. Projected Potable Reuse Water Use (Normal Year – AF/YR)

2015	2020	2025	2030	2035	2040
0	3,300	3,300	3,300	3,300	3,300

The increase in projected potable reuse shown in Table 5-6 in 2025 and beyond is primarily from new, proposed facilities.

The City of Oceanside completed the investigative phase of their Indirect Potable Reuse Project to enhance water supply reliability. This will involve the recharging of the Mission Groundwater Basin using water treated at the SLRWRF. This project will utilize advanced treated recycled water for subsurface and surface replenishment supplied through the advanced water treatment facility. The Phase I Project includes the construction of a 3-MGD capacity AWT facility, three injection wells, and a separate conveyance pipeline to the injection wells, which will result in the production of 3,300 AF/YR to be used for groundwater injection. Phase II consists of adding 1,700 AF/YR of advanced treated water for surface spreading at two water basins. This will necessitate increasing the capacity of the AWT facility to accommodate this additional supply for a final capacity of 4.5 MGD, which will provide an ultimate yield of 3,300 AF/YR of groundwater recharge. Both Project Phases 1 and 2 will require the construction of monitoring wells. It is expected that the City of Oceanside's Indirect Potable Reuse Project will be operational in 2020.

Additional Planned Potable Reuse Projects

As part of the City of San Diego's effort to provide a local and sustainable water supply, the City of San Diego's Water Purification Demonstration Project (WPDP) examined the use of advanced water purification technology to provide a safe and reliable water supply, and determined if reservoir augmentation using this purified water was a feasible option for San Diego. The WPDP concluded in 2013. The information collected via various studies and the results of the WPDP determined that it was feasible for San Diego to use water purification technology.

Pure Water San Diego, the City's phased, multi-year program to produce purified water to supplement San Diego's drinking water supply, is scheduled to be operational by 2021. The long-term goal, producing 83 million gallons of purified water per day (one-third of San Diego's future drinking water supply), is scheduled for 2035. All phases of the City's Pure Water San Diego program are considered additional planned projects.

The East County Advanced Water Purification Program Planning Study was partially grant funded and addressed the elements of the Recycled Water Facilities Planning Report outline provided by the SWRCB. The study evaluated the potential for expanding Title 22 tertiary recycled water for irrigation and developing potable reuse within the study area that included the following four agencies: Padre Dam MWD, Helix WD, the County of San Diego, and the City of El Cajon. The objectives of the East County Regional Potable Reuse Program were as follows:

1. Increase the reliability of water supply by increasing the use of recycled water as a local water supply and decreasing reliance on imported water.

2. Minimize the financial impacts from the projected increase in wastewater treatment costs by Metropolitan.
3. Create a new, local, reliable and drought proof drinking water supply.
4. Produce 25 to 30 percent of East Count's drinking water supply.
5. Repurpose water treatment byproducts for beneficial use, including electricity generation and dust control.
6. Sustain East County's economy and quality of life.

Phases 1 and 2 of the East County Advanced Water Purification Program are considered additional planned projects. Potable reuse will require full advanced treatment in addition to conventional wastewater treatment by microfiltration, reverse osmosis, ultraviolet disinfection, and advanced oxidation process, which is similar to treatment provided in Orange County. Further treatment using free chlorine to produce advanced water treatment water is also planned. The addition of free chlorine provides supplemental log removal to meet DDW requirements that allow a reduction in the environmental buffer, meaning reduced travel time requirements. In March 2015, Padre Dam opened the Advanced Water Purification Demonstration Facility, which uses a four-step water purification process to treat recycled water using state-of-the-art technologies. Since its opening, this pilot facility has produced approximately 100,000 gallons of purified water each day for testing purposes to ensure it meets the public health objectives to earn approval from the SWRCB's DDW. The water purified at the facility is not currently being distributed as drinking water.

Conceptual Potable Reuse Projects

The East County Advanced Water Purification Program Planning Study described above also evaluated the feasibility to treat all wastewater generated by Padre Dam MWD, the County, and El Cajon using full advanced treatment at the proposed East County Advanced Water Purification Facility before being injected into the Santee Groundwater Basin or used to augment surface water at Lake Jennings. For surface water augmentation at Lake Jennings, AWT water would be blended with a mixture of imported surface water and local runoff in Lake Jennings before it is treated at Helix WD's R. M. Levy Water Treatment Plant. Effluent will be split between Helix WD and Padre Dam MWD with percentages to be determined in the future, should Helix WD decide to participate in the project beyond the current study's planning. This Phase 3 project is considered a conceptual project.

Additional conceptual projects include the City of Escondido, which is planning to expand its non-potable water recycling program to include additional landscaping and agricultural irrigation, and incorporation of a future indirect potable reuse element. Escondido is pursuing this dual path for water supply reliability and to avoid the cost of a future ocean outfall expansion associated with its discharge of secondary treated wastewater. The Escondido City Council has approved exploring this project alternative and has incorporated this approach into their long-range financial planning.

5.6 Member Agency Seawater Desalination

5.6.1 Carlsbad Desalination Plant

In June 2011, the Water Authority Board of Directors adopted guiding principles for the Water Authority to make available to its member agencies up to 49 percent of the Minimum Annual Demand Commitment (48,000 AF) and provide the opportunity for member agencies to enter into uniform contracts to make firm commitments to individually purchase from the Water Authority treated water in designated amounts that represent a portion of the Minimum Annual Demand Commitment. Vallecitos WD and Carlsbad MWD both entered into contracts with the Water Authority to purchase desalinated water. Beginning in July 2016, Vallecitos WD and Carlsbad MWD will purchase 3,500 and 2,500 AF/YR, respectively, for a full contract year, representing a total of 6,000 AF of member agency seawater desalination water supply annually.

5.6.2 Rosarito Beach Desalination Project, Otay Water District

The Otay Rosarito Beach Desalination Project is not considered a verifiable supply and is therefore not included in the reliability assessment in **Section 9**. The Otay WD project is considered an additional planned project and is presented in **Section 10** as a potential strategy to manage future uncertainty planning scenarios.

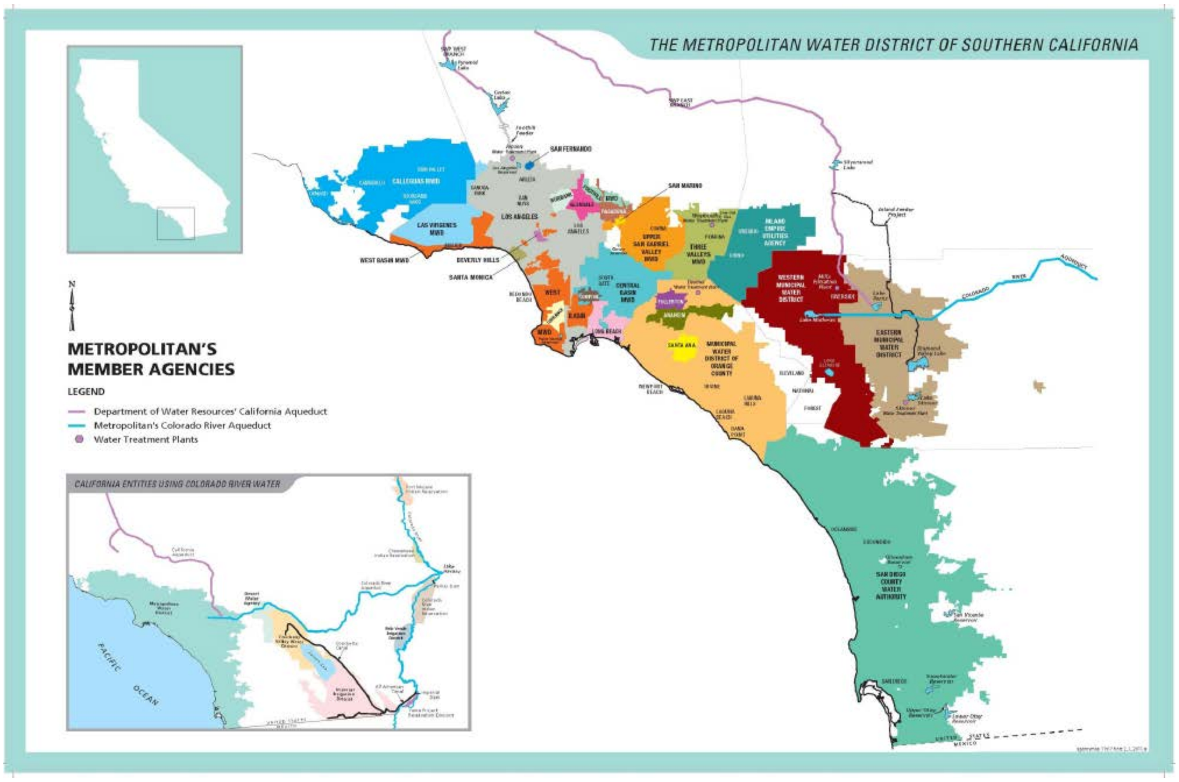
Plans are underway to develop a seawater desalination facility in Rosarito Beach by a private company, Consolidated Water Co. Ltd. This bi-national project would produce up to 100 MGD for potential distribution to the federal and/or state agencies serving the Rosarito and Tijuana areas, and to the Otay WD. The district has sought a presidential permit to build a cross-border pipeline to carry up to 50 MGD from Mexico into its service area, which is currently awaiting approval.

Section 6
Metropolitan Water District of Southern California

6.1 Description

The Water Authority's imported water sources include purchases from Metropolitan. Metropolitan was formed in 1928 to develop, store and distribute supplemental water in Southern California for domestic and municipal purposes. Metropolitan supplies water to approximately 19 million people in a service area that includes portions of Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego counties. The Metropolitan service area, shown in Figure 6-1, covers a 70-mile-wide strip of the Southern California coastal plain, extending from the city of Oxnard on the north to the Mexican border. Close to half of the water used in this 5,200-square-mile region is supplied by Metropolitan, and about 90 percent of its population receives at least some of its water from Metropolitan. The Water Authority, one of 26 Metropolitan member agencies, is historically the largest in terms of purchases, purchasing 360,018 AF, or about 21 percent, of all the water Metropolitan delivered in fiscal year 2015. The extent to which Metropolitan's member agencies rely upon Metropolitan supplies varies by the amount of local supplies available or each agency's own reliability goals. Water Authority demands on Metropolitan, provided by Metropolitan, can be found in **Appendix I**.

Figure 6-1
Metropolitan Service Area



6.1.1 Metropolitan Act Section 135 – Preferential Right to Water

Under Section 135 of the Metropolitan Act, each member agency has a preferential right to Metropolitan purchases. The Metropolitan Act stipulates that member agencies' preferential rights to Metropolitan water are proportional to their respective total payments to Metropolitan, "excepting purchase of water." Metropolitan calculates the preferential rights by including each agency's total historical payments to Metropolitan from property taxes, readiness-to-serve and capacity charges, and other minor miscellaneous revenue. Revenue resulting from the purchase of Metropolitan water is excluded, even though more than 80 percent of Metropolitan's revenues come from water sales.

Metropolitan member agencies' respective abilities to exercise preferential rights were confirmed in a lawsuit filed by the Water Authority in 2001. The court decisions made clear the preferential right of each member agency, including the Water Authority, to Metropolitan water.

The Water Authority filed lawsuits against Metropolitan, challenging its water rates set in 2010, 2012, 2014 and 2016. The Superior Court issued the final judgment in December 2015 confirming its prior favorable rulings for the Water Authority's 2010 and 2012 lawsuits. (The 2014 case was stayed pending the final outcome of the 2010 and 2012 cases, and the 2016 case has just recently been filed.) In the 2010 and 2012 cases, the Water Authority also challenged how Metropolitan calculates member agencies' preferential rights, specifically Metropolitan's exclusion of certain payments the Water Authority made that were unrelated to the purchase of Metropolitan water. The Superior Court also ruled in favor of the Water Authority, finding Metropolitan under-calculated the Water Authority's preferential right to Metropolitan water. The 2010 and 2012 cases have been appealed. At the time of this writing, the impact of the judge's decision to the Water Authority's preferential rights is not available.

While the cases are pending appeal, Metropolitan continues to calculate the preferential rights under its existing assumptions. Using these assumptions, the Water Authority had a preferential right to purchase 18.42 percent of Metropolitan's water as of June 30, 2015. In contrast, the Water Authority purchased about 21 percent of Metropolitan's available supply in fiscal year 2015.

In Metropolitan's now-final 2015 UWMP, Section 2.3, Metropolitan presents its supply capability at the regional level, rather than at the member agency level. The report stated that Metropolitan has supply capabilities that would be sufficient to meet expected demands under both the single driest year and the multiple dry-year hydrologies through 2040. The report lists Metropolitan's forecasted imported water supply capabilities under normal, single driest year and multiple dry-year hydrologies through 2040, which would provide the Water Authority with adequate supplemental imported supplies in normal years and a single dry year. In multiple dry years, under its projected preferential right formula, and assuming very conservative projections for Metropolitan dry-year supplies, the Water Authority could experience shortages as shown in **Section 9.3**.

6.2 Metropolitan's Water Supplies

Metropolitan obtains its water from two sources: the CRA, which it owns and operates, and the State Water Project, with which Metropolitan has a water supply contract through the State of California. Figure 6-2 shows these imported water supply sources, and they are described below. To meet emerging challenges from dry hydrologic conditions and regulatory restrictions that limit supplies from the State Water Project, Metropolitan's strategy also includes utilizing its storage programs to maximize available supplies in wet years for use in dry years.

Figure 6-2
Major Water Conveyance Facilities Serving San Diego County

6.2.1 Colorado River

Metropolitan was formed to import water from the Colorado River. During the 1930s, Metropolitan built the 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 the capacity to deliver up to 1.25 million AF/YR. Figure 6-2 shows the location of the aqueduct.

Reliability Issues

Before 1964, Metropolitan had a firm annual allocation of 1.212 million AF 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, its basic annual apportionment. Due to growth in demand from the other states and drought conditions, since 2003, Metropolitan's deliveries have been limited to its basic annual apportionment plus water resulting from unused apportionment water by other California holders of priorities 1 through 3, and transfer programs resulting from conservation with other senior water right holders.

Water availability from the Colorado River is governed by a system of priorities and water rights that has been established over many years. The Colorado River Lower Basin states (California, Arizona, and Nevada) have an annual apportionment of 7.5 million AF of water divided as follows: (1) California, 4.4 million AF; (2) Arizona, 2.8 million AF; and (3) Nevada, 300,000 AF. Under the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, California has senior water rights and faces no reductions under the first, second, or third shortage triggers. (Arizona and Nevada supplies are curtailed under all triggers.) Shortages in the Lower Basin are triggered by Lake Mead's elevation dropping to certain elevations, with first, second, and third triggers occurring at elevations of 1,075 feet, 1,050 feet, and 1,025 feet, respectively. The 1931 Seven Party Agreement established California's priorities for water among the state's contractors to use Colorado River water made available to California. The first four priorities total 4.4 million AF/YR. Metropolitan has priorities 4, 5(a), and 5(b) water listed in the Seven Party Agreement, but only priorities 1 through 4 of the Seven Party Agreement are within California's basic annual apportionment. Metropolitan's fourth priority of 550,000 AF is junior to that of the first three priorities, 3.85 million AF to California agricultural agencies. Water used to satisfy Metropolitan's priorities 5(a) and 5 (b) must come from unused allocations within California, Arizona, or Nevada, or from surpluses declared by the Secretary of the Interior.

Environmental Considerations

Several fish species and other wildlife species either directly or indirectly have the potential to affect Colorado River operations, thus changing power operations and the amount of water deliveries to the CRA. A number of species that are on "endangered" or "threatened" lists under the federal and/or California Endangered Species Acts (ESAs) are present in the area of the Lower Colorado River. To address this issue, a broad-based state/federal/tribal/private regional partnership, which includes water, hydroelectric power, and wildlife management agencies in Arizona, California, and Nevada, developed a multi-species conservation plan for the main stem of the Lower Colorado River (the Lower Colorado River Multi-Species Conservation Program [MSCP]). Developed between 1996 and launched in early-2005, this 50-year plan allows Metropolitan to obtain federal and state permits for any incidental take of protected species resulting from current and future water and power operations and diversions on the Colorado River. The MSCP also covers operations of federal dams and power plants on the Colorado River, and the change in point of diversion on the river for the Water Authority's conserved water transfer and canal lining projects.

Water Quality Considerations

Please see **Section 7**, "Water Quality," for information.

Current Supplies

Per the Seven Party Agreement, Metropolitan's Colorado River supply is 550,000 AF from its fourth priority within California's basic apportionment of 4.4 million AF. With the 2003 QSA and related agreements among the IID, the CVWD, State of California, Department of Interior, Metropolitan, and the Water Authority, 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 million AF basic annual apportionment of Colorado River water. Because Metropolitan continues to face dry hydrologic challenges coupled with increasing demands, Metropolitan has relied on its land fallowing, storage, and exchange programs, on the river to increase its Colorado River supplies. These programs include Metropolitan's Intentionally Created Surplus account in Lake Mead, exchange program with the Southern Nevada Water Authority, Palo Verde Irrigation District Land Fallowing Program, and IID/Metropolitan Conservation Program.

Quantification Settlement Agreement and Future Supplies

The Water Authority, together with CVWD, IID, and Metropolitan, entered into the QSA in October 2003. The QSA, which is in effect for 45 years (and up to 75 years if existing agreements are extended), resolved longstanding disputes regarding Colorado River water use among the agencies, and established a baseline water use for IID, CVWD, and Metropolitan. This permitted the implementation of a variety of water conservation and transfer agreements, including the Water Authority's transfer agreement with IID. The QSA also provides that CVWD and Metropolitan will put aside, for the term of the agreement, a dispute over beneficial use of water by IID; and that Metropolitan would forbear consumptive use of water to permit the Secretary of Interior to satisfy the uses of the non-encompassed water delivered to holders of present perfected rights. See **Section 4.2**, "Water Authority – IID Water Conservation and Transfer Agreement," for more information on the QSA.

Metropolitan's Tables 2-4, 2-5, and 2-6 in its recently adopted 2015 UWMP indicate that supply capabilities for current programs in Metropolitan's Colorado River Aqueduct under an average year (based on 1922–2012 hydrologies) and single dry year (repeat of 1977 hydrology) or multiple dry year (based on 1990–1992 hydrology) exceed 1.2 million AF. Metropolitan limits the Colorado River supply deliveries to 1.2 million AF to match its maximum Colorado River Aqueduct delivery capacity. These programs include water management programs and the Water Authority's IID transfers and conserved canal lining water conveyed by the aqueduct.

6.2.2 State Water Project

The State Water Project is owned by the State of California and is operated by DWR. Metropolitan has a take-or-pay supply contract with the State of California and is entitled to take about 48 percent of available State Water Project water through its Long-Term SWP Water Supply Contract (referred to as the Table A allocation). The project stretches for 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 Delta. The Delta is the largest estuary on the United States' west coast and is used for multiple purposes, including agriculture, recreation, and fishing, and provides the means by which to deliver water from Northern California to the south. 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 State Water Project's Harvey O. Banks Pumping Plant (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. State Water Project facilities provide drinking water to 23 million Californians and 755,000 acres of irrigated farmland. Figure 6-2 shows the California Aqueduct.

Reliability Issues

The reliability of State Water Project supplies is limited by the level of State Water Project supply development, pumping restrictions due to state and federal environmental regulations, and hydrology. When approved by the voters in the 1960s, the State Water Project was planned to deliver 4.2 million AF to 32 contracting agencies. Subsequent contract amendments reduced total contracted deliveries to 4.13 million AF and the number of contracting agencies to 29. Metropolitan's contracted entitlement is currently at 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 State Water Project 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 SWRCB to protect the San Francisco Bay/Sacramento–San Joaquin River Delta (Bay-Delta) have reduced the amount of water available for diversion. Environmental challenges to the State Water Project operations also resulted in the issuance of new biological opinions (BiOps), which led to pumping restrictions that further reduced State Water Project exports. At the same time, California's population and water demand continued to grow.

The Delta Vision process, established by then-Governor Schwarzenegger in 2006, aimed to identify long-term solutions to resolve the conflicts in the Bay-Delta, including natural resource, infrastructure, land use, and governance issues. In an effort to meet the recommendation to restore habitat within the Delta in a way that reliably delivers water, the California Natural Resources Agency (Resources Agency) initiated the preparation of the BDCP. While the BDCP was managed by the Resources Agency, the development of the environmental impact report and environmental impact statement (EIR/EIS) was led by DWR as state lead agency, and U.S. Bureau of Reclamation, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fishery Service as federal co-lead agencies.

In 2009, the State of California passed SB X7-1, known as the Sacramento-San Joaquin Delta Reform Act (Delta Reform Act). The Water Authority, a strong advocate for a sustainable Bay-Delta solution, actively encouraged passage of the 2009 measure, among other bills that made up a comprehensive water package of legislation. The Delta Reform Act directed that the Bay-Delta be managed with dual goals of water supply reliability and ecosystem protection. The legislation also created the Delta Stewardship Council, charged with adopting and overseeing implementation of a comprehensive Bay-Delta management plan (Delta Plan).

On December 13, 2013, DWR along with other lead and cooperating agencies released the BDCP document and draft EIR/EIS for public review. The BDCP, at that time, was planned as a joint Habitat Conservation Plan (HCP)/NCCP intended to meet the state-mandated co-equal goals of restoring and protecting ecosystem health, water supply and water quality within a stable regulatory framework. The BDCP was to obtain 50-year California and federal ESA permits for the operation of the State Water Project and Central Valley Project (CVP).

After receiving more than 10,000 comment letters through the environmental review process, including concerns raised by the federal fishery agencies, DWR and the lead agencies decided to change the permitting approach. The new approach decouples BDCP's water conveyance and ecosystem restoration objectives into two distinct efforts – California WaterFix and California Eco Restore. Rather than pursuing long-term 50-year permits to operate the proposed conveyance facilities, the California WaterFix is proposed to operate under Section 7 of the federal ESA and corresponding state regulations, similar to the current permit mechanism under which the State Water Project and CVP operate. In July 2015, the Partially Recirculated Draft EIR and Supplemental Draft EIS was released for a public review and comment period. The public review and comment period closed October 30, 2015. The Record of Decision for the California WaterFix is scheduled in 2016.

DWR's *State Water Project Delivery Capability Report 2015* updated DWR's estimate of the current (2015) State Water Project delivery capability. Historically, the Capability Report provided estimates of the current and future (20 years in the future) State Water Project delivery capability. The 2015 report showed that current deliveries continue to be impacted by significant restrictions due to operational requirements contained in federal BiOps. It projected that the primary component of the annual State Water Project deliveries will be slightly less, when compared to the preceding 2013 report.

In developing its supply capabilities, Metropolitan assumed a new Delta conveyance as fully operational by 2030 and would produce 1.2 million AF of average annual State Water Project supplies. Metropolitan also assumed near-term actions that would provide average annual State Water Project water supplies of 980,000 AF.

Environmental Considerations

In recent years, actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on State Water Project operations. The Bay-Delta is the largest estuary on the west coast and supports more than 750 plant and animal species. However, 150 years of human activity, dating back to 19th century gold mining, has taken its toll on the Bay-Delta ecosystem and the fish that live there.

Numerous factors contribute to the degradation of the Bay-Delta ecosystem and the decline of Delta fisheries, such as habitat loss, water diversions, non-point source pollution, over-fishing, and the introduction of non-native species. Regulatory protection efforts have nevertheless tended to focus on the operations of the State Water Project and the CVP. The restrictions began in 2007, when Federal Court Judge Oliver Wanger, acting in a case filed two years earlier, invalidated the BiOp for the Delta smelt and imposed an injunction that limited the time during which water could be pumped out of the Delta. The judge imposed restrictions on pumping to protect the Delta smelt, while new BiOps were being prepared. During the spring of 2008, Judge Wanger also invalidated the federal government's BiOps with respect to salmon and steelhead in the Sacramento River. In December 2008, the USFWS issued a new BiOp for the Delta smelt. This BiOp imposed operating restrictions that were even more severe than those imposed by the judge. Metropolitan and other State Water Contractors filed separate lawsuits in federal district court challenging the BiOp, which were consolidated under the caption *Delta Smelt Consolidated Cases*. On March 13, 2014, the Ninth Circuit held that the 2008 BiOp is valid and lawful. The impacts of the 2008 BiOp on Delta smelt to Metropolitan's deliveries from the State Water Project are variable based on hydrologic conditions.

On June 4, 2009, the National Oceanic and Atmospheric Administration National Marine Fisheries Service issued a BiOp intended to protect spring- and winter-run Chinook salmon, Central Valley steelhead, green sturgeon, and Southern Resident killer whales. This action placed additional restrictions on State Water Project and CVP operations. Six lawsuits were filed challenging the BiOp and were consolidated under the caption *Consolidated Salmon Cases*. On December 22, 2014, the Ninth Circuit held that the 2009 BiOp is valid and lawful. DWR estimated a 10 percent average water loss under this BiOp.

Water Quality Considerations

Please see **Section 7**, "Water Quality," for information.

Current Supplies

Metropolitan's State Water Project supplies are projected using DWR's *2015 State Water Project Delivery Capability Report*. The capability report presents current DWR estimates of the amount of water deliveries for current (2015) conditions and conditions 20 years in the future. Under the reliability report, the delivery estimates for the State Water Project for 2020 conditions, with existing conveyance and low outflow, as a percentage of Table A amounts for Metropolitan, are 12 percent under a single dry-year (1977) condition, which is equivalent to 257,000 AF, and 51 percent under long-term average conditions, which is equivalent to 976,000 AF. In dry below-normal conditions caused by dry hydrologic conditions and regulatory restrictions, Metropolitan developed additional supplies from Central Valley storage and transfer programs.

Future Supplies

Metropolitan's 2015 UWMP indicates that its State Water Project target for the "near term" under average hydrology (based on 1922–2012 hydrologies) is 984,000 AF. The "long-term" target for State Water Project supplies is 1.2 million AF under average hydrologies. These figures exclude Central Valley transfer and storage program supplies conveyed by the aqueduct. In Metropolitan's 2015 UWMP, the increased supply yield from a long-term Delta fix is contained in "programs under development." The 2015 UWMP estimates that the State Water Project "current programs," which include transfers and storage withdrawals, will be capable of serving between 1.76 million to 1.90 million AF to Metropolitan from 2020 through 2040 in an average year.

6.2.3 Storage Management Programs

At times, Metropolitan relies on water in storage to augment limited imported supplies. It manages its storage portfolio by storing water during wet years to meet the region's needs during critical droughts caused by varied hydrologic conditions and State Water Project pumping restrictions imposed to protect endangered or threatened fish species. The amount of water in Metropolitan's storage resources influences the likelihood that Metropolitan will have adequate supplies to meet projected demands without implementing the Water Supply Allocation Plan (WSAP). The principles that guide the management of supply and storage are based on the framework established in the Water Surplus and Drought Management Plan. Currently, Metropolitan has about 30 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 million AF. Metropolitan’s dry-year storage was at its highest, at 2.7 million AF, at the end of calendar year 2012. Although Metropolitan currently employs its WSAP to allocate its 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 following the WSAP allocation.

Metropolitan's 2015 UWMP indicates that the in-region supplies and programs target for “current programs” in a single dry year (based on 1977 hydrology) is 693,000 AF in 2020, 774,000 AF in 2025, and 852,000 AF in 2030. The 2015 UWMP also estimates that in the 2035–2040 period, Metropolitan's annual supply range from the in-region supplies and programs will be 956,000 AF and 992,000 AF, respectively, in a single dry year. The 2015 UWMP estimates that the in-region supplies and programs will be capable of serving between 693,000 AF and 992,000 AF to Metropolitan from 2020 through 2040 under average hydrology.

Metropolitan’s ability to utilize its water storage reserves depends on the actual amount of water in storage and “take” or “exchange” limits of various storage/exchange programs. During the most recent dry period, Metropolitan’s take capacity from its storage accounts was limited. Access to storage on the State Water Project system was restricted due to low State Water Project allocations and pumping limitations for Metropolitan’s Central Valley groundwater storage programs. On the Colorado River, Metropolitan’s access to its Intentionally Created Surplus stored in Lake Mead may be limited by available capacity in its CRA, or if a shortage on the River is declared. Additionally, during the current drought, limited water is available for transfers, constraining Metropolitan’s ability to secure additional supplies.

This page intentionally left blank.

Section 7
Water Quality

The Act requires that the 2015 Plan include information, to the extent practicable, on the quality of existing supply sources and the manner in which water quality affects water supply reliability. A significant task for the Water Authority is to protect the water quality of the water passing through its delivery system and communicating water quality changes to its member agencies. This section summarizes water quality issues associated with supplies serving the San Diego region. Information on Colorado River and State Water Project supplies came in part from Metropolitan's final 2015 UWMP. 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. Updated drinking water standards also result in additional costs to water suppliers.

7.1 Background on Key Water Quality Constituents

EPA establishes federal primary and secondary maximum contaminant levels (MCLs) for the nation. The SWRCB DDW, establishes primary and secondary MCLs for California, which must be at least as stringent as the federal MCLs. A secondary MCL is an enforceable standard based on the aesthetic quality of water. A primary MCL is an enforceable standard set based on health effects. All MCLs take into consideration health effects, occurrence and cost of treatment. The State Office of Environmental Health Hazard assessment establishes public health goals (PHGs), which set a goal for contaminants based strictly on health effects. For constituents that have no MCLs, EPA can set monitoring requirements through the unregulated contaminant monitoring rule (UCMR). Where no MCLs are adopted, EPA can also set unenforceable health advisory levels and DDW can set notification levels, which are also health-based advisory levels.

7.1.1 Salinity

The recommended secondary MCL for salinity is 500 milligrams per liter (mg/l) of TDS with an upper limit of 1,000 mg/l. High levels of salinity can have economic impacts on various water uses, such as reduced lifespan of household appliances, reduced crop yields, and increased water use for irrigation to flush salts through the soil. When treatment is required to reduce TDS concentrations, this can increase the costs of water supply. High TDS has an even greater impact on recycled water supplies that have TDS concentrations approximately 200 to 300 mg/l higher than the source water supplies. Metropolitan has set a goal of delivering water to its customers that contains less than 500 mg/l TDS by blending water from State Water Project with Colorado River Water. Metropolitan has typically been able to operate to meet the 500 mg/l TDS goal. However, during drought periods, when State Water Project supplies are limited, and TDS is increasing within the Colorado River, this goal has not been met. Development of new sources of supply with lower TDS concentrations, such as seawater desalination and potable reuse, can result in multiple economic benefits from the reduced TDS. At the same time, extremely low TDS supplies can be corrosive and should be managed to avoid unintended consequences.

7.1.2 Nutrients

Elevated levels of nutrients (phosphorus and nitrogen compounds) can stimulate nuisance algal (cyanobacteria) and aquatic weed growth that affects water system operations and consumer acceptability, including the production of noxious taste and odor compounds and algal toxins. Additionally, algae growth can shorten filter run times, increase solids production at drinking water plants, and add to organic carbon loading. Nutrients also provide an additional food source that can lead to proliferation of quagga and zebra mussels and other invasive species.

The issue of algae toxins has become a growing concern nationally as a result of increasing occurrence. In August 2014, an algae bloom producing microcystins in Lake Erie resulted in a "do not drink" order for the city of Toledo, Ohio. This triggered federal legislation requiring EPA to develop health advisories and strategic plans for managing algae toxins. In June 2015, EPA issued health advisories for two cyanobacterial toxins, recommending exposure levels over a 10-day period at or below 0.3 micrograms per liter (μg/l) for microcystins and 0.7 μg/l for cylindrospermopsin in drinking water for children pre-school age and younger (less than six years old). For school-age children through adults, the recommended health advisory levels for drinking water are at or below 1.6 μg/l for microcystins and 3.0 μg/l for cylindrospermopsin. The health advisories serve as recommended precautionary levels and are not enforceable federal water quality standards. Additional work is being done to improve laboratory methods for monitoring of algae species and any associated algae toxins, including microcystins, anatoxin-a, and cylindrospermopsin. Monitoring for algae toxins may be required through the UCMR regulations, which could require monitoring to begin in 2018. The Water Research Foundation has conducted research and provided recommendations for controlling algae growth in reservoirs and treatment approaches that can help to avoid delivery of unacceptable levels of algae toxins in treated water supplies.

7.1.3 Total Organic Carbon and Bromide

Disinfection byproducts (DBPs) form when source water containing high levels of total organic carbon and bromide is treated with disinfectants such as chlorine or ozone. Source water quality and surface water treatment processes play an important role in DBP formation. Studies show a link between DBP exposure and certain cancers. EPA rules on DBPs attempt to balance the reduction in risk of waterborne disease outbreak through use of disinfectants, against the cancer risk of DBP formed during the treatment processes. In 2002, EPA's Stage 1 Disinfectant and Disinfection Byproducts (D/DBP) Rules established new MCLs and a treatment technique requirement. In 2006, the Stage 2 D/DBP Rule added a requirement for systems to comply with the MCL based on locational running averages. The MCL applies to suppliers with permitted water treatment facilities and consecutive systems receiving treated water from a wholesale provider.

7.1.4 Arsenic

Arsenic is a naturally occurring element found in rocks, soil, water, and air. It is also used in wood preservatives, alloying agents, agricultural application, semi-conductors, paints, dyes and soaps. Long-term exposure to high levels of arsenic drinking water has been linked to certain cancers, skin pigmentation changes and hyperkeratosis (skin thickening). Effective in January 2006, the federal MCL for arsenic was lowered to 10 μg/l. In California, naturally occurring arsenic is commonly found in drinking water sources. Arsenic can be removed from drinking water through coagulation and filtration processes.

7.1.5 Uranium

Uranium is a naturally occurring radioactive element commonly found in groundwater supplies developed in granitic formations. Concentrated uranium can also be found in tailings from mining operations and the downstream water supplies. Uranium has been shown to cause certain cancers. The California MCL for uranium is 20 picocuries per liter (pCi/l) or 30 µg/l.

7.1.6 Chromium-6

Chromium is a naturally occurring element found in rocks, soils, plants and animals. Chromium-6 is used in electroplating, stainless steel production, leather tanning, textiles manufacturing, dyes and pigments, and wood preservation. Chromium can be found in the form of chromium-3 or chromium-6. Chromium-6 has been shown to cause certain cancers. Effective July 1, 2014, DDW adopted an MCL of 10 µg/l for chromium. The federal MCL of 100 µg/l is being reevaluated.

7.1.7 Perchlorate

Perchlorate compounds are used as a main component in solid rocket propellant and are also found in munitions and fireworks. Perchlorate dissolves easily and is highly mobile in groundwater. The primary health concern of perchlorate is that it causes hypothyroidism. This is especially critical in pregnant women and for development of infants and small children. In 2007, DDW adopted an MCL of 6 µg/l for perchlorate. In 2015, the PHG for perchlorate was set at 1 µg/l, prompting DDW to initiate a review of the MCL based on the current PHG. A federal MCL is being developed.

7.1.8 Constituents of Emerging Concern

Two significant categories of constituents of emerging concerns (CECs) are nitrosamines, and pharmaceuticals and personal care products (PPCPs). CECs include emerging contaminants that have no state or federal MCL adopted where health effects information or the ability to monitor the contaminant may be limited.

The most abundantly detected nitrosamine is nitrosodimethylamine (NDMA). NDMA is a DBP of chloramines and organic matter. Chloramines are a common secondary disinfectant at surface water treatment plants. Contributing factors may include organic matter in wastewater discharges or surface water supplies, and certain coagulant aid polymers. EPA considers NDMA to be a probable human carcinogen and put it on the monitoring list for the UCMR. The notification level for NDMA and two other nitrosamines is 0.01 µg/l. The PHG for NDMA is 0.003 µg/l.

Studies have reported the occurrence of PPCPs in treated wastewater and surface water supplies. PPCPs have been detected in extremely low concentrations in raw surface water supplies downstream of waste discharges including the following: carbamazepine, sulfamethoxazole, caffeine, primidone and gemfibrozil. Additional research is needed on monitoring methods, health effects, or fate and transport of these constituents and the efficacy of treatment processes to remove the constituents.

7.1.9 Iron and Manganese

Iron and manganese are commonly occurring groundwater contaminants. Manganese is also commonly occurring in the anoxic zone of surface water reservoirs and is found in wastewater discharges. The secondary MCL for iron is 0.3 mg/l. The secondary MCL for manganese is 0.05 mg/l. High iron and manganese in source waters can result in added treatment removal costs.

7.2 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.

7.2.1 Salinity

The 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 TDS.

Water imported via the CRA has a TDS averaging around 650 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. (Refer to **Section 7.6** for details on salinity impacts on water recycling.) 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 State Water Project to achieve delivered water salinity levels of 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.

7.2.2 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 a chemical manufacturing facility in Henderson, Nevada. Because of growing concerns over perchlorate levels in drinking water, in 2002, Metropolitan adopted a Perchlorate Action Plan. Objectives include expanded monitoring and reporting programs and continued tracking of remediation efforts in the Las Vegas Wash. Metropolitan has been conducting monthly monitoring of Colorado River supplies. The Nevada Department of Environmental Protection manages a comprehensive groundwater remediation program in the Henderson area. As of December 2004, the amount of perchlorate entering the Colorado River system from Henderson has been reduced from approximately 1,000 pounds per day (lb/day) to less than 90 lb/day. As a result of the aggressive cleanup efforts, perchlorate levels in the Colorado River water have decreased significantly from a peak of 9 μg/l in May 1998 and have remained less than 2 μg/l since June 2006. From 2010 through 2014, the perchlorate levels in Colorado River water ranged from not detected to 1.6 μg/l, with no detections since 2012.

7.2.3 Uranium

Naturally occurring uranium has always been present in Colorado River water and has always been under the California MCL of 20 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 (DOE) is working to remove and dispose of mine tailings and improve groundwater quality on the Colorado River watershed near Moab. The expected completion of this cleanup is between 2019 and 2025. Current levels at Metropolitan's intake have ranged from 1 to 6 pCi/l and are well below the MCL.

7.2.4 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 State Water Project water to reduce the nutrient level delivered to retail agencies.

7.2.5 Arsenic

Arsenic is another naturally occurring element monitored by drinking water agencies. Between 2001 and 2014, arsenic levels in Colorado River water have ranged from not detected to 3.5 μg/l, which is well below the MCL for arsenic. Increasing coagulant doses at water treatment plants can reduce arsenic levels for retail deliveries.

7.2.6 Chromium-6

Metropolitan has actively monitored the Colorado River water for chromium-6. All monitoring results have been below the detection limit for reporting. Pacific Gas and 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. This is a toxic cleanup site. Results of chromium-6 monitoring from the Colorado River upstream and downstream of this site have been below the detection limit for reporting.

7.3 State Water Project

The quality of State Water Project 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. State Water Project water contains relatively high levels of bromide and total organic carbon, two elements of particular concern to drinking water agencies. Bromide and total organic carbon combine with chemicals used in the water treatment process to form DBPs that are 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, and they influence its suitability for drinking and recycling.

The 2000 Record of Decision adopted by CALFED states that CALFED will either 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 State Water Project 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 State Water Project water quality by reducing the flow of higher-quality Sacramento River water to the State Water Project pumps at critical times. This can result in increased concentrations of salinity and bromide in the water delivered to Southern California.

DWR is proposing construction of a new intake system as part of the California WaterFix. By moving the intakes upstream, this would improve the water quality in the Delta and could allow for increased deliveries in wet years. The California WaterFix (Alternative 4A) includes three new intakes along the Sacramento River and dual-bore tunnels to convey water to the existing state and federal pumping facilities, and habitat restoration measures and environmental commitments necessary to mitigate impacts in compliance with state and federal environmental laws. The environmental document for the California WaterFix was released for review and comments were closed on October 20, 2015. This project will require broad support and funding commitments to implement.

7.3.1 Total Organic Carbon and Bromide

Total organic carbon (TOC) and bromide are naturally occurring but are elevated due to agricultural drainage and seawater intrusion as water moves through the Delta. The concern with TOC and bromide is that they form DBPs 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 present challenges for water utilities to comply with the regulations. Levels of these constituents increase due to agricultural drainage and seawater intrusion into the Delta. No regulatory water quality objectives are available for bromide in the Delta. However, the CALFED Bay-Delta Program 2000 set a goal of 0.05 mg/l for bromide and 3 mg/l for TOC to minimize formation of DBPs through the treatment process and enable water suppliers to meet the MCLs. More recent information states that concentrations ranging from 0.1 to 0.3 mg/l should be adequate to meet the DBP standards. During drought periods, existing Delta water quality regularly exceeds 2 mg/l for TOC.

Several treatment plants serving the San Diego region have upgraded to ozone as a primary disinfectant to allow treatment of challenging water sources, such as State Water Project, and continue to meet the DBP standards. Some local treatment plants use chlorine dioxide as a primary disinfectant to reduce DBP formation. Blending of the State Water Project source with Colorado River water also reduces precursors and DBP formation.

7.3.2 Nutrients

State Water Project supplies have significantly higher nutrient levels than the Colorado River supplies. Elevated levels of nutrients can increase nuisance algal and aquatic weed growth; in turn, this affects taste and odor in product water and can reduce filter run times at water treatment plants. Nutrient-rich soils in the Delta, agricultural drainage, urban runoff and wastewater discharges are primary sources of nutrient loading to the State Water Project. 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 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 in 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 will likely result in upgrades to that plant as well.

Low flows, increased temperatures and increased nutrient concentrations during drought have increased the algae blooms, which produce algal toxins. Of particular concern is microcystis, a harmful species of cyanobacteria. DWR increases its application of copper compounds to control algae and aquatic weed growth during the drought. 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.

7.3.3 Salinity

Water supplies from the State Water Project have significantly lower TDS levels 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 State Water Project water with high salinity CRA water to reduce the salinity levels of delivered water. However, both the supply and the TDS levels of State Water Project water can vary significantly in response to hydrologic conditions in the Sacramento–San Joaquin watersheds.

The TDS levels of 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 to blending as a management tool to lower the higher TDS levels from the CRA supply. For example, in the 1977 drought, the salinity of State Water Project water reaching Metropolitan increased to 430 mg/l, and supplies became limited. During this same event, salinity at the 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.

7.3.4 Arsenic

Between 2001 and 2008, arsenic levels in SWP water have ranged from not detected to 4.0 µg/l. Increasing coagulant doses at water treatment plants can reduce arsenic levels for retail deliveries. Groundwater storage programs in the SWP appear to provide the greatest risk of arsenic contamination; therefore, a pilot arsenic treatment facility is being tested by one of the groundwater partners. Non-project deliveries of groundwater to the California Aqueduct increase during drought periods. Although the groundwater being pumped into the aqueduct contains arsenic in concentrations above the MCL, the arsenic in the blended water remains below the MCL. The intent is to manage inflows so the arsenic concentrations do not increase by more than 2 µg/l.

7.4 Local Surface Water Reservoirs

Local surface water supply reservoirs are used to store imported water from the SWP and Colorado River and capture local runoff from the watershed. The region's water quality is influenced by a variety of factors depending on its source. As stated above, waters from the Colorado River and from Northern California are vulnerable to a number of contributors to water quality degradation. Regional surface and groundwater quality are vulnerable to increasing urbanization in the watershed, agriculture, recreational uses, invasive species, and fires. Historically, regional surface water quality has been considered good to excellent. Water quality can vary with imported water inflows and surface water contamination. While many of the local surface water supplies remain of good quality, some of the local supplies could be described as having poor quality, which results in costs and challenges to downstream utilities to reliably treat the water to meet drinking water standards. Downstream treatment plants are designed with a focus to remove and inactivate pathogens through filtration and disinfection.

Source water protection is considered a key element in regional water quality. The Water Authority and its member agencies are working together to improve watershed awareness and management. Currently, the most significant water quality issue that affects the public is algae blooms, which can create taste and odor problems or algal toxins. Algae blooms are typically caused by runoff containing nutrients and build-up of those nutrients in local reservoirs. The water suppliers in the region are actively developing monitoring and response plans to maintain assurances that water delivered to the public is safe for human consumption.

In San Diego County, the SWRCB DDW has primacy over the implementation of the SDWA. The SDWA regulates source water protection to ensure public health through the multiple barrier approach to source protection and treatment, an approach that anticipates that the public will participate in source water protection. Member agencies in the Water Authority's service area that have surface water have a good, long-standing working relationship with DDW.

A similar requirement from EPA calls for utilities to complete a Source Water Assessment (SWA). Information collected in SWAs is used to evaluate changes in potential sources of contamination and to help determine if more protection measures are needed. EPA requires utilities to complete an SWA that uses information collected in the sanitary surveys. The SWA is also used to evaluate the vulnerability of water sources to contamination and also helps determine whether more protective measures are needed.

Source water protection is fundamentally important to all of California. DDW 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 for how to protect water quality at the source.

The monitoring of key constituents in source waters is critical in helping to identify constituents that should be controlled at the source and to determine the best ways to operate the water system to improve the quality of water delivered to the consumer. The effect of urban and agricultural runoff on receiving water quality is a recognized problem. The San Diego Water Board has the responsibility to protect local water supplies from impacts caused by pollutants in runoff. The San Diego Water Board has not historically established protection of drinking water supplies or nutrients as its highest priority. This will likely become a higher priority in the future. In its 2013 Practical Vision, the San Diego Water Board stated that achieving a sustainable local water supply is a priority.

To address the issues associated with surface water quality and watershed management, the Water Authority, the City of San Diego, and the County of San Diego have formed a Regional Water Management Group to coordinate development of an IRWM for the San Diego region. An important element in the IRWM is to protect and enhance the region's local surface water quality. As part of this process, watershed-based and reservoir projects were identified and are being implemented to assist in watershed protection and improvement of surface water quality.

One key objective of the IRWM is to reduce sources of pollutants and environmental stressors. This objective targets water management strategies that directly address pollution management and include agricultural land stewardship, pollution prevention, urban land use planning, urban runoff management, and watershed management and planning. The IRWM stresses the need to attain the region's water quality standards by managing runoff from all sources within the region through the watershed management framework. (Refer to **Section 8**, "Integrated Regional Water Management Planning," for more information.) DWR has provided funding for projects through the San Diego IRWM program to improve water quality in several of the watersheds having local water supply reservoirs. IRWM grants have funded several projects in the San Dieguito watershed for the improvement of water quality in Hodges Reservoir. This reservoir is impacted by urban and agricultural runoff. The IRWM projects completed assessed water quality in the reservoir and impacts from urban and agricultural runoff and developed projects to help solve the water quality challenges. In subsequent phases, IRWM grants are funding a hypolimnetic aeration system in Hodges Reservoir and constructed wetlands that will capture and treat urban runoff.

7.5 Groundwater

Water quality parameters that can affect reliability of groundwater resources in San Diego County are high salinity levels, nitrate, iron and manganese, and methyl tertiary butyl ether.

7.5.1 Salinity and Nitrate

Increased TDS in groundwater basins occurs when basins near the ocean are over-drafted, leading to seawater intrusion, or when agricultural and urban return flows add salts to the basins. Much of the water used for agricultural or urban irrigation infiltrates into the aquifer, so where high TDS irrigation water is used or where the water transports salts from overlying soil, the infiltrating water will increase the salinity of the aquifer. Using this resource requires demineralization through reverse osmosis. When compared to other supplies, desalinated groundwater has been proven a cost-effective and reliable supply. (Refer to **Section 5.3**, "Groundwater," for discussion on groundwater recovery projects.) Increased nitrate concentrations can occur due to runoff and recharge from agriculture and from on-site waste treatment systems. High nitrate concentrations can be managed through treatment or blending with other lower nitrate sources.

To protect the quality of these basins, the San Diego Water Board often places restrictions on the salinity and nitrate levels of water used for basin recharge or for irrigation of lands overlying the aquifers. Where these restrictions are in place, water reuse and aquifer recharge may be restricted, or expensive mitigation measures may be required. The San Diego Water Board also includes criteria in their basin plan for permitting on-site waste treatment systems and regulates agricultural discharges.

7.5.2 Iron and Manganese

Some local groundwater supplies are naturally high in iron and manganese. While not a public health concern, groundwater supplies exceeding the secondary standard for iron and manganese are treated to remove these constituents.

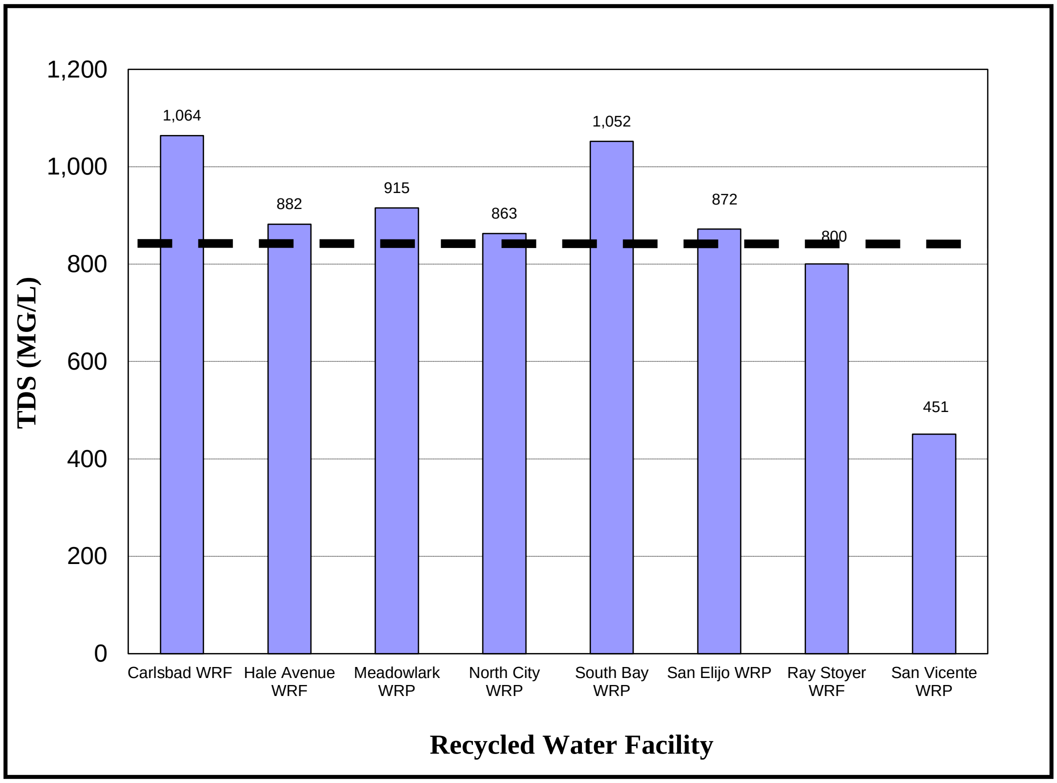
7.6 Recycled Water

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. Figure 7-1 shows the average TDS at several existing water recycling facilities. 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.

In May 2009, the SWRCB adopted a Recycled Water Policy to help streamline the recycled water permitting process as it relates to meeting basin plan objectives for TDS and nutrients. The policy encourages the development of basin-specific salt and nutrient management plans that identify sources of salt and nutrient loading to the basin, so the focus can be on the greatest sources of salt and nutrients. This can provide greater flexibility for recycled water projects to meet TDS and nitrate limitations. Several salt and nutrient management plans were developed for key groundwater basins. These are described in more detail in **Section 5.4.3**. Development of low TDS supplies such as brackish groundwater desalination, seawater desalination and potable reuse will further reduce salt loadings to the groundwater basins. The lower TDS source water will also reduce the salt concentration in the recycled water and the need for desalination of recycled water.

Figure 7-1
Recycled Water Facility Average TDS (mg/l)



7.7 Seawater Desalination

The feedwater source for the regional seawater desalination plant at the Encina Power Station in Carlsbad is the Pacific Ocean. The salinity of the Pacific Ocean in San Diego County is fairly stable, with a TDS concentration around 34,000 mg/l. To address TDS concentrations at this level, the desalination facility uses an RO membrane treatment process to reduce the TDS to less than 350 mg/l, resulting in approximately 99 percent removal of TDS and a supply that meets drinking water standards. Prior to distribution, the desalinated water is post-treated for stabilization and corrosion control. The desalinated water is blended with other Water Authority treated water supplies at the Twin Oaks Valley WTP. The concentration of TDS in the blend water will vary seasonally depending on system demands. Agencies upstream of Twin Oaks will not normally receive the lower TDS water from the Seawater Desalination Plant. Two member agencies, Carlsbad MWD and Vallecitos WD, have, or will have, connections directly to the pipeline delivering desalinated seawater.

Prior to the RO process, the feedwater is pretreated to remove suspended solids, including organic material. The RO process then removes the dissolved solids. Next, the 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 RO process of seawater generally results in about 50 percent recovery of treated water. The remaining 50 percent 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.

7.8 Potable Reuse

Several member agencies are considering potable reuse projects through groundwater recharge, augmenting local reservoir supplies or augmenting raw water supplies upstream of a surface water treatment plant. Because the raw water comes from wastewater treatment plants, a high level of treatment is required to ensure the safety of the water supply. Wastewater contains pathogens; known chemical contaminants, which have an adopted MCL; and constituents of emerging concern. It also contains TOC, which could lead to the formation of disinfection byproducts if not properly managed. To ensure public health protection, potable reuse projects will rely on source control programs, multiple treatment barriers, and monitoring to ensure reliable removal of pathogens and chemical constituents from the water supply. RO and advanced oxidation are common advanced treatment processes used for potable reuse projects. The advanced treatment provides a significant barrier to pathogens and constituents of emerging concern that are likely present in the wastewater. The advanced treated water could also be further treated at a downstream surface water treatment plant, which also provides a significant pathogen barrier. The advanced treated water will be very different in quality from the raw water currently supplied to local surface water treatment plants from the Colorado River, SWP and local supplies. Local surface water treatment plant operations will need to adapt to the change in water quality. The advanced treatment will result in delivery of a water supply to the customers much lower in TDS than existing water supplies.

SB 918 and SB 322 required the SWRCB to adopt groundwater recharge criteria by December 31, 2014, and surface water augmentation criteria by December 31, 2016. The legislation also required the formation of an expert panel. The panel must review the surface water augmentation criteria and determine the feasibility of adopting regulations for direct potable reuse by December 31, 2016. The nature and content of the adopted criteria will impact the ability to implement potable projects in the San Diego region and the cost of those projects.

Section 8

Integrated Regional Water Management Planning

IRWM planning involves the coordination and integration of water planning activities occurring within a defined region to improve and maintain the reliability and quality of the region's water supply. IRWM planning recognizes that water supplies, water quality and natural resources are connected and, as such, focuses on projects that produce multiple benefits in those areas. It typically involves both governmental and non-governmental stakeholders.

IRWM planning also is a mechanism through which a region becomes eligible for state grant funding for projects that help to achieve goals established through the planning efforts. Through voter-approved bond measures—Proposition 50 in 2002 and Proposition 84 in 2006—DWR has awarded approximately $1.5 billion to support IRWM planning and implementation in the 48 recognized IRWM regions in California. Proposition 1, approved by the voters in 2014, makes available another $510 million to support IRWM.

IRWM has been a featured element of the last three State Water Plan Updates. As the 2013 Update states, "This integrated approach delivers higher value for investments by considering all interests, providing multiple benefits and working across jurisdictional boundaries at the appropriate geographic scale."

The Water Authority, the City of San Diego, and the County of San Diego joined together in 2005 to form the Regional Water Management Group (RWMG) and define the San Diego IRWM planning region as the watersheds of San Diego County that are tributary to coastal waters (Figure 8-1). The RWMG in turn organized the Regional Advisory Committee (RAC) to assist in completion of San Diego's first IRWM Plan, published in 2007, and to otherwise advise the RWMG on important matters such as selection of projects for funding applications. The RWMG and the RAC worked together in 2011–2013 to update the 2007 Plan. The RAC provides diverse representation to the IRWM Program from various functional areas related to water management, including water supply, water quality, wastewater, natural resources, watersheds, disadvantaged communities, flood management, business, agriculture, tribes and land use planning.

Both the original 2007 IRWM Plan and the 2013 update were adopted by the Water Authority Board of Directors, San Diego City Council and San Diego County Board of Supervisors. The San Diego IRWM Plan forms the foundation of long-term IRWM planning in the region. It also is required for the San Diego planning region to apply for state funding. For detailed information on the San Diego IRWM Plan, visit the Plan's website: http://www.sdirwmp.org/2013-irwm-plan-update.

Since 2008, DWR has awarded five IRWM implementation grants totaling $89.6 million to the San Diego IRWM Planning Region (Table 8-1). The funds have come from the Proposition 84 and Proposition 50 grant programs.

Figure 8-1
San Diego IRWM Planning Region

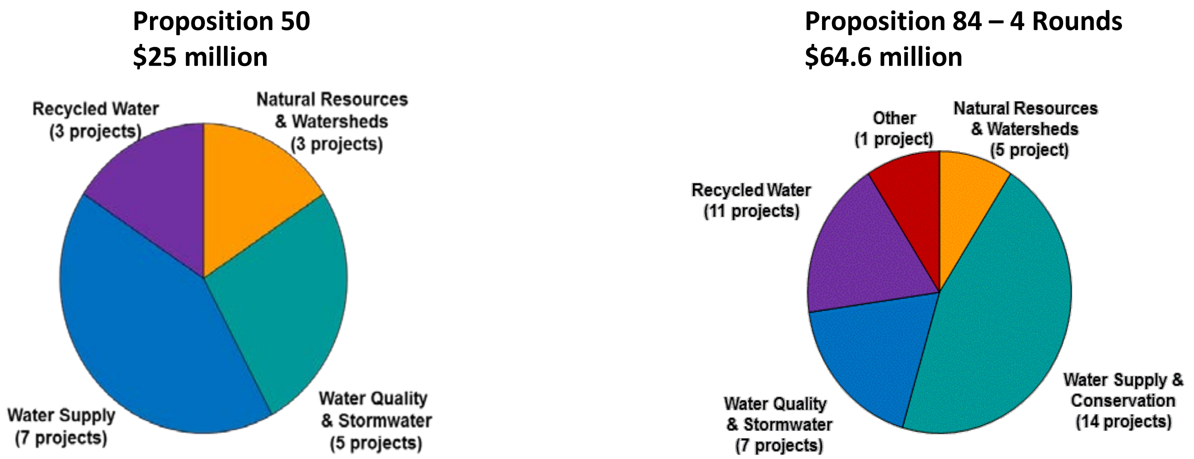
Combined, the grants have supported 56 multi-benefit projects developed by public agencies and non-profit organizations (Figure 8-2). Some $57.7 million of the funding is directed to eight projects sponsored by the Water Authority and 23 sponsored by Water Authority member agencies. The San Diego region also received a $1 million Proposition 84 planning grant that the RWMG used to support the update of the 2007 IRWM Plan so it would comply with new state guidelines and requirements. The San Diego region expects to receive approximately $39 million when DWR awards Proposition 1 grants.

Table 8-1. San Diego IRWM Implementation Grants (as of April 2016)

Funding Source	Date Awarded	# of Projects Funded	Grant Award	Costs Billed to Date	Projects Completed	Projects at Least 80% Completed
Proposition 50	2008	18	$250.0 million	$23.1 million	14	4
Proposition 84, Round 1	2011	11	$7.9 million	$4.7 million	2	2
Proposition 84, Round 2	2014	7	$10.5 million	$4 million	--	--
Proposition 84, Drought Solicitation	2014	7	$15.1 million	$1.2 million	--	2
Proposition 84, Final*	2016	13	$31.1M	$0.0	--	--
Total		**56**	**$89.6 million**	**$33.0 million**	**16**	**8**

*The Water Authority expects to execute the Proposition 84 Final grant agreement with DWR by July 2016.

Figure 8-2
San Diego IRWM Grant Projects

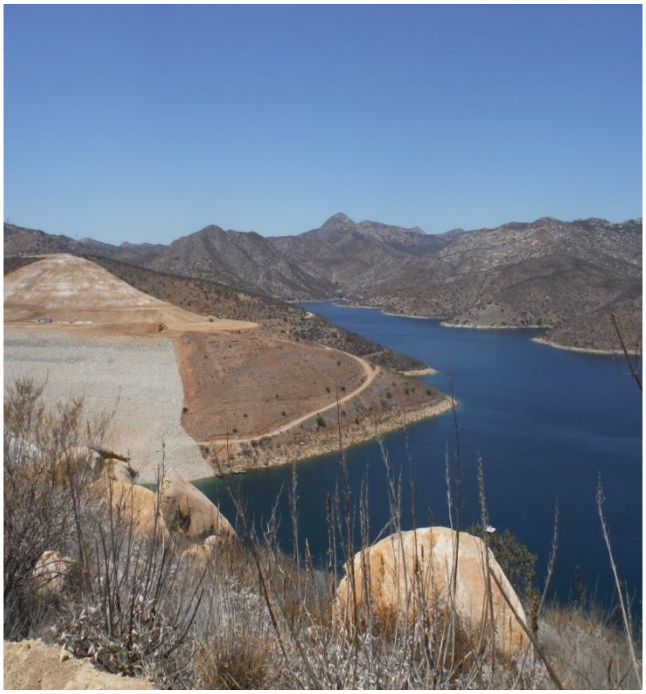


San Diego Region also received $1 million Proposition 84 planning grant to support 2013 IRWM Plan Update.

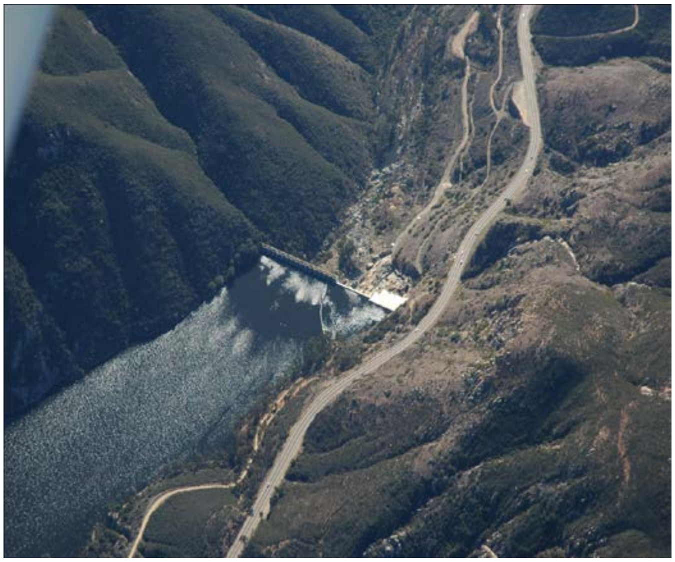
The San Diego IRWM Program supports the UWMP by promoting regional planning and funding projects that aim to increase water supply reliability and improve surface water and groundwater quality. IRWM planning and funding help to make possible water supply projects in the areas of seawater desalination, recycled water, local surface water and groundwater, all of which are identified in this 2015 UWMP as part of the region's projected mix of water resources. The IRWM Program also supports water conservation, another key element of this 2015 UWMP. Figure 8-3 depicts three projects funded through the IRWM Program.

Figure 8-3
Examples of IRWM Projects

Multiple turf replacement programs have been selected for IRWM grant funding in the San Diego region.



The San Vicente Reservoir Source Water Protection, sponsored by the Water Authority with funding from the San Diego IRWM Program, helps to maintain water quality in the expanded San Vicente Reservoir.



An aerial view of Hodges Reservoir as it nears capacity. The San Diego IRWM Program is funding multiple projects that aim to solve water quality problems in Hodges Reservoir.

The Water Authority has an additional role in the San Diego IRWM Program. The MOU that established the San Diego RWMG designates the Water Authority as the lead agency for purposes of applying for grants, signing grant agreements, administering grant funding and representing the RWMG to funding agencies. The Water Authority administers the grant funds for all of the individual projects with respect to reporting progress and submitting invoices to DWR and distributing funding to the project sponsors. This responsibility requires the Water Authority to contract directly with all of the project sponsors, except those projects sponsored by the Water Authority itself. To defray these administrative costs, the Water Authority receives 3 percent of all IRWM grant funds awarded to the region.

This page intentionally left blank.

Section 9
Water Supply Reliability

Under the Act, every UWMP must include an assessment of water supply reliability. The assessment must compare the total projected water supply and demands over the next 20 years in five-year increments under normal, single dry year, and multiple dry water years. The assessment contained in the 2015 Plan evaluates reliability through the next 25 years. Verifiable supplies are included in water supply assessments and verifications prepared by retail water agencies and are used by the cities and county in their land-use decisions regarding available water supplies for growth under SB 221 and SB 610. Those projects with adequate documentation regarding implementation and supply utilization, or existing projects already planned for expansion, are included in the assessments discussed in **Sections 9.2** and **9.3**. In addition to the verifiable mix of resources utilized in the reliability assessment, additional planned resources by the Water Authority and its member agencies have also been identified. Additional planned projects can further reduce the region's reliance on sources of supply from Metropolitan, such as the Bay-Delta. This section presents a summary of the water demands and supplies within the Water Authority's service area, along with the reliability assessment and discussion on additional planned projects. Results from the reliability assessment demonstrate that, even with very conservative assumptions regarding the availability of dry year supplies from Metropolitan, the region's existing and projected water resource mix is increasingly drought-resilient, but shortages still occur during a single dry-year by 2035, and more significant shortages during a multiple dry water year event beginning in 2028. These shortages can be mitigated through extraordinary water conservation actions and if necessary, dry-year transfers.

9.1 Development of Projected Water Resources Mix

In summary, development of the projected mix of resources to meet future demands is based on the following factors:

I. Member agency information on projected water recycling, potable reuse, groundwater, desalination, and surface water (discussed in **Section 5**)

II. Attaining the additional regional water use efficiency targets (**Section 2**)

III. Board approvals taken in regard to Water Authority supplies (**Sections 4 and 11**):

    a. Agreement between IID and the Water Authority for Transfer of Conserved Water, and other related agreements (**Section 4.2**);

    b. Agreements related to the ACC and CC Lining Projects, and other related agreements (**Section 4.3**);

    c. Claude "Bud" Lewis Carlsbad Desalination Plant Water Purchase Agreement between the Water Authority and Poseidon Water (**Section 4.5**);

    d. Acceptance of San Vicente Dam Raise Project (emergency and carryover storage) as complete (**Section 11.2.4**);

    e. Approval of 2013 Regional Water Facilities Optimization and Master Plan Update (**Section 1.6.4**); and

f. Agreements and actions related to out-of-region groundwater banking program (**Section 11.2.4**).

9.2 Normal Water Year Assessment

Table 9-1 shows the normal year assessment, summarizing the total water demands within the Water Authority's service area through the year 2040 along with the supplies necessary to meet demands under normal conditions. **Section 2** contains a discussion of the normal year water demands in the Water Authority's service area. If Metropolitan, the Water Authority and member agency supplies are maintained and developed as planned, along with achievement of the additional water conservation, no shortages are anticipated within the Water Authority's service area in a normal year through 2040.

In the reliability assessment, the projected supplies from Metropolitan are considered supplemental and are calculated as the increment of supply necessary to meet demands after taking into account member agency and Water Authority supplies. Metropolitan staff provided the Water Authority with estimated demands on Metropolitan that will be used in their 2015 Plan. The estimated demands are shown to be adequate to cover the supplemental need identified in Table 9-1. The data provided by Metropolitan is included in **Appendix I**.

Table 9-1. Normal Water Year Supply and Demand Assessment (AF/YR)[1]

	2020	**2025**	**2030**	**2035**	**2040**
Water Authority Supplies					
IID Water Transfer	190,000	200,000	200,000	200,000	200,000
ACC and CC Lining Projects	80,200	80,200	80,200	80,200	80,200
Lewis Carlsbad Desalination Plant	50,000	50,000	50,000	50,000	50,000
Sub-Total	320,200	330,200	330,200	330,200	330,200
Member Agency Supplies (Verifiable Supplies)					
Surface Water	51,580	51,480	51,380	51,280	51,180
Water Recycling	40,459	43,674	45,758	46,118	46,858
Seawater Desalination	6,000	6,000	6,000	6,000	6,000
Potable Reuse	3,300	3,300	3,300	3,300	3,300
Brackish GW Recovery	12,100	12,500	12,500	12,500	12,500
Groundwater	17,940	19,130	20,170	20,170	20,170
Sub-Total	131,379	136,084	139,108	139,368	140,008
Metropolitan Water District Supplies	136,002	181,840	207,413	224,863	248,565
Total Projected Supplies	**587,581**	**648,124**	**676,721**	**694,431**	**718,773**
Total Demands w/ Water Efficiency Savings	587,581	648,124	676,721	694,431	718,773

[1] Normal water year demands based on 1960 – 2013 hydrology.

9.3 Dry Water Year Assessment

In addition to a normal water year assessment, the Act requires an assessment to compare supply and demands under a single dry year and multiple dry water years over the next 20 years, in five-year increments. **Section 2** describes the derivation of the dry water year demands. Table 9-2 shows the single dry-year assessment. The dry-year demands reflect long-term water use efficiency, but do not incorporate potential savings due to extraordinary conservation occurring during droughts. This approach allows for more comprehensive shortage analyses and drought response planning.

Table 9-2. Single Dry Water Year Supply and Demand Assessment Five Year Increments (AF/YR)

	2020	2025	2030	2035	2040
Water Authority Supplies					
IID Water Transfer	190,000	200,000	200,000	200,000	200,000
ACC and CC Lining Projects	80,200	80,200	80,200	80,200	80,200
Regional Seawater Desalination	50,000	50,000	50,000	50,000	50,000
Sub-Total	320,200	330,200	330,200	330,200	330,200
Member Agency Supplies [1]					
Surface Water	6,004	6,004	6,004	6,004	6,004
Water Recycling	40,459	43,674	45,758	46,118	46,858
Seawater Desalination	6,000	6,000	6,000	6,000	6,000
Potable Reuse	3,300	3,300	3,300	3,300	3,300
Brackish GW Recovery	12,100	12,500	12,500	12,500	12,500
Groundwater	15,281	15,281	15,281	15,281	15,281
Sub-Total	83,144	86,759	88,843	89,203	89,943
Metropolitan Water District Supplies	263,340	264,740	263,340	260,680	258,720
Total Projected Supplies w/o Storage Takes	666,684	681,699	682,383	680,083	678,863
Total Demands w/ Water Efficiency Savings	629,198	694,147	725,006	743,990	770,765
Potential Supply (Shortage) or Surplus	37,486	(12,448)	(42,623)	(63,907)	(91,902)
Utilization of Carryover Supplies	0	12,448	42,623	40,000	40,000
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	666,684	694,147	725,006	720,083	718,863
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	37,486	0	0	(23,907)	(51,902)

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

The projected groundwater and surface water yields shown in the table are based on 2015 dry-year supplies during the present drought beginning in 2012. The verifiable supplies available from member agency projected recycling, potable reuse, and groundwater recovery projects are assumed to experience little, if any, reduction in a dry year. The Water Authority's existing and planned conserved supplies from the IID transfer, canal lining projects, and Carlsbad Desalination Plant are also considered “drought-resilient” supplies as discussed in **Section 4**. For this single dry-year assessment, it was assumed that Metropolitan is limited to 1.4 MAF of supplies due to dry conditions and increased reductions in deliveries from State Water Project (no Delta improvements) and/or reduction in Colorado River deliveries; and the Water Authority receives its preferential right based on Metropolitan’s current method of calculating such rights. With a very conservative assumption regarding limited Metropolitan supplies during a single dry water year, and assuming Water Authority and member agency 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 until 2035. These shortages would be eliminated should Metropolitan supplies approach the supply levels projected in Metropolitan’s 2015 UWMP Single Dry Year Supply Capability.

As discussed in **Section 11.2.4**, the Water Authority has invested in carryover storage supply capacity, which can be utilized in dry years to improve reliability. The carryover storage investment includes both surface water storage in San Vicente Reservoir and out-of-region groundwater storage in California’s Central Valley, for a total of 170,000 AF of carryover storage capacity available.

As described in **Section 11.2.4**, there are a number of factors to consider when determining the utilization of carryover supplies to reduce or eliminate shortages. The storage take amount should be handled on a case-by-case basis, considering such items as, current demand trends, core supply availability, hydrologic conditions, and storage supply available for withdrawal. These factors will vary depending upon the situation. For the analysis in the 2015 Plan, it was assumed the available carryover storage would be 120,000 AF going into the dry-year period. In determining the amount to utilize, the analysis uses general guidelines, consistent with previous Water Authority planning documents, that approximately one third of the carryover supplies available in storage will be utilized in one year. Utilizing a portion of available storage supplies avoids depletion of storage reserves, thereby making water available for potential ongoing or future shortages. The supplies taken from carryover storage will be considered a Water Authority regional supply to be combined with the Water Authority’s core supplies and any potential dry-year transfers.

Under the Water Authority’s current Transitional Special Agricultural Water Rate (TSAWR) program requirements, customers in the TSAWR class of service receive no water from the Carryover Storage Program during Stage 2 or 3 of the Water Shortage Drought Response Plan. During shortages, TSAWR deliveries are also cut back at the same level as Metropolitan’s cutback to the Water Authority. Extension of the TSAWR program was approved by the Water Authority Board in March 2014 and will be revisited by the Board again in 2020. For planning purposes only, the assessments in Tables 9-3 through 9-7 do not factor in the exclusion from the Carryover Storage Program due to the uncertainties associated with the future of the program beyond 2020. This also provides a more conservative planning analysis.

In years where shortages may still occur after utilization of carryover storage, additional regional shortage management measures, consistent with the Water Authority’s Water Shortage and Drought Response Plan (described in **Section 11.2.1**), will be taken to fill the supply shortfall. These measures could include extraordinary conservation, achieved through voluntary or mandatory water-use restrictions. A description of the savings achieved during the 2012-2016 shortage period is included in **Section 11.2.3**. As discussed in the following section, the amount of savings achieved through extraordinary conservation measures could be limited due to demand hardening. In addition, the Water Authority could evaluate the option of securing dry-year transfers, which the Water Authority successfully acquired and utilized during the 2007-2011 shortage management period. (A description of the Water Authority's dry-year transfer program is included in **Section 11.2.4**.).

Table 9-3. Multiple Dry Water Year Supply and Demand Assessment Five-Year Increments (AF/YR) – 2017-2019

	2017	2018	2019
Member Agency Supplies[1]	71,950	74,034	71,267
Water Authority Supplies	230,200	260,200	290,200
Metropolitan Allocation (Preferential Right)	223,560	224,400	225,120
Total Estimated Core Supplies w/o Storage Takes	525,710	558,634	586,587
Total Demands w/ Water Efficiency Savings	491,000	495,910	500,869
Potential Supply (Shortage) or Surplus *(Difference between Supplies and Demands)*	34,710	62,724	85,718
Utilization of Carryover Supplies	0	0	0
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	525,710	558,634	586,587
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	34,710	62,724	85,718

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

Table 9-4. Multiple Dry Water Year Supply and Demand Assessment Five-Year Increments (AF/YR) – 2021-2023

	2021	2022	2023
Member Agency Supplies[1]	124,552	101,885	85,073
Water Authority Supplies	330,200	330,200	330,200
Metropolitan Allocation (Preferential Right)	263,900	245,310	226,680
Total Estimated Core Supplies w/o Storage Takes	718,652	677,395	641,953
Total Demands w/ Water Efficiency Savings	640,932	647,342	653,815
Potential Supply (Shortage) or Surplus *(Difference between Supplies and Demands)*	77,720	30,053	(11,862)
Utilization of Carryover Supplies	0	0	11,862
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	718,652	677,395	653,815
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	77,720	30,053	0

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

Table 9-5. Multiple Dry Water Year Supply and Demand Assessment Five-Year Increments (AF/YR) – 2026-2028

	2026	2027	2028
Member Agency Supplies[1]	127,941	105,048	88,009
Water Authority Supplies	330,200	330,200	330,200
Metropolitan Allocation (Preferential Right)	264,600	245,570	226,440
Total Estimated Core Supplies w/o Storage Takes	722,741	680,818	644,649
Total Demands w/ Water Efficiency Savings	699,895	706,894	713,963
Potential Supply (Shortage) or Surplus *(Difference between Supplies and Demands)*	22,846	(26,076)	(69,314)
Utilization of Carryover Supplies	0	26,076	40,000
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	722,741	706,894	684,649
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	22,846	0	(29,314)

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

Table 9-6. Multiple Dry Water Year Supply and Demand Assessment Five-Year Increments (AF/YR) – 2031-2033

	2031	2032	2033
Member Agency Supplies[1]	129,680	106,442	89,059
Water Authority Supplies	330,200	330,200	330,200
Metropolitan Allocation (Preferential Right)	262,780	243,490	224,280
Total Estimated Core Supplies w/o Storage Takes	722,660	680,132	643,539
Total Demands w/ Water Efficiency Savings	728,330	735,613	742,969
Potential Supply (Shortage) or Surplus *(Difference between Supplies and Demands)*	(5,670)	(55,481)	(99,430)
Utilization of Carryover Supplies	5,670	40,000	40,000
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	728,330	720,132	683,539
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	0	(15,481)	(59,430)

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

Table 9-7. Multiple Dry Water Year Supply and Demand Assessment Five-Year Increments (AF/YR) – 2036-2038

	2036	2037	2038
Member Agency Supplies[1]	130,116	106,954	89,647
Water Authority Supplies	330,200	330,200	330,200
Metropolitan Allocation (Preferential Right)	260,260	241,410	222,480
Total Estimated Core Supplies w/o Storage Takes	720,576	678,564	642,327
Total Demands w/ Water Efficiency Savings	749,030	756,521	764,086
Potential Supply (Shortage) or Surplus *(Difference between Supplies and Demands)*	(28,454)	(77,957)	(121,759)
Utilization Carryover Supplies	28,454	40,000	40,000
Total Projected Core Supplies w/ Utilization of Carryover Storage Supplies	749,030	718,564	682,327
Remaining Potential Surplus Supply, or (Shortage) that will be handled through Management Actions	0	(37,957)	(81,759)

[1] Member agency local supplies include verifiable recycling and brackish groundwater, as well as dry-year estimates for surface water and groundwater.

In accordance with the Act, Tables 9-3, 9-4, 9-5, 9-6, and 9-7 show the multiple dry water year assessments in five-year increments. Similar to the single dry-year assessment, the member agencies' surface and groundwater yields shown in these tables are reflective of supplies available during the present drought, beginning in 2012, for years 2013, 2014 and 2015. However, due to recent supply conditions, the analysis for the 2017 to 2019 period was based on a different assumption. For this period, it was assumed water supplies are based on current levels for the first year and reduced down to actual 2015 levels over the three-year cycle ending with 2019. While surface and groundwater yields are based on historic estimates, recycled and brackish groundwater yields are based on projected growth in these member agency supplies. For the multiple dry-year reliability analysis, the conservative planning assumption is that Metropolitan will be allocating supplies to its member agencies. By assuming allocations in this reliability assessment, it allows the Water Authority to analyze how storage supplies could potentially be utilized and the likelihood of shortages. Currently, Metropolitan allocates supplies through its WSAP. Because it is uncertain in the future how Metropolitan will allocate supplies to its member agencies, the analysis in the tables assumes supplies are allocated based on preferential right to Metropolitan supplies. As discussed above in **Section 6.1.1**, Section 135, Preferential Right to Purchase Water, is included in the Metropolitan Act and allows a Metropolitan member agency to acquire, for use within the agency, supplies based on preferential right at any time.

The Water Authority's annual preferential right percentage of Metropolitan supplies, used in Tables 9-3 through 9-7, is estimated through 2040 and is based on Metropolitan's current method of calculating preferential rights. In 2015, a Superior Court ruled Metropolitan under-calculated the Water Authority's preferential right to Metropolitan water. That ruling is being appealed. The analysis assumes the total Metropolitan dry-year supplies available for allocation to be 1.2 MAF for the period of 2017 to 2019 due to temporal proximity to current dry conditions and depleted storage levels; and a decreasing amount of 1.4 MAF, 1.3 MAF, and 1.2 MAF for the first, second, and third year respectively for the remaining multi-year dry periods. A conservative methodology was employed due to the numerous uncertainties associated with identifying Metropolitan's future available supplies and storage. In **Section 10**, there are scenarios presented that modify the dry-year supplies available for allocation. This total supply assumes reduced deliveries from the State Water Project and Colorado River Aqueduct along with limited storage supplies. This conservative approach is based on Water Authority's experience with the current 5-year drought and its adverse impacts on imported water supplies.

Based on recent available information, the demands for the period of 2017 to 2019 were adjusted to align with current demands that were dampened due to the statewide Emergency Conservation Regulation. Specifically, the 2017 demands were adjusted to match demands from the Water Authority's Calendar Year 2017 Rates and Charges forecast to yield more accurate demand projections. Years 2018 and 2019 demands were then increased one percent from the previous year to account for minimal growth. As a result of this adjustment to the 2017-2019 demands, there is a step-up in demand between Tables 9-3 and 9-4 that provides for a return to, and alignment with, the un-dampened dry year demand projections developed for the 2015 Plan.

The rest of the multi dry-year periods have the first year based on the multi dry-year demand forecast with the next two years being increased one percent from the previous year to account for growth. This method for the multi dry-year events was used in order to account for the lower than normal demand increases being experienced by the Water Authority and its member agencies as they respond to the current drought and conservation efforts.

Under specific parameters assumed in the multi dry-year analysis, shortages are experienced, as shown in Tables 9-5 thru 9-7. The significant shortages are due to increasing water demands due to economic growth within the region and the approach of applying restricted supply from Metropolitan. As with the Single Dry Water Year Supply and Demand Assessment, these shortages could be eliminated should Metropolitan supplies approach the supply levels projected in Metropolitan's 2015 UWMP Multiple Dry Year Supply Capability.

As stated in the single dry-year analysis, carryover storage would be utilized in order to lessen the impacts of a supply shortfall.

It should be emphasized that the amount of extraordinary conservation savings expected to be achieved through mandatory measures, such as water-use restrictions, could be less than that experienced in the previous shortage periods due to demand hardening. Responsiveness to drought pricing and general price increases will diminish because remaining essential uses are less responsive to price. Shortage management measures such as water-use restrictions may not be as effective in the future in achieving necessary savings to help reduce the supply gap. This will reduce customer discretionary demands and create less flexibility in the managing of demand during shortages, which will increase the importance of acquiring supplemental dry-year supplies to eliminate or reduce potential supply shortages. **Section 11.2.4** discusses the Water Authority's potential dry-year supplies. Long-term permanent conservation savings is critical to ensuring water is used most efficiently and will help avoid or minimize drought situations.

9.4 Reliability of Supply

The above sections identify the diverse mix of resources planned to meet future demands in both a normal and dry year. Implementation of this regional resource mix will require maintaining and developing projects and programs by the Water Authority, its member agencies, and Metropolitan. The Water Authority coordinated with its member agencies during preparation of the 2015 Plan on the future demands and supplies projected for the region. The steps being taken by the member agencies and Metropolitan to develop supplies are addressed in their respective UWMPs. **Section 4** contains the steps taken and remaining actions necessary to develop and maintain the Water Authority supplies.

The Act requires agencies to describe reliability of the water supply and vulnerability to seasonal and climatic shortage. **Section 9.2** and **Section 9.3** describe the results of the water supply reliability assessment for the region, during normal water years, single dry years, and multiple dry years. The Act also requires the 2015 Plan to contain historic data on supplies available for the three water year types. The following are the historic total supplies, both local and imported, that were utilized during the periods identified: Normal/average based on a 30-year average between 1986 and 2015, single dry year based on 2015, and multiple dry water years based on years 2013–2015. Supplies utilized in a non-allocation dry period could exceed the supplies utilized in a normal year, due to the ability to purchase additional imported supplies from Metropolitan. It should also be noted that in the reliability assessment, contained in **Section 9.2**, the average local supply yields are not based on historic yields, but projected numbers provided by member agencies. These figures more accurately reflect the expected yield based on current local agency policies and procedures on operations and management of the supply.

Key to long-term reliability will be the monitoring of supplies and demands in order to make necessary modifications to the core and dry-year resources identified in the normal and dry-year resource mixes. The Water Authority Board will monitor reliability of existing supplies and development of identified future supplies through the Annual Supply Report and five-year updates to the UWMP.

The Act requires that, for any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, the agency describe, to the extent practicable, plans to replace that source with alternative sources or water demand management measures. As stated throughout the 2015 Plan, the Water Authority and its member agencies are planning to develop a diverse supply of resources. The unavailability of any one supply source will be buffered because of the diversity of the supplies: the region is not reliant on a single source. To replace or supplement an existing supply, the Water Authority could take steps to further long-term efficient water use and work with member agencies to further maximize development of recycled water, potable reuse, groundwater, and seawater desalination. To adequately plan for potential supply uncertainties and identify alternative sources, the 2015 Plan contains a scenario planning process described in **Section 10**.

9.5 Additional Planned Supply Projects

The mix of current and future supplies is developed jointly between the Water Authority and its member agencies. The mix of supplies is being represented in two ways. Verifiable supplies are those supplies identified by the Water Authority or member agencies as having achieved a level of certainty in their planning and implementation, such as where CEQA has been satisfied, permits are in hand, or contracts have been executed. As part of this general definition, these projects also have the political support of the governing body to move forward and be implemented at this time. Verifiable supplies are included in water supply assessments and verifications prepared by retail water agencies and used by the cities and county in their land use decisions regarding available water supplies for growth under SB 221 and SB 610. Those projects with adequate documentation regarding implementation and supply utilization, or existing projects already planned for expansion, are included in the assessments discussed in **Sections 9.2** and **9.3**. Additional planned supplies are those that have not yet achieved the same level of certainty as the verifiable supplies, but have progressed to a point where the Water Authority or a member agency has taken significant financial actions to pursue the project. Additional planned supplies are not included in supply verifications for SB 221 and SB 610.

These additional planned supplies are important to the region for a number of reasons. The Water Authority and member agencies must continue to strive to develop cost-effective local resources that can further diversify the region's supplies and reduce demands for imported water from Metropolitan. In particular, member agency additional planned supplies, if implemented, would also reduce or potentially eliminate the later dry year shortages shown in Section 9.3. They provide objectives for the region to work toward by resolving any funding, regulatory, and other constraints associated with implementation. As part of conducting comprehensive supply planning, both the verifiable and additional planned projects are evaluated in regard to meeting future demands and the need for supplemental supplies from Metropolitan. Table 9-8 includes the evaluation of verifiable and additional planned projects compared with projected water demands in a normal year. It is important to emphasize that this evaluation is presented as a potential supply scenario and not the region's reliability analysis for purposes of compliance with state laws governing approval of land use projects (SB 610 and SB 221).

The specific member agency local recycled water, potable reuse and brackish groundwater projects included in the figures are listed in Tables F-2 and F-4, respectively, in Appendix F. Also included in Appendix F are conceptual projects identified by the member agencies.

Table 9-8. Supply Scenario with Additional Planned Projects (Normal Year AF/YR)

	2020	2025	2030	2035	2040
Water Authority Supplies					
IID Water Transfer	190,000	200,000	200,000	200,000	200,000
ACC and CC Lining Projects	80,200	80,200	80,200	80,200	80,200
Regional Seawater Desalination	50,000	50,000	50,000	50,000	50,000
Sub-Total	320,200	330,200	330,200	330,200	330,200
Water Authority Additional Planned (Desal)	0	5,600	5,600	61,600	61,600
Water Authority Total	**320,200**	**335,800**	**335,800**	**391,800**	**391,800**
Member Agency Supplies					
Verifiable Total	131,379	136,084	139,108	139,368	140,008
Additional Planned					
Surface Water	0	0	0	0	0
Water Recycling	2,840	9,926	10,926	10,926	10,926
Seawater Desalination	0	15,100	15,600	16,100	16,800
Potable Reuse	4,470	29,086	46,686	106,099	106,099
Brackish GW Recovery	0	0	0	0	0
Groundwater	3,100	3,100	3,600	3,600	3,600
Member Agency Total	**141,789**	**193,296**	**215,920**	**276,093**	**277,433**
Total Projected Local Supplies	461,989	529,096	551,720	667,893	669,233
Metropolitan Water District Supplies	125,592	119,028	125,001	26,538	49,540
Total Supplies	**587,581**	**648,124**	**676,721**	**694,431**	**718,773**
Total Demands w/ Water Efficiency Savings	587,581	648,124	676,721	694,431	718,773

[1] Normal water year demands based on 1960 – 2008 hydrology.

This page intentionally left blank.

Section 10

Scenario Planning – Managing an Uncertain Future

The Water Authority's water supply reliability assessment can be found in **Section 9**. The Act also requires that, for any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, the agency describe to the extent practicable, plans to replace that source with alternative sources or water demand management measures.

To adequately assess the reliability of the region's future resource mix and plan for potential uncertainties of the water supply sources, the 2015 Plan update incorporates a traditional scenario planning process. The process assesses potential risks associated with implementation of the projected resource mix and identifies management strategies to help deal with the uncertainties. A procedure to track development of supply sources to determine when and if potential adaptive management strategies may be needed is also included.

A list of the primary source documents used to prepare this section is included in **Section 10.3**. One of the foundational documents used as a resource in selecting the traditional scenario planning process is the 2010 Water Utility Climate Alliance Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning (2010 WUCA Report).

10.1 Traditional Scenario Planning Process

Various decision support planning methods are available to planners that incorporate uncertainty and risk assessment into water planning. Traditional scenario planning was selected for the 2015 Plan based primarily on the following factors:

- Used for uncertainty analysis specific to water resources/water utility planning
- Develops a small but wide ranging set of future scenarios to test and make planning decisions more robust
- Highly transparent, easily implemented with medium level of development by internal staff, outside expertise not required
- Does not require extensive computer power, can accommodate changes in assumptions, inputs and objectives
- Uses concepts familiar to stakeholders, improves understanding and communicability, and avoids the "black box" issue

The basic steps for the 2015 Plan scenario planning process are summarized below:

1. Define the focal issue or central question for the process that will be assessed and ultimately answered through the process;
2. Identify the projected water resource supply mix;
3. Identify critical uncertainties that could influence implementation of the mix;

4. Formulate potential scenarios based on the critical uncertainties;
5. Identify common strategies to manage the scenarios; and
6. Establish key tracking metrics that evaluate the status of supply sources in the projected resource mix and whether adaptive management strategies are required to ensure continued reliability.

Each of the steps taken is described in the remainder of this section.

10.1.1 Definition of the Focal Issue or Central Question

The focal issue or central question to be assessed and ultimately answered through the scenario planning process is:

> In this climate of supply uncertainty and scarcity, how will the Water Authority and its member agencies adaptively provide a water supply that is reliable and drought-resilient over the next 25 years?

10.1.2 Identify Projected Water Resource Mix

As discussed in **Section 9**, in coordination with the member agencies, a projected resource mix to meet future demands was generated in five-year increments. For the scenario planning process, the projected mix in 2035 was selected for evaluation in order to capture long-term supply planning. The normal weather resource mix in 2035 is based on the following factors:

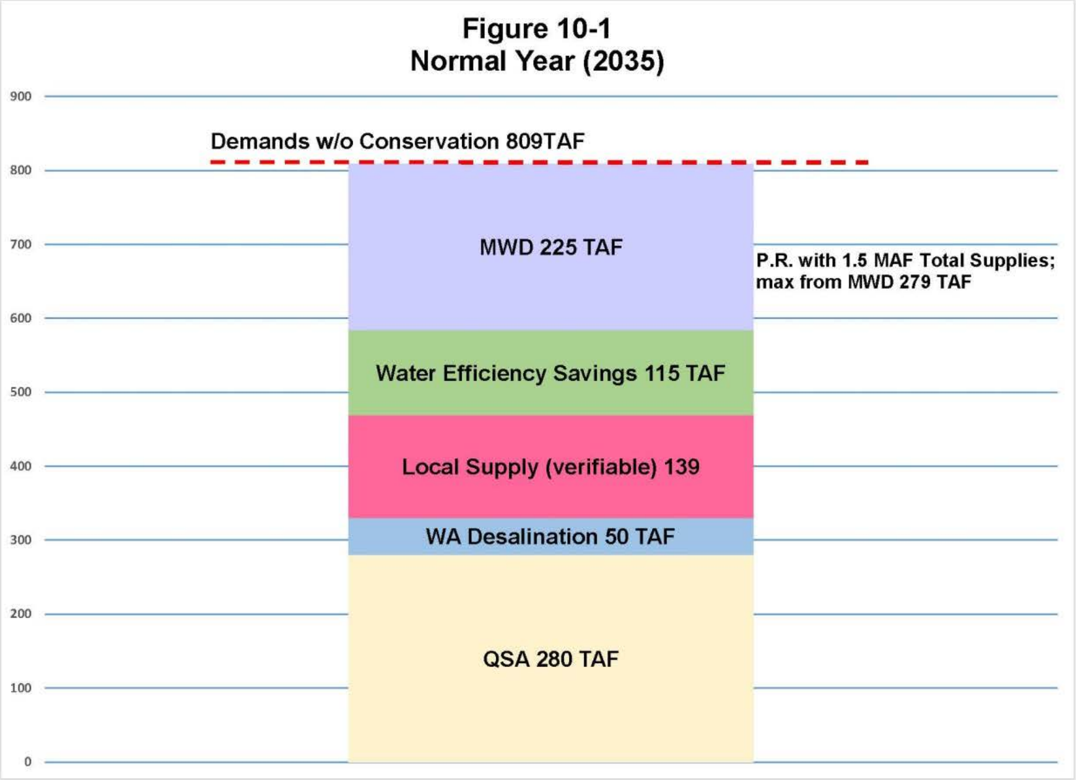
- Member agency implementation of projected verifiable water recycling, and brackish groundwater recovery projects
- Member agency long-term water efficiency savings
- Average yield from surface and groundwater supplies
- Water Authority's QSA supplies delivered in accordance with agreements
- Deliveries from the Carlsbad Desalination Plant in accordance with the Water Purchase Agreement
- To determine Metropolitan's supply to the Water Authority, its preferential rights allocation methodology was used. In 2035, the Water Authority's right is estimated to be approximately 18.62 percent with Metropolitan at 1.5 million AF of supply available.[1] (Refer to **Section 6.1.1** for details on preferential rights.) Under normal weather, Metropolitan is able to meet the supplemental needs.

Figure 10-1 below includes the projected water resource mix for 2035 under normal weather conditions. The scenarios illustrated in the process include member agency long-term water

---

[1] Forecasted number using Metropolitan's current methodology to calculating the preferential rights for the Water Authority; a Superior Court in 2015 ruled Metropolitan under-calculated the Water Authority's preferential rights, a decision that is being appealed by Metropolitan.

efficiency savings to highlight the expected volume and importance in evaluating supply uncertainties.



As shown in Figure 10-1, if the projected Metropolitan, Water Authority, and member agency supplies are maintained and developed as planned, no shortages are anticipated within the Water Authority's service area in 2035 in a normal year. Consistent with the Act, it is important that a risk assessment be conducted on the projected resource mix to ensure long-term reliable and sustainable water supplies to meet demands. This is accomplished through the scenario planning process, with the next step being to identify the critical uncertainties.

10.1.3 Critical Uncertainties Associated with Implementation of Projected Resource Mix

Following identification of the projected resource mix, the next step in the analysis is to identify critical uncertainties surrounding implementation of the mix. Table 10-1 provides a list of the critical uncertainties based on source documents, such as the DWR 2013 California Water Plan Update. The list does not include all the uncertainties water planners face, but focuses on critical uncertainties associated with supply planning reliability. For example, managing uncertainties associated with physical system reliability, such as a potential pipeline failure, is handled through the Water Authority's Integrated Contingency Plan: Emergency Operations Plan. The critical uncertainties form the basis for developing potential future scenarios. To aid in the process of formulating the potential scenarios, the uncertainties are categorized into whether the source of change is gradual over the long term or more sudden.

Table 10-1. Critical Uncertainties Associated with Implementation of Projected Resource Mix

Sources of Gradual Change and Uncertainty	Sources of Sudden or Short-term Change and Uncertainty
Demographic	**Droughts**
Growth deviates from SANDAG Forecast	Severity, timing, and frequency
Climate Change	**Changing Policies/Regulations/Laws/Social Attitudes**
Impacts from long-term changes in temperature and precipitation • Snowpack • Hydrologic Pattern • Rainfall • Seal Level Rise	• Regulatory restrictions are put in place that further limit supply availability • Emerging Contaminants • Endangered Species • Plumbing Codes
State Water Project Reliability	**Delta Levee Failure**
Willingness to pay for Delta Fix	Delta levees fail due to earthquake or flooding and supplies are curtailed from State Water Project
Local Supplies not Developed as Planned	

Notes: Format adopted from DWR California Water Plan Update 2013, Volume 1, Chapter 5

10.1.4 Scenario Analysis – Future Potential Scenarios Based on Critical Uncertainties

“Traditional scenario planning, also known as traditional scenario analysis is a methodology that relies on developing future scenarios that consider a variety of potential future situations.” (WUCA, 2010) The scenarios are plausible, but not predictions or forecasts of the future. They incorporate the water supply uncertainties urban water planners face and can be qualitative, quantitative or both. Important to traditional scenario planning is to select just a few scenarios that focus on critical uncertainties and avoid having too many scenarios. When working with numerous scenarios they will begin to blur and lose their meaningful distinctions as decision tools. From the scenario analysis, common strategies are developed to manage the uncertainties. The five potential scenarios developed based on the uncertainties are listed in Table 10-2, followed by a detailed description.

Table 10-2. Future Potential Scenarios Based on Critical Uncertainties

	Future Potential Scenarios Identified for Planning Purposes
1	Drought
2	Drought with Further Limitations on Metropolitan Supplies
3	Drought with Limited Metropolitan Supplies and Member Agency Local Supplies
4	Demographic Shift
5	Climate Change

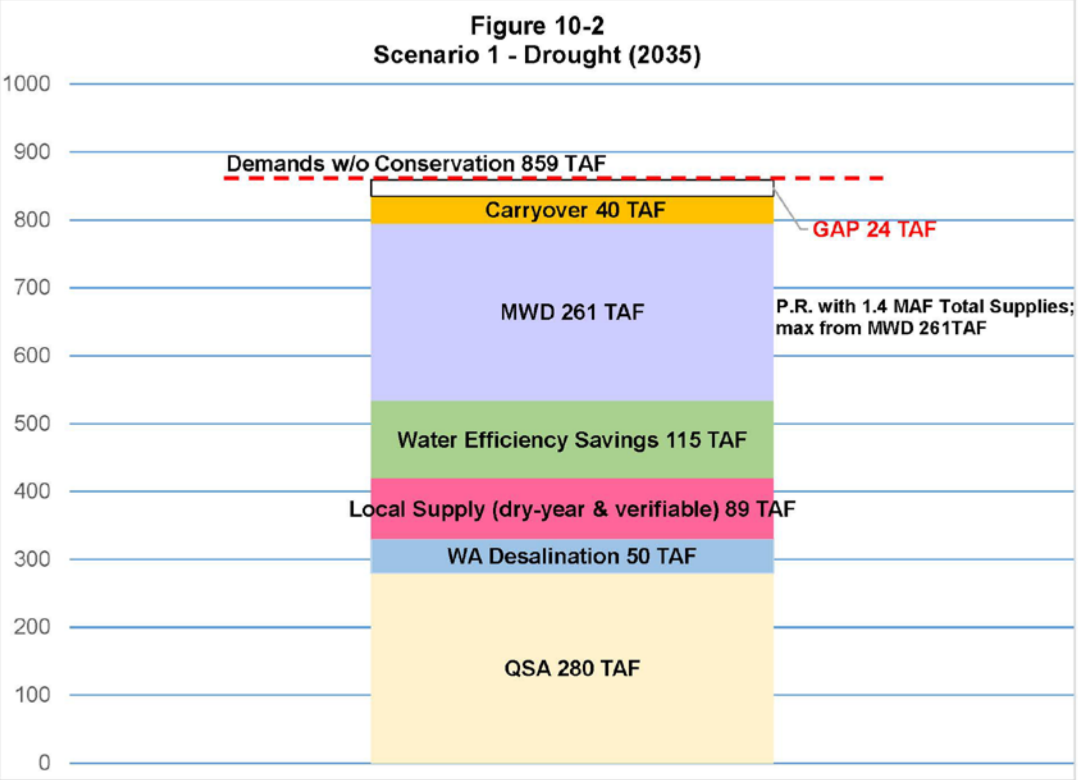
The five scenarios and potential supply gap are described below.

Scenario 1: Drought

Scenario 1 is a dry-year situation developed based on the following factors:

- Single dry-year demands derived from CWA-MAIN modeling effort (refer to **Section 2**).
- Metropolitan is allocating supplies due to dry conditions. It is unknown how Metropolitan will allocate supplies in the long term. For this reason and for conservative planning purposes, the Water Authority's allocation is based on its preferential right to purchase supplies from Metropolitan. In 2035, that right is estimated to be approximately 18.62 percent with 1.4 million AF of supply available (refer to **Section 6.1.1** for details on preferential rights).
- Surface and groundwater supply yields reduced based on 2015 dry-year supplies.
- Supplies utilized from carryover storage reserves.
- Verifiable member agency projected water recycling and brackish groundwater supplies.
- Water Authority's QSA supplies are being delivered in accordance with agreements.
- Deliveries from the Carlsbad Desalination Plant are made in accordance with the Water Purchase Agreement.

The projected mix of supplies and potential gap are shown in Figure 10-2.



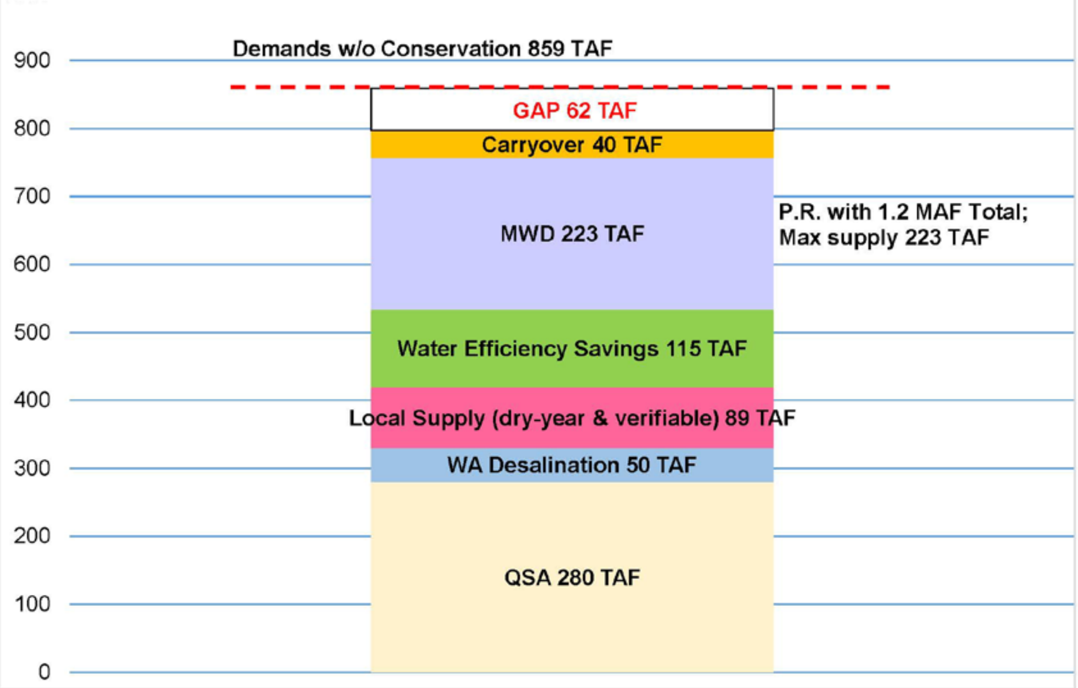
Scenario 2: Drought with Further Limitations on Metropolitan Supplies

Scenario 2 was developed utilizing the same variables identified in Scenario 1, with the following modification:

- Metropolitan supplies are further limited and being allocated to the member agencies due to a prolonged multi-year drought:
  - Metropolitan limited to 1.2 million acre-feet of supplies due to dry conditions and increased reductions in deliveries from State Water Project (no Delta improvements) and/or reduction in Colorado River deliveries, and
  - Water Authority receives estimated preferential right allocation of 18.62 percent.

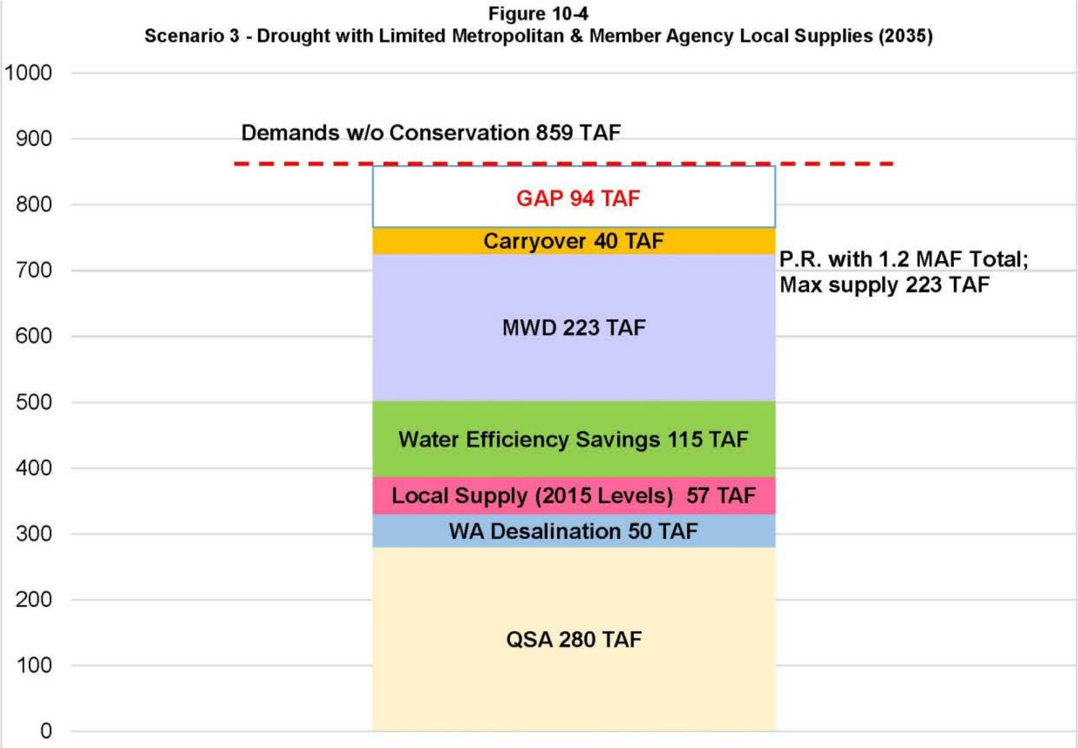
The projected mix of supplies and potential gap are shown in Figure 10-3.

Figure 10-3
Scenario 2 - Drought with Further Limitations on Metropolitan Supplies (2035)



Scenario 3: Drought with Limited Metropolitan Supplies and Member Agency Local Supplies

Scenario 3 was developed utilizing the same variables identified in Scenario 2, except that the verifiable recycled, potable reuse and brackish groundwater supplies are not developed as planned and remain at 2015 levels. The projected mix of supplies and potential gap are shown in Figure 10-4.



Scenario 4: Demographic Shift

As discussed in **Section 2**, the Water Authority's demand projections are driven by SANDAG's most recent regional growth forecast. In turn, the regional growth forecast is based on the cities and county general plans. Under this scenario, land use development approval would differ from that identified in the cities and county general plans. Depending upon the variation in housing type, demands could be higher or lower. Single-family homes with larger lots (lower density and potentially more irrigated landscape) will generally use more water than multi-family units (higher density). One potential scenario that would cause demands to be higher than projected is if the multi-family units included in the growth forecast are approved as single-family units. The magnitude of a potential housing shift is difficult to quantify. The effect on water demands due to a shift in demographics would be a gradual change that would be captured in each five-year update to the UWMP. Projected demands in the UWMP updates would be based on SANDAG's most recent growth forecast, which would reflect changes to land use plans occurring between plan updates. In part to deal with this uncertainty associated with land use approvals occurring during the 2015 Plan planning horizon, an additional demand increment, termed Accelerated Forecasted Growth, has been included in the regional total demand forecast, as discussed in **Section 2**.

Scenario 5: Climate Change

Scenario 5 considers the potential influence climate change may have on the projected resource mix. Because there are still too many uncertainties regarding the impact of climate change on supplies and demands, a qualitative risk assessment is conducted. The assessment is based primarily on the DWR October 2008 Report entitled "Managing an Uncertain Future; Climate Change Adaptation Strategies for California's Water."

When evaluating the effects of climate change on long-term water supply planning, a distinction should be made between climate and weather. Weather consists of the short-term (minutes to months) changes in the atmosphere. Climate is how the atmosphere "behaves" over relatively long periods of time. Climate change refers to changes in long-term averages of daily weather. Changes to climate will be gradual, providing water supply agencies the ability to adapt planning strategies to manage for the supply uncertainties. The effect on supply would be gradual and captured in each five-year update to the UWMP.

Researchers have concluded that increasing atmospheric concentrations of GHGs, such as carbon dioxide, are causing Earth's air temperature to rise. While uncertainties remain regarding the exact timing, magnitude, and regional impacts of the temperature and potential precipitation changes due to climate change, researchers have identified several areas of concern that could influence long-term water supply reliability. These potential areas are listed below.

Loss of Natural Snowpack Storage. Rising temperatures reduce snowpack in the Sierra Nevada because more precipitation falls as rain, and snowmelt occurs sooner. Snowpack in the Sierra Nevada is the primary source of supply for the State Water Project. Snowpack is often considered a large surface "reservoir," where water is slowly released between April and July each year. Much of the state's water infrastructure was designed to capture the slow spring runoff and deliver it during the drier summer and fall months. DWR projects that the Sierra Nevada snowpack will experience a 25 to 40 percent reduction from its historic average by 2050.

Sea Level Rise. Rising sea levels could increase the risk of damage to water and water recycling facilities from storms, high-tide events, and erosion of levees. A potential catastrophic levee failure in the Delta could interrupt supplies from the State Water Project, potentially reducing supply deliveries to the San Diego region from Metropolitan. In addition, rising sea levels could cause saltwater intrusion into the Delta, degrading drinking water quality. More freshwater releases from upstream reservoirs would be required to repel the sea to maintain salinity levels for municipal, industrial, and agricultural uses.

Changes in Average Precipitation and Runoff Volume. The effect of climate change on overall precipitation and runoff volumes is still unclear and highly uncertain. For example, a number of studies conclude that the flow of the Colorado River may be reduced by climate change, but a wide disparity exists on the predicted volume. The yield from local surface water resources could potentially be reduced, if annual runoff volumes are reduced due to a decline in precipitation or an increase occurs in evapotranspiration in reservoirs. It must be highlighted that research is still highly unclear on how precipitation levels may be impacted by climate change.

Change in Frequency and Intensity of Droughts. Warming temperatures, combined with potential changes in rainfall and runoff patterns, could exacerbate the frequency and intensity of droughts.

Demands Levels. Climate change could also gradually affect water demands out in the future. Warmer temperatures increase evapotranspiration rates and the growing season, which are likely to increase outdoor consumptive water use for landscaping. As part of the water demand forecasting effort for the 2015 Plan, the long-term influence of climate change on demands in the San Diego region was evaluated. Results from the analysis are included in **Section 2**.

All five of the areas discussed above focus on the potential effect climate change could have on future supply reliability. The potential long-term effect is a possible decrease in the availability of imported supplies from Metropolitan and local supplies—causing a potential gap between supply and demands. With so many unknowns regarding the actual impact, the previous uncertainty scenarios could be seen as capturing any potential shortfalls in supply due to climate change. In addition, the supply and demand impacts from climate change will start to be experienced within the 2015 Plan 25-year planning horizon and should be considered in establishing "no regret" strategies that provide water supply benefits within the planning horizon, while increasing the ability to manage potential climate change impacts in the future.

10.1.5 Strategies to Strengthen Implementation of Resource Mix and Manage Uncertainty Scenarios

For each projected scenario, including the projected resource mix, management strategies are identified to both strengthen likelihood of development of identified resources and fill potential gaps in supply. The strategies are generally common to all the scenarios, meaning that such projects and programs will be useful under a wide range of possible outcomes. As a result, the strategies are more likely to be viable as the future unfolds. The strategies include individual elements that can consist of policies and programs, as well as, various potential construction projects. The management strategies included in the 2015 Plan scenario planning process are derived based on previous Water Authority Board actions on policies and programs surrounding supply reliability and development.

Table 10-3 contains strategies that the Water Authority can employ to aid in the implementation of the supplies identified in the projected resource mix and manage uncertainty scenarios. The strategies focus on programs, many of which are already being implemented consistent with Water Authority Board policy.

Table 10-3. Potential Common Strategies to Strengthen Implementation of Projected Resource Mix and Manage Uncertainty Scenarios

Potential Water Authority Policies/Programs
Foundational Strategy
Reduce reliance on Metropolitan supply sources to ensure the existing and projected water resource mix is reliable and drought-resilient.
Member Agency Local Projects
Provide technical assistance to member agencies in the planning, design, and construction of local projects.
Advocate at local, state, and federal levels for minimizing regulatory constraints and enacting acceptable and practicable regulatory standards that allow member agencies to maximize local supply project development.
Advocate for state and federal funding for local projects and work with agencies to ensure projects qualify for funding.
Water Conservation
Offer programs that encourage long-term behavioral change toward measureable reductions in outdoor water use.
Climate Change
Encourage focused scientific research on climate change to identify the impacts on the San Diego region's imported and local water supplies.

In addition to the policies and programs identified in Table 10-3, Table 10-4 provides a list of the potential management strategies that the Water Authority and member agencies can take in regard to managing the uncertainty scenarios and filling potential gaps. As discussed in **Section 9.5**, development of additional planned projects is critical to continue reducing the region's reliance on Metropolitan supply sources and increasing the region's self-reliance. In addition, member agency projects, such as potable reuse, not only provide the agency a supply reliability benefit, but can also provide other benefits, such as reducing wastewater flows to a downstream treatment plant and ultimately the ocean.

Table 10-4. Potential Strategies to Manage Uncertainty Scenarios (2035)

Potential Strategy	Estimated Yield (AF)
Member Agency Potential Additional Planned Local Projects[1]	
Potable Reuse	106,099
Additional Planned Recycled Water and Brackish Groundwater	10,926
Fallbrook PUD/MCB Camp Pendleton Groundwater Recharge and Recovery Project	3,100
Otay WD Rosarito Beach Desalination Project	16,100
Total Additional Planned Local Projects (Member Agencies):	136,225
Water Authority Potential Strategies	
Carlsbad Desalination Plant Additional Capacity	5,600
Potential Regional Seawater Desalination Facility (MCB Camp Pendleton Phase I)[2]:	56,000
Regional Shortage Management Actions (Dry-year transfers and potential extraordinary conservation savings)	--[3]
Total Minimum Estimated Yield from Potential Strategies:	197,825

[1] The estimated yields from the additional planned local supply projects are from the member agencies, and the development and implementation of these supplies rest with the member agencies.

[2] Ultimate decision to move forward on construction of the proposed MCB Camp Pendleton desalination project would be considered in context of the development of member agency local supplies, such as potable reuse, changes in imported supply reliability, and regional water demand levels.

[3] Availability of dry-year supplies is described in Section 11.2.4.

In regard to Scenario 6: Climate Change, the strategies outlined in Tables 10-3 and 10-4 can also be used to manage the supply uncertainties associated with a changing climate. For example, the foundational strategy to diversify the region's resource mix through development of local projects, such as recycled water and seawater desalination, reduces reliance on imported and local surface supplies, whose yields could potentially decrease as a result of climate change. The strategies identified in this section provide supply reliability benefits within the planning horizon, while increasing the ability to manage potential climate change impacts in the future.

A number of factors influence the decision to develop a new supply project, such as reliability, political will, community support, cost and financing. A key factor often considered when evaluating potential supply strategies is the project costs.

As listed in Table 10-4, extraordinary conservation is identified as a potential shortage management action to assist in managing uncertainties. It should be noted that the amount of extraordinary savings expected to be achieved through mandatory measures, such as water-use restrictions, could be less than that experienced in the current and previous shortage periods. This is due to the concept known as demand hardening, which is described in the dry-year reliability assessment (**Section 9.3**).

10.1.6 Key Tracking Metrics – Track Progress on Implementation of Projected Resource Mix and Need for Adaptive Strategies

Through the scenario analysis, the projected resource mix plus the five uncertainty scenarios have been identified. Potential strategies to strengthen implementation of the resource mix and manage the uncertainty scenarios have been identified. The critical final step, which links these two components, is to establish a few key tracking metrics that evaluate the status of supply sources in the projected resource mix and whether the adaptive management strategies are required to ensure continued reliability. The primary vehicle for reporting to the Board on the metrics would be through the Water Authority's Annual Water Supply Report. Water Authority Administrative Code Section 8.00.050 outlines preparation of an annual water supply report that would provide information on the reliability of existing supplies and implementation of plans and programs to meet the future water supply requirements. The annual report serves as an excellent vehicle to monitor the key tracking metrics. A complete evaluation and update of the resource mix would occur every five years with update of the UWMP. Table 10-5 highlights the timing upon which the Water Authority Board would track progress on implementation of the projected resource mix. If necessary, reporting to the Board on issues related to implementation of the resource mix could occur more frequently.

Table 10-5. Tracking Progress on Implementation of Resource Mix

Time Period	Vehicle	Purpose
Annually (except UWMP years)	Annual Supply Report to Board (Consistent with Administrative Code Section 8.00.050)	Utilizing key indicators, conduct evaluation and track progress on implementation of UWMP projected water resource mix
At Least Every five years	Urban Water Management Plan Update	Conduct evaluation of supply and demand conditions and update projected resource mix
As Needed	Reports to Board	Update the Board on issues impacting resource mix implementation

With the many unknown factors and outside influences affecting development of supply sources in the projected mix, the key metrics for tracking implementation will be included in the next update of the annual supply report. The metrics could be reset with each annual supply report update. Examples of metrics include evaluating the status of the following items:

- State and federal efforts to fix the Bay-Delta
- Supply conditions on the Colorado River and likelihood of the Secretary of Interior declaring shortages
- Regional storage programs
- Member agency development of local supplies consistent with the targets identified in the 2015 Plan

The analysis included in the annual supply report will include a discussion on the status of meeting the metrics and overall implementation of the projected resources mix. Highlighting this list of metric, does not preclude other metrics from being evaluated in the supply report. Key to the reporting will also be an update on the potential strategies; whether they remain a viable option taking into account specific project studies and political decisions made over the reporting period.

10.2 Conclusion

As identified at the beginning of the scenario planning process, the focal question that ultimately needed to be answered as a result of this process is:

> In this climate of supply uncertainty and scarcity, how will the Water Authority and its member agencies adaptively provide a water supply that is reliable and drought-resilient over the next 20 years?

Based on the results of the scenario planning process, the Water Authority and its member agencies can help ensure a long-term reliable water supply for the region through the following four basic measures:

1. Implementation of the diverse resource mix identified in the 2015 Plan, including the long-term water-use efficiency targets;
2. Continue to implement additional planned local projects, with a priority on member agency projects, that would strengthen implementation of the projected resource mix, continue to reduce reliance on Metropolitan supply sources, and manage potential shortfalls in development of supplies identified in the resource mix; and
3. Conduct annual tracking and reporting on implementation of the mix that will allow the Water Authority and its member agencies to adjust based on actual supply availability and conditions and take appropriate action if necessary, if supplies in the resource mix are not developed as planned.

10.3 Primary Source Documents

California Department of Water Resources. California Water Plan Update 2009 and 2013. Chapter 5: Managing an Uncertain Future.

California Department of Water Resources, 2008. Managing an Uncertain Future; Climate Change Adaptation strategies for California's Water.

Hanak, Ellen and Lund, Jay, 2008. Adapting California's Water Management to Climate Change, Public Policy Institute of California.

Howe, Charles W., and Goemans, Christopher, 2007. "The Simple Analytics of Demand Hardening." Journal AWWA.

Metropolitan Water District 2010 Urban Water Management Plan

Schartz, Peter, 1991. The Art of the Long View: Planning for the Future in an Uncertain World.

U.S. Geological Survey Circular 1331, 2009. Climate Change and water resources management – A Federal Perspective

Water Utility Climate Alliance (WUCA), 2010. Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning

This page intentionally left blank.

Section 11
Shortage Contingency Analysis

The Act requires that urban water agencies conduct a water shortage contingency analysis as part of their 2015 plans. This section includes the Water Authority's analysis and plans to address supply shortages due to a catastrophe, drought, or other situations. An estimate of the minimum supplies available during each of the next three years, required under the Act, is also contained in this section.

11.1 Catastrophic Water Shortage

A catastrophic water shortage occurs when a disaster, such as an earthquake, results in insufficient available water to meet the region's needs or eliminates access to imported water supplies. The following section describes the Water Authority's Integrated Contingency Plan (ICP) and ESP, both of which 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. The Water Authority's ICP and ESP provide actions to be taken in the event of an earthquake or power outage. The ESP provides actions that the Water Authority will take to operate ESP facilities to address up to a six-month supply interruption, which could result from earthquakes (see **Section 11.1.2** below for ESP actions). As discussed in the ICP, the Water Authority has prepared for potential power outages by operating and testing standby and mobile generators that can provide power for essential or critical activities for at least one hour. Power outages may occur as a result of natural events such as an earthquake and flooding, or man-made events such as a terrorist act.

11.1.1 Integrated Contingency Plan

The Water Authority's ICP provides staff with the information necessary to respond to an emergency that causes severe damage to the Water Authority's water distribution system, or impedes the Water Authority's ability to provide reliable water service to its member agencies. The ICP describes the situations and incidents that will trigger the activation of the Water Authority's ICP and Emergency Operations Center. It also provides direction and strategies for responding to a crisis. The Water Authority's ICP includes:

- Authorities, policies, and procedures associated with emergency response activities
- Emergency Operations Center activities, including activation and deactivation guidelines
- Multi-agency and multi-jurisdictional coordination, particularly between the Water Authority, its member agencies, and Metropolitan in accordance with Standardized Emergency Management System and National Incident Management System guidelines
- Incident Command System management and organization and emergency staffing required to assist in mitigating any significant emergency or disaster
- Mutual Aid Agreements and covenants that outline the terms and conditions under which mutual aid assistance will be provided

- Hazard specific action plans and Incident Command System position checklists

In addition, the Water Authority's ICP uses a step-by-step approach to emergency response planning by providing tools such as resource and information lists, personnel rosters, pertinent policies and procedures, and reference materials. The Water Authority provides input to the Unified San Diego County Emergency Services Organization's "Operational Area Emergency Plan," which, in turn, supports the Water Authority's ICP.

11.1.2 Water Authority's Emergency Storage Project

The ESP is a system of reservoirs, pipelines, pump stations, and other conveyance facilities intended to improve San Diego's regional water storage capacity and allow stored emergency water to be delivered to the Water Authority's member agencies within San Diego County during a prolonged regional interruption. The ESP facilities can be used to help deliver emergency water supply to member agencies during two- and six-month emergency events in which San Diego County is unable to receive regular imported water deliveries from Metropolitan due to a disaster that renders their transmission system inoperable. A regional emergency event is a catastrophic interruption of imported water supplies, or any other emergency situation in which the Water Authority has insufficient water available to supply at least 75 percent of the total demand of its service area, or any portion thereof. The Water Authority Board may also authorize that water stored for emergency use under the ESP be used in a prolonged drought or other water shortage situation where imported and local supplies do not meet 75 percent level of service to the member agencies. The regional emergency water supply reservoirs (with their ESP capacity) are Olivenhain (18,000 AF), Lake Hodges (20,000 AF), and San Vicente (52,100 AF). The actual amount of ESP water to be delivered to a particular member agency during an emergency event will depend on many factors, including member agency demands, local supplies, parts of the ESP infrastructure and other Water Authority infrastructure in place, availability of supplies from Metropolitan, and the actual duration of the emergency. Overall, the ESP was designed to create a regional storage capacity of 90,100 AF of water to meet emergency needs through at least 2030.

The ESP storage and conveyance facilities that are completed include Olivenhain Reservoir, Olivenhain Pipeline and Pump Station, Lake Hodges Pipeline and Pump Station, San Vicente Reservoir Dam Raise, and San Vicente Pipeline and Pump Station. These ESP facilities will allow untreated water to be delivered to member agency treatment plants as well as the Water Authority's treatment plant, which in turn will provide treated water to all member agency customers during an emergency event. The final ESP components to be built will be a north San Diego County ESP pump station and associated conveyance facilities that will be capable of delivering treated water from the Water Authority's treatment plant to the most northern member agencies. The estimated completion date for these facilities is late 2019.

In sizing the ESP, the Water Authority calculated necessary storage capacities required to provide member agencies with a 75 percent level of service during a two- or six-month emergency event, after taking into account other supplies available to its member agencies. The level of service is the ratio of all supplies available to a member agency to the net demand of the member agency. The two- and six-month emergency events formed the basis for planning, design, construction, and operation of ESP facilities.

Completion of the Water Authority's Twin Oaks Valley WTP in 2008 has increased the ability to treat emergency water supplies delivered from Olivenhain and Lake Hodges Reservoirs. Prior to construction of the Twin Oaks Valley WTP, many member agencies that normally receive treated water from the Water Authority would have to be delivered untreated water in a two-month emergency event. In addition, untreated water would have to be conveyed in several treated water pipelines, resulting in the need for decontamination of the treated water pipelines prior to switching back to treated water deliveries. The construction of the Twin Oaks Valley WTP now allows the Water Authority to deliver treated water to its treated water customers in a two-month emergency event, and eliminates the need to convey untreated water in treated water pipelines. Additionally, the completion of the Carlsbad Desalination Plant now allows the Water Authority to deliver additional treated water supply to member agencies during the emergency events. This results in a commensurate decrease in emergency storage that will need to be maintained in ESP reservoirs, and decreases the burden on the Twin Oaks Valley WTP, especially in a two-month emergency event.

The following general procedure from the January 2013 Emergency Water Delivery Plans shows the methodology for calculating the allocation of ESP supplies to member agencies in a prolonged outage situation without imported supplies:

1. Define the water storage and conveyance facility infrastructure that would be in place at the time of the emergency event in order to estimate duration of emergency (that is, time needed to repair damaged pipelines and/or infrastructure).
2. Determine the total demand of each member agency during the emergency, considering both M&I and agricultural demands.
3. Determine the net demand of each member agency, considering the availability of recycled water supplies.
4. Determine the local supplies available to each member agency from groundwater and surface water storage.
5. Determine the amount of local water that could be transferred within City of San Diego service areas, and between member agencies.
6. Determine the amount of Carlsbad Desalination Plant supplies that could be delivered to member agencies.
7. Determine the amount of imported water supplies from Metropolitan available to deliver to member agencies.
8. Allocate ESP supplies in Olivenhain, Lake Hodges, and San Vicente Reservoirs to each member agency to achieve an initial level of service of 75 percent, considering other supplies available to each member agency as described above and taking into account limitations of delivery facilities.
9. Determine reductions in member agency deliveries due to the influence of the Water Authority's TSAWR program. The cutback rate for TSAWR customers is twice the rate imposed on Water Authority M&I customers, up to a 90 percent cutback. Reductions in deliveries that arise from such a cutback would be reallocated to commercial and industrial customers.
10. Determine increases in member agency deliveries due to redistribution of the emergency water not delivered to member agencies as a result of the TSAWR program.

11. Determine net Water Authority deliveries to member agencies from all water supply sources available to the Water Authority, consisting of Carlsbad Desalination Plant supplies, imported water supplies from Metropolitan, and ESP reservoir supplies.

11.2 Water Shortage and Drought Response Planning

This section discusses the actions the Water Authority, in coordination with its member agencies, could take to effectively plan for potential shortages. The Water Authority's Water Shortage and Drought Response Plan (WSDRP), which serves as the region's guiding shortage management document, is discussed below. The section also highlights the actions taken over the past decade to manage drought and supply shortfalls, and contains information on the Water Authority's carryover storage and dry-year supplies.

11.2.1 Water Shortage and Drought Response Plan

Following the major drought in California of 1987—1992, which led to severe water supply shortages throughout the state, the Water Authority and its member agencies aggressively developed plans to minimize the impact of potential shortages. In 2006, the Water Authority Board adopted the WSDRP, to serve as a comprehensive plan in the event that the region faced supply shortages due to drought or other water shortage conditions.

The WSDRP was developed by the Water Authority in coordination with its member agencies 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 of 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 WSDRP is organized into three stages: voluntary supply management, supply enhancement, and mandatory cutbacks including a supply allocation methodology. These stages are summarized in the Drought Response Matrix in Table 11-1. A copy of the WSDRP is included in **Appendix G**.

Drought Response Matrix

The WSDRP includes a drought response matrix that serves as guidance to the Water Authority and member agencies in selecting potential regional actions to lessen the severity of shortage conditions. As shown in Table 11-1, the matrix identifies the three drought stages and potential actions available to the Water Authority at each stage.

Table 11-1. Drought Response Matrix – Firm Demands

Potential SDCWA Drought Actions	Stages		
	Voluntary	Supply Enhancement	Mandatory Cutbacks
Ongoing BMP implementation	X	X	X
Communication strategy	X	X	X
Monitoring supply conditions and storage levels	X	X	X
Call for voluntary conservation	X	X	X
Draw from SDCWA carryover storage	X	X	X
Secure transfer option contracts	X	X	X
Buy phase 1 spot transfers (cost at or below Tier 2 rate)		X	X
Call transfer options		X	X
Buy phase 2 spot transfers (cost at or above Tier 2 rate)		X	X
Implement allocation methodology			X
Utilize ESP Supplies			X

SDCWA = San Diego County Water Authority

Water Authority Supply Allocation Methodology

In the event of mandatory supply cutbacks from Metropolitan, the WSDRP includes an M&I allocation methodology to determine how the Water Authority's available supplies will be equitably allocated to its member agencies. Based on "lessons learned" from implementation of the allocation methodology during the 2007–2011 drought management period, the Water Authority and member agencies worked together to identify specific elements of the methodology that could be modified to improve its future use. These modifications were approved by the Water Authority Board in April 2012 and are incorporated into the WSDRP.

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 monthly meter reads, which are compared to the allocation targets for each member agency. This tracking information is then provided in monthly progress reports to the board of directors.

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 Drought Management Plan Water Supply Allocation Methodology. A copy of the resolution is included in **Appendix G**. The resolution includes a requirement for the Water Authority staff to report monthly to the Board and member agency managers on how agency deliveries are tracking compared to their allocation target.

A separate process is used to allocate deliveries under the TSAWR program, where the supply allocations are based on Metropolitan's cutback level to the Water Authority and Water Authority regional supplies are not available to mitigate the cutback. Under this process, TSAWR demands are met through the supplies allocated from Metropolitan and not supplemented with the Water Authority's regional supplies: Colorado River Transfers; Carlsbad Desalination Plant water; any carry-over storage water; and potential dry-year supplies.

11.2.2 Model Drought Response Conservation Ordinance

In March 2008, the Water Authority Board of Directors approved for release a Model Drought Response Conservation Program Ordinance (Model Drought Ordinance) for use by member agencies in updating their existing ordinances. The Model Drought Ordinance was developed with input from the member agencies to provide regional consistency during periods of shortages. It identifies four drought response levels that contain water-use restrictions to help achieve demand reduction during temporary shortages. The restrictions become more stringent at each successive level to obtain necessary savings and delay economic impact until higher levels. The Model Drought Ordinance is included in **Appendix H**. Table 11-2 shows the correlation between the WSDRP stages and the Model Drought Ordinance.

Table 11-2. Correlation between WSDRP Stages and Model Drought Ordinance Levels

WSDRP Stage	Drought Response Level	Use Restrictions	Conservation Target
Voluntary (Stage I)	1 – Drought Watch	Voluntary	Up to 10%
Supply Enhancement (Stage II)	1 – Drought Watch	Voluntary	Up to 10%
	2 – Drought Alert	Mandatory	Up to 20%
Mandatory Supply Cutback (Stage III)	2 - Drought Alert	Mandatory	Up to 20%
	3 - Drought Critical	Mandatory	Up to 40%
	4 - Drought Emergency	Mandatory	Above 40%+

The Water Authority's member agencies, not the Water Authority, have the direct customer service relationship with water users, and responsibility to address mandatory use prohibitions or restrictions during water shortages. The Model Drought Ordinance served as a model to the member agencies in updating their individual ordinances to help promote regional consistency. Member agencies independently adopt retail-level actions to manage potential shortages. Since its approval, all of the member agencies have updated their existing ordinances, based on the Model Drought Ordinance but also tailoring their individual ordinances to their unique service area, characteristics and conservation requirements. Similar to the Water Authority's Model Drought Ordinance, the member agencies' ordinances provide specific mandatory restrictions on water use during a water shortage or drought event depending on its severity.

11.2.3 Drought Response and Shortage Management Actions

Over the past decade, California's water supplies have been limited due to a combination of increased restrictions on State Water Project operations coupled with ongoing drought conditions. Beginning in 2007, DWR voluntarily shut down the State Water Project pumps for the first time ever to protect fish species in the Delta listed under the federal or California ESAs. Additional environmental restrictions on pumping from the State Water Project and Central Valley Project went into place in 2008 and 2009 to protect aquatic species, including the Delta smelt and salmon. The impact of these restrictions is a reduction in available supplies from the State Water Project compared to historic allocations, even in wetter years. Metropolitan estimates that the combined reduction in State Water Project deliveries ranges from 0.3 million AF during critically dry years to 1.3 million AF in above normal water years. Under average hydrology, the impact is estimated to be

1.0 million AF, effectively reducing State Water Project deliveries from approximately 3.3 million AF to 2.3 million AF for the year (see **Section 6.2.2** for more discussion).

California has also been in two significant droughts since 2007, compounding the reductions in supply availability due to State Water Project pumping restrictions. Statewide runoff to surface water reservoirs has been below average every water year from 2007 through 2015, with the exception of 2011. Water year 2011 was a very wet year that brought relief from the 2007—2011 drought, with above average precipitation and snowpack that filled key surface water reservoirs across California. The Colorado River has also been in the midst of a prolonged multi-year drought that began in 2000, affecting supply availability to Metropolitan (see **Section 6.2.1** for more discussion).

Table 11-3 shows the annual percent of State Water Project Table A allocations by DWR to the State Water Contractors, which includes Metropolitan, and reflects the influence of drought and the environmental restrictions on State Water Project operations that went into effect first in 2007.

Table 11-3. State Water Project Table A Allocation

Calendar Year	Initial Allocation	Final Allocation
2005	40%	90%
2006	55%	100%
2007[1]	60%	60%
2008	25%	35%
2009	15%	40%
2010	5%	50%
2011	25%	80%
2012	60%	65%
2013	30%	35%
2014	5%	5%
2015	10%	20%
2016[2]	10%	60%

[1] Additional restrictions on State Water Project operations were imposed in calendar year 2007.

[2] Calendar year 2016 Table A allocation reflects DWR's April 21, 2016 update and may not be the final calendar year allocation.

During the 2007—2011 drought management period, the Water Authority first implemented its WSDRP, following its progressive phased approach, beginning with Stage 1, Voluntary Supply Management in 2007 and progressing in 2009 to Stage III, Mandatory Supply Cutback. During this period, Metropolitan allocated supplies to its member agencies, including the Water Authority, under its WSAP. The WSAP was approved by Metropolitan's board in 2008, and is intended to manage Metropolitan's member agencies' demands and to help keep sufficient water in storage for immediate future years, if supply deficiencies continue. Metropolitan's actual cutback level to its member agencies was 13 percent, which was reduced to a regional cutback level of 8 percent due to the supply reliability investments made by the Water Authority and member agencies. As supply conditions improved into spring 2011 and storage levels began to rise, Metropolitan terminated water allocations to its member agencies. Subsequently, the Water Authority discontinued allocations to its member agencies and deactivated the WSDRP on April 28, 2011.

Emergency Regulations and Drought Response 2012–2016

California is in the midst of an unprecedented multi-year drought following record-breaking dry and warm weather across the state since 2012. Due to severe drought conditions, on January 17, 2014, Gov. Edmund G. Brown Jr. proclaimed a state of emergency throughout California, calling for increased conservation across the state. In response to the governor's drought declaration and call for conservation, the Water Authority activated its WSDRP for the second time since its adoption in 2006, declaring in February 2014, a regional drought response Stage I, Voluntary Supply Management, and notifying the member agencies of a voluntary Drought Watch condition under the Model Drought Ordinance. The Water Authority recognized that voluntary measures to reduce water use would be instrumental in helping preserve critical water reserves, should dry conditions continue.

As drought conditions intensified across the state, with smaller communities in the Central Valley at risk of significant water supply shortages, in April 2014, the governor directed the SWRCB to adopt emergency regulations to prevent "the waste and unreasonable use of water," calling for a voluntary 20 percent reduction in urban water use statewide. In July 2014, the SWRCB adopted an emergency regulation for urban water conservation aimed at reducing outdoor water use, which established prohibitions on water waste and identified actions local water agencies should take to reduce water demand in their service areas. Consistent with the governor's call for statewide conservation, in July 2014, the Water Authority increased the regional drought response to Stage II, Supply Enhancement, and Drought Alert under the regional Model Drought Ordinance, which includes mandatory water-use restrictions with a regional savings target of up to 20 percent.

Dry conditions continued to worsen into a fourth year in the spring of 2015, as reflected by a record low level of snow water content in the northern Sierra Nevada of 5 percent of average for April 1, the date that usually marks the maximum accumulation of snowpack before it begins to melt. On April 1, 2015, the governor directed the SWRCB to impose restrictions on urban suppliers to achieve a statewide reduction in potable urban use of 25 percent. Following this direction, in May 2015, the SWRCB amended and readopted its emergency regulation to require a 25 percent reduction statewide in overall potable water use effective June 1, 2015, through February 2016. The regulation included water conservation standards for retail urban water suppliers based on a reduction in water use that varied between 4 and 36 percent depending on residential GPCD, compared with 2013 water-use levels. This marked the first time in California's history that conservation measures were mandated statewide to respond to drought conditions.

In April 2015, Metropolitan's Board announced that it would implement its WSAP, calling for a 15 percent cutback in fiscal year 2016 deliveries in its service area. In response to these cutbacks and the SWRCB emergency regulation, in May 2015, the Water Authority declared the Mandatory Supply Cutback stage under its WSDRP and approved member agency M&I and TSAWR supply allocations for fiscal year 2016. The Water Authority member agencies also were required to limit outdoor irrigation of ornamental landscapes and turf with potable water to no more than two days per week.

An important element to drought response planning is determining the regional shortage level based on available supplies and projected demands. This analysis was conducted in 2015 for fiscal year 2016, based on the supply allocation from Metropolitan. The Metropolitan supply allocation was combined with member agency dry-year local supplies, supplies from the Water Authority's

Colorado River transfers of conserved water, and deliveries from the Carlsbad Desalination Plant. The total supplies available were calculated as 521,000 AF. Normal water demands were calculated for fiscal year 2016 based on fiscal year 2014 demands. The analysis showed a shortage of less than one percent for the region, which demonstrated that the planning and actions taken by the Water Authority and its member agencies are effective in managing severe multi-year droughts. Unfortunately, the SWRCB emergency regulation did not take into account the supplies water agencies had available during the drought and the required agency reduction levels did not reflect the supply reliability investments agencies had taken to avoid or mitigate shortage due to drought.

Under the SWRCB's May 2015 emergency regulation, the Water Authority member agencies were required to reduce their monthly water use on a cumulative basis starting June 1, 2015, through February 2016, by 12 to 36 percent compared to 2013 water-use levels, for a total aggregate region-wide reduction in water use of 20 percent. The San Diego region effectively reduced its potable water use by 21 percent from June 2015 through February 2016, outperforming the state's aggregate regional target of 20 percent during the initial phase of unprecedented state water-use mandates.

In November 2015 the governor issued Executive Order B-36-15, extending the regulation until October 2016 and directing the SWRCB to consider modifications to the regulation. The Water Authority advocated for revisions to the regulation that take into account investments in drought resilient supplies. In February 2016, the SWRCB amended the emergency regulation to allow for adjustments to the conservation standards, including for new local drought-resilient supplies developed after 2013. In March 2016, the SWRCB certified supply from the Carlsbad Desalination Plant as drought-resilient, which lowered the range of member agencies' conservation standards to between 8 percent and 28 percent, with the regional aggregate water conservation goal reduced from 20 percent to about 13 percent. Under the regulations, a water supplier's conservation standard required at least an eight percent reduction in water use, regardless of supply availability.

The State's supply conditions improved somewhat during the winter of water year 2016, with an El Niño weather pattern bringing rain and snow to parched California. In March 2016, the Water Authority Board revised its regional drought management actions, rescinding its declaration of a regional Level 2 Drought Alert condition under the Model Drought Response Ordinance, recognizing that the SWRCB individual water supplies conservation standards are driving member agency-specific, rather than regional, water-use restrictions. In May 2016, due to the improved supply conditions and sufficient supply availability, Metropolitan terminated its member agency allocations. The Water Authority then ended allocations to its member agencies, consistent with the WSDRP.

Although California's supply conditions improved during water year 2016, the improvement was not enough to emerge from the current multi-year statewide drought and the accompanying statewide emergency regulation. On May 18, 2016, the SWRCB amended the emergency regulation to change from a mandated conservation standard to a self-certification approach to recognize the unique supply conditions of each region, with the changes in effect from June 1, 2016, to the end of January 2017. Through establishment of a drought awareness effort, the Water Authority will continue its messaging and outreach to residents and businesses to ensure an ongoing community focus on drought and a commitment to water-use efficiency across the region.

Timeline of Important Drought and Shortage Related Events

To assist in the potential activation of the WSDRP in the future, Table 11-4 contains a timeline of key events during the statewide drought emergency declared by the Governor in January 2014. The Water Authority responded to the drought with actions consistent with its WSDRP. With the SWRCB adoption of the May 2015 emergency regulation however, the SWRCB individual member agency-specific water conservation standards superseded the Water Authority's regional approach to drought response measures.

Table 11-4. Timeline of Significant Drought and Shortage-Related Events

January 2014	Gov. Brown declares a state of emergency throughout California due to severe drought, calling for increased voluntary conservation to reduce water use by 20 percent.
February 2014	Water Authority notifies member agencies of a Level 1, Drought Watch condition, under the regional Model Drought Ordinance, and declares implementation of Stage I, Voluntary Supply Management, under WSDRP.
April 2014	Gov. Brown issues proclamation that the drought emergency continues in California, calling for increased statewide conservation.
July 2014	SWRCB adopts emergency regulation for statewide urban conservation.
July 2014	Water Authority notifies member agencies of a Level 2, Drought Alert condition, under the regional Model Drought Ordinance, and declares implementation of Stage II, Supply Enhancement, under WSDRP.
April 2015	Gov. Brown issues Executive Order B-29-15 instituting emergency actions and mandatory water-use restrictions for California.
April 2015	Metropolitan imposes Level 3 under its WSAP to be effective July 1, 2015, reducing Metropolitan supplies by 15 percent.
May 2015	SWRCB issues additional requirements to its emergency regulation, including mandatory water-use reductions that ranged from 12 to 36 percent for Water Authority member agencies with an aggregate water conservation target of 20 percent.
May 2015	Water Authority declares implementation of Stage III, Mandatory Supply Cutback, under WSDRP, adopts Ordinance No. 2015-02 allocating M&I and TSAWR supplies to its member agencies, and requires member agencies to restrict irrigation of ornamental landscapes and turf with potable water to no more than two days a week.
November 2015	Gov. Brown issues Executive Order B-36-15 calling for extensions of urban water use restriction until October 31, 2016, should drought conditions persist through January 2016, and directs SWRCB to consider modifying restrictions.
February 2016	SWRCB extends the emergency regulation through October 2016, and provides for adjustments to conservation standard for significant investment in new, local, drought-resilient sources of potable supply, climate differences and growth.
March 2016	SWRCB certifies supplies from the Carlsbad Desalination Plant are drought-resilient, reducing member agency conservation standards to a range of 8 to 28 percent with a regional aggregate water conservation target of 13 percent.
March 2016	Water Authority modifies its shortage management actions, adopting Ordinance No. 2016-01 and rescinding Ordinance No. 2015-02. Actions include continuing to allocate supplies to its member agencies in FY 2016 under its WSRP Stage III, Mandatory Supply Cutback, but rescinding the July 2014 notification of a regional Level 2, Drought Alert condition.
May 2016	Metropolitan rescinds its member agency allocations effective May 10, 2016.
May 2016	Water Authority modifies its shortage management actions, rescinding Ordinance No. 2016-01 to end member agency allocations effective May 26, 2016, and establishes a drought awareness effort.
May 2016	SWRCB modifies its emergency regulation from a mandated conservation standard to a self-certification approach, effective June 1, 2016, through January 2017.

11.2.4 Water Authority Dry-Year Supplies and Carryover Storage

The Water Authority's dry-year supplies and carryover storage are important components of managing potential shortages within the region and for increasing supply reliability. The dry-year supplies assist in minimizing or reducing potential supply shortages from Metropolitan. The Water Authority has developed a Carryover Storage Program to more effectively manage supplies, which includes in-region surface storage at San Vicente Reservoir, secured as part of the San Vicente Dam project, which was completed in 2014. The Water Authority also has an out-of-region groundwater banking program in the California Central Valley. Through these efforts, the Water Authority can store water available during wet periods for use during times of shortage. The Water Authority's carryover storage and dry-year transfer programs are discussed below.

Water Authority Carryover Storage Program

The Carryover Storage Program provides water for the region in the case of a supply shortage, such as during a drought. The Water Authority has identified three main needs for carryover storage:

1. Enhance reliability of the water supply: During dry weather periods, increased regional demand for water may exceed available supplies, resulting in potential water shortages. Carryover storage provides a reliable and readily available source of water during periods of shortage, such as during dry years.

2. Increase system efficiency: Carryover storage provides operational flexibility to serve above normal demands, such as those occurring during peak summer months or extended droughts, from locally stored water rather than by the over-sizing of the Water Authority's imported water transmission facilities.

3. Better management of water supplies: Carryover storage allows the Water Authority to accept additional deliveries from its existing State Water Project- and Colorado River-derived sources during periods of greater availability, such as during wet years, to increase water availability locally during periods of shortage, such as during dry years.

San Vicente Dam Raise Carryover Storage Project

The Water Authority's Water Facilities Master Plan (December 2002) identified a need for approximately 100,000 AF of carryover storage to assist in maintaining a secure and reliable supply for the region. The San Vicente Dam Raise CSP meets this need by providing approximately 100,000 AF of local storage capacity, facilitating the reliable and efficient delivery of water to residents of the Water Authority service area. It is located in the San Vicente Reservoir above the reservoir expansion for the ESP (see previous **Section 11.1.2**), increasing water storage reliability for the region. Construction was completed in 2014, and in June 2016 the carryover pool of 100,000 AF was full.

Water Authority's Out-Of-Region Groundwater Program

In 2008, the Water Authority acquired a total of 70,000 AF of permanent storage allocation in the Semitropic-Rosamond Water Bank Authority and the Semitropic Water Bank (40,000 AF and 30,000 AF, respectively) located in Kern County. Due to its location near the California Aqueduct, the Kern River and the Friant-Kern Canal, the location was ideally suited for groundwater banking. The Water Authority's assigned rights included a total Program Delivery Capacity of 12,715 AF per year and

10,865 AF per year of Program Pumpback Capacity. Due to continuing statewide dry conditions, in 2008, the Water Authority acquired approximately 16,117 AF of water, which continues to be stored in the Water Authority's out-of-region banking program.

Utilization of Carryover Storage Supplies

In accordance with the Water Authority's WSDRP, potential utilization of carryover storage supplies could occur in Stage II, Supply Enhancement, or Stage III, Mandatory Cutbacks. The amount of water taken from carryover storage reserves, to manage potential shortages, is influenced by a number of factors and should generally be handled on a case-by-case basis. Many of the factors influencing the storage take will vary depending upon conditions present. These factors include, but are not limited to:

- Current water demand trends
- Core water supply availability from imported and local sources
- Existing and projected hydrologic conditions
- Storage supply available for withdrawal
- Take capacity from the groundwater banking program
- Need to avoid depletion of storage reserves

For planning purposes in the 2015 Plan, general guidelines, consistent with previous Water Authority planning documents, established that approximately one-third of the carryover supplies available in storage will be utilized in one year. Utilizing only a portion of available storage supplies avoids depletion of storage reserves, thereby making water available for potential ongoing or future shortages. It should be emphasized that the carryover storage takes shown in the dry water year assessments contained in **Section 9.3** are used for planning purposes only and should not dictate future carryover storage takes. The supplies taken from carryover storage will be considered a Water Authority regional supply to be combined with the Water Authority's core supplies and any potential dry-year transfers.

Another factor that will be considered when utilizing carryover supplies is participation in the Water Authority's TSAWR program. Customers in the program are exempt from paying the Water Authority's storage charge and in turn receive no water from the Carryover Storage Program. In March 2015, the Water Authority Board extended the TSAWR program through December 2020.

Water Authority's Dry-Year Transfer Program

To ensure adequate water supplies during drought conditions and periods of regulatory constraints, the Water Authority may consider securing water transfers as part of its WSDRP. Considerations on whether to pursue transfers are based on a range of factors, such as source location, federal and state agency approvals, price, call period, and capacity in the State Water Project system.

To lessen the impact of shortages during the 2007–2011 drought, in 2009, the Water Authority acquired in 20,000 AF of water under a one-year transfer agreement with Placer County Water Agency in Northern California to lessen the impact of water supply reductions on the San Diego region. The transfer eased the region's transition from voluntary conservation to mandatory water-use restrictions by keeping the regional water savings target for the year at a manageable level.

The Water Authority has not pursued transfers during the 2012—2016 drought for a number of reasons, including limited availability of transfers, high cost, and the ability of the Water Authority and the member agencies to manage the drought with the current available supplies. In addition, securing dry-year transfers with the SWRCB May 2015 emergency regulation in place would not have alleviated the state-mandated cutback levels. Supply availability was not taken into account when the state established the reduction mandates.

11.2.5 Penalties for Excessive Water Use

Penalty rates may be used by the Water Authority to encourage conservation and reduce demand during a drought or other water supply shortage. If Metropolitan allocates imported water supplies to the Water Authority, Metropolitan can impose surcharges (penalty pricing) on water consumption in excess of the Water Authority's allocation. The Water Authority's Implementing Resolution provides for a pass through to the Water Authority's member agencies of any penalties levied by Metropolitan on the Water Authority for exceeding its annual allocation. Penalties are assessed at the end of the fiscal year, on a pro rata basis to the member agencies that exceed their allocations. The Water Authority is subject to significant financial penalties if it exceeds its Metropolitan allocation.

Rates may also be adjusted based on any other allocation program implemented by the Water Authority as determined necessary by the Board. The Water Authority may also reduce the amount of water it allocates to a member agency if the member agency fails to adopt or implement water-use restrictions.

11.2.6 Revenue Impacts

The Water Authority has taken significant steps to reduce potential revenue impacts resulting from fluctuating water sales. In fiscal year 1990, the Water Authority created a Rate Stabilization Fund (RSF) to provide funds that would mitigate the need for rate increases in the event of an unexpected decline in water sales. In 2006, the Board adopted new policies governing the RSF. Under the newly adopted policy, the RSF has a "target" balance that is the equivalent of the estimated financial impact 2.5 years of wet weather (reduced sales). The new policy also established a maximum RSF balance equal to the financial impact of 3.5 years of wet weather. The policy matches the level of RSF funding with the risk (water sales volatility) that the fund is designed to mitigate. The RSF provides an important tool to mitigate water sales volatility and the impact that has on water rates.

On January 1, 2003, the Water Authority implemented a rate structure that substantially increased the percentage of water revenues generated from fixed charges. This increase replaced the previous variable "postage stamp" rate, which historically generated as much as 80 percent or more of total annual revenues, with two fixed charges, and one variable rate. The new fixed charges, Customer Service and Storage combined with the Infrastructure Access Charge, provide the Water Authority with enhanced revenue stability. Additionally, in March 2015, the Board adopted the new fixed Supply Reliability Charge. The Supply Reliability Charge recovers a portion of the Carlsbad Desalination Plant water purchase and IID water transfer supply costs. The fixed charges combined help to mitigate revenue volatility due to changes in either water demand or supply availability and support smooth and predictable rates and charges.

Although the Water Authority maintains financial reserves, it is possible that additional costs associated with demand reduction and supply enhancement could negatively affect the Water

Authority's short-term financial situation. The Water Authority may compensate for increased costs or reduced water sales by adjusting water rates in succeeding years.

11.2.7 Minimum Water Supply Available over Next Three Years

In accordance with the Act, agencies are required to estimate the minimum water supply available during each of the next three years, based on the driest three-year historic sequence, compared with a normal water year. To determine the minimum supplies potentially available to the region, the same assumptions contained in the multi dry-year analysis in **Section 9.3** were used. Table 11-5 contains the minimum estimated supplies. The minimum supplies are included in accordance with the Act. It should be noted that, based on current supply and storage conditions statewide, the Water Authority is not currently forecasting this supply scenario.

Table 11-5. Estimated Minimum Supplies without Utilization of Carryover Storage (AF)

Supplies	Average Year 2017	Single Dry Year 2017	Multiple Dry-Year Water Supply		
			2017	2018	2019
Member Agency Local Supplies[1]	116,345	64,235	71,950	74,034	71,267
Carlsbad Desalination	50,000	50,000	50,000	50,000	50,000
Water Authority QSA	180,200	180,200	180,200	210,200	240,200
Metropolitan Supplies [2]	222,155	260,820	223,560	224,400	225,120
Total	568,700	555,255	525,710	558,634	586,587

[1] Member agency local supplies include 6,000 AF of Carlsbad Desalination Plant supplies.

[2] Metropolitan supplies in single and multiple dry years are conservatively based on the Water Authority's estimated preferential rights using Metropolitan's current calculation, which the trial court invalidated, and Metropolitan has appealed. The trial court ruled Metropolitan's method under-calculates the Water Authority's preferential rights.

11.3 Summary

The shortage contingency analysis included in this section demonstrates that the Water Authority and its member agencies, through the ICP and ESP, are taking actions to prepare for and appropriately handle a catastrophic interruption of water supplies. The analysis also describes the Water Authority's plans, procedures, and WSDRP for the San Diego region. The WSDRP identifies the actions to be taken by the Water Authority to minimize the impacts of a supply shortage due to a drought or other water supply shortage, including a methodology for allocating M&I supplies to the member agencies during a water shortage. These components address the requirements of the Act that are applicable to the Water Authority.

Appendix A

California Urban Water Management Planning Act and SBX7-7

Changes to California Water Code Final

Change Number	Topic	CWC Section	Legislative Bill	Summary	Guidebook Section
1	Demand Management Measures	10631 (f)(1) and (2)	AB 2067, 2014	Requires water suppliers to provide narratives describing their water demand management measures, as provided. Requires retail water suppliers to address the nature and extent of each water demand management measure implemented over the past 5 years and describe the water demand management measures that the supplier plans to implement to achieve its water use targets.	Chapter 9
2	Submittal Date	10621 (d)	AB 2067, 2014	Requires each urban water supplier to submit its 2015 plan to the Department of Water Resources by July 1, 2016.	Chapter 10
3	Electronic Submittal	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to be submitted electronically to the department.	Chapter 10
4	Standardized Forms	10644 (a) (2)	SB 1420, 2014	Requires the plan, or amendments to the plan, to include any standardized forms, tables, or displays specified by the department.	CH 1, Section 1.4
5	Water Loss	10631 (e) (1) (J) and (e) (3) (A) and (B)	SB 1420, 2014	Requires a plan to quantify and report on distribution system water loss.	Appendix L
6	Estimating Future Water Savings	10631 (e) (4)	SB 1420, 2014	Provides for water use projections to display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans, when that information is available and applicable to an urban water supplier.	Appendix K
7	Voluntary Reporting of Energy Intensity	10631.2 (a) and (b)	SB 1036, 2014	Provides for an urban water supplier to include certain energy-related information, including, but not limited to, an estimate of the amount of energy used to extract or divert water supplies.	Appendix O
8	Defining Water Features	10632	AB 2409, 2010	Requires urban water suppliers to analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	CH 8, Section 8.2.4

Changes to California Water Code Final

1. Demand Management Measures (AB 2067, 2014)

10631(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
~~(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:~~

~~(A) Water survey programs for single-family residential and multifamily residential customers.~~
~~(B) Residential plumbing retrofit.~~
~~(C) System water audits, leak detection, and repair.~~
~~(D) Metering with commodity rates for all new connections and retrofit of existing connections.~~
~~(E) Large landscape conservation programs and incentives.~~
~~(F) High-efficiency washing machine rebate programs.~~
~~(G) Public information programs.~~
~~(H) School education programs.~~
~~(I) Conservation programs for commercial, industrial, and institutional accounts.~~
~~(J) Wholesale agency programs.~~
~~(K) Conservation pricing.~~
~~(L) Water conservation coordinator.~~
~~(M) Water waste prohibition.~~
~~(N) Residential ultra-low-flush toilet replacement programs.~~

~~(2) A schedule of implementation for all water demand management measures proposed or described in the plan.~~
~~(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.~~
~~(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.~~

~~(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:~~
~~(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.~~
~~(2) Include a cost-benefit analysis, identifying total benefits and total costs.~~
~~(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.~~
~~(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.~~

(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.

~~(h)~~

(g) 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~~ *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, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f),~~ *programs* that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry 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.

~~(i)~~

(h) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

~~(j)~~

(i) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of ~~subdivisions~~ *subdivision* (f) ~~and (g)~~ by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

~~(k) Urban~~

2. Submittal Date (AB 2067, 2014)

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero *, except as provided in subdivision (d).*

(d) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

Changes to California Water Code Final

3. Electronic Submittal (SB 1420, 2014)

10644. (a) *(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically…*

4. Standardized Forms (SB 1420, 2014)

10644. (a) *(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) … shall include any standardized forms, tables, or displays specified by the department.*

5. Water Loss (SB 1420, 2014)

(e) (1) 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, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(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) For the 2015 urban water management plan update, the distribution system water loss shall be quantified for the most recent 12-month period available. For all subsequent updates, the distribution system water loss shall be quantified for each of the five years preceding the plan update.

(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.

6. Voluntary Reporting of Passive Savings (SB 1420, 2014)

10631 (4) (A) If available and applicable to an urban water supplier, water use projections may 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.

7. Voluntary Reporting of Energy Intensity (SB 1036, 2014)

10631.2. (a) In addition to the requirements of Section 10631, an urban water management plan may, but is not required to, include any of the following information:

(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.

8. Defining Water Features (AB 2409, 2010)

10632 (b) Commencing with the urban water management plan update due December 31, 2015, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the 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.

Senate Bill No. 7

CHAPTER 4

An act to amend and repeal Section 10631.5 of, to add Part 2.55 (commencing with Section 10608) to Division 6 of, and to repeal and add Part 2.8 (commencing with Section 10800) of Division 6 of, the Water Code, relating to water.

[Approved by Governor November 10, 2009. Filed with Secretary of State November 10, 2009.]

LEGISLATIVE COUNSEL'S DIGEST

SB 7, Steinberg. Water conservation.

(1) Existing law requires the Department of Water Resources to convene an independent technical panel to provide information to the department and the Legislature on new demand management measures, technologies, and approaches. "Demand management measures" 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.

This bill would require the state to achieve a 20% reduction in urban per capita water use in California by December 31, 2020. The state would be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. The bill would require each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements. The bill would require agricultural water suppliers to implement efficient water management practices. The bill would require the department, in consultation with other state agencies, to develop a single standardized water use reporting form. The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill. The bill would repeal, on July 1, 2016, an existing requirement that conditions eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

(2) Existing law, until January 1, 1993, and thereafter only as specified, requires certain agricultural water suppliers to prepare and adopt water management plans.

This bill would revise existing law relating to agricultural water management planning to require agricultural water suppliers to prepare and adopt agricultural water management plans with specified components on or before December 31, 2012, and update those plans on or before December

31, 2015, and on or before December 31 every 5 years thereafter. An agricultural water supplier that becomes an agricultural water supplier after December 31, 2012, would be required to prepare and adopt an agricultural water management plan within one year after becoming an agricultural water supplier. The agricultural water supplier would be required to notify each city or county within which the supplier provides water supplies with regard to the preparation or review of the plan. The bill would require the agricultural water supplier to submit copies of the plan to the department and other specified entities. The bill would provide that an agricultural water supplier is not eligible for state water grants or loans unless the supplier complies with the water management planning requirements established by the bill.

(3) The bill would take effect only if SB 1 and SB 6 of the 2009–10 7th Extraordinary Session of the Legislature are enacted and become effective.

The people of the State of California do enact as follows:

SECTION 1. Part 2.55 (commencing with Section 10608) is added to Division 6 of the Water Code, to read:

PART 2.55. SUSTAINABLE WATER USE AND DEMAND REDUCTION

Chapter 1. General Declarations and Policy

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. 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) "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 final 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.

(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.

(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

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 subdivision (a) 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 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 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 required pursuant to Part 2.6 (commencing with Section 10610) due in 2010 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 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) An urban retail water supplier shall be 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 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.

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 United States Department of Defense military installation's requirements under federal Executive Order 13423.

(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.

10608.36. 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. 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.

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 on 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. (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.

(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.

(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

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. (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. (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. 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.

SEC. 2. Section 10631.5 of the Water Code is amended to read:

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban 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 water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section 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 water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

SEC. 3. Part 2.8 (commencing with Section 10800) of Division 6 of the Water Code is repealed.

SEC. 4. Part 2.8 (commencing with Section 10800) is added to Division 6 of the Water Code, to read:

PART 2.8. AGRICULTURAL WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATIONS AND POLICY

10800. This part shall be known and may be cited as the Agricultural Water Management Planning Act.

10801. The Legislature finds and declares all of the following:

(a) The waters of the state are a limited and renewable resource.

(b) The California Constitution requires that water in the state be used in a reasonable and beneficial manner.

(c) Urban water districts are required to adopt water management plans.

(d) The conservation of agricultural water supplies is of great statewide concern.

(e) There is a great amount of reuse of delivered water, both inside and outside the water service areas.

(f) Significant noncrop beneficial uses are associated with agricultural water use, including streamflows and wildlife habitat.

(g) Significant opportunities exist in some areas, through improved irrigation water management, to conserve water or to reduce the quantity of highly saline or toxic drainage water.

(h) Changes in water management practices should be carefully planned and implemented to minimize adverse effects on other beneficial uses currently being served.

(i) Agricultural water suppliers that receive water from the federal Central Valley Project are required by federal law to prepare and implement water conservation plans.

(j) Agricultural water users applying for a permit to appropriate water from the board are required to prepare and implement water conservation plans.

10802. The Legislature finds and declares that all of the following are the policies of the state:

(a) The conservation of water shall be pursued actively to protect both the people of the state and the state's water resources.

(b) The conservation of agricultural water supplies shall be an important criterion in public decisions with regard to water.

(c) Agricultural water suppliers shall be required to prepare water management plans to achieve conservation of water.

CHAPTER 2. DEFINITIONS

10810. Unless the context otherwise requires, the definitions set forth in this chapter govern the construction of this part.

10811. "Agricultural water management plan" or "plan" means an agricultural water management plan prepared pursuant to this part.

10812. "Agricultural water supplier" has the same meaning as defined in Section 10608.12.

10813. "Customer" means a purchaser of water from a water supplier who uses water for agricultural purposes.

10814. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of that entity.

10815. "Public agency" means any city, county, city and county, special district, or other public entity.

10816. "Urban water supplier" has the same meaning as set forth in Section 10617.

10817. "Water conservation" means the efficient management of water resources for beneficial uses, preventing waste, or accomplishing additional benefits with the same amount of water.

CHAPTER 3. AGRICULTURAL WATER MANAGEMENT PLANS

Article 1. General Provisions

10820. (a) An agricultural water supplier shall prepare and adopt an agricultural water management plan in the manner set forth in this chapter on or before December 31, 2012, and shall update that plan on December 31, 2015, and on or before December 31 every five years thereafter.

(b) Every supplier that becomes an agricultural water supplier after December 31, 2012, shall prepare and adopt an agricultural water management plan within one year after the date it has become an agricultural water supplier.

(c) A water supplier that indirectly provides water to customers for agricultural purposes shall not prepare a plan pursuant to this part without the consent of each agricultural water supplier that directly provides that water to its customers.

10821. (a) An agricultural water supplier required to prepare a plan pursuant to this part shall notify each city or county within which the supplier provides water supplies that the agricultural water supplier will be preparing the plan or reviewing the plan and considering amendments or changes to the plan. The agricultural water supplier may consult with, and obtain comments from, each city or county that receives notice pursuant to this subdivision.

(b) The amendments to, or changes in, the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with Section 10840).

Article 2. Contents of Plans

10825. (a) It is the intent of the Legislature in enacting this part to allow levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

(b) This part does not require the implementation of water conservation programs or practices that are not locally cost effective.

10826. An agricultural water management plan shall be adopted in accordance with this chapter. The plan shall do all of the following:

(a) Describe the agricultural water supplier and the service area, including all of the following:

(1) Size of the service area.

(2) Location of the service area and its water management facilities.

(3) Terrain and soils.

(4) Climate.

(5) Operating rules and regulations.
(6) Water delivery measurements or calculations.
(7) Water rate schedules and billing.
(8) Water shortage allocation policies.

(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:
(1) Surface water supply.
(2) Groundwater supply.
(3) Other water supplies.
(4) Source water quality monitoring practices.

(5) Water uses within the agricultural water supplier's service area, including all of the following:
(A) Agricultural.
(B) Environmental.
(C) Recreational.
(D) Municipal and industrial.
(E) Groundwater recharge.
(F) Transfers and exchanges.
(G) Other water uses.
(6) Drainage from the water supplier's service area.
(7) Water accounting, including all of the following:
(A) Quantifying the water supplier's water supplies.
(B) Tabulating water uses.
(C) Overall water budget.
(8) Water supply reliability.

(c) Include an analysis, based on available information, of the effect of climate change on future water supplies.

(d) Describe previous water management activities.

(e) Include in the plan the water use efficiency information required pursuant to Section 10608.48.

10827. Agricultural water suppliers that are members of the Agricultural Water Management Council, and that submit water management plans to that council in accordance with the "Memorandum of Understanding Regarding Efficient Water Management Practices By Agricultural Water Suppliers In California," dated January 1, 1999, may submit the water management plans identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of Section 10826.

10828. (a) Agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, may submit those water conservation plans to satisfy the requirements of Section 10826, if both of the following apply:

(1) The agricultural water supplier has adopted and submitted the water conservation plan to the United States Bureau of Reclamation within the previous four years.

(2) The United States Bureau of Reclamation has accepted the water conservation plan as adequate.

(b) This part does not require agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, to prepare and adopt water conservation plans according to a schedule that is different from that required by the United States Bureau of Reclamation.

10829. An agricultural water supplier may satisfy the requirements of this part by adopting an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) or by participation in areawide, regional, watershed, or basinwide water management planning if those plans meet or exceed the requirements of this part.

Article 3. Adoption and Implementation of Plans

10840. Every agricultural water supplier shall prepare its plan pursuant to Article 2 (commencing with Section 10825).

10841. Prior to adopting a plan, the agricultural water supplier shall make the proposed plan available for public inspection, and shall hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned agricultural water supplier pursuant to Section 6066 of the Government Code. A privately owned agricultural water supplier shall provide an equivalent notice within its service area and shall provide a reasonably equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan. After the hearing, the plan shall be adopted as prepared or as modified during or after the hearing.

10842. An agricultural water supplier shall implement the plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan, as determined by the governing body of the agricultural water supplier.

10843. (a) An agricultural water supplier shall submit to the entities identified in subdivision (b) a copy of its plan no later than 30 days after the adoption of the plan. Copies of amendments or changes to the plans shall be submitted to the entities identified in subdivision (b) within 30 days after the adoption of the amendments or changes.

(b) An agricultural water supplier shall submit a copy of its plan and amendments or changes to the plan to each of the following entities:

(1) The department.

(2) Any city, county, or city and county within which the agricultural water supplier provides water supplies.

(3) Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.

(4) Any urban water supplier within which jurisdiction the agricultural water supplier provides water supplies.

(5) Any city or county library within which jurisdiction the agricultural water supplier provides water supplies.

(6) The California State Library.

(7) Any local agency formation commission serving a county within which the agricultural water supplier provides water supplies.

10844. (a) Not later than 30 days after the date of adopting its plan, the agricultural water supplier shall make the plan available for public review on the agricultural water supplier's Internet Web site.

(b) An agricultural water supplier that does not have an Internet Web site shall submit to the department, not later than 30 days after the date of adopting its plan, a copy of the adopted plan in an electronic format. The department shall make the plan available for public review on the department's Internet Web site.

10845. (a) The department shall prepare and submit to the Legislature, on or before December 31, 2013, and thereafter in the years ending in six and years ending in one, a report summarizing the status of the plans adopted pursuant to this part.

(b) The report prepared by the department shall identify the outstanding elements of any plan adopted pursuant to this part. The report shall include an evaluation of the effectiveness of this part in promoting efficient agricultural water management practices and recommendations relating to proposed changes to this part, as appropriate.

(c) The department shall provide a copy of the report to each agricultural water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearing designed to consider the effectiveness of plans submitted pursuant to this part.

(d) This section does not authorize the department, in preparing the report, to approve, disapprove, or critique individual plans submitted pursuant to this part.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10850. (a) Any action or proceeding to attack, review, set aside, void, or annul the acts or decisions of an agricultural water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(1) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(2) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 120 days after submitting the plan or amendments to the plan to entities in accordance with Section 10844 or the taking of that action.

(b) In an action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an agricultural 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 agricultural water supplier has not proceeded in a manner required by law, or if the action by the agricultural water supplier is not supported by substantial evidence.

10851. 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. This part does not exempt projects for implementation of the plan or for expanded or additional water supplies from the California Environmental Quality Act.

10852. 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.

10853. No agricultural water supplier that provides water to less than 25,000 irrigated acres, excluding recycled water, shall be required to implement the requirements of this part or Part 2.55 (commencing with Section 10608) unless sufficient funding has specifically been provided to that water supplier for these purposes.

SEC. 5. This act shall take effect only if Senate Bill 1 and Senate Bill 6 of the 2009–10 Seventh Extraordinary Session of the Legislature are enacted and become effective.

O

Appendix B

Water Authority 2015 UWMP Implementation Documents

The San Diego Union-Tribune

PROOF of Publication

SDCWA RECEIVED
MAY 25 REC'D
WATER RESOURCES

Bill To:
San Diego County Water Authority - CU00465013
4677 Overland Avenue
San Diego,CA 92123

STATE OF ILLINOIS
COUNTY OF Cook

The Undersigned, declares under penalty of perjury under the laws of the State of California: That he/she is and at all times herein mentioned was a citizen of the United States, over the age of twenty-one years, and that he/she is not a party to, nor interested in the above entitled matter; that he/she is Chief Clerk for the publisher of

San Diego Union-Tribune

a newspaper of general circulation, printed and published daily in the City of San Diego, County of San Diego, and which newspaper is published for the dissemination of local news and intelligence of a general character, and which newspaper at all the times herein mentioned had and still has a bona fide subscription list of paying subscribers, and which newspaper has been established, printed and published at regular intervals in the said City of San Diego, County of San Diego, for a period exceeding one year next preceding the date of publication of the notice hereinafter referred to, and which newspaper is not devoted to nor published for the interests, entertainment or instruction of a particular class, profession, trade, calling, race, or denomination, or any number of same; that the notice of which the annexed is a printed copy, has been published in said newspaper in accordance with the instruction of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

May 8, 2016; May 15, 2016

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated in the City of Chicago, State of Illinois
on this 18th of May 2016.

Brittany Gerard
San Diego Union-Tribune
Legal Advertising

Proof of Publication of

See Attached

4169389

The San Diego
Union-Tribune

NOTICE OF PUBLIC HEARING FOR THE PUBLIC REVIEW OF THE SAN DIEGO COUNTY WATER AUTHORITY DRAFT 2015 URBAN WATER MANAGEMENT PLAN

NOTICE IS HEREBY GIVEN to all interested in above subject matter that a Public Review Draft 2015 Urban Water Management Plan (Draft 2015 Plan) was completed by the San Diego County Water Authority (Water Authority). A public hearing on the preparation of the Draft 2015 Plan is scheduled for May 26, 2016, at 9:00 a.m. or as soon thereafter as the matter may be heard, in the Board Room at 4677 Overland Avenue, San Diego, California.

The Draft 2015 Plan identifies a diverse mix of water resources planned to be developed over the next 25 years which will, along with the aggressive conservation efforts of the Water Authority and its member agencies, ensure long-term water supply reliability for the region. The Water Authority's Board of Directors is scheduled to consider the Draft 2015 Plan for adoption at its regularly scheduled meeting on June 23, 2016.

The California Urban Water Management Planning Act, included in the California State Water Code, requires urban water suppliers to prepare urban water management plans and update them every five years. The Water Authority is required to update and adopt a plan for submittal to the California Department of Water Resources by July 1, 2016. The public is invited to submit written comments concerning the Draft 2015 Plan to the Water Authority. A copy of the Draft 2015 Plan is available for review on the Water Authority's website at www.sdcwa.org, or can be viewed at the Water Authority's Headquarters during normal business hours (4677 Overland Avenue, San Diego, California). Comments on the Draft 2015 Plan must be received by June 6, 2016, and can be e-mailed to the Water Authority, to Alexi Schnell, at aschnell@sdcwa.org, or by writing to: Urban Water Management Plan, San Diego County Water Authority, Attn: Alexi Schnell, 4677 Overland Ave., San Diego, CA 92123. If you have any questions regarding the Draft 2015 Plan, please contact Alexi Schnell, Water Resources Specialist, at (858) 522-6778.

Region's Long-Term Water Management Strategy Released for Public Review

News Release

Share This

< Back to News Releases

Region's Long-Term Water Management Strategy Released for Public Review

Updated Urban Water Management Plan balances supplies and demands over two decades

April 29, 2016 -The development of drought-resilient water resources and a sustained emphasis on water-use efficiency mean that San Diego County will continue to have a safe and reliable water supply for decades, according to the San Diego County Water Authority's draft 2015 Urban Water Management Plan.

The draft plan – known as the 2015 UWMP based on when the updating process began – was released today for public review, starting a public comment period that will include a public hearing on May 26 during the regular meeting of the Water Authority Board of Directors. The Board will consider adoption of the plan during its regular meeting on June 23.

Urban Water Management Plans are important tools for reporting water agencies' long-term planning efforts to meet future demands and tracking progress toward achieving state-mandated water conservation targets. They also support state laws linking approval for large developments to water supply availability. By law, the plans must be updated every five years.

The Water Authority's draft 2015 UWMP estimates that future water demands will be about 14 percent lower in 2020 and about 15 percent lower in 2035 compared to projections in the 2010 plan. The reduction is due to changes in demographic and economic projections by SANDAG that were primarily driven by the Great Recession and long-term improvements in water-use efficiency by residents and businesses. To meet projected demands, the Water Authority anticipates continued development of highly reliable, locally controlled water supplies such as new recycling and groundwater recovery projects.

"We enjoy a safe and reliable water supply even during the current drought because earlier generations crafted long-term plans and carried them out," said Bob Yamada, director of water resources for the Water Authority. "As we look into the future, we remain very confident about the ability of the Water Authority and its 24 member agencies to support our vibrant region through a combination of locally controlled, drought-proof supplies and making the most of every drop."

The Water Authority developed its draft 2015 UWMP in coordination with its 24 member agencies, most of which must submit similar plans to the state. Main components of the Water Authority's plan include: baseline demand forecasts under normal weather, dry weather and climate change scenarios; conservation savings estimates and net water demand projections; a water supply assessment; supply reliability analysis; and scenario planning.

The baseline demand forecast accounts for changes in socio-economic factors, such as the number of projected housing units, the mix of single-family and multi-family dwellings, and employment

RECENT NEWS

Water Authority Executes Money-Saving $340 Million Bond Sale
06.09.2016
The San Diego County Water Authority this week priced a $340 million bond sale...
Read More >

Analysis Shows Sufficient Water Supplies for San Diego Region Using New State Formula
06.09.2016
The San Diego County Water Authority and its member agencies have sufficient...
Read More >

Water Authority's "To Quench a Thirst" Documentary Highlights Region's Water History
06.02.2016
The San Diego County Water Authority has released a succinct yet engaging new...
Read More >

More News

FIND YOUR WATER DISTRICT

Looking for water restrictions, conservation programs and incentives, to establish water service, pay a bill or to contact your local water agency.

Address & Zip Code Go

growth. Conservation projections account for continued adoption of water-use efficiency measures, compliance with landscape water-use ordinances for new residential construction, and continued installations of sustainable landscapes at existing homes.

On the supply side, the Water Authority – working with its member agencies – compiled local supply estimates and grouped them into "verifiable," "additional planned," and "conceptual" projects based on where they are in the planning process. Normal-year projections based on verifiable projects show that the Water Authority will buy approximately 165,000 acre-feet of water from the Metropolitan Water District of Southern California in 2025, down from 613,287 acre-feet in 1990. The projected decline is due to the Water Authority's long-term strategy of using drought-resilient, locally controlled supplies such as the Claude "Bud" Lewis Carlsbad Desalination Plant to replace less-reliable supplies from MWD.

In addition to the Urban Water Management Plan, the Water Authority also regularly updates its Regional Water Facilities Optimization and Master Plan, which focuses on the infrastructure necessary to meet projected long-term water demands. For more information about the Water Authority's water supply and demand planning efforts, including a copy of the draft 2015 Urban Water Management Plan, go to www.sdcwa.org/uwmp.

###

The San Diego County Water Authority sustains a $218 billion regional economy and the quality of life for 3.2 million residents through a multi-decade water supply diversification plan, major infrastructure investments and forward-thinking policies that promote fiscal and environmental responsibility. A public agency created in 1944, the Water Authority delivers wholesale water supplies to 24 retail water providers, including cities, special districts and a military base.

Media Contact Information
James Palen
Office: (858) 522-6621
Cell: (619) 384-2918

Media Contact Information
Mike Lee
Office: (858) 522-6703
Cell: (760) 208-0588

water smart

Learn about conservation incentives, programs, resources and more!

Visit WaterSmart

Site Links

Careers
Documents & Forms
Planning Documents
Site Use & Privacy Policy
Contact Us
Glossary
Site Map
Fact Sheets
Helpful Links
Social Media Policy

Join Our Newsletter

Receive news and alerts

Enter Email Join

San Diego County Water Authority
4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

Notice of San Diego County Water Authority's 2015 Urban Water Management Plan Preparation

Date: February 24, 2016

This letter is to inform you that the San Diego County Water Authority (Water Authority) 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 cities and counties within their service area that a plan is being prepared. The Water Authority must adopt and submit an updated UWMP by July 1, 2016 to the California Department of Water Resources.

The UWMP is required to contain a detailed evaluation of the supplies necessary to reliably meet demands over at least a 20-year period in both normal and dry years. In accordance with State law, the Water Authority will distribute a copy of its draft 2015 UWMP to the cities and county for public review at least two weeks prior to holding a tentatively scheduled public hearing in **May 2016**.

Please feel free to contact Ms. Alexi Schnell in the Water Resources department at (858) 522-6778, or aschnell@sdcwa.org, if you have any questions or would like additional information.

Sincerely,

Dana Friehauf
Water Resources Manager

Cc: Robert R. Yamada, Director of Water Resources
Alexi Schnell, Water Resources Specialist

SAN DIEGO COUNTY WATER AUTHORITY 2015 UWMP
60-DAY NOTICE TO LAND USE AGENCIES WITHIN SERVICE AREA MAILING LIST

Jurisdiction/Agency	Name	Address
City of Carlsbad	Don Neu	City of Carlsbad Planning Department 1635 Faraday Drive Carlsbad, CA 92008
	David De Cordova	City of Carlsbad Planning Department 1635 Faraday Drive Carlsbad, CA 92008
City of Chula Vista	Kelly Broughton Development Services Director	City of Chula Vista Development Services 276 Fourth Avenue, Bldg B Chula Vista, CA 91910-2631
	Ed Batchelder Advance Planning Manager	City of Chula Vista Development Services 276 Fourth Avenue Chula Vista, CA 91910-2631
City of Coronado	Rachel Hurst Director of Community Development, Redevelopment Services and Housing	City of Coronado Department of Community Development 1825 Strand Way Coronado, CA 92118-3005
City of Del Mar	Kathy Garcia Planning and Community Development Director	City of Del Mar Planning and Comm. Dev. 1050 Camino Del Mar Del Mar, CA 92014-2604
City of El Cajon	Melissa Ayres Director of Community Development	City of El Cajon Community Development Department 200 Civic Center Way, 3rd Floor El Cajon, CA 92020-3912
City of Encinitas	Diane Langager Principal Planner	City of Encinitas Dept of Planning and Building 505 S. Vulcan Avenue Encinitas, CA 92024-3633
City of Escondido	Jay Petrek Director of Community	City of Escondido Community Dev. 201 N. Broadway Escondido, CA 92025-2709
City of Imperial Beach	Steve Dush Director of Community Development	City of Imperial Beach Community Development Department 825 Imperial Beach Boulevard Imperial Beach, CA 91932-2702
	Jim Nakagawa Planner	City of Imperial Beach Community Development Department 825 Imperial Beach Boulevard Imperial Beach, CA 91932-2702
City of La Mesa	Carol Dick Director of Community Development	City of La Mesa Community Development Department 8130 Allison Avenue La Mesa, CA 91942

Jurisdiction/Agency	Name	Address
City of Lemon Grove	David DeVries Acting Development Services Director	City of Lemon Grove Development Services Department 3232 Main Street Lemon Grove, CA 91945-1705
City of National City	Ray Pe Principal Planner	City of National City Planning Department 1243 National City Boulevard National City, CA 91950-4301
City of Oceanside	Jeff Hunt City Planner	City of Oceanside Planning Department 300 N. Coast Highway Oceanside, CA 92054
City of Poway	Robert (Bob) Manis Director of Development Services Department	City of Poway Department of Development Services 13325 Civic Center Drive, 1st Floor Poway, CA 92064
City of San Diego	Jeff Murphy Director of Planning	City of San Diego Planning Department 1222 First Ave MS 413 San Diego, CA 92101
County of San Diego	Mark Wardlaw Director, Depatment of Planning and Development Services Darren Gretler Assistant Director, Department of Planning and Development Services	County Department of Planning and Development Services 5510 Overland Avenue San Diego, CA 92123 County Department of Planning and Development Services 5510 Overland Avenue San Diego, CA 92123
City of San Marcos	Jerry Backoff Planning Director Karen Brindley Planning Division Manager	City of San Marcos Planning Department 1 Civic Center Drive San Marcos, CA 92069-2949 City of San Marcos Planning Department 1 Civic Center Drive San Marcos, CA 92069-2949
City of Santee	Melanie Kush Director of Development Services	City of Santee Development Services 10601 Magnolia Avenue Santee, CA 92071-1222
City of Solana Beach	Bill Chopyk Director of Community Development	Solana Beach Community Development Department 635 S. Highway 101 Solana Beach, CA 92075-2215

Jurisdiction/Agency	Name	Address
City of Vista	John Conley Director of Community Development and Engineering Patsy Chow City Planner	Vista Community Development Department 200 Civic Center Drive Vista, CA 92084 Vista Community Development Department 200 Civic Center Drive Vista, CA 92084
San Diego County Water Authority	Dana Friehauf Water Resources Manager	San Diego County Water Authority 4677 Overland Avenue San Diego, CA 92123
San Diego Association of Governments	Charles "Muggs" Stoll Director of Land Use and Development	SANDAG 401 B Street, Suite 800 San Diego, CA 92101 (or Mail Station 980)
San Diego LAFCO	Ingrid Hansen Chief, Governmental Services	9335 Hazard Way, Suite 200 San Diego, CA 92123

San Diego County Water Authority

Member Agency Working Group Meeting
2015 Urban Water Management Plan

July 15, 2015
(1:30 p.m. – 3:30 p.m.)
San Diego County Water Authority
Library Conference Room

PURPOSE: Coordination with Member Agencies on preparation of their local supply and conservation projections for the 2040 Regional Water Demand Forecast and 2015 Urban Water Management Plans.

AGENDA

1. Introductions
2. Purpose and overview of 2015 UWMP (Alexi Schnell)
    a. Regulatory/Legislative changes
    b. Status of DWR 2015 UWMP guidebook
    c. SDCWA schedule
3. Overview of Water Authority's approach to preparation of 2015 UWMP (Dana Friehauf)
4. Review process and schedule for 2040 regional water demand forecast (Tim Bombardier)
    a. Accelerated forecasted growth
    b. Near-term annexations
5. Overview of SBX7-7 targets and compliance (Tim Bombardier)
6. Demand Management Measures (Lori Swanson)
7. Local Supply Projections
    a. Water reuse and wastewater treatment projections (Maria Mariscal)
        - Water recycling
        - Potable reuse
    b. Groundwater projections (Maria Mariscal)
    c. Local surface water projections (Stu Williams)
8. Education and Outreach (Denise Vedder)
9. Discussion

RESOLUTION NO. 2016- ______

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN DIEGO COUNTY WATER AUTHORITY APPROVING THE 2015 URBAN WATER MANAGEMENT PLAN

WHEREAS, California Water Code Section 10610 et seq., known as the Urban Water Management Planning Act (Act), requires urban water suppliers to prepare and adopt an Urban Water Management Plan every five years on or before December 31, in years ending in five and zero; and

WHEREAS, due to recent changes in the Act, State law has extended the deadline for adoption of the 2015 Urban Water Management Plans (2015 Plan) to July 1, 2016; and

WHEREAS, the Act specifies the requirements and procedures for adopting such Urban Water Management Plans; and

WHEREAS, pursuant to the Act, the Water Authority prepared a draft 2015 Plan in consultation with the Water Authority's member agencies in the areas of water demand forecasting and identification of local and imported supplies; and

WHEREAS, the draft 2015 Plan was made available for public review commencing April 29, 2016, and ending on June 6, 2016, notices of the availability of the draft 2015 Plan and of the public hearing to receive comments on the draft 2015 Plan on May 26, 2016, were published in accordance with applicable law; and

WHEREAS, copies of the draft 2015 Plan were distributed to Water Authority member agencies, interested parties who submitted requests for copies, as well as to each of the cities within the Water Authority's service area and the County of San Diego; and

WHEREAS, the final 2015 Plan, incorporating changes to the draft Plan as a result of certain comments, were distributed to the Water Authority Board of Directors prior to the June 23, 2016, Board meeting; and

WHEREAS, the Water Authority Board of Directors, upon recommendation of the General Manager, and the information presented to it at a Board meeting on May 26, 2016, has determined that the final 2015 Plan, dated June 23, 2016, and on file with the Clerk of the Board is consistent with the Act and is an accurate representation of the water resources plan for the Water Authority;

NOW THEREFORE, the Board of Directors of the San Diego County Water Authority resolves as follows:

1. The foregoing recitals are true and correct and constitute the findings and determinations of the Board.

2. The final 2015 Plan, dated June 23, 2016, on file with the Clerk of the Board, is approved and adopted.

3. The General Manager is hereby directed to:

- Submit the 2015 Plan to the California Department of Water Resources not later than July 1, 2016;
- Submit a copy of the 2015 Plan to the California State Library, each Water Authority member agency, the County of San Diego and each city within the territory of the Water Authority not later than 30 days after adoption;
- Make the 2015 Plan available for public review through the Water Authority's Internet web site;
- Make the 2015 Plan available for public review at the Water Authority headquarters during the Water Authority's normal business hours;
- Implement the 2015 Plan consistent with the Water Authority's Administrative Code, adopted Operations and Capital Improvement Plan Budgets, adopted Water Facilities Master Plan and other formal action of the Board.

4. The General Manager is further directed to periodically review the 2015 Plan in accordance with applicable law and recommend to the Board amendments to the plan as may be appropriate as a result of such review.

5. This resolution is effective upon adoption.

PASSED, APPROVED AND ADOPTED this 23rd day of June 2016, by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

____
Mark Weston, Chairman
Board of Directors

ATTEST:

____
Jim Madaffer, Secretary
Board of Directors

I, Melinda Cogle, Clerk of the Board of the San Diego County Water Authority, certify that the vote shown above is correct and this Resolution No. 2016-______ was duly adopted at the meeting of the Board of Directors on the date stated above.

____

Melinda Cogle, Clerk of the Board

Appendix C

DWR 2015 Urban Water Management Plan Checklist

Checklist Arranged by Water Code Section

CWC Section	UWMP Requirement	Subject	UWMP Location
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	**n/a**
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	**n/a**
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	**n/a**
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	**n/a**
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	**n/a**
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	**n/a**
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	**Section 3**
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	**n/a**
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	**n/a**
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	**Section 1.4; Appendix B**
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	**Sections 3; 5; 9**

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.	Plan Adoption, Submittal, and Implementation	**Section 1.4, Appendix B**
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	**Section 1.4**
10631(a)	Describe the water supplier service area.	System Description	**Section 1.5.2**
10631(a)	Describe the climate of the service area of the supplier.	System Description	**Section 1.7.2**
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	**Section 1.7.4**
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	**Section 1.7.4, Table 1-4**
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	**Section 1.7.1**
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	**Sections 4, 5, 6, 9.5, Tables 9-1 to 9-7**
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	**n/a**
10631(b)(1)	Indicate whether a 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	**n/a**
10631(b)(2)	Describe the groundwater basin.	System Supplies	**n/a**
10631(b)(2)	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	**n/a**
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	**n/a**
10631(b)(3)	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	**n/a**
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	**Apendix F, Table F-2**

10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	**Sections 9.2, 9.3, 9.4**
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	**Sections 9.2, 9.3**
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	**Section 10**
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	**Sections 4.2, 4.3, 11.2.4**
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	**Section 2.3, Figure 2-1**
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	**Appendix J**
10631(f)(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	**n/a**
10631(f)(2)	Wholesale suppliers shall describe **a)** specific demand management measures listed in code, **b)** their distribution system asset management program, and **c)** supplier assistance program.	Demand Management Measures	**a) Section 3** **b) Section 1.6.4** **c) Section 3**
10631(g)	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 multiple-dry years.	System Supplies	**Sections 4, 5, 6, 9**
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	**Section 4.5**
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	**Appendix D**
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	**n/a**
10631(j)	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	**Section 1.4**

10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	**n/a**
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	**Section 11.2**
10632(a)(2)	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency.	Water Shortage Contingency Planning	**Section 11.2.7, Table 11-5**
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	**Section 11.1**
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	**Sections 11.2.1, 11.2.2**
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	**Section 11.2**
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	**Section 11.2.5**
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	**Section 11.2.6**
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	**Appendix H**
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	**Section 11.2.1**
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	**Section 5.4, Appendix F**
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	**Section 5.4.2, Appendix F**
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)	**Appendix F**
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	**Section 5.4**

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)	**Section 5.4.1**
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)	**Section 5.4.4**
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)	**Section 5.4.3**
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	**Section 5.4.3**
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	**Section 7**
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry 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	**Section 9**
10635(b)	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 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	**Section 1.4, Appendix B**
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.	Plan Preparation	**Section 1.4, Appendix B**
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	**Section 1.4**
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	**Section 1.4**
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	**Appendix B**
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	**Section 1.4**

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	**Section 1.4**
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	**Section 1.4**
10645	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	**Section 1.4**

Appendix D

Regional Water Planning and Reporting (BMPs)

CUWCC BMP Wholesale Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

196 **San Diego County Water Authority**

Name: Lori Swasnon Email: lswanson@sdcwa.org

a) Financial Investments and Building Partnerships

BMP Section	Monetary Amount for Financial Incentives	Monetary Amount for Equivalent Resources
BMP 1.1 Operation Practices		798165
BMP 2.1 Public Outreach		565765
BMP 3 Residential	74968	
BMP 4 CII	58313	
BMP 5 Landscape	432509	

b) Technical Support

c) Retail Agency

Retail Agency Name	Program Description
Other	SDCWA manages the following programs on behalf of its 24 retail agencies WITHOUT assuming their reporting responsibility.
Other	SDCWA Turf Replacement Program
Other	WaterSmart Field Services Program
Other	Agricultural Water Management Program
Other	Water/Energy Pilot Program with SDG&E
Other	Metropolitan Water District's (MWD) SoCal WaterSmart Program
Other	MWD Turf Removal Program

d) Water Shortage Allocation

Adoption Date: 5/1/2006

File Name: Water Shortage and Drought Response Plan (updated April 2012)
http://www.sdcwa.org/sites/default/files/files/water-shortage-drought-response-plan.pdf

e) Non signatory Reporting of BMP implementation by non-signatory Agencies

Not able to report.

f) Encourage CUWCC Membership List Efforts to Recuit Retailers

CUWCC membership benefits and Council updates are provided on a regular basis at the SDCWA hosted monthly meeting with member agency conservation coordinators. There are 24 SDCWA member agencies, 21 of them are CUWCC members.

CUWCC dues 2013.PDF

42532.00

At Least As effective As No

CUWCC BMP Wholesale Coverage Report 2013

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

Exemption	No	

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

196 San Diego County Water Authority

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
BMP12WaterLoss_FY 2013.xls	
AWWA Water Audit Validity Score?	93
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
2	5	5	131.8	False	39000	0.01

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

196 San Diego County Water Authority

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No
Feasibility Study provided to CUWCC?	No
Date:	
Uploaded file name:	
Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach ON TRACK

196 San Diego County Water Authority Wholesale

Does your agency perform Public Outreach programs? Yes

The list of retail agencies your agency assists with public outreach

Carlsbad Municipal Water District,City of Escondido,City of Oceanside, Water Dept,City of Poway,City of San Diego - Retailer,Fallbrook Public Utility District,Helix Water District,Lakeside Water District,Olivenhain Municipal Water District,Otay Water District,Padre Dam Municipal Water District - Retail,Rainbow Municipal Water District,Ramona Municipal Water District,Rincon Del Diablo Municipal Water District,San Dieguito Water District,Santa Fe Irrigation District,Sweetwater Authority,Vallecitos Water District,Valley Center Municipal Water District,Vista Irrigation District,Yuima Municipal Water District - Retialer

City of Del Mar
Camp Pendleton MCB
See comments section at end of form

Agency Name	ID number
Carlsbad Municipal Water District	6996
City of Escondido	56
City of Oceanside, Water Dept	70
City of Poway	76
City of San Diego - Retailer	82
Fallbrook Public Utility District	121
Helix Water District	128
Lakeside Water District	7020
Olivenhain Municipal Water District	176
Otay Water District	179
Padre Dam Municipal Water District - Retail	1005
Rainbow Municipal Water District	7047
Ramona Municipal Water District	187
Rincon Del Diablo Municipal Water District	190
San Dieguito Water District	197
Santa Fe Irrigation District	202
Sweetwater Authority	213
Vallecitos Water District	231
Valley Center Municipal Water District	232
Vista Irrigation District	234
Yuima Municipal Water District - Retialer	7044

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? No

BMP 2.1 Public Outreach

ON TRACK

Public Outreach Program List	**Number**
Website	450
Newsletter articles on conservation	4000
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	65000
General water conservation information	25000
Total	**94450**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	**Number**
News releases	55
Total	**55**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	**Annual Budget Amount**
Public Outreach	565764
Total Amount:	**565764**

Description of all other Public Outreach programs

Retail agencies and The Home Depot to offer Plant Fairs

Comments:

A list of SDCWA member agencies is posted here http://www.sdcwa.org/member-agencies.
Not CUWCC Group 1 members: City of Del Mar; Pendleton Military Reservation, Lakside WD and Yuima MWD.

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs ON TRACK

196 San Diego County Water Authority **Wholesale**

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

See Comments Section at end of form

Materials meet state education framework requirements? Yes

Yes, all are compliant with state curriculum standards

Materials distributed to K-6? Yes

Posters on water distribution and water cycle, corresponding workbooks (Watersheds, Water and You), coloring books & crayons, cootie catchers with rain tips, Pencil Pouches with conservation messages

Materials distributed to 7-12 students? Yes (Info Only)

Materials related to Water Quality testing

Annual budget for school education program: 89645.00

Description of all other water supplier education programs

Water-related assemblies, Splash Mobile Lab, Science Fair, Scout Patch Program, Reuben H Fleet Science Center

Comments:

A list of SDCWA member agencies is posted at www.sdcwa.org/member-agencies.
Not CUWCC Group 1 members: City of Del Mar; Pendleton Military Reservation, Lakside WD and Yuima MWD.

At Least As effective As No

Exemption No 0

CUWCC BMP Wholesale Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

196 **San Diego County Water Authority**

Name: Lori Swanson Email: lswanson@sdcwa.org

a) Financial Investments and Building Partnerships

BMP Section	Monetary Amount for Financial Incentives	Monetary Amount for Equivalent Resources
BMP 1.1 Operation Practices		746039
BMP 2.1 Public Outreach		471644
BMP 3 Residential	92513	
BMP 4 CII	94108	
BMP 5 Landscape	580663	

b) Technical Support

c) Retail Agency

Retail Agency Name	Program Description
Other	SDCWA manages the following programs on behalf of its 24 retail agencies WITHOUT assuming their reporting responsibility.
Other	SDCWA Turf Replacement Program
Other	WaterSmart Field Services Program
Other	Agricultural Water Management Program
Other	Water/Energy Pilot Program with SDG&E
Other	Metropolitan Water District's (MWD) SoCal WaterSmart Program
Other	MWD Turf Removal Program
Other	MWD Water Savings Incentive Program

d) Water Shortage Allocation

Adoption Date: 5/1/2006

File Name: Water Shortage and Drought Response Plan (updated April 2012)
http://www.sdcwa.org/sites/default/files/files/water-shortage-drought-response-plan.pdf

e) Non signatory Reporting of BMP Implementation by non-signatory Agencies

Not able to report.

f) Encourage CUWCC Membership List Efforts to Recuit Retailers

CUWCC membership benefits and Council updates are provided on a regular basis at the SDCWA hosted monthly meeting with member agency conservation coordinators. There are 24 SDCWA member agencies, 21 of them are CUWCC members.

CUWCC 2014 MEMAGENCY DUES.PDF

41276.00

CUWCC BMP Wholesale Coverage Report 2014

Foundational Best Managemant Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

196 San Diego County Water Authority

Completed Standard Water Audit Using AWWA Software?	Yes
AWWA File provided to CUWCC?	Yes
BMP12WaterLoss_FY 2014.xls	
AWWA Water Audit Validity Score?	93
Complete Training in AWWA Audit Method	Yes
Complete Training in Component Analysis Process?	Yes
Component Analysis?	Yes
Repaired all leaks and breaks to the extent cost effective?	Yes
Locate and Repar unreported leaks to the extent cost effective?	Yes
Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
2	164	164	131	True	15000	0.2

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

196 San Diego County Water Authority

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No
Feasibility Study provided to CUWCC?	No

Date:

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters	Yes

At Least As effective As No

Exemption No

Comments:

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach **ON TRACK**

196 **San Diego County Water Authority** **Wholesale**

Does your agency perform Public Outreach programs? Yes

The list of retail agencies your agency assists with public outreach

Carlsbad Municipal Water District,City of Escondido,City of Oceanside, Water Dept,City of Poway,City of San Diego - Retailer,Fallbrook Public Utility District,Helix Water District,Lakeside Water District,Olivenhain Municipal Water District,Otay Water District,Padre Dam Municipal Water District - Retail,Rainbow Municipal Water District,Ramona Municipal Water District,San Dieguito Water District,Santa Fe Irrigation District,Sweetwater Authority,Vallecitos Water District,Valley Center Municipal Water District,Vista Irrigation District,Yuima Municipal Water District - Retialer

See comments section at end of form

Agency Name	ID number
Carlsbad Municipal Water District	6996
City of Escondido	56
City of Oceanside, Water Dept	70
City of Poway	76
City of San Diego - Retailer	82
Fallbrook Public Utility District	121
Helix Water District	128
Lakeside Water District	7020
Olivenhain Municipal Water District	176
Otay Water District	179
Padre Dam Municipal Water District - Retail	1005
Rainbow Municipal Water District	7047
Ramona Municipal Water District	187
San Dieguito Water District	197
Santa Fe Irrigation District	202
Sweetwater Authority	213
Vallecitos Water District	231
Valley Center Municipal Water District	232
Vista Irrigation District	234
Yuima Municipal Water District - Retialer	7044

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quater of the reporting year? Yes

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Public Outreach Program List	Number
Newsletter articles on conservation	500
Website	300000
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	100000
General water conservation information	30000
Total	**430500**

Did at least one contact take place during each quater of the reporting year? Yes

Number Media Contacts	Number
News releases	50
Total	**50**

Did at least one website update take place during each quater of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Public Outreach & Conservation Budget	471641
Total Amount:	**471641**

Public Outreah Additional Programs
3 WaterTalk Forums

Description of all other Public Outreach programs

Home depot Plant fairs

Comments:

A list of SDCWA member agencies is posted at http://www.sdcwa.org/member-agencies.
Not CUWCC Group 1 members: City of Del Mar; Pendleton Military Reservation, Lakside WD and Yuima MWD.

At Least As effective As No

Exemption No 0

CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

196 San Diego County Water Authority **Wholesale**

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

See comments section at end of form

Materials meet state education framework requirements? Yes

Yes, all programs are compliant with state curriculum standards

Materials distributed to K-6? Yes

Posters on water distribution and water cycle, corresponding workbooks (Watersheds, Water and you), cootie catchers with rain tips, pencil pouches

Materials distributed to 7-12 students? Yes (Info Only)

Materials related to Water Quality testing

Annual budget for school education program: 66805.00

Description of all other water supplier education programs

Water-related assemblies, Splash Mobile Science Lab, Science Fair, Scout Patch Program, Reuben H Fleet Science Center display

Comments:

A list of SDCWA member agencies is posted at www.sdcwa.org/member agencies.
Not CUWCC Group 1 members: City of Del Mar; Pendleton Military Reservation, Lakside WD and Yuima MWD.

At Least As effective As No

Exemption No 0

Appendix E

Documentation of Water Authority Supplies

Documentation on Water Authority Supplies

Written Contracts or Other Proof

Imperial Irrigation District (IID) - Written Contracts or other Proof

The supply and costs associated with the transfer are based primarily on the following documents:

Agreement for Transfer of Conserved Water by and between IID and the Water Authority (April 29, 1998). This Agreement provides for a market-based transaction in which the Water Authority would pay IID a unit price for agricultural water conserved by IID and transferred to the Water Authority.

Revised Fourth Amendment to Agreement between IID and the Water Authority for Transfer of Conserved Water (October 10, 2003). Consistent with the executed Quantification Settlement Agreement (QSA) and related agreements, the amendments restructure the agreement and modify it to minimize the environmental impacts of the transfer of conserved water to the Water Authority.

Amended and Restated Agreement between Metropolitan and Water Authority for the Exchange of Water (October 10, 2003). This agreement was executed pursuant to the QSA and provides for delivery of the transfer water to the Water Authority.

Environmental Cost Sharing, Funding, and Habitat Conservation Plan Development Agreement among IID, Coachella Valley Water District (CVWD), and Water Authority (October 10, 2003). This Agreement provides for the specified allocation of QSA-related environmental review, mitigation, and litigation costs for the term of the QSA, and for development of a Habitat Conservation Plan.

Quantification Settlement Agreement Joint Powers Authority Creation and Funding Agreement (October 10, 2003). The purpose of this agreement is to create and fund the QSA Joint Powers Authority and to establish the limits of the funding obligation of CVWD, IID, and the Water Authority for environmental mitigation and Salton Sea restoration pursuant to SB 654 (Machado).

First Amendment to the Environmental Cost Sharing, Funding, and Habitat Conservation Plan Development Agreement (August 5, 2005). This agreement amends the roles and responsibilities of CVWD, IID, and the Water Authority related to the Habitat Conservation Plan and related permits.

Fifth Amendment to Agreement Between Imperial Irrigation District and San Diego County Water Authority for Transfer of Conserved Water (December 21, 2009). This agreement implements a settlement between the Water Authority and IID regarding the base contract price of transferred water.

Federal, State, and Local Permits/Approvals

Federal Endangered Species Act Permit. The U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion on January 12, 2001, that provides incidental take authorization and certain measures required to offset species impacts on the Colorado River regarding such actions.

State Water Resources Control Board (SWRCB) Petition. SWRCB adopted Water Rights Order 2002-0016 concerning IID and Water Authority's amended joint petition for approval of a long-term transfer of conserved water from IID to the Water Authority and to change the point of diversion, place of use, and purpose of use under Permit 7643.

Environmental Impact Report (EIR) for Conservation and Transfer Agreement. As lead agency, IID certified the Final EIR for the Conservation and Transfer Agreement on June 28, 2002.

U. S. Fish and Wildlife Service Biological Draft Biological Opinion and Incidental Take Statement on the Bureau of Reclamation's Voluntary Fish and Wildlife Conservation Measures and Associated Conservation Agreements with the California Water Agencies (12/18/02). The USFWS issued the biological opinion/incidental take statement for water transfer activities involving the Bureau of Reclamation and associated with IID/other California water agencies' actions on listed species in the Imperial Valley and Salton Sea (per the June 28, 2002 EIR).

Addendum to EIR for Conservation and Transfer Agreement. IID as lead agency and Water Authority as responsible agency approved addendum to EIR in October 2003.

Environmental Impact Statement (EIS) for Conservation and Transfer Agreement. Bureau of Reclamation issued a Record of Decision on the EIS in October 2003.

CA Department of Fish and Game California Endangered Species Act Incidental Take Permit #2081-2003-024-006). The CDFG issued this permit (10/22/04) for potential take effects on state-listed/fully protected species associated with IID/other California water agencies' actions on listed species in the Imperial Valley and Salton Sea (per the June 28, 2002 EIR).

California Endangered Species Act Permit. A CESA permit was issued by California Department of Fish and Game (CDFG) on April 4, 2005, providing incidental take authorization for potential species impacts on the Colorado River.

All-American Canal (AAC) and Coachella Canal (CC) Lining - Written Contracts or other Proof

The expected supply and costs associated with the lining projects are based primarily on the following documents:

U.S. Public Law 100-675 (1988). Authorized the Department of the Interior to reduce seepage from the existing earthen AAC and CC. The law provides that conserved water will be made available to specified California contracting water agencies according to established priorities.

California Department of Water Resources - Metropolitan Funding Agreement (2001). Reimburse Metropolitan for project work necessary to construct the lining of the CC in an amount not to exceed $74 million. Modified by First Amendment (2004) to replace Metropolitan with the Authority. Modified by Second Amendment (2004) to increase funding amount to $83.65 million, with addition of funds from Proposition 50.

California Department of Water Resources - IID Funding Agreement (2001). Reimburse IID for project work necessary to construct a lined AAC in an amount not to exceed $126 million.

Metropolitan - CVWD Assignment and Delegation of Design Obligations Agreement (2002). Assigns design of the CC lining project to CVWD.

Metropolitan - CVWD Financial Arrangements Agreement for Design Obligations (2002). Obligates Metropolitan to advance funds to CVWD to cover costs for CC lining project design and CVWD to invoice Metropolitan to permit the Department of Water Resources to be billed for work completed.

Allocation Agreement among the United States of America, The Metropolitan Water District of Southern California, Coachella Valley Water District, Imperial Irrigation District, San Diego County Water Authority, the La Jolla, Pala, Pauma, Rincon, and San Pasqual Bands of Mission Indians, the San Luis Rey River Indian Water Authority, the City of Escondido, and Vista Irrigation District (October 10, 2003). This agreement includes assignment of Metropolitan's rights and interest in delivery of 77,700 AF of Colorado River water previously intended to be delivered to Metropolitan to the Water Authority. Allocates water from the AAC and CC lining projects for at least 110 years to the Water Authority, the San Luis Rey Indian Water Rights Settlement Parties, and IID, if it exercises its call rights.

Amended and Restated Agreement between Metropolitan and Water Authority for the Exchange of Water (October 10, 2003). This agreement was executed pursuant to the QSA and provides for delivery of the conserved canal lining water to the Water Authority.

Agreement between Metropolitan and Water Authority regarding Assignment of Agreements related to the AAC and CC Lining Projects. This agreement was executed in April 2004 and assigns Metropolitan's rights to the Water Authority for agreements that had been executed to facilitate funding and construction of the AAC and CC lining projects.

Assignment and Delegation of Construction Obligations for the Coachella Canal Lining Project under the Department of Water Resources Funding Agreement No. 4600001474 from the San Diego County Water Authority to the Coachella Valley Water District, dated September 8, 2004.

Agreement Regarding the Financial Arrangements between the San Diego County Water Authority and Coachella Valley Water District for the Construction Obligations for the Coachella Canal Lining Project, dated September 8, 2004.

Agreement No. 04-XX-30-W0429 Among the United States Bureau of Reclamation, the Coachella Valley Water District, and the San Diego County Water Authority for the Construction of the Coachella Canal Lining Project Pursuant to Title II of Public Law 100-675, dated October 19, 2004.

Agreement No. 06-XX-30-W0447 Among the United States Department of the Interior Bureau of Reclamation, the Imperial Irrigation District, and San Diego County Water r Authority for the Construction the AAC Lining Project Pursuant to Title II- of Public Law 100-675, dated January 13, 2006.

California Water Code Section 12560 et seq. This Water Code Section provides for $200 million to be appropriated to the Department of Water Resources to help fund the canal lining projects in furtherance of implementing California's Colorado River Water Use Plan.

California Water Code Section 79567. This Water Code Section identifies $20 million as available for appropriation by the California Legislature from the Water Security, Clean Drinking Water, Coastal, and Beach Protection Fund of 2002 (Proposition 50) to DWR for grants for canal lining and related projects necessary to reduce Colorado River water use. According to the Allocation Agreement, it is the intention of the agencies that those funds will be available for use by the Water Authority, IID, or CVWD for the AAC and CC lining projects.

California Public Resources Code Section 75050(b)(1). This section identifies up to $36 million as available for water conservation projects that implement the Allocation Agreement as defined in the Quantification Settlement Agreement.

Agreement regarding the Financial Arrangements between IID and SDCWA for the AAC lining project (January 12, 2006). This agreement set forth the terms and conditions under which the design and construction obligations to be performed by IID will be financed.

Federal, State, and Local Permits/Approvals

AAC Lining Project Final EIS/EIR (March 1994). A final EIR/EIS analyzing the potential impacts of lining the AAC was completed by the Bureau of Reclamation (Reclamation) in March 1994. A Record of Decision was signed by Reclamation in July 1994, implementing the preferred alternative for lining the AAC. A re-examination and analysis of these environmental compliance documents by Reclamation in November 1999 determined that these documents continued to meet the requirements of the NEPA and the CEQA and would be valid in the future.

CC Lining Project Final EIS/EIR (April 2001). The final EIR/EIS for the CC lining project was completed in 2001. Reclamation signed the Record of Decision in April 2002. An amended Record of Decision has also been signed to take into account revisions to the project description.

Mitigation, Monitoring, and Reporting Program for Coachella Canal Lining Project, SCH #1990020408; prepared by Coachella Valley Water District, May 16, 2001.

Environmental Commitment Plan for the Coachella Canal Lining Project, approved by the US Bureau of Reclamation (Boulder City, NV) on March 4, 2003.

Environmental Commitment Plan and Addendum to the All-American Canal Lining Project EIS/EIR California State Clearinghouse Number SCH 90010472 (June 2004, prepared by IID).

Addendum to Final EIS/EIR and Amendment to Environmental Commitment Plan for the All-American Canal Lining Project (approved June 27, 2006, by IID Board of Directors).

Addendum to the EIR/EIS for the Coachella Canal Lining Project for Wister Pond Sport Fishery Mitigation Project (November 2011).

Carlsbad Desalination Project – Written Contracts or other Proof

The supply and costs associated with the Carlsbad Desalination Project are based primarily on the following documents:

Development Agreement between City of Carlsbad and Poseidon (October 2009). A Development Agreement between Carlsbad and Poseidon was executed on October 5, 2009

Agreement of Term Sheet between the Water Authority and Poseidon Resources (July 2010). The Water Authority approved the Term Sheet at its July 2010 Board Meeting. The Term Sheet outlines the terms and conditions of a future Water Purchase Agreement with Poseidon and allocates the resources to prepare the draft Water Purchase Agreement.

Water Purchase Agreement between the Water Authority and Poseidon Resources (November 2012). The Water Authority approved the Water Purchase Agreement (WPA) at its November 2012 Board Meeting. The WPA enters the Water Authority into a contract with Poseidon for the purchase of between 48,000 acre-feet and 56,000 acre-feet of desalinated seawater per year for 30 years.

Federal, State, and Local Permits/Approvals

Carlsbad Desalination Project Final EIR (June 2006). The City of Carlsbad certified the Final EIR and the final Notice of Determination for the project was signed on June 14, 2006.

NPDES Discharge Permit (August 2006). The Regional Water Quality Control Board issues the NPDES Discharge Permit for the project on August 16, 2006.

Drinking Water Permit (October 2006). The California Department of Health Services approved the Conditional Drinking Water Permit on October 19, 2006.

Coastal Development Permit (November 2007). The California Coastal Commission approved, with conditions, the Coastal Development Permit on November 15, 2007. The Coastal Development Permit allows construction and operation of the project in the Coastal Zone.

State Lands Commission Lease Application (August 2008). Amends lease of land by Cabrillo Power I LLC (Cabrillo) from the State Lands Commission for the lands where the project will be constructed. Cabrillo and Poseidon entered into agreement on July 1, 2003, authorizing Poseidon to use those lands to construct the project.

Addendum to Final EIR (September 2009). An Addendum to the Final EIR was certified by the City of Carlsbad and Notice of Determination for the Addendum was signed on September 15, 2009. The Addendum modified water conveyance pipeline alignments.

Second Addendum to the Final EIR (November 2012). An Addendum to the Final EIR was certified by the San Diego County Water Authority and Notice of Determination for the Addendum was signed on November 29, 2012. The Second Addendum documented minor changes to the footprint associated with the Twin Oaks Valley Water Treatment Plant modifications, Pipeline 3 relining, San Marcos aqueduct connection point modifications, Pipeline 4 modifications, and the Macario Canyon pipeline alignment modification and pumping well.

Third Addendum to the Final EIR (September 2013). An Addendum to the Final EIR was certified by the San Diego County Water Authority and Notice of Determination for the Addendum was signed on September 26, 2013. The Third Addendum covered minor changes to the Macario Canyon pipeline alignment.

Forth Addendum to the Final EIR (July 2014). An Addendum to the Final EIR was certified by the San Diego County Water Authority and Notice of Determination for the Addendum was signed on July 9, 2014. The Forth Addendum covers the construction of two above ground buildings at the San Marcos connection point site to house the previously approved "split level" flow control vaults and the relocation of previously approved underground interconnect vaults for Water Authority Pipelines 3 and 4 (proposed modifications)

Domestic Water Supply Permit (November 2015). The State Water Resources Control Board, Division of Drinking Water issued a domestic water supply permit for the Poseidon Resources – Carlsbad Desalination Plant on November 6, 2015.

Carryover Storage and San Vicente Dam Raise Project – Written Contracts or other Proof

The expected dry-year supply and costs associated with 100,000 AF of carryover storage at San Vicente Dam and Reservoir are based primarily on the following documents:

Agreement Between the San Diego County Water Authority and the City of San Diego for the Emergency Storage Project (Expansion of San Vicente Reservoir) (May 1998). Agreement allowing the Water Authority emergency storage and future carryover storage rights in San Vicente Reservoir, where the City maintains ownership and operation of the expanded San Vicente Dam and Reservoir facilities.

City of San Diego Ordinance Number O-18521 (May 1998). Ordinance passed by the City of San Diego City Council authorizing execution of above 1998 Agreement between the City and Water Authority.

Principles of Understanding Between the City of San Diego and the San Diego County Water Authority for the Emergency Storage Project (Operation of the San Vicente Reservoir and Lake Hodges Facilities) (February 2003). POU amending the 1998 Agreement clarifying operation of the expanded San Vicente Reservoir for emergency storage, and maintaining allowance for future expansion for carryover storage capacity.

Principles of Understanding Between the San Diego County Water Authority and the City of San Diego for the Operation of the San Vicente Reservoir Implemented Under the Carryover Storage Project (August 2008). POU amending the 1998 Agreement and 2003 POU establishing protocols for cooperation between the Water Authority and the City during carryover storage project implementation; issues included a reservoir regulating plan, operating plan, water quality studies, operation of existing City facilities, and land acquisition.

Federal, State, and Local Permits/Approvals

Carryover Storage and San Vicente Dam Raise EIR/EIS (April 2008). As CEQA lead agency, the Water Authority's Board of Directors certified the Final EIR/EIS on April 24, 2008. As NEPA lead agency, the U.S. Army Corps of Engineers issued a Record of Decision on the Final EIS on January 8, 2009.

California Regional Water Quality Control Board Clean Water Act Section 401 Water Quality Certification (October 2008). RWQCB issued a Section 401 Certification on October 27, 2008, Water Quality Certification Number 08C-047.

U.S. Fish & Wildlife Service Biological Opinion for the San Diego County Water Authority's Carryover Storage and San Vicente Dam Raise Project (October 2008). U.S. Fish & Wildlife Service issued a Biological Opinion on October 28, 2008, B.O. Number 2008B0061-2008F0732.

Reinitiation of U.S. Fish & Wildlife Service Biological Opinion for the San Diego County Water Authority's Carryover Storage and San Vicente Dam Raise Project (May, 2009). U.S. Fish & Wildlife Service issued a revised Biological Opinion on May 8, 2009, B.O. Number 2008B0061-2008F0732-R001.

California Department of Fish & Game Streambed Alteration Agreement (October 2008). California Dept. of Fish & Game issued Streambed Alteration Agreement #1600-2008-0216-R5 on October 24, 2008, per Section 1602 of the Fish & Game Code.

Amendment to California Department of Fish & Game Streambed Alteration Agreement (February 2012). California Dept. of Fish & Game issued an Amendment to Streambed Alteration Agreement #1600-2008-0216-R5 on February 15, 2012, per Section 1602 of the Fish & Game Code.

U.S. Army Corps of Engineers Section 404 Permit (February 2009). U.S. Army Corps of Engineers issued a Section 404 permit on February 12, 2009, Permit Number SPL-200-01015-RRS.

Semitropic Original Water Bank - Written Contracts or other Proof

The expected supply and costs associated with out-of-county storage and transfer water are based primarily on the following documents:

Amended and Restated Assignment Agreement (June 2008). Assignment and purchase of Vidler Water Company, Inc. rights, title, interest and obligations in the Semitropic Water Banking and Exchange Program

Consent to Assignment (July 2008). Fulfills the condition precedent described in Section 3 of the Amended Assignment Agreement, including the requirements of subsections 3.1 and 3.2. The Second Amended Agreement and Third Amendment and the Fourth Amendment are incorporated in its entirety.

Memorandum of Assignment of Vidler-Semitropic Water Banking and Exchange Program (July 2008). Assigned to the Water Authority 18.5 percent of the rights and obligations of the Semitropic Water Banking and Exchange Program from Vidler Water Company, Inc.
Agreement Among The Department of Water Resources, Metropolitan Water District and Sutter Extension Water District for Storage and Conveyance of 2008 Transfer Water (April 2008). Set forth provisions governing the storage and conveyance of 13,071 af of Transfer Water (before conveyance and carriage losses) via State Water Project facilities.

Sutter Extension Water District and the Water Authority Memorandum of Understanding for Transfer of Water (February 2008 and March 2008, respectively). Memorialize the agreement for program development, environmental review, and other preliminary actions necessary for an agreement for transfer of water on the general terms provided in Memorandum.

Agreement Among The Department of Water Resources, Metropolitan Water District and Butte Water District for Storage and Conveyance of 2008 Transfer Water (April 2008). Set forth provisions governing the storage and conveyance of 10,006 af of Transfer Water (before conveyance and carriage losses) via State Water Project facilities.

Butte Water District and the Water Authority Memorandum of Understanding for Transfer of Water (February 2008 and March 2008, respectively). Memorialize the agreement for program development, environmental review, and other preliminary actions necessary for an agreement for transfer of water on the general terms provided in Memorandum.

Agreement for Exchange and Conveyance of Water between MWD and the Water Authority (September 2008). Agreement between the Water Authority and MWD to exchange water utilizing its storage and recovery rights in Semitropic's Groundwater Storage Program.

Consent Agreement (September 2008). Semitropic consents to the assignment by MWD from MWD's Semitropic Storage Account to the Water Authority's Semitropic Storage Account of approximately 16,117 af of water.

Semitropic Rosamond Water Bank Authority - Written Contracts or other Proof

Agreement Among Semitropic-Rosamond Water Bank Authority and San Diego County Water Authority (August 2008). Assignment of 10,000 shares in the Semitropic-Rosamond Water Bank Authority – 5,000 shares in the Semitropic Water Storage District's Stored Water Recovery Unit and 5,000 shares in the Antelope valley Water Bank.

Appendix F

Member Agency Local Supply Projections

Table F-1

Member Agency Surface Water Projections

Member Agency	Reservoir	Annual Member Agency Planned Local Use (AF)	Basis for Yield (information provided by member agencies)
Escondido, City of	Henshaw / Wohlford	7,260	25-year average.
Helix WD	Cuyamaca / El Capitan	3,258	Based on historical median runoff of 3,644 AFY, reduced by historical evaporation rate of 10.6% (386 AFY).
San Diego, City of [a]	Barrett El Capitan Hodges Lower Otay Morena San Vicente Sutherland Total	23,000	Median yield based on Reservoir Management Plan - post-2015 supply adjusted downward to account for increase in Cal-Am Water Co. demands.
San Dieguito WD / Santa Fe ID	San Dieguito / Hodges	5,700	Fractional interest: 42.67% / 57.33% (SDWD / SFID).
Sweetwater Authority	Loveland / Sweetwater	7,400	Average annual production from Sweetwater River since 1945.
Vista I.D.	Henshaw	5,062	Median for the years 1960-2015.
	Total	51,680	

[a] Surface water use projections: 23,000 AFY (2015); 22,900 AFY (2020); 22,800 AFY (2025); 22,700 AFY (2030); 22,600 AFY (2035); 22,500 AFY (2040).

Table F-2

Member Agency Groundwater Projections

EXISTING GROUNDWATER [YIELD] PROJECTS AND PROPOSED EXPANSIONS (VERIFIABLE)

Member Agency	**Project or Facility Name**	**Project Type**	**Groundwater Basin or Location**	**Existing (AF/YR)**[1]	**Projected Yield Verifiable Projects (AF/YR)**					
				Based on Period 2010-2014	2015	2020	2025	2030	2035	2040
Helix WD	*Groundwater Production Well 101*	*Pump & Blend (with raw imported water)*	*El Monte Basin*	135	*93*	*130*	*130*	*130*	*130*	*130*
Lakeside WD	*Vine Street Groundwater Production Facility*	*Pump & Treat (blend with imported water)*	*Santee Basin (San Diego River Basin)*		*700*	*700*	*700*	*700*	*700*	*700*
Oceanside, City of	*Mission Basin Desalter Facility - 1st & 2nd Phase of Desal Expansion & IPR*	*Brackish Groundwater Recovery & Treatment*	*Mission Basin (Lower San Luis Rey River Valley)*	3,300	*3,300*	*3,300*	*3,700*	*3,700*	*3,700*	*3,700*
MCB Camp Pendleton	*Groundwater Production Wells*	*Pump & Conventional Treatment*	*Lower Santa Margarita, Las Flores, San Mateo, and San Onofre Basins*		*6,480*	*7,510*	*8,700*	*9,740*	*9,740*	9740
San Diego, City of	*San Vicente GW Production Well*	*Pump & Blend*	*Santee/El Monte*		*500*	*500*	*500*	*500*	*500*	*500*
	Richard A. Reynolds Desalination Facility	*Brackish Groundwater Recovery*	*San Diego Formation*			*2,600*	*2,600*	*2,600*	*2,600*	*2,600*
Sweetwater Authority	*Richard A. Reynolds Desalination Facility*	*Brackish Groundwater Recovery*	*San Diego Formation*		*3,600*	*6,200*	*6,200*	*6,200*	*6,200*	*6,200*
	National City Well Field	*Pump & Conventional Treatment*	*San Diego Formation [National City Well Field]*		*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*
Yuima MWD	*Mutual Water Company wells within district*	*Groundwater Extraction*	*Pauma Basin (Upper San Luis Rey River Valley)*	1,073	*7,000*	*7,000*	*7,000*	*7,000*	*7,000*	*7,000*
			Total Verifiable		***23,773***	***30,040***	***31,630***	***32,670***	***32,670***	***32,670***

ADDITIONAL PLANNED PROJECTS

Member Agency	**Project or Study Name**	**Project Type**	**Groundwater Basin or Location**	**Study / Project Status**	**Groundwater Additional Planned (AF/YR)**					
					2015	**2020**	**2025**	**2030**	**2035**	**2040**
Fallbrook PUD/ Camp Pendleton (Conjunctive-Use Project)	*Santa Margarita Conjunctive-Use Project*	*Local Surface Water Recharge and Expansion of Camp Pendleton GW Recovery Program*	*Lower Santa Margarita River Basin (Upper Ysidora and Chappo Sub-basins).*	*Progress continues; Feasibility Study Completed & CEQA 2011*	-	*3,100*	*3,100*	*3,100*	*3,100*	*3,100*
Otay WD	*Rancho del Rey Groundwater Well Development (Capacity)*	*Groundwater Recovery*	*Unknown*	*Feasibility Study & CEQA complete*	-	-	-	500	500	500
				Additional Planned Yields	***-***	***3,100***	***3,100***	***3,600***	***3,600***	***3,600***

PROJECT CONCEPTS AND ONGOING FEASIBILITY STUDIES

Member Agency	**Project or Study Name**	**Project Type**	**Groundwater Basin or Location**	**Study / Project Status**	**Groundwater Conceptual (AF/YR)**					
					2015	**2020**	**2025**	**2030**	**2035**	**2040**
Olivenhain MWD	*San Dieguito River Basin Brackish GW Recovery and Treatment*	*Brackish Groundwater Recovery*	*San Dieguito River Groundwater Basin*	*Project Concept/ Feasibility Study*	*0*	*560*	*560*	*560*	*560*	*560*
Otay WD	*Otay Mesa Lot 7 Groundwater Well System (Capacity)*	*Groundwater Recovery*	*Unknown*	*Feasibility Study*	*0*	*0*	*0*	*400*	*400*	*400*
Otay WD	*Middle Sweetwater River Basin Groundwater Well System (Capacity)*	*Groundwater Recovery*	*Middle Sweetwater River Basin*	*Advanced Planning Stage*	*0*	*0*	*0*	*1,000*	*1,000*	*1,000*
Rainbow MWD	*San Luis Rey Groundwater Study*	*Brackish Groundwater Recovery*	*San Luis Rey Basin*	*Feasibility Study*	*0*	*4,000*	*4,000*	*4,000*	*4,000*	*4,000*
San Diego, City of	*San Pasqual Brackish Groundwater Recovery Project*	*Brackish Groundwater Recovery and Treatment*	*San Pasqual Basin*	*Feasibility Report Complete/ CEQA 2012*		*0*	*1,235*	*1,427*	*1,539*	*1,619*
San Diego, City of	*Mission Valley Brackish Groundwater Recovery Project*	*Brackish Groundwater Recovery and Treatment*	*Mission Valley Basin (Alluvial Aquifer / San Diego River)*	*Pilot Production Well Study 2012*	*0*	*0*	*840*	*1,680*	*1,680*	*1,680*
San Diego, City of	*San Diego Formation - Southeastern San Diego, including Mt. Hope*	*Groundwater Recovery*	*San Diego Formation*	*Hydro-geologic Studies (2012)*	*0*	*0*	*800*	*1,600*	*1,600*	*1,600*
Sweetwater Authority / Otay WD	*Otay River Valley GW Aquifer Studies & Field Investigations*	*Brackish Groundwater Recovery*	*San Diego Formation (Otay River Basin)*	*Hydro-geologic Studies on-going (2012)*	*0*	*0*	*3,900*	*3,900*	*3,900*	*3,900*
				Project Concepts Yields	***-***	***4,560***	***11,335***	***14,567***	***14,679***	***14,759***

1 5-year average 2010-2014

Table F-3
Member Agency Wastewater Treatment
San Diego Wastewater Treatment and Water Recycling Facilities Plant Capacity (Million Gallons/Day)

Operating Agency	Treatment Facility Name	Planned Treatment Capacity						Effluent Quality for TDS (mg/L)	Disposal Method
		2020			2045				
		P	S	T	P	S	T		
Carlsbad, City of	*Carlsbad WRF*	*-*	*-*	*7.4*	*-*	*-*	*12.0*	*1,000*	*Irrigation*
Encina Wastewater Authority	*Encina WPCF*	*43.3*	*43.3*	*-*	*43.3*	*43.3*	*-*	*1,031*	*Outfall-Reuse*
Escondido, City of	*Hale Avenue Resource Recovery Facility (HARRF)*	*18.0*	*18.0*	*9.0*	*27.0*	*27.0*	*20.0*	*1,000*	*Reuse-Outfall*
Fairbanks Ranch Comm. Ser. D	*Fairbanks Ranch WPCF*	*0.3*	*0.3*	*-*	*0.3*	*0.3*	*0.3*	*1,100*	*Percolation*
Fallbrook PUD	*Fallbrook Plant #1 WRF*	*2.7*	*2.7*	*2.7*	*2.7*	*2.7*	*2.7*	*850*	*Reuse-Outfall*
Leucadia CWD	*Forest R. Gafner WRP*	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*	*1,000*	*Reuse-Outfall*
Oceanside, City of	*La Salina WWTP*	*5.5*	*5.5*	*-*	*-*	*-*	*-*	*897*	*Outfall*
Oceanside, City of	*San Luis Rey WWTP*	*13.5*	*13.5*	*1.5*	*17.4*	*17.4*	*7.5*	*874*	*Reuse-Outfall*
Olivenhain MWD	*4-S Ranch WWTP*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*1,000*	*Reuse*
Otay WD	*Ralph W Chapman WRF*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*850*	*Reuse- Outfall*
Padre Dam MWD	*Ray Stoyer WRF Phase I*	*6.0*	*6.0*	*5.7*	*6.0*	*6.0*	*5.7*	*800*	*Reuse- Outfall*
Padre Dam MWD	*Ray Stoyer WRF Phase 2*	*-*	*-*	*-*	*9.0*	*9.0*	*8.5*	*800*	*Reuse- Outfall*
Padre Dam MWD	*Ray Stoyer WRF Phase 3*	*-*	*-*	*-*	*6.0*	*6.0*	*5.7*	*800*	*Reuse- Outfall*
Camp Pendleton Marine Corps Base	*Southern Region TTP*	*-*	*-*	*7.5*	*-*	*-*	*7.5*	*750*	*Irrigation/Outfall*
Camp Pendleton Marine Corps Base	*Northern Region TTP*	*-*	*-*	*4.0*	*-*	*-*	*4.0*	*750*	*Irrigation/Percolation*
Ramona MWD	*Santa Maria WRP*		*1.0*	*0.4*		*1.0*	*0.4*	*850*	*Reuse-Stream*
Ramona MWD	*San Vicente WRP*			*0.5*			*0.6*	*550*	*Reuse-Stream*
Rancho Santa Fe Com. Service District	*Santa Fe Valley WRF*	*-*	*-*	*0.5*	*-*	*-*	*0.5*	*1,000*	*Irrigation*
Rancho Santa Fe Com. Service District	*Rancho Santa Fe WRF*	*0.5*	*0.5*	*-*	*0.6*	*0.6*	*0.6*	*1,100*	*Percolation*
Rincon del Diablo MWD	*Harmony Grove Village*	*-*	*-*	*0.2*	*-*	*-*	*0.3*	*1,000*	*Reuse - Irrigation*
Rincon del Diablo MWD	*Harmony Grove Village - South*	*-*	*-*	*0.2*	*-*	*-*	*0.3*	*1,000*	*Reuse - Irrigation*
San Diego, City of	*North City WRP*	*30.0*	*30.0*	*24.0*	*52.0*	*52.0*	*52.0*	*1,000*	*Reuse*
San Diego, City of	*Point Loma WWTP*	*240.0*	*-*	*-*	*240.0*	*-*	*-*	*1700-3000*	*Outfall*
San Diego, City of	*Harbor Drive WRP*[1]				*49*	*49*	*49*	*1,000*	*Reuse*
San Diego, City of	*South Bay WRP*[1]	*15.0*	*15.0*	*15.0*	*36.0*	*36.0*	*36.0*	*1,000*	*Reuse-Outfall*
San Diego, City of	*Harbor Drive WRP*[2]				*68*	*68*	*68*	*1,000*	*Reuse*
San Diego, City of	*South Bay WRP*[2]	*15.0*	*15.0*	*15*	*15*	*15*	*13.5*	*1,000*	*Reuse-Outfall*
San Elijo Joint Powers Authority	*San Elijo WRF*	*5.3*	*5.3*	*3.0*	*5.3*	*5.3*	*5.3*	*950*	*Reuse-Outfall*
Vallecitos WD	*Meadowlark WRF*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*5.0*	*1,000*	*Reuse*
Valley Center MWD	*Lower Moosa Canyon WRF*	*0.40*	*0.40*	*0.40*	*0.875*	*0.875*	*0.875*	*1,000*	*Irrigation*
Valley Center MWD	*Welk WRF*	*-*	*-*	*-*	*0.125*	*0.125*	*0.125*	*1,000*	*Irrigation (Golf Course)*
Valley Center MWD	*Lilac Hills Ranch WRF*	*-*	*-*	*-*	*0.350*	*0.350*	*0.350*	*1,000*	*Irrigation*
Valley Center MWD	*Woods Valley Ranch WRF*	*0.275*	*0.275*	*0.275*	*0.475*	*0.475*	*0.475*	*1,000*	*Irrigation (Golf Course)*
Valley Center MWD	*North Village WRF (WVR Ph. 4)*	*-*	*-*	*-*	*0.125*	*0.125*	*0.125*	*1,000*	*Irrigation*
Valley Center MWD	*Meadowood WRF*	*0.170*	*0.170*	*0.170*	*0.170*	*0.170*	*0.170*	*1,000*	*Irrigation*
Whispering Palms CSD	*Whispering Palms WPCF*	*0.5*	*0.5*	*-*	*0.5*	*0.5*	*0.5*	*963*	*Pasture-Percolation*
	*	*105.73*	*106.73*	*67.66*	*266.50*	*267.50*	*230.78*		

CSD - Community Services District
MWD - Municipal Water District
RRF - Resource Recovery Facility
TTP - Tertiary Treatment Plant
WPCF - Water Pollution Control Facility
WRF - Water Reclamation/Recycling Facility
WRP - Water Reclamation Plant
WWTP - Wastewater Treatment Plant

P - Primary Treatment
S - Secondary Treatment
T - Tertiary Treatment

1. Scenario 1, HDWRP has 49 MGD treatment capacity and SBWRP has 36 MGD treatment capacity

2. Scenario 2, HDWRP has 68 MGD treatment capacity and SBWRP has 15 MGD treatment capacity

* Totals include only Scenario 1 for City of San Diego's Harbor Drive WRP and South Bay WRP

Table F-4
Member Agency Recycled Water Projections

EXISTING RECYCLED PROJECTS AND PROPOSED EXPANSIONS (VERIFIABLE)

Purveyor	Supply Source Treatment Plant/Agency	Treatment Level	Type of Reuse [1]	Projected Verifiable Reuse (AF/YR) [2]					
				2015	2020	2025	2030	2035	2040
Carlsbad MWD	*Carlsbad WRF/Carlsbad MWD*	*Tertiary*	*Landscape, Agriculture*	*1,903*	*2,831*	*2,831*	*2,831*	*2,831*	*2,831*
	Gafner WRF/Leucadia CWD	*Tertiary*	*Landscape, Agriculture*	*247*	*247*	*247*	*247*	*247*	*247*
	Meadowlark WRF (via Mahr Reservoir) /Vallecitos WD	*Tertiary*	*Landscape, Agriculture*	*2,000*	*2,000*	*2,000*	*2,000*	*2,000*	*2,000*
			Sub-total	***4,150***	***5,078***	***5,078***	***5,078***	***5,078***	**5,078**
Del Mar, City of	*San Elijo WRF/San Elijo JPA*	*Tertiary*	*Landscape*	*90*	*100*	*125*	*150*	*150*	*150*
Escondido, City of	*Hale Avenue RRF/WRF/City of Escondido*	*Tertiary*	*Landscape, Agriculture, Industrial/PR*	*600*	*3,000*	*3,650*	*4,400*	*4,400*	*4,400*
Fallbrook PUD	*Fallbrook Plant #1/Fallbrook PUD*	*Tertiary*	*Landscape, Agriculture*	*600*	*1,200*	*1,200*	*1,200*	*1,200*	*1,200*
Oceanside, City of	*San Luis Rey WWTP/City of Oceanside - Phase 1 Expansion*	*Tertiary*	*Landscape*	*130*	*400*	*1,700*	*2,900*	*3,060*	*3,500*
Olivenhain MWD	*4S Ranch WRF/Olivenhain MWD*	*Tertiary*	*Landscape*	*915*	*915*	*915*	*915*	*915*	*915*
	Connection #1-North City Water Reclamation Plant/City of San Diego	*Tertiary*	*Golf Course Irrigation/HOAs (includes farms at 272 AF/YR)*	*356*	*623*	*623*	*623*	*623*	*623*
	Connection #2-North City Water Reclamation Plant/City of San Diego	*Tertiary*	*Golf Course Irrigation/HOAs*	*15*	*20*	*20*	*20*	*20*	*20*
	Santa Fe Valley WRF/Rancho Santa Fe CSD	*Tertiary*	*Landscape, Golf Course Irrigation*	*140*	*140*	*140*	*140*	*140*	*140*
	Northwest Quadrant /Meadowlark WRF/Vallecitos WD	*Tertiary*	*Landscape*	*358*	*459*	*459*	*459*	*459*	*459*
	SEJPA1-Quail Gardens	*Tertiary*	*Landscape*	*144*	*50*	*50*	*50*	*50*	*50*
	SEJPA2-Village Park, Manchester Phase I	*Tertiary*	*Landscape*	*-*	*236*	*236*	*236*	*236*	*236*
			Sub-total	***1,928***	***2,443***	***2,443***	***2,443***	***2,443***	**2,443**
Otay WD	*R. W. Chapman WRF/Otay WD*	*Tertiary*	*Landscape*	*1,100*	*1,100*	*1,100*	*1,100*	*1,100*	*1,100*
	South Bay WRP/City of SD	*Tertiary*	*Landscape*	*3,300*	*4,570*	*4,800*	*4,900*	*5,100*	*5,400*
			Sub-total	***4,400***	***5,670***	***5,900***	***6,000***	***6,200***	**6,500**
Padre Dam MWD	*Ray Stoyer WRF (Existing)/Padre Dam MWD*	*Tertiary*	*Replenishment of Santee Lakes*	*1,120*	*1,120*	*1,120*	*1,120*	*1,120*	*1,120*
	Ray Stoyer WRF (Existing)/Padre Dam MWD	*Tertiary*	*Landscape (Existing Distribution System)*	*896*	*896*	*896*	*896*	*896*	*896*
			Sub-total	***2,016***	***2,016***	***2,016***	***2,016***	***2,016***	**2,016**
Camp Pendleton Marine Corps Base	*South WWTPs/USMC*	*Tertiary*	*Landscape, Golf Course, Agriculture*	*450*	*480*	*480*	*480*	*480*	*480*
	Sewage Treatment Plants # 11 & #12/USMC	*Secondary*	*Percolation/Seawater Intrusion Barrier*	*148*	*-*	*-*	*-*	*-*	*-*
	North WWTPs/USMC	*Tertiary*	*Landscape/Seawater Intrusion Barrier*	*450*	*510*	*510*	*510*	*510*	*510*
			Sub-total	***1,048***	***990***	***990***	***990***	***990***	**990**
Poway, City of	*North City WRP/City of San Diego*	*Tertiary*	*Landscape, Agriculture*	*645*	*645*	*645*	*645*	*645*	*645*
Ramona MWD	*Santa Maria WRP/Ramona MWD*	*Tertiary*	*Landscape, Recreational Impound, Development*	*230*	*230*	*230*	*230*	*230*	*230*
	San Vicente WRP/Ramona MWD	*Tertiary*	*Landscape (Golf Course), Agriculture (Orchard)*	*480*	*500*	*525*	*525*	*525*	*525*
			Sub-total	***710***	***730***	***755***	***755***	***755***	**755**
Rincon Del Diablo MWD	*Hale Avenue RRF/WRF/City of Escondido*	*Tertiary*	*Landscape, Industrial*	*3,300*	*3,100*	*4,000*	*4,000*	*4,000*	*4,000*
San Diego, City of	*North City WRP/City of San Diego*	*Tertiary*	*Landscape, Industrial*	*7,029*	*12,500*	*12,500*	*12,500*	*12,500*	*12,500*
	South Bay WRP/City of San Diego	*Tertiary*	*Landscape, Industrial*	*1,166*	*1,150*	*1,150*	*1,150*	*1,150*	*1,150*
			Sub-total	***8,195***	***13,650***	***13,650***	***13,650***	***13,650***	**13,650**
San Dieguito WD	*San Elijo WRF/San Elijo JPA*	*Tertiary*	*Landscape*	*736*	*800*	*800*	*800*	*800*	*800*
Santa Fe ID	*San Elijo WRF/San Elijo JPA*	*Tertiary*	*Landscape*	*500*	*500*	*500*	*500*	*500*	*500*
Valley Center MWD	*Woods Valley Ranch WRF/VCMWD*	*Tertiary*	*Landscape Irrigation/Golf Course Irrigation*	*47*	*47*	*47*	*47*	*47*	*47*
	Woods Valley Ranch WRF (Phase 2)	*Tertiary*	*Landscape Irrigation/Golf Course Irrigation*	*-*	*90*	*175*	*184*	*184*	*184*
			Sub-total	***47***	***137***	***222***	***231***	***231***	**231**
			Total	***29,095***	***40,459***	***43,674***	***45,758***	***46,118***	***46,858***

ADDITIONAL PLANNED PROJECTS

Purveyor	Supply Source Treatment Plant/Agency	Treatment Level	Type of Reuse [1]	2015	2020	2025	2030	2035	2040	Project Phase
Carlsbad MWD	*Carlsbad WRF/Carlsbad MWD*	*Tertiary*	*Landscape, Agriculture*	-	-	*328*	*328*	*328*	*328*	*Design/Planning*
Escondido, City of	*Hale Avenue Resource Recovery Facility (HARRF)*	*Tertiary*	*Landscape, Agriculture, Industrial, PR*	-	*1,380*	*7,130*	*8,130*	*8,130*	*8,130*	*FS*
Padre Dam MWD	*Ray Stoyer WRF/Padre Dam MWD*	*Tertiary*	*Landscape, Irrigation, Dust Control*	-	-	*1,008*	*1,008*	*1,008*	*1,008*	*FS*
Camp Pendleton Marine Corps Base	*South WWTPs/USMC*	*Tertiary*	*Injection - Las Flores Basin*	-	*450*	*450*	*450*	*450*	*450*	*Design*
	South WWTPs/USMC	*Tertiary*	*Injection - Santa Margarita Basin*	-	*870*	*870*	*870*	*870*	*870*	*Design*
	North WWTPs/USMC	*Tertiary*	*Landscape*	-	*90*	*90*	*90*	*90*	*90*	*Design*
			Sub-total	**-**	***1,410***	***1,410***	***1,410***	***1,410***	***1,410***	
Santa Fe ID	*Evaluating Multiple Options/TBD*	*Tertiary*	*Landscape*	*50*	*50*	*50*	*50*	*50*	*50*	*FS*
			Total	***50***	***2,840***	***9,926***	***10,926***	***10,926***	***10,926***	

PROJECT CONCEPTS

Purveyor	Supply Source Treatment Plant/Agency	Treatment Level	Type of Reuse [1]	2015	2020	2025	2030	2035	2040	Project Phase
Carlsbad MWD	*Carlsbad WRF/Carlsbad MWD*	*Tertiary*	*Landscape, Agriculture*	-	-	-	-	*616*	*616*	*EIR*
	Meadowlark WRF/Vallecitos WD	*Tertiary*	*Landscape, Agriculture*	-	-	-	-	*187*	*187*	*EIR*
			Sub-total	**-**	**-**	**-**	**-**	***803***	***803***	
Olivenhain MWD	*Village Park Recycled Water Expansion Project*	*Tertiary*	*Turf and Landscape*	-	*80*	*127*	*127*	*127*	*127*	*Concept*
	Extension 153 Phase I	*Tertiary*	*Landscape*	-	-	*189*	*189*	*189*	*189*	*Concept*
	Joint RW Transmission Project with SFID and OMWD/TBD	*Tertiary*	*Landscape, Golf Course Irrigation*	-	-	*400*	*400*	*400*	*400*	*Concept*
	Extension 153 Phase II	*Tertiary*	*Landscape*	-	-	-	*300*	*300*	*300*	*Concept*
	Rancho Cielo	*Tertiary*	*Landscape*	-	-	-	*100*	*100*	*100*	*Concept*
			Sub-total	**-**	***80***	***716***	***1,116***	***1,116***	***1,116***	
Otay WD	*North District Recycled System/R.W. Chapman WRF/Otay WD*	*Tertiary*	*Landscape*	-	-	-	*4,400*	*4,400*	*4,400*	*Concept*
Camp Pendleton Marine Corps Base	*South WWTPs/USMC*	*Tertiary*	*Indirect Potable Recharge*	-	*2,060*	*2,060*	*2,060*	*2,060*	*2,060*	*Concept*
Poway, City of	*North City WRP/City of San Diego*	*Tertiary*	*Landscape, Agriculture*		*100*	*100*	*100*	*100*	*100*	*Concept*
	North City WRP/City of San Diego	*Tertiary*	*Landscape, Agriculture*		*50*	*50*	*50*	*50*	*50*	*Concept*
			Sub-total	**-**	***150***	***150***	***150***	***150***	***150***	
Rainbow MWD	WRP/Recycled Water Distribution System	*Tertiary*	*Landscape, Agriculture, Irrigation*	-	*300*	*670*	*1,000*	*1,600*	*1,600*	*Design Review*
Ramona MWD	*Santa Maria WRP/Ramona MWD*	*Tertiary*	*Landscape, Recreational Impound, Development*		*3,000*	*3,000*	*3,000*	*3,000*	*3,000*	*Concept*
Valley Center MWD	*Lower Moosa Canyon WRF*	*Tertiary*	*Landscape Irrigation*	-	*370*	*460*	*580*	*700*	*700*	*FS*
	Welk WRF/VCMWD	*Tertiary*	*Landscape/Golf Course Irrigation*	-	-	*140*	*140*	*140*	*140*	*FS*
	Lilac Hills Ranch WRF/VCMWD	*Tertiary*	*Landscape Irrigation*	-	-	-	-	*147*	*294*	*FS*
	Meadowood WRF/VCMWD	*Tertiary*	*Landscape Irrigation*	-	-	*100*	*143*	*143*	*143*	*FS*
	Woods Valley Ranch WRF (Phase 3)/VCMWD	*Tertiary*	*Landscape Irrigation*	-	-	-	*50*	*150*	*168*	*FS*
	North Village WRF (Phase 4)/VCMWD	*Tertiary*	*Landscape Irrigation*	-	-	-	-	-	*105*	*FS*
			Sub-total	**-**	***370***	***700***	***913***	***1,280***	***1,550***	
Vista Irrigation District	*Shadowridge WRP*	*Tertiary*	*Landscape Irrigation*	-	-	*1,800*	*1,800*	*1,800*	*3,000*	*Concept*
			Total	**-**	**5,960**	**9,096**	**14,439**	**16,209**	**17,679**	

[1] *Does not include recycled water used for environmental enhancement.*

[2] *Projected verifiable projects are included in the Water Authority's 2015 UWMP reliability analysis.*

Table F-5
Member Agency Potable Reuse Projections

EXISTING POTABLE REUSE PROJECTS AND PROPOSED EXPANSIONS (VERIFIABLE)

Lead Agency	Project Name	Source Water Purveyor *(if different from lead agency)*	Source Water Facility	Project Type *(i.e. direct, indirect)*	Projected Verifiable Use (AF/YR)					
					2015	2020	2025	2030	2035	2040
Oceanside, City of	San Luis Rey WRF - Short/Long-Term Expansion	Oceanside, City of	San Luis Rey WRF	Indirect and/or Direct	-	3,300	3,300	3,300	3,300	3,300
				Total	**-**	**3,300**	**3,300**	**3,300**	**3,300**	**3,300**

ADDITIONAL PLANNED PROJECTS

Lead Agency	Project Name	Source Water Purveyor *(if different from lead agency)*	Supply Source Treatment Plant/Agency	Project Type *(i.e. direct, indirect)*	Projected Additional Planned (AF/YR)					
					2015	2020	2025	2030	2035	2040
Padre Dam MWD	East County Advanced Water Purification Program Phase 1*	Padre Dam MWD/SD County San. District	East County Advanced Water Purification Facility / Padre Dam MWD	Indirect	-	3,920	3,920	3,920	3,920	3,920
	East County Advanced Water Purification Program Phase 2*	Padre Dam MWD/SD County San. District/ City of El Cajon	East County Advanced Water Purification Facility / Padre Dam MWD	Indirect	-	-	7,616	7,616	7,616	7,616
				Sub-total	**-**	**3,920**	**11,536**	**11,536**	**11,536**	**11,536**
Rincon del Diablo MWD	New Local Supply **		Hale Avenue RRF/ City of Escondido/WRFs	Indirect/ Direct	-	-	200	1,000	1,000	1,000
San Diego, City of	PURE Water	San Diego, City of	Phase 1 North City / City of San Diego	Indirect	-	-	16,800	33,600	33,600	33,600
			Phase 2 Central Area / City of San Diego	Indirect	-	-	-	-	42,598	42,598
			Phase 3 South Bay / City of San Diego	Indirect	-	-	-	-	16,815	16,815
				Sub-total	**-**	**-**	**16,800**	**33,600**	**93,013**	**93,013**
Santa Fe ID	SFID/SDWD/SEJPA Potable Reuse Project	San Elijo Joint Powers Authority	San Elijo Water Reclamation Facility (Advanced Treatment) / San Elijo JPA	Indirect or Direct	-	550	550	550	550	550
				Total	**-**	**4,470**	**29,086**	**46,686**	**106,099**	**106,099**

PROJECT CONCEPTS

Lead Agency	Project Name	Source Water Purveyor *(if different from lead agency)*	Supply Source Treatment Plant/Agency	Project Type *(i.e. direct, indirect)*	Conceptual (AF/YR)					
					2015	2020	2025	2030	2035	2040
Escondido, City of	Potable Reuse	Escondido, City of	Hale Avenue Resource Recovery Facility (HARRF) / City of Escondido	TBD	-	-	-	4,000	5,000	5,000
Olivenhain MWD	San Elijo Valley/San Dieguito River Basin Brackish GW Recovery & Treatment	San Elijo JPA/Leucadia Wastewater District	San Elijo JPA/Leucadia Wastewater District	Indirect	-	560	560	560	560	560
Padre Dam MWD	East County Advanced Water Purification Program Phase 3*	Padre Dam MWD/SD County San. District/ City of El Cajon	East County Advanced Water Purification Facility / Padre Dam MWD	Indirect	-	-	-	-	-	5,824
				Total	**-**	**560**	**560**	**4,560**	**5,560**	**11,384**

*** Effluent will be split between Helix WD & Padre Dam with percentages to TBD in the future, should Helix decide to participate in the Project beyond the current planning.**

**** Based on HARRF/Harmony Grove Village WRFs and potential scalping plant.**

Table F-6
Member Agency Desalination Projections

EXISTING DESALINATION PROJECTS AND PROPOSED EXPANSIONS (VERIFIABLE)

Lead Agency	Project Name	Projected Verifiable Use (AF/YR)					
		2015	2020	2025	2030	2035	2040
Supplies to be purchased by Carlsbad MWD	Claude "Bud" Lewis Carlsbad Desalination Plant	-	2,500	2,500	2,500	2,500	2,500
Supplies to be purchased by Vallecitos WD	Claude "Bud" Lewis Carlsbad Desalination Plant	-	3,500	3,500	3,500	3,500	3,500
	Total	**-**	**6,000**	**6,000**	**6,000**	**6,000**	**6,000**

ADDITIONAL PLANNED PROJECTS

Lead Agency	Project Name	Projected Additional Planned (AF/YR)					
		2015	2020	2025	2030	2035	2040
Otay WD	Otay WD/ Rosarito Beach	-	-	15,100	15,600	16,100	16,800
	Total	**-**	**-**	**15,100**	**15,600**	**16,100**	**16,800**

PROJECT CONCEPTS

Lead Agency	Project Name	Conceptual (AF/YR)					
		2015	2020	2025	2030	2035	2040
-	-	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**

Appendix G

Water Shortage and Drought Response Plan & Implementing Resolution

RESOLUTION NO. 2008-11

A RESOLUTION OF THE SAN DIEGO COUNTY WATER AUTHORITY ESTABLISHING PROCEDURES AND POLICIES FOR ADMINISTRATION OF THE DROUGHT MANAGEMENT PLAN WATER SUPPLY ALLOCATION METHODOLOGY

WHEREAS, pursuant to the County Water Authority Act, the San Diego County Water Authority exists to provide, as far as practicable, each of its member agencies with reliable and adequate supplies of water to meet their needs, and to establish reasonable rules, regulations and restrictions for the allocation of available supplies for the greatest public interest and benefit; and

WHEREAS, the water supply needs of Water Authority member agencies includes supplies to serve current demands and reasonably anticipated future demands; and

WHEREAS, providing a reliable water supply includes the obligation to manage water and use of water; and

WHEREAS, on May 25, 2006, the Water Authority Board of Directors adopted Resolution No. 2006-16, approving and adopting a comprehensive Drought Management Plan of specific actions to be taken by the Water Authority and its member agencies during anticipated or actual water supply shortages; and

WHEREAS, the Drought Management Plan establishes the methodology by which with the Water Authority will allocate supplies under various supply reduction scenarios; and

WHEREAS, the Water Authority Board of Directors desires to establish administrative procedures and policies for implementation of the allocation methodology established by the Drought Management Plan;

NOW, THEREFORE, the Board of Directors of the San Diego County Water Authority resolves as follows:

Section 1. Municipal and Industrial Water Supply Allocations\

The provisions of this section shall govern the establishment and adoption of a water supply allocation whenever the Water Authority Board of Directors determines it is necessary to allocate water as provided in the Drought Management Plan. This section applies to allocation of water for all uses except Interim Agricultural Water Program uses which are subject to Section 7 of this resolution.

a. Water Supply Allocation Period

An allocation period shall be for 12 months, from July 1 of a given year through the following June 30, unless otherwise specifically determined by the Board. It is the intention of the Board of Directors that the Water Authority's allocation period be consistent, to the extent feasible, with the Metropolitan Water District of Southern California February 2008 Water Supply Allocation Plan, or later update of such plan, adopted by the Metropolitan Water District of Southern California.

b. Establish Water Supply Allocation

The General Manager shall establish the supply allocation for each member agency based on the Supply Allocation Methodology included in the Water Authority's Drought Management Plan. The three-year base period described in the Drought Management Plan shall be determined prior to commencement of the water allocation period and shall include the three most recent consecutive non-allocation years. The General Manager shall coordinate with member agencies to obtain and analyze historic data such as, but not limited to, total water use, local water use, new meters assessed a capacity charge, conservation savings and projected local supply, in order to finalize the allocation data to be utilized by the Water Authority in calculating the supply allocation. This coordination shall occur during January through April of a year in which the General Manager determines an allocation may be necessary beginning July 1. During this coordination period, member agencies will have an opportunity to provide updated projections for local supply based upon changes in local supply conditions caused by winter runoff. Member agencies shall provide water use and other information upon request of the General Manager. The Integrated Contingency Plan, Emergency Storage Project or Treated Water Shortage Plan shall govern allocations in response to an unanticipated or catastrophic event.

c. Adoption Supply Allocation

The General Managers recommendation for allocation shall be submitted to the Water Planning Committee for recommendation to the Board of Directors. The determination by the Board of Directors of the allocation for each member agency shall be final, subject only to modification by the Board because of significant changes in Water Authority supply conditions or pursuant to Section 3.

Section 2. Monthly Reporting

The General Manager shall provide monthly reports of each member agency's actual imported and local water use data compared to their allocation to the Water Planning Committee, Member Agency Advisory Team, member agencies, and the Board of Directors. In order to provide an accurate accounting of member agencies' performance, member agencies shall provide monthly total water use data and other information in a timely manner upon request of the General Manager.

Section 3. Modifications to Supply Allocations Due to Changes in Local Conditions

A member agency may request a modification to its approved allocation based upon new information justifying a recalculation of the allocation because of significant changes in local circumstances, e.g. surface water or local supply changes. Information shall not be considered new if it reasonably could have been made available before the initial establishment of the allocation. The General Manager may initiate a modification to a member agency's allocation at any time if the General Manager determines that information provided by the member agency was inaccurate or incomplete. Requests for modification that, alone or in the aggregate, total more than 10 percent of the requesting agency's allocation or greater than 500 acre feet within a single allocation period must be approved by the Board of Directors. All other modification requests are considered minor and may be approved by the General Manager after consultation with the Member Agency Advisory Team.

A member agency may initiate a request for modification by providing written notice and supporting documentation to the General Manager no later than December 30 within an allocation period running from July 1 to June 30. The General Manager shall review the request and provide a written response supporting or opposing the modification, and the reasons for support or opposition, within 30 days of the member agency request.

The Member Agency Advisory Team shall review the Member agency request and the General Manager's written response prior to making a recommendation regarding the modification. The Member Agency Advisory Team shall consider all circumstances surrounding the request, including the period of time impacted by the changed local circumstances. If the Member Agency Advisory Team recommends approval or modified approval of the determination, the General Manager shall forward the modification to the Board of Directors for final action, with the exception of minor modifications which become effective upon approval by the General Manager.

If the Member Agency Advisory Team denies a request for modification, the member agency may request, within five days, an appeal of the Member Agency Advisory Team decision to the Board of Directors at the next regular Board Meeting that is not less then 20 days from the date of the Member Agency Advisory Team recommendation. The decision of the Board of Directors is final.

Section 4. Reconciliation

Within six months of the end of an allocation period, the General Manager shall conduct a final accounting of member agency deliveries during the allocation period compared with the member agency supply allocations, including any modifications provided in Section 3 of this resolution. As part of the reconciliation, member agencies shall provide actual local water use for the allocation period and other information upon request of the General Manager. Upon completion of the reconciliation, the General Manager shall notify each member agency of their performance in meeting their supply allocation.

Section 5. Monetary Penalties from MWD

The Water Authority is subject to monetary penalties imposed by Metropolitan Water District of Southern California in the event it exceeds its annual water allocation from Metropolitan Water District of Southern California. Upon the Water Authority's reconciliation of its own water supply allocation as described in Section 4, any Metropolitan Water District of Southern California penalties levied upon the Water Authority shall in turn be assessed on a pro rata basis to the Water Authority member agencies that exceeded their Water Authority allocation.

Section 6. Exemption for Participants in the Interim Agricultural Water Program

Supply allocations to Interim Agricultural Water Program customers shall be established, monitored, and enforced based on Metropolitan Water District of Southern California's Interim Agricultural Water Program reduction guidelines and the Water Authority's Interim Agricultural Water Program Regional Reduction Plan and are not subject to the provisions of this resolution. If the Interim Agricultural Water Program is terminated, the Board of Directors may allocate water for agriculture according to the methodology provided in the Drought Management Plan.

Section 7. Reserved Discretion

The Water Authority Board of Directors reserves its discretion to amend any of the provisions of this resolution as changed circumstances warrant. Nothing in this resolution shall limit the discretion or powers of the Board of Directors under Water Code section 350.

PASSED, APPROVED AND ADOPTED this 24th day of July, 2008.

AYES: Unless otherwise noted all Directors present voted aye.

NOES:

ABSTAIN:

ABSENT: Arant, Bond,(p), Johnson, Knutson, Lewinger, Lewis (p) and Tu

Fern M. Steiner
Chair

ATTEST:

Mark W. Watton
Secretary

I, Doria F. Lore, Clerk of the Board of the San Diego County Water Authority, certify that the vote shown above is correct and this Resolution No. 2008-11 was duly adopted at the meeting of the Board of Directors on the date stated above.

Doria F. Lore
Clerk of the Board

San Diego County Water Authority

Water Shortage and Drought Response Plan

May 2006 *(Updated April 2012)*

Prepared by
Water Resources Department

With Assistance from
Public Affairs Department

Drought Management Plan
Technical Advisory Committee

McGuire Malcom Pirnie
Environmental Consultants

Page intentionally left blank.

Water Shortage and Drought Response Plan

(Updated April 2012)

(Previous title, *Drought Management Plan*, prepared May 2006)

The San Diego County Water Authority and its member agencies developed and approved the *Drought Management Plan* in May 2006. This document was later renamed the *Water Shortage and Drought Response Plan* (WSDRP), and was updated in April 2012 with the replacement of Section 5 – Supply Allocation Methodology. It should be noted that in other sections, the document is still referred to as the *Drought Management Plan*.

Page intentionally left blank.

Acknowledgements

Drought Management Plan
Technical Advisory Committee Members

Agency	Name
Carlsbad M.W.D.	Bob Greaney
Carlsbad M.W.D.	Kurt Musser
Del Mar, City Of	Dave Scherer
Escondido, City Of	Glen Peterson
Escondido, City Of	Mary Ann Mann
Fallbrook P.U.D.	Joe Jackson
Fallbrook P.U.D.	Keith Lewinger
Helix W.D.	Mark Umphres
Helix W.D.	Mark Weston
Oceanside, City Of	Barry Martin
Oceanside, City Of	Greg Blakely
Oceanside, City Of	Steve Plyler
Olivenhain M.W.D.	Dave McCollom
Olivenhain M.W.D.	Harry Erlich
Otay W.D.	Mark Watton
Otay W.D.	Pedro Porras
Otay W.D.	Gary Stalker
Padre Dam M.W.D.	Augie Caires
Padre Dam M.W.D.	Frank Kowalski
Poway, City Of	Dennis Quillen
Poway, City Of	Tom Howard
Rainbow M.W.D.	Chris Trees
Ramona M.W.D.	Tom Brammell
Rincon del Diablo M.W.D.	Annette Hubbell
Rincon del Diablo M.W.D.	Julia Escamilla
San Diego, City Of	Kent Floro
San Diego, City Of	Jesus Meda
San Diego, City Of	Bob McCullough
San Dieguito W.D.	Phil Cotton
San Dieguito W.D.	Victor Graves
Santa Fe I.D.	Cor Shaffer
Santa Fe I.D.	Mike Bardin
Sweetwater Authority	Dennis Bostad
Sweetwater Authority	Sue Mosburg
Vallecitos W.D.	Dale Mason
Vallecitos W.D.	Dennis Lamb
Valley Center M.W.D.	Gary Arant
Valley Center M.W.D.	Greg Hoyle
Vista I.D.	John Amodeo
Vista I.D.	Roy Coox
Yuima M.W.D.	Linden Burzell

Page intentionally left blank.

WATER SHORTAGE AND DROUGHT RESPONSE PLAN
TABLE OF CONTENTS

Section 1 - Introduction

The primary purpose of the Drought Management Plan (DMP) is to provide the Water Authority and its member agencies with a series of potential actions to take when faced with a shortage of imported water supplies from Metropolitan due to drought conditions. The actions will help the region minimize the impacts of shortages and ensure an equitable allocation of supplies. Different from a treated water shortage allocation plan, the DMP focuses on issues associated with shortages due to supply cutbacks, not shortages due to facility constraints.

1.1 Reliability

The Water Authority and its member agencies have made substantial investments in new diversified supplies and facilities to improve water reliability in the San Diego region. As mentioned in the Water Authority's 2005 Urban Water Management Plan, if the Water Authority and member agency supplies are developed as planned and Metropolitan's Integrated Resource Plan is fully implemented, no shortages are anticipated within the Water Authority's service area through 2030. **Table 1-1**, below, shows the mix of resources identified to meet future demands in a single dry-year period.

TABLE 1-1
SAN DIEGO COUNTY WATER AUTHORITY
SINGLE DRY WATER YEAR SUPPLY AND DEMAND ASSESSMENT
(AF/YR)

	2010	2015	2020	2025	2030
Water Authority Supplies					
Regional Seawater Desalination at Encina	0	56,000	56,000	56,000	56,000
IID Water Transfer	70,000	100,000	190,000	200,000	200,000
ACC and CC Lining Projects	77,700	77,700	77,700	77,700	77,700
Sub-Total	147,700	233,700	323,700	333,700	333,700
Member Agency Supplies					
Surface Water	22,284	22,284	22,284	22,284	22,284
Water Recycling	33,668	40,662	45,548	46,492	47,584
Groundwater	10,838	10,838	10,838	10,838	10,838
Groundwater Recovery	11,400	11,400	11,400	11,400	11,400
Sub-Total	78,190	85,184	90,070	91,014	92,106
Metropolitan Water District Supplies	541,760	477,086	411,790	423,896	457,224
TOTAL PROJECTED SUPPLIES	767,650	795,970	825,560	848,610	883,030
TOTAL ESTIMATED DEMANDS w/ Conservation	767,650	795,970	825,560	848,610	883,030

Source: Water Authority's 2005 Urban Water Management Plan

Water conservation plays a critical role in long-term supply reliability for the region. The Water Authority and its member agencies are considered leaders in California in the implementation of an aggressive conservation program to use water more efficiently. The total reduction in water demand attributable to projected conservation savings over the next 25 years is identified in **Table 1-2.**

TABLE 1-2
PROJECTED CONSERVATION SAVINGS
WATER AUTHORITY SERVICE AREA
(Normal Year - AF/YR)

2010	2015	2020	2025	2030
79,960	87,306	94,174	101,954	108,396

Source: Water Authority's 2005 Urban Water Management Plan

With the objective to obtain a reliable supply as outlined in the agencies' planning documents - with no anticipated shortages - Metropolitan, Water Authority and its member agencies will need to make investments in development of projects and programs along with gaining support from the local community for implementation.

While the region has plans to provide a high level of water reliability, there will always be some level of uncertainty associated with maintaining and developing local and imported supplies. Therefore, as a prudent measure, the Water Authority and its member agencies have developed a comprehensive DMP in the event that the region faces supply shortages due to drought conditions.

1.2 Defining a Drought

The question is often asked as to what defines a drought. As stated on the California Department of Water Resources (DWR) drought preparedness website:

> "Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions."

Defining when supply conditions signify a drought in the San Diego region is a combination of the condition of Metropolitan's supplies and storage levels and local supply production in San Diego, both groundwater and surface water. One of the actions that may trigger initial drought conditions is when Metropolitan must take water from storage to meet demands. With the storage and supplies developed by the Water Authority, its member agencies, and Metropolitan since the last drought in 1987-1992, the region has significantly improved its ability to respond to drought conditions. As further stated on DWR's website:

> "Droughts occur slowly, over a multiyear period. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall – ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Criteria used to identify statewide drought conditions do not address these localized impacts. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline."

1.3 Plan Summary

This first section of the report highlights the region's plans for providing a reliable supply for the next 25 years, with no anticipated shortages. It also describes the need for a DMP due to uncertainties in development and management of both imported and local supplies. This section also looks at defining a drought and the DMP report format.

The next section, Section 2 – DMP Preparation, discusses preparation of the DMP. This section includes a discussion of the formation of the member agency Technical Advisory Committee (TAC), along with the results from a questionnaire completed by the TAC members. This section also includes the principles that provided guidance in preparation of the DMP.

Section 3, Review of Historic Plans and Implementation, contains a summary of the past drought response plans and ordinances prepared by the Metropolitan Water District and the Water Authority. The section concludes with a discussion on the lessons learned from preparation and implementation of these previous plans.

The following section, Section 4 – Drought Response Matrix, includes a description of the stages and actions contained in the drought response matrix. The matrix provides guidance to the Water Authority in selecting potential regional actions that can be taken to lessen the severity of shortage conditions. This includes such items as purchasing spot transfers and utilizing carryover storage.

Section 5, Supply Allocation Methodology, provides a detailed description of the supply allocation methodology. The methodology provides the Water Authority a means to allocate its supplies to its member agencies in a shortage situation. To help describe and demonstrate the calculation procedure, an example is included for illustrative purposes.

Section 6, Water Authority/Member Agency Coordination, outlines the coordination to occur between the Water Authority and its member agencies in implementation of the DMP. A communication strategy is included that describes actions for the Water Authority to take to ensure clear communication with its member agencies, the public, and elected officials prior to and during shortage conditions.

The final section, Section 7 – Summary, summarizes the accomplishments of the DMP. There are also a series of appendices containing detailed supporting documentation.

1.4 Member Agency Coordination

The challenge in preparing the DMP was to meet the needs of the Water Authority's member agencies in a fair and equitable manner. Each of the agencies has a unique supply portfolio and customer-base. Some agencies have abundant local supplies, while others are 100 percent reliant on water supplies purchased from the Water Authority. There are member agencies that serve primarily agricultural customers, while others serve only municipal and industrial customers. Through the yearlong process of developing the DMP, these challenges were addressed and the Water Authority appreciated the involvement of the member agencies.

Page intentionally left blank.

Section 2 – DMP Preparation

In February 1991, as a result of the 1987-1992 drought, the Water Authority prepared and adopted a Drought Response Plan that outlined the actions for the Water Authority and its member agencies to take during the supply shortage situation. In accordance with California Water Code, the Water Authority prepared an Urban Water Shortage Contingency Plan in January 1992 that included the ordinances and other procedures adopted during the 1987-1992 drought. The current DMP was prepared to identify the actions that the Water Authority and its member agencies will now take if faced with drought conditions, and specifically, how supplies will be allocated.

2.1 Member Agency Technical Advisory Committee

Preparation and implementation of a drought plan for the San Diego region must have input and support from the Water Authority's member agencies. Recognizing the importance of member agency involvement, the Water Authority formed a TAC – Technical Advisory Committee – to provide input on development of the DMP. The TAC included a representative from each of the member agencies. Key to the successful preparation of the plan was full involvement from all member agencies to ensure effective communication and understanding of member agencies' issues and concerns. To assist in this effort, a consultant team was hired to facilitate the TAC meetings and assist with technical details such as the historic context of drought plans in Southern California and the development of the allocation model. The TAC members are to be commended for their efforts to work together to develop the elements of this regional DMP.

2.2 Drought Management Plan Questionnaire

To gain an initial understanding of the TAC members' position on the DMP elements, a five-page questionnaire was distributed to the member agencies. The questionnaire consisted of eighteen questions, as well as a section for general comments. The questions were divided into the following five areas: 1) what is important in the overall design of a drought management plan; 2) what are the issues related to water transfers; 3) what role should the Emergency Storage Project play during a drought; 4) how should water be allocated in a drought; and 5) what role should a public communication strategy play during a drought. **Appendix B** contains the questionnaire results. Each of the TAC members completed the questionnaire, which was helpful to ensure that all member agency perspectives were heard. The results also provided valuable information used to develop a set of DMP Principles.

2.3 Principles

To provide guidance to the Water Authority and its member agencies in developing and implementing the DMP, twenty-three principles were developed. The principles were initially drafted based on results from the questionnaire that was completed by the TAC members (**Appendix B**). They were then revised and finalized based upon input received during a series of TAC meetings.

The principles are grouped below under the following categories: a) Overall Plan; b) Communication Strategy; c) Drought Supply Enhancement; d) Drought Response Stages; and e) Allocation Methodology.

Overall Plan

1. *The DMP will be developed in cooperation with the member agencies and include all aspects of drought planning – including steps to avoid rationing, drought response stages, allocation methodology, pricing, and communication strategy.*

Communication Strategy

2. *An on-going, coordinated and regional public outreach program shall be developed by the Water Authority that provides a clear and consistent message to the public regarding water supplies and specific conservation measures. The outreach program will also recognize and support member agency communication efforts that address specific retail level allocations.*

3. *A Drought Coordination Team, made up of one representative from each member agency, will be established to assist the Water Authority in implementation of the DMP. This includes items such as formulation and implementation of the public outreach program, timing of drought stages, selection of drought supply actions, and addressing potential issues surrounding implementation of the shortage allocation methodology.*

4. *The drought management plan should specify actions and timing of communications.*

Drought Supply Enhancement

5. *The Water Authority and its member agencies will work cooperatively to avoid and/or minimize rationing during droughts through supply enhancement and voluntary demand reduction measures.*

6. *Future Water Authority carryover storage supplies will be managed and utilized to assist in meeting demands during drought periods. Member agencies will be encouraged to develop carryover storage.*

7. *The Water Authority will consider securing option and/or spot water transfers to meet the reliability goal set by the Board. The cost of this regional supply will be melded into the Water Authority's supply costs for all classes of service that benefit.*

8. *Subject to the Water Authority's wheeling policy, if a member agency purchases transfer water from a source other than the Water Authority, the full cost of the transfer, including, but not limited to, purchase costs, wheeling costs, and administrative costs, will be borne by said member agency.*

9. *ESP supplies may be available when any member agency's non-interruptible firm demands drop below a 75 percent service level.*

10. *The quantities of supplies from the ESP to be removed from storage will be based on a minimum amount necessary to meet essential health, safety, and firefighting needs, and maximum amount based on the need to ensure adequate supplies remain for a catastrophic event (e.g. earthquake).*

Drought Response Stages

11. *Develop drought response stages, which at a minimum, accomplish the following:*

    - *Can be easily communicated to the public;*
    - *Flexible to handle unexpected changes in demand and supply conditions;*
    - *Includes percent reduction (voluntary or mandatory) per stage; and*
    - *Includes both supply enhancement and emergency demand reduction methods.*

12. *Targets for achieving the emergency demand reduction measures should take into account the region's already aggressive long-term water conservation program.*

13. *The decision on when, and in which sequence drought enhancement supplies will be utilized during different stages will include consideration of the following factors:*

    - *Location – Out-of-region supplies will be utilized in the earlier stages, prior to in-county storage, because these supplies are more vulnerable to implementation risks such as seismic events;*
    - *Cost – Priority will be given to maximizing supply reliability and at the same time using the most cost-effective supplies; and*
    - *Limitations – Potential restrictions on the use of drought enhancement supplies is a factor in determining supply availability (e.g. potential restrictions on ESP supplies).*

Allocation Methodology

14. *The allocation methodology will be equitable, easy to administer, contain financial penalties and pricing signals, and a communication strategy to ensure member agencies and the public are informed and understand the need to conserve.*

15. *In order to protect the economic health of the entire region, it is very important for the allocation methodology to avoid large, uneven retail impacts across the region. The methodology should include a minimum level of retail agency reliability to ensure equitable allocation among the member agencies.*

16. *With the exception of allocating water from the ESP, the Water Authority shall make no distinction among customers paying the same M&I rate (e.g. non-Interim Agricultural Water Program (IAWP) agriculture, residential, commercial, and industrial).*

17. *Additional IAWP cutbacks beyond the initial 30 percent faced by IAWP customers should be equally applied to both IAWP and M&I customers.*

18. *A member agency that has developed local projects and instituted conservation measures should not be penalized in the computation of allocations.*

19. *To help balance out the financial costs and risks associated with development of local resources, the shortage allocation methodology should provide an incentive to those member agencies that have developed local supplies.*

20. *The base-year, upon which allocations will be derived, will be based on historic demands. Adjustments to the base-year will be made for demographic changes, growth, local supplies, demand hardening, and supplies allocated under interruptible service programs.*

21. *A member agency's base-year will be adjusted to reflect the regional financial contribution from the Water Authority for development of local projects. The adjustment will take into account the risks associated with developing the local projects.*

22. *A member agency will not be able to market its unused allocation to other agencies within the Water Authority's service area at a cost higher than the Water Authority's charges for those supplies.*

23. *Penalty rates, along with other demand reduction measures, will be used by the Water Authority to encourage conservation during a drought.*

2.4 Report Preparation and Approval

Water Authority staff, with consultant assistance, prepared an initial draft of the DMP based on results from the TAC member discussions on DMP elements. TAC members reviewed the draft report and their comments were incorporated. On February 14, 2006, the TAC supported forwarding the report to the Water Authority's Board of Director's Water Planning Committee for their consideration. The DMP elements were presented to Water Authority's Board of Directors through a series of meetings and workshops, with final approval of the DMP on May 25, 2006.

Section 3 – Review of Historic Plans and Implementation

"Experience is not always the kindest of teachers, but it is surely the best."[1] Thus, it was important to review the historical context of drought plans in Southern California and examine how those drought plans were implemented, and what impact they had on the Water Authority. Historically, due to the dependence on deliveries from Metropolitan, the Water Authority's guidelines for drought management actions have paralleled Metropolitan's adopted plans for supply management in drought situations. Lessons learned from the creation and implementation of these plans were used when preparing the DMP. This section summarizes those historical drought plans and lessons learned. Detailed information regarding the historical drought plans can be found in **Appendix C** (Water Authority) and **Appendix D** (Metropolitan).

Metropolitan began delivering water in 1941 and had been able to meet demands through system expansion through much of its history. However, during the drought of 1976-1977, Metropolitan first experienced demands that were greater than supplies. During the 1976-77 drought, Metropolitan asked for and received voluntary reductions in deliveries of 10 percent. It was then, that Metropolitan began considering how to deal with future supply shortages. The sections below describe the four drought plans that Metropolitan has had since that time, along with the Water Authority's actions to implement those plans.

3.1 Metropolitan's 1981 Interruptible Water Service Program

The first drought plan that Metropolitan's Board of Directors adopted was the Interruptible Water Service Program in 1981. This program combined a rate structure and drought plan. The Interruptible Water Service Program was intended to deliver water at a discounted rate in return for the ability to interrupt the deliveries as required. Water that did not receive a discount was deemed to be "noninterruptible."

Deliveries for groundwater or reservoir storage, agricultural purposes, and seawater barrier injection were considered to be interruptible water. An agency had an obligation to take a reduction or interruption in deliveries for three years after taking interruptible water deliveries.

When the 1987-1992 drought occurred, many member agencies that had purchased the interruptible water were not able to manage an interruption in deliveries. Some agencies did not have the facilities in place to produce stored water, others did not have the water in storage, while others preferred to have customers conserve rather than produce from storage.[2] Additionally, there was concern expressed by some farmers that trees and vines

---

[1] Spanish Proverb, *The Columbia World of Quotations*, 1996.

[2] Memorandums dated June 4, 1990, and July 19, 1990, to Chief of Operations, and September 10, 1990, Water Problems Committee Public Hearing minutes, pgs. 1-6, and attachments.

and livestock would be permanently destroyed by interrupting their water service.[3] In response and as the drought deepened, Metropolitan's Board of Directors adopted the Incremental Interruption and Conservation Plan.

3.2 Metropolitan's 1990 Incremental Interruption and Conservation Plan

The Incremental Interruption and Conservation Plan (IICP) was devised to reduce both noninterruptible and interruptible deliveries. Metropolitan's Board of Directors attempted to rectify the inequity of agencies receiving past discounts for interruptible water service by reducing water taken as interruptible water at a greater percentage than water taken as noninterruptible water. Stages of reductions in deliveries for "firm" and "nonfirm" water deliveries were created based on the amount of supply available to Metropolitan and projected demands. This reduction in deliveries occurred for 14 months starting in February 1991.

The IICP used fiscal year 1989-90 sales as the basis of its allocation. These sales were broken down into monthly targets. The targets were adjusted for loss of local supply, growth, conservation, and reclamation. The percentage reduction in deliveries was then applied. For part of the allocation period, agencies that took less water than their IICP target received an incentive of $99 per acre-foot. These incentives were eliminated as the combined revenue impacts of reduced sales and large incentive payments affected Metropolitan. Agencies that took more than their target paid a disincentive of two times the untreated noninterruptible rate in addition to paying the noninterruptible rate for delivery of the water. Monthly overages and underages were allowed to offset one another over the course of the year through an annual reconciliation. At the beginning of the allocation, billing for disincentives occurred monthly. This was later changed to a quarterly basis. Additionally, a time limit was placed on applying for adjustments.

3.3 Water Authority's 1991 Drought Response Plan

In response to the continuing drought and Metropolitan's adoption of the IICP, the Water Authority adopted its own Drought Response Plan in 1991. The Board Letter and Drought Response Plan are included in **Appendix C**. The Drought Response Plan had four components as summarized below.

1. <u>Drought Response Program</u>

   The Water Authority tied its response stages to the IICP. However, reductions were not broken down between "firm" and "nonfirm" deliveries in the base year. Rather, it reduced deliveries to its agencies uniformly based on fiscal year 1989-90 sales. Incentive and disincentive payments were assessed using the same formula as Metropolitan. Additionally, a Response Stage Activities matrix was developed for the member agencies. This matrix arranged water management techniques, such as

---

[3] Metropolitan Water District of Southern California, *Draft Paper on Events Leading Up to and Chronology of the 1990-92 Drought Years and Supply Reliability Improvements Achieved as a Result of the Drought.*

no outside irrigation except with water reclaimed from indoor use, to the reduction levels corresponding to the stage of the IICP. Through its member agency response to the public information program and prohibitions of water use, the Water Authority, overall, was able to stay within its allocation of water from Metropolitan.

2. Conservation Program

The Water Authority had long-term conservation programs in place prior to the allocation of water. Once the allocation of water began, additional short-term conservation programs, such as assistance to public institutions for conserving water, were added.

3. Member Agency Assistance Activities

Beyond the Response Stage Activities matrix, the Water Authority provided other assistance to member agencies, such as a member agency workshop on penalty pricing methods.

4. Public Information Activities

There were two objectives to the activities. The first was to highlight the drought situation and the need for immediate cutbacks in water usage. The second was to develop continuing methods to assist member agencies and educate the public on water supplies.

3.4 Department of Water Resources Drought Water Bank

Supplies from a Drought Water Bank were made available by DWR for one year, in 1991, to State Water Contractors. Metropolitan was able to obtain 215,000 acre-feet of the bank water. It sold some water directly to member agencies and melded the remainder with the rest of its supplies. Water sold directly to agencies was sold at DWR's melded rate of $175 per acre-foot plus Metropolitan's noninterruptible rate. The Water Authority contracted for 21,600 acre-feet of bank water, and took delivery of 20,100 acre-feet of bank water. The Water Authority melded the bank water into its other supplies.

3.5 Metropolitan's 1995 Drought Management Plan

The 1995 Drought Management Plan (1995 Plan) was the first time that Metropolitan formalized a plan which addressed the actions to take during a drought prior to reducing or interrupting deliveries of water. These actions included calling on water from various storage programs and participating in water bank and transfer options.

The 1995 Plan included a modified IICP. The modifications to the IICP included using an average of three fiscal years rather than one fiscal year for the base period and the establishment of an Interagency Advisory Committee to assist Metropolitan's General Manager during an allocation.

The 1995 Plan was adopted for only one year. As part of Metropolitan's integrated water resources planning process, it was intended that a more permanent drought management plan, which also incorporated surplus conditions, be prepared to create a general policy direction on the basic sequence of water resource management steps to take under surplus or shortage conditions. This plan, adopted in 1999, became known as the Water Surplus and Drought Management Plan (**Section 3.7**).

3.6 1994 Ordinance of the San Diego County Water Authority Establishing Contingency Plans, Rules, Regulations, and Restrictions so that Available Water Supplies are Allocated among Member Agencies for the Greatest Public Interest and Benefit

The Water Authority, in response to Metropolitan adopting its 1995 Plan (in October 1994), adopted its own water shortage contingency ordinance (**Appendix C**) a month later, in November 1994. The water resource portion of the ordinance included two basic components. First, if Metropolitan had to implement the IICP, the Water Authority would act to minimize shortages to its service area by making available stored water that it owned and securing other water supplies. And second, if the Water Authority continued to have a supply shortage it would allocate water supplies using Metropolitan's 1995 Plan-modified IICP as a template. This allocation included having separate cutback percentages for IAWP deliveries and firm deliveries, using the same three-year base period as the basis for the firm allocation, and passing through any penalties on a pro-rata basis to those agencies that received deliveries in excess of their allocation. If a member agency was not able to reduce its deliveries to within 5 percent of its monthly allocation, then its daily deliveries could be reduced by the Water Authority in a manner to ensure compliance. In addition to the basic concepts listed above, an appeals board was established to review actions taken by the Water Authority's General Manager if a member agency did not agree with the actions. The appeals board consisted of five Water Authority Board members.

3.7 Metropolitan's Water Surplus and Drought Management Plan

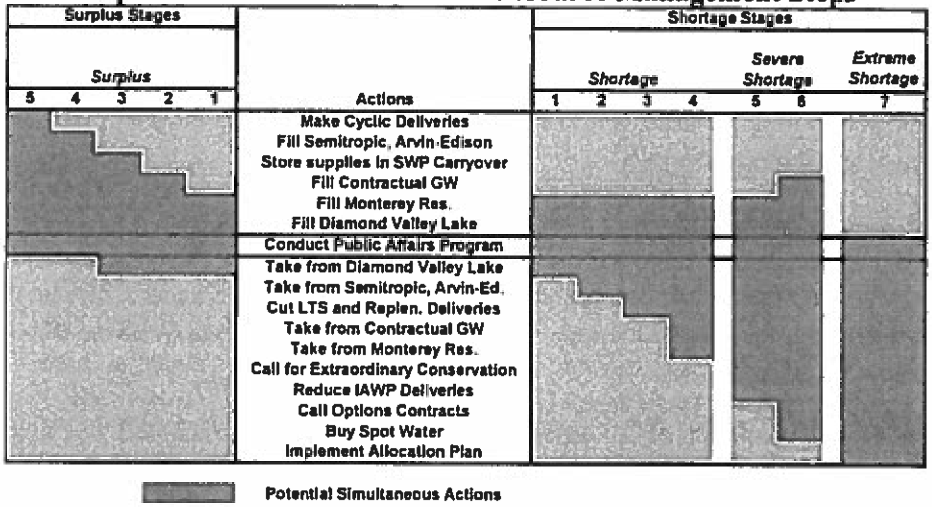
The Water Surplus and Drought Management Plan (WSDM) is the drought management plan that Metropolitan currently operates under. Based on water supplies and projected demands, varying actions may be taken by Metropolitan. These actions are shown in **Figure 3-1.**[4] The matrix acts as a "framework." Actual responses would be based on conditions at the time of need.

---

[4] Metropolitan Water District of Southern California, *Water Surplus and Drought Management Plan*, 1999, page 28.

Figure 3-1

Sequence of WSDM Plan Water Resource Management Steps



A water allocation methodology in the event "rationing" becomes necessary is not included in the WSDM Plan. A draft methodology was devised and specific concepts of an allocation are laid out in the WSDM Plan. These concepts include the goal that overall retail demands would be used to minimize uneven impacts to agencies within Metropolitan's service area. The final allocation plan was not adopted, in part, due to this concept. Agencies that had invested heavily to develop local supplies or for conservation felt that they were being treated unfairly and that there was no incentive to continue with these local investments since overall retail demands were used as the starting point for the drought allocation.

3.8 Interim Agricultural Water Program Reduction Guidelines

Metropolitan converted the "Interruptible Program" for agricultural users into the Interim Agricultural Water Program (IAWP) in May 1994. The IAWP provides for the delivery of surplus water for agricultural purposes at a discounted rate in exchange for up to a 30 percent reduction in demand by participating agricultural water users prior to implementation of municipal and industrial water use rationing. This reduction enables Metropolitan to better conserve limited supplies during shortages.

For the past several years and until the fall of 2004, Metropolitan's service area experienced dry conditions combined with high demands. Metropolitan and its member agencies began preparing a plan to reduce IAWP deliveries in the 2004-2005 water year (October through April) in the event that a reduction was necessary. This plan, although not finalized, is included in **Appendix E.**

3.9 Lessons Learned

As review of the historical plans occurred, it became apparent that certain lessons could be learned from them about both what to do and not to do before and during an allocation. These lessons include:

Effective Communications

It is important that Directors, agency staff, governmental officials, the news media, and the public understand the water supply situation, how the Water Authority is prepared to meet demands, and ultimately if required, how an allocation plan would be implemented. Permanent outreach activities that educate the public about the region's water supplies are vital. Additionally, a communication team that has a plan that it can work during a drought in a proactive, rather than reactive mode, will help in the implementation of the drought plan. A proactive approach will also help manage rapidly changing conditions during a shortage. In response to these observations, a communication strategy has included in the DMP that establishes a drought communication team. Please refer to **Section 6** for a more complete discussion of the communication plan.

Advance Supply and Facility Planning

Agencies should have supply and facility plans in place ahead of time to avoid supply shortage situations. The planning should include storing surplus supplies when and where possible, having the facilities in place to withdraw these supplies, and being prepared with a staged plan on how to deal with shortages. The Water Authority and its member agencies have accomplished this through development of urban water management plans, facility master plans, and the DMP.

Avoid Rationing as much as Possible

This avoidance includes entering into option contracts, voluntary conservation, and encouraging the development of local supplies. Although all of these methods have some cost associated with them, they are likely not as high as the economic impacts of water supply shortages to the region. This DMP, through its Drought Response Matrix and possible supply enhancement actions, provides a plan to potentially avoid rationing when feasible. The Drought Response Matrix is discussed further in **Section 4**.

Develop an Allocation Methodology that Encourages Local Supply Development

By developing local supplies, the reliability of both the individual member agency that developed the supply, as well as the region, is improved. Thus, any drought plan should encourage the development of local supplies, not hinder them. The allocation methodology in this DMP encourages local supply development in two ways. First, it uses historic Water Authority demands, not retail demands, as the basis for allocating water. Second, an adjustment for the development of local projects (recycled water, groundwater recovery, and seawater desalination) is provided in the allocation methodology. This adjustment provides a 30 percent credit on the yield of locally developed reliable supplies in the base period (discussed in **Section 5**).

Review and Remind Agencies of DMP Annually

This review educates staff members who are new to the Water Authority or its member agencies on how the DMP works. One of the problems with the 1981 Interruptible Water Service Program was that the reason for Metropolitan providing the discount was lost with the departure of staff members who had worked on the program. Thus, implementation of the plan could not occur and a new plan, the IICP, had to be formulated at the last minute. An annual review and reminder of the DMP will help reduce any last minute confusion.

Make Adjustments in Allocation Methodology Simple to Administer

By having a fairly simple preset formula that uses historic information for adjustments and a three-year average base period, administering adjustments in the DMP allocation methodology will be easier and less time consuming.

Page intentionally left blank.

Section 4 – Drought Response Matrix

4.1 Introduction

The Water Authority exists to provide, as far as practicable, each of its member agencies with adequate supplies of water to meet their expanding and increasing needs. In times of extreme drought, where the San Diego region could experience shortages of supply from Metropolitan, the Water Authority needs to take actions to try to both reduce and eliminate shortages. A Drought Response Matrix was developed to provide guidance to the Water Authority and its member agencies to select potential regional actions to lessen the severity of shortage conditions. The matrix is shown below in **Table 4-1.**

Table 4-1
Drought Response Matrix – Firm Demands

POTENTIAL SDCWA DROUGHT ACTIONS	**STAGES**		
	Voluntary	**SDCWA Supply Enhancement**	**Mandatory Cutbacks**
Ongoing BMP implementation	X	X	X
Communication strategy	X	X	X
Monitoring supply conditions and storage levels	X	X	X
Call for voluntary conservation	X	X	X
Draw from SDCWA Carryover Storage	X	X	X
Secure transfer option contracts	X	X	X
Buy phase 1 spot transfers (cost at or below Tier 2 rate)		X	X
Call transfer options		X	X
Buy phase 2 spot transfers (cost at or above Tier 2 rate)		X	X
Implement allocation methodology			X
Utilize ESP Supplies			X

The matrix includes a list of potential actions available to the Water Authority at each of the three main stages. To determine the specific actions that should be taken at each stage, the Water Authority and its member agencies will evaluate conditions specific to the timing, supply availability, and cost, along with other pertinent variables. Numerous variables can influence the supply reduction levels during a drought. These variables include, but are not limited to, State Water Project allocation, conditions on the Colorado River, Water Authority supplies, local storage, local demands, and timing. Member agencies will independently adopt retail-level actions to manage potential shortages.

4.2 Drought Response Matrix Stages

The potential actions are grouped into the following three stages:

Voluntary

The first stage of the drought response matrix is considered voluntary. The voluntary stage would likely occur when Metropolitan has been experiencing shortages in its imported water supply (from either the Colorado River or the State Water Project, or both) and is withdrawing water from storage due to the drought conditions to meet normal demands.

Water Authority Supply Enhancement

This stage could occur in year three or four of a dry period and represents that point in time when Metropolitan reduces water deliveries to its member agencies. The Water Authority's Board of Directors will then consider the potential actions in this stage, or others that may surface, to eliminate any cutbacks to the member agencies from the reduction in Metropolitan supplies.

Mandatory Cutbacks

The final stage follows once both Metropolitan and the Water Authority Board have exhausted all supply enhancement options due to lack of supplies and/or increasing costs, and mandatory cutbacks are required. The actions taken at this stage include implementation of the allocation methodology and potential utilization of ESP supplies. It should be noted that members of the DMP TAC expressed strong opinions that the ESP supplies only be used during a hydrologic drought as a last resort, if at all. Should the dry weather continue and the region enter a sixth year of drought, some communities may begin facing health and safety issues.

4.3 Potential Water Authority Drought Actions

The following is a brief description of each of the potential Water Authority actions that may be taken in a drought situation.

Ongoing Best Management Practices Implementation

The Water Authority and its member agencies continue to implement the California Urban Water Conservation Council's comprehensive water conservation Best Management Practices.

Communication Strategy

A Communication Strategy will be in place prior to the drought and continue through all stages. The strategy is a coordinated effort between the Water Authority and its member agencies. It includes phases of response and corresponding activities to take during each phase. Refer to **Section 6** for additional information.

Monitoring Supply Conditions and Storage Levels

Water Authority staff monitors State Water Project and Colorado River supplies, along with supply levels in Metropolitan's storage facilities and programs. Reports will be made to the member agencies and the Water Authority's Board of Directors on the status of the supply conditions. This action is also an important element of the Communication Strategy.

Call for Voluntary Conservation

The Water Authority and its member agencies will ask the public to implement voluntary water conservation practices. The voluntary water conservation measures are in addition to the region's ongoing implementation of the BMPs. Voluntary water conservation measures may focus on outdoor water conservation, elimination of run-off, and leak detection. The shift from indoor water conservation to outdoor water conservation is due to demand hardening that is the result of 15 years worth of indoor water conservation efforts that targeted homes and businesses. The specifics of the voluntary water conservation measures will be determined by member agencies, with the Water Authority providing regional messages and assistance. The action will be closely coordinated through the Communication Strategy.

Draw from Water Authority Carryover Storage

The Water Authority will draw from its non-ESP storage in order to meet member agency demands. This could include supplies available through the Water Authority's proposed carryover storage project that is scheduled for completion in 2011.

Secure Transfer Option Contracts

The Water Authority secures transfer option contracts for supplies from outside of the region. Transfer options are multi-year contacts that allow the Water Authority to obtain a specified quantity of water at some future date. The amount secured will depend on supply need and cost. A minimum payment for water is usually required in order to secure the transfer. This payment must be made even if the water is not needed.

Buy Phase 1 Spot Transfers

The Water Authority buys Phase 1 spot transfers from outside of the region. Spot transfers make water available for a limited duration (typically one year or less) through a contract entered into in the same year that the water is delivered. The cost for this block of water would be at or below the Tier 2 water rate. Purchase of spot transfers are categorized into two phases to provide the Board the ability to determine action based on cost. The cost includes purchase and conveyance. Examples of a spot transfer are supplies purchased through DWR's Drought Water Bank during the 1987-1992 drought (See Section 3.4). The transfer water will be melded in with the remaining supplies available to the Water Authority.

Call Transfer Options

The Water Authority buys the previously secured transfer options. In addition to the cost to purchase the transfer water, the Water Authority needs to pay for conveyance between the location of the sale and the San Diego region. Additional costs could include storage, treatment, and seepage losses depending upon the origin of the transfer water. The transfer water will be melded in with the remaining supplies available to the Water Authority.

Buy Phase 2 Spot Transfers

The Water Authority buys Phase 2 spot transfers from outside of the region. The transfer water will be melded in with the remaining supplies available to the Water Authority.

Implement Allocation Methodology

The Water Authority's Board of Directors determines that all potential actions have been taken to avoid shortages and the remaining action is to implement the allocation methodology outlined in **Section 5.**

Utilize Emergency Storage Project Supplies

The Water Authority draws from its ESP supplies when any member agency's non-interruptible firm demands drop below a 75% service level. The quantities of supplies drawn from storage are based on the minimum amount necessary to meet essential health, safety, and firefighting needs. It is also based on the maximum amount needed to ensure adequate supplies remain for a catastrophic event.

The drought response matrix provides guidance to the Board on potential actions that the Water Authority could take at certain stages of drought. There are variables, unknown at this time, which may influence the options available to the Water Authority's Board of Directors. This will need to be taken account when it is time to implement the matrix.

Section 5 - Supply Allocation Methodology (Updated April 2012)

5.1 Introduction

As outlined in the Drought Response Matrix discussed in **Section 4**, after the Water Authority's Board of Directors has exhausted available supply enhancement options and can no longer avoid cutbacks, implementation of an allocation methodology will occur. The challenge in developing the methodology was to meet the diverse needs of the member agencies in a fair and equitable manner. Each of the Water Authority's member agencies has a different demand profile and unique supply portfolio. Some agencies have abundant local supplies, while others are 100 percent reliant on water supplies purchased from the Water Authority. There are member agencies that serve primarily agricultural customers, while others serve only municipal and industrial customers.

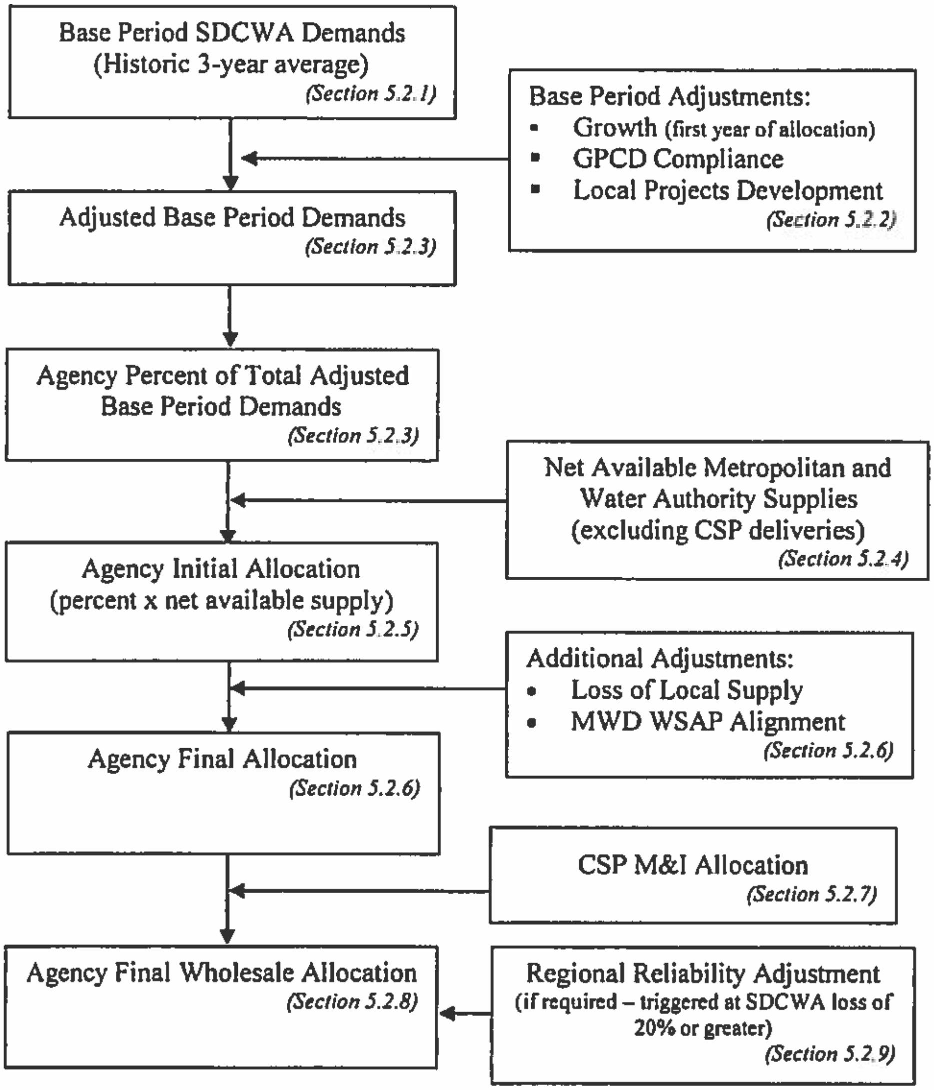
This section includes a description of the supply allocation methodology developed through a collaborative effort between the Water Authority and its member agencies. The goal of the methodology is to provide an equitable means of apportioning the Water Authority's supplies during periods of supply shortages consistent with the TAC approved principles discussed in **Section 2.3**. Through the TAC meetings, Water Authority staff and designated member agency representatives have collectively agreed to the allocation methodology described in this section.

In evaluating implementation of the Water Authority's allocation methodology during the FY 2010 and FY 2011cutback period, Water Authority and member agency staff identified specific elements of the methodology for review and refinement. As part of this effort, it was also noted that certain conditions have changed since adoption of the methodology in 2006, specifically in the area of conservation. Adoption of State water use efficiency legislation has caused a paradigm shift in conservation tracking, and prompted an evaluation of the manner in which the allocation methodology addresses demand hardening and conservation savings. A final area of review involved the relationship between the Water Authority's methodology and recent modifications to Metropolitan's Water Supply Allocation Plan (WSAP). Alignment between the two allocation plans was necessary when methodological inconsistencies result in unintended and inequitable impacts to the region or a single member agency. On April 26, 2012, the Water Authority Board approved modifications to the allocation methodology that were developed through the member agency review and refinement process.

To provide an overview of the allocation methodology that includes the April 2012 modifications, a schematic has been prepared that shows principal steps in the process. As shown in **Figure 5-1**, the methodology begins with a determination of each agency's base period demands. From this base, adjustments are added to account for agency's growth in demand, local projects development, and compliance with water use efficiency requirements. The calculation results in an adjusted base period demand for each member agency. Next, the amount of supplies available from the Water Authority is determined. This includes the Water Authority's own supplies (excluding Carryover Storage) along with supplies available from Metropolitan. Individual member agency's percent share of the total regional adjusted base period demand is then calculated. The percentages are multiplied by Water Authority supplies available to derive an initial allocation for each member agency. To calculate agencies' final supply allocations, additional adjustments are subsequently made for allocation-year local supply loss and for Metropolitan WSAP alignment. If the Water

Authority Board elects to utilize carryover storage, a separate allocation for this supply is performed and results in a final total wholesale allocation. In the rare circumstance of severe imported supply shortages, a regional reliability adjustment will be applied to avoid large uneven retail impacts. Each box shown in **Figure 5-1** contains a reference number to the corresponding subsection that describes the step in detail.

Figure 5-1
Supply Allocation Methodology



5.2 Description of Allocation Methodology

To help describe the allocation methodology and demonstrate the calculation procedures, the following example was developed. The example was prepared for illustration purposes only. For this sample analysis, demand and local supply data for five representative agencies was established to approximate a cross-section of urban and agricultural characteristics unique to the region. Other agency attributes such as estimated growth, per capita use, and local supply availability were also based on local agency characteristics.

The first step in determining the severity of necessary cutbacks during any water supply shortage event is an assessment of available supply compared to estimated demands. Because the majority of the region's water supply originates from outside the San Diego area, the severity of regional drought cutbacks is driven by the availability of imported supplies. However, imported supplies developed by the Water Authority are less vulnerable to reductions due to their higher priority water right. The high reliability of the IID transfer water and conserved water resulting from the lining of the All-American Canal and Coachella Canals assures that these supplies will be available to the Water Authority during extreme hydrologic events. As a result, imported Metropolitan supplies and local surface water would be most susceptible to a reduction during a drought. Therefore, an estimated 15 percent cutback in Metropolitan supplies to the Water Authority was assumed to illustrate the allocation methodology.

5.2.1 Historic Base Period Demands on the Water Authority (Unadjusted)

A historic base period demand is required to establish each agency's demands on the Water Authority prior to activation of the WSDRP. Base period demands are calculated using data from the three most recently completed consecutive fiscal years immediately preceding the year in which Board action is taken to activate the WSDRP due to supply shortage conditions. Each of the three consecutive fiscal years will be years in which the WSDRP has not been activated. Each agency's base period demand is established by calculating its three-year average of demand.

For illustrative purposes, **Table 5-1** contains historic base period demands for the sample agencies. In the event that consecutive multi-year allocations are required, base period demands (based on the three years prior to the activation of the WSDRP) are to remain fixed for the duration of the allocation.

Table 5-1
Example
Historic Base Period Demands on Water Authority

	Agency A	Agency B	Agency C	Agency D	Agency E
SDCWA Demand (three-year average)	2,200	6,500	181,000	43,100	25,000

5.2.2 Adjustments

Adjustments applied to the base period were developed to equitably account for relevant factors in calculating each agency's allocation. Such factors include growth, compliance with water use efficiency requirements, local supply availability, and efforts taken by local agencies to develop reliable local projects such as recycled water, groundwater recovery, and seawater desalination. The adjustments are intended to acknowledge unique agency characteristics and provide an incentive for agencies to decrease their reliance on imported supplies over the long-term.
The following is a summary of each adjustment:

Growth

Because the base period is fixed, a growth adjustment is applied to estimate the increase in demand due to growth from the base period to the allocation year. This adjustment is calculated using agency-level population estimates as a metric to approximate growth in demand. These population figures are based on SANDAG generated annual demographic totals. Each agency's demand increase is computed by multiplying its change in population by a per-capita water use efficiency factor (GPCD factor). The GPCD factor is an aggregate of member agencies' SBX7-7 GPCD targets from the Water Authority's Urban Water Management Plan (UWMP), and encompasses residential and Commercial, Industrial, and Institutional (CII) demands. As an example, the 2010 UWMP contains an aggregated GPCD target of 174 GPCD for year 2015. The growth adjustment calculation is expressed as:

= (Change in Population) X (Aggregated Member Agency GPCD Target)

However, if an agency's actual base period GPCD is less than the aggregated GPCD target, the lower value will be utilized as the water use factor in the growth calculation. This is done to ensure that the growth adjustment reflects efficient water use levels in the member agency's service area.

In the event that an agency experiences minimal or no population increase, an alternate growth adjustment calculation is available. To qualify, the agency must have sustained a growth rate of less than 50 percent of the regional population growth rate. As previously stated, SANDAG data will be utilized to determine each agency's and the regional growth rate. Under the proposed adjustment, CII growth would be captured through CII meter installations that occurred after the base period. Additionally, residential growth in demands would be captured by applying a water-efficient residential GPCD to the minimal population increase. Agencies requesting this method for capturing growth are required to provide adequate documentation on CII meter installations and residential GPCD factors based on their individual SBX7-7 targets.

Finally, to ensure alignment with Metropolitan's WSAP in subsequent years of a multi-year allocation period the growth adjustment amount received from Metropolitan will be passed through to Water Authority member agencies based on each agency's proportional share of Water Authority-wide population growth. The reason the Water Authority growth adjustment from Metropolitan is not passed through to agencies in the first year, is because the two agencies' base periods would likely be different, making the time frame between the base periods and allocation years inconsistent. To again address the concern of agencies with minimal population growth and large

CII increase, an agency can request CII meter installations be used, in part, as a basis for proportioning the growth adjustment received from Metropolitan. The same criteria and documentation would be required as discussed above.

Table 5-2 illustrates the growth adjustment calculations for each sample agency.

Table 5-2
Growth Adjustment

Member Agency Population

Population	Agency A	Agency B	Agency C	Agency D	Agency E
Final Year of Base Period	12,197	31,784	789,627	220,970	116,782
Allocation Year	12,300	32,400	808,100	233,300	117,500
Change in Population	103	616	18,473	12,330	718

Governing GPCD Target

Agency	Base Period GPCD	Aggregated Agency SBX 7-7 Target	Governing GPCD Target
A	176	174	174
B	186	174	174
C	200	174	174
D	165	174	165
E	187	174	174

Growth Adjustment

	Agency A	Agency B	Agency C	Agency D	Agency E
Governing GPCD Target	174	174	174	165	174
Population	103	616	18,473	12,330	718
Gallons (MG)	**6.5**	**39.1**	**1,173.2**	**742.6**	**45.6**
Adjustment (AF)	**20**	**120**	**3,600**	**2,280**	**140**

GPCD Compliance

With the state's adoption of the SBX 7-7, retail agencies are now required to implement water use efficiency measures that result in a 20 percent reduction in their per capita water use by the year 2020. In order to acknowledge the importance of meeting SBX 7-7 targets, a water use efficiency adjustment is incorporated into the allocation methodology. The GPCD compliance adjustment applies only to agencies that fail to meet their SBX 7-7 2020 targets, or estimated pre-2020 targets, over the Water Authority established allocation base period. Agencies not meeting their targets will have their SBX 7-7 compliance shortfall deducted from their base period demand. Consistent with SBX 7-7 guidelines, each agency's base period demand will be normalized for weather before comparison to its GPCD target.

However, to recognize agencies' efforts towards meeting their targets, an SBX 7-7 target performance allowance is included as part of the adjustment. Under this allowance, an agency's base period demand would be reduced only if its GPCD exceedence is over 5% of its SBX 7-7 target. GPCD compliance adjustments for the sample agencies are shown below in **Table 5-3.**

Table 5-3
GPCD Compliance Adjustment

	Agency A	Agency B	Agency C	Agency D	Agency E
Base Period GPCD (weather normalized)	176	186	200	165	187
SBX7-7 GPCD Target	178	174	210	170	180
Variance	-2	12	-10	-5	7
SBX 7-7 Target 5% Exceedence Allowance	**N/A**	**183**	**N/A**	**N/A**	**189**
Adjustment (GPCD)	**0**	**3**	**0**	**0**	**0**
Adjustment (AF)	**0**	**117**	**0**	**0**	**0**

Local Projects Development

The development of highly reliable in-region supplies, such as brackish groundwater recovery, recycled water, and seawater desalination result in a dual benefit. They add to the region's supply diversity and are a dependable source during shortages of imported water. An adjustment is made for the regional benefit of these annually reliable supplies. The adjustment recognizes both the investment made by the local agency and the regional financial contribution made by the Water Authority. Similar to the base period calculation time frame, a three-year average of beneficial use from these reliable supplies is employed to calculate the adjustment. The Local Projects Development adjustment is 30 percent of the three-year average. In addition to the incentive from the adjustment, the member agency will be able to utilize 100 percent of their local project's supply that is available during a drought. **Table 5-4** on the following page shows the Local Projects Adjustment.

Table 5-4
Local Projects Development Adjustment (AF)

Year	Agency A	Agency B	Agency C	Agency D	Agency E
1	65	0	4,900	1,310	1,850
2	64	0	4,950	1,350	2,100
3	66	0	5,150	1,340	2,050
Average	**65**	**0**	**5,000**	**1,333**	**2,000**
30% Credit	**20**	**0**	**1,500**	**400**	**600**

5.2.3 Adjusted Base Period Demands and Supply Allocation Percentages

An agency's adjusted base period demand is calculated by adding the applicable adjustments to their initial base period demand. The adjusted base period demand amount is then used to generate an agency's pro-rata percent share of the total adjusted base period demand. It is this percentage that is used to calculate an agency's initial imported supply allocation volume. **Table 5-5** illustrates the calculation for the sample agencies.

Table 5-5
Adjusted Base Period Demand and
Initial Supply Allocation Percentages (AF)

Agency	Base Period Demand on SDCWA	Growth Adjustment	GPCD Compliance Adjustment	Local Projects Development Adjustment	Adjusted Base Period Demand	Pro-rata Share of Adjusted Base Period Demand
A	2,200	20	0	20	2,240	0.80%
B	6,500	120	-117	0	6,503	2.40%
C	181,000	3,600	0	1,500	186,100	69.90%
D	43,100	2,280	0	400	45,780	17.20%
E	25,000	140	0	600	25,740	9.70%
				Total	**266,363**	

5.2.4 Water Authority Supply Availability and Net Cutback Percentages

The next step in the allocation methodology is to identify the total supplies available to meet member agency demands during shortage events. Supplies are equal to the sum of water from Metropolitan, the Water Authority's existing Imperial Irrigation District transfer water, conserved water from planned canal lining programs, and projected supplies from future seawater desalination project(s). These additional supplies developed by the Water Authority help to reduce demands on Metropolitan, and therefore decrease the impact from reductions in Metropolitan's supplies. This is demonstrated in the calculations shown in **Table 5-6**.

For this example, it is assumed that Metropolitan's allocation results in a drought supply allotment equal to 85 percent of the Water Authority's demand on Metropolitan. In the example, Water Authority supplies are set at 20,000 acre-feet per year. Total supply availability is computed by combining Water Authority supplies and Metropolitan drought supplies (**Table 5-6**). As discussed in Section 5.2.6., the loss of local supply adjustment requires a portion of the available supply to be set aside to implement the adjustment, the loss of local supply volume is shown in **Table 5-8**.

Table 5-6
Supply Availability - illustrative purposes (AF)

Supply Availability

Allocation-Year Demand	273,360
SDCWA Supply	20,000
Demand on Metropolitan	253,360
Metropolitan Cutback to Supplies	15%
Net Metropolitan Supply Availability	215,356
Initial SDCWA Supply Availability	235,356
Loss of Local Supply Adjustment Set Aside	4,700
Net SDCWA Supply Availability	230,656

5.2.5 Member Agency Initial Allocation of Water Authority Supplies

The next step in the allocation methodology is to determine the initial member agency level allocation of available supplies. This is calculated by multiplying total available supplies (excluding carryover storage) by each agency's percent share of the adjusted base period demand, as shown in the following equation:

= *(Net Available Regional Imported Supply) X (Agency's Pro-rata Share of Base Period Demand)*

For the example, data from **Tables 5-5** and **5-6** are used to calculate allocations for the sample agencies. The results are shown in **Table 5-7**.

. **Table 5-7**
Initial Imported Supply Allocation Volumes

Agency	Pro-rata Share of Adjusted Base Period SDCWA Demands	SDCWA Initial Allocation Volume
A	0.8%	1,845.2
B	2.4%	5,536
C	69.9%	161,228
D	17.2%	39,673
E	9.7%	22,374
Total	**100.0%**	**230,656**

5.2.6 Additional Adjustments

Loss of Local Supply

Some agencies have invested heavily in local supply development, thereby reducing their reliance on imported water and providing other regional benefits such as surface water treatment capacity. The loss of local supply adjustment was developed to recognize the benefit of these historic supplies and not penalize agencies for diminished local supplies during an allocation year. The adjustment is calculated as the difference between an agency's average local supply used over the base period and its projected allocation-year local supply use. This difference is then reduced by the Water Authority cutback percentage from MWD.

Loss of local supply during an allocation year, as used in this section, shall be deemed by the Water Authority to occur, or have occurred, where a member agency's locally produced source of water supply is lost or otherwise reduced as a result of drought/locally dry conditions, legislative and regulatory actions, court orders, water rights decrees and related settlements, the inability of the member agency claiming the adjustment to obtain contracted deliveries from a local water supplier , damage or loss of member agency infrastructure needed to produce, store, treat and convey local water supplies, or other circumstances where the member agency has lost the ability to utilize a local water supply through no fault of its own. The Loss of Local Supply Adjustment for the sample agencies is shown in **Table 5-8**.

Member agency developed local water supplies subject to adjustment under this provision include, but are not limited to, locally produced surface water, groundwater, desalinated ocean or brackish water, recycled water, captured stormwater or any other locally produced source of water that satisfies the potable or non-potable demands of a Water Authority member agency during the allocation year where a loss of local supply adjustment is sought. It is critical that the agency claiming a potential local supply loss adequately document the actual loss for the year end reconciliation when financial penalties for exceeding allocation targets are assessed.

While recycled, brackish groundwater, and seawater desalination supplies are eligible for the Loss of Local Supply Adjustment, doing so will preclude an agency from applying for the Local Projects Development Adjustment described in the Section 5.2.2 on this same supply.

Table 5-8
Loss of Local Supply Adjustment

Base Period Local Use

Year	Agency A	Agency B	Agency C	Agency D	Agency E
1	0	0	19,700	0	2,000
2	0	0	21,800	0	3,900
3	0	0	18,500	0	2,500
Average	**0**	**0**	**20,000**	**0**	**2,800**
Allocation Year Local Supply	**0**	**0**	**15,000**	**0**	**1,925**
Difference (less 15% MWD Cutback)	**0**	**0**	**4,250**	**0**	**744**

Metropolitan WSAP Alignment

The WSDRP allocation methodology also contains adjustments necessary to align it with Metropolitan's WSAP to ensure equitable supply allocations to Water Authority member agencies. In December of 2008, the Water Authority Board approved alignment modifications that dealt with agencies adding planned local supplies and extraordinary increases in production during consecutive allocation years. The modifications were made because, due to increases in certain member agency local supplies, the Water Authority would have been allocated less water by Metropolitan and the net effect on the Water Authority's allocation needs to be passed through to the member agency developing the local supply.

For agencies adding planned local supplies during consecutive allocation years, a pass through of the net effect on the Water Authority's allocation from Metropolitan will be conveyed directly to the Water Authority member agencies adding these local supplies. The specific change in the amount of water allocated to the Water Authority by Metropolitan because of the member agency's local supply will be identified and the member agency's allocation will be adjusted accordingly by that amount of volume. If more than one agency is involved in a single local supply project, each participating agency's Water Authority allocation will be adjusted on a pro rata basis relative to the participating agency's share of the water delivered by the local supply project.

Under the Metropolitan WSAP, "extraordinary" increases in production are treated differently than planned local supplies. This allows the member agency to improve its reliability through unplanned actions that are solely in response to the drought. Extraordinary increases, such as short-term water transfers and overproduction (mining) of groundwater basins, are not included in an agency's allocation year local supplies. However, the full amount of the extraordinary local supply will be included in the calculation of an agency's Retail Impact Adjustment. Similar to planned local supplies, the change in the amount of water allocated to the Water Authority by Metropolitan will be identified and the allocation of the member agency who implemented the extraordinary local supply will be adjusted accordingly by that volume of water.

The Metropolitan Board subsequently approved additional modifications to its WSAP in September 2011. To maintain continued equitable allocation of supplies to member agencies, an additional adjustment pertaining to recycled water development is now made to the Water Authority's allocation methodology based on the WSAP modifications. The net effect on the Water Authority's allocation from the increased recycled water developed after the based period would be passed on to those member agencies that developed the recycled water supplies. This would be reflected as a reduction in their allocation from the Water Authority. While the agency's allocation from the Water Authority would be reduced, the agency would still be better off in regard to reliability then if they had not developed the recycled water supply.

5.2.7 Carryover Storage Program

Special Agricultural Water Rate (SAWR)

Under the SAWR program, SAWR customers are exempt from paying the Water Authority's storage charge and in return will not receive supplies from the Carryover Storage Program (CSP) during shortages and limited supplies from the Emergency Storage Program.

Carryover Storage Adjustment

Under the SAWR, no CSP supplies are available to SAWR customers during the Supply Augmentation Stage (Stage 2) or Mandatory Cutback Stage (Stage 3) of the WSDRP. A description of the methodology used to ensure CSP supplies are delivered solely to M&I customers, under both stages, is outlined below.

Utilizing CSP Deliveries during Supply Augmentation Stage (Stage 2)
In this scenario, the assumptions are that MWD is allocating supplies to its member agencies, but the cutback is minimal, and the Water Authority and its member agencies are able to avoid mandatory cutbacks to M&I customers through shortage management actions. These actions could include voluntary conservation measures and utilization of CSP deliveries. To ensure no CSP supplies are delivered to SAWR customers, each member agency with SAWR customers would be given a SAWR supply allocation based on the Water Authority cutback level. The following basic steps will be taken to establish the SAWR allocation of non-CSP supplies:

1. Establish SAWR base period, consisting of SAWR demands on the Water Authority from the three consecutive most recently completed fiscal years prior to activation of the WSDRP;
2. Determine Water Authority cutback level based on Metropolitan allocation, Water Authority supplies (excluding CSP) and estimated water demand; and
3. Apply cutback level to each agency's SAWR base period to determine its SAWR allocation.

Allocating CSP Supplies during Mandatory Cutback Stage (Stage 3)
At this stage, Metropolitan and the Water Authority are both allocating supplies to their member agencies. The Water Authority is utilizing CSP supplies to lessen the cutback level from Metropolitan to M&I customers. In establishing member agency allocations, it is critical that the allocations reflect only CSP deliveries to M&I customers. As a result, a separate calculation to

determine the M&I allocation of CSP deliveries is required. The methodology employed is consistent with the approach used to allocate non-CSP supplies (i.e., MWD allocation and Water Authority QSA supplies), except that WSAP Alignment Adjustments are not necessary because they pertain to allocation of Metropolitan supplies.

For this sample calculation, it is assumed that the Water Authority is in mandatory cutbacks and 10,000 acre-feet of CSP storage is made available for distribution to M&I customers. The methodology used to allocate the 10,000 acre-feet of CSP supplies is shown in **Table 5-9.** In this scenario, agency M&I demands are calculated by subtracting SAWR water use from their adjusted base period demand. Each agency's percent share of M&I demand is then computed and used to determine its proportional share of the available CSP supplies.

Table 5-9
CSP Allocation (AF)

Agency	Adjusted Base Period Demand	SAWR Base Period Demand	M&I Base Period Demand	Pro-rata Share of M&I Demand	CSP Allocation (10,000 AF available storage)
A	2,240	0	2,240	0.8%	80
B	6,503	100	6,403	2.4%	240
C	186,100	200	185,900	70.1%	7,010
D	45,780	800	44,980	17.0%	1,700
E	25,740	0	25,740	9.7%	970
Total	**266,363**	**1,100**	**265,263**	**100.0%**	**10,000**

5.2.8 Member Agency Final Total Wholesale Allocation

The last step in the allocation process is to calculate each agency's total available Water Authority supplies. This is done by summing each agency's allocation of supplies and adding in its share of M&I CSP allocation, as shown in the following equation:

= Supply Allocation + CSP Allocation (M&I)

For the example, **Table 5-10** shows final allocations for the sample agencies. Unless Water Authority supply cutbacks are severe, at or exceeding 20%, the calculation is now complete. If the cutback is severe, the methodology includes a regional reliability adjustment, which is discussed in **Section 5.2.9** below.

Table 5-10
Final Supply Allocation (AF)

Agency	SDCWA Initial Allocation Volume	Loss of Local Supply Adjustment	MWD WSAP Alignment	CSP Allocation	Total Allocation Volume
A	1,845	0	0	80	1,925
B	5,536	0	0	240	5,776
C	161,228	4,250	0	7,010	172,488
D	39,673	0	0	1,700	41,373
E	22,374	744	0	970	24,088
Total	**230,656**	**4,994**	**0**	**10,000**	**245,650**

5.2.9 Regional Reliability Adjustment (if required)

In accordance with Principle 15, which states, "*In order to protect the economic health of the entire region, it is very important for the allocation methodology to avoid large, uneven retail impacts across the region. The methodology should include a minimum level of retail agency reliability to ensure equitable allocation among the member agencies,*" a regional reliability floor was established. The floor, if needed, is set at 5 percent below the region's total level of service and is triggered when the net cutback to total Water Authority supplies reaches or exceeds 20 percent. Taking into account the supply development by the Water Authority, its member agencies, and Metropolitan, this level of cutback is very unlikely. The first step in determining the adjustment is calculation of the level of service for each member agency and region, which is shown below.

Level of Service

The level of service value is computed as the ratio of total supplies available to an agency, including allocated imported supplies and local resources, to projected demand during that same period. Thus, in order to calculate Level of Service estimates, projected member agency allocation-year demand and supply projections are necessary.

Table 5-11 contains estimated allocation-year demands and supplies used for this example. The second column titled, Demand on SDCWA, has been computed for this example by adding the demand increase associated with the growth adjustment and the estimated loss of local potable supply volume to the base period demand. Estimated allocation year local supplies used to offset imported demands are provided by member agencies.

Table 5-11
Allocation-Year Demand and Supply (AF)

Agency	Demand on SDCWA	Total Local Supply	Total Demands
A	2,220	70	2,290
B	6,920	0	6,920
C	192,600	20,100	212,700
D	45,380	1,400	46,780
E	26,540	4,125	30,665
Total	**273,660**	**25,695**	**299,355**

Summing an agency's allocation volume (**Table 5-10**) and projected allocation-year total local supplies (**Table 5-11**) results in their total supply during a cutback. This value is then divided by the projected total demand (**Table 5-11**) to generate the agency's estimated level of service. A summary of agency level allocations and resulting levels of service is shown in **Table 5-12.** The level of service of the agencies' and region are utilized in severe cutback levels to calculate the regional reliability adjustment.

Table 5-12
Allocation and Resulting Level of Service (AF)
15% Cutback to Metropolitan Supply

Agency	Total Allocation Volume	Total Local Supply	Total Supply	Projected Total Demand	Level of Service
A	1,925	70	1,995	2,290	87.1%
B	5,776	0	5,776	6,920	83.5%
C	172,488	20,100	192,588	212,700	90.5%
D	41,373	1,400	42,773	46,780	91.4%
E	24,088	4,125	28,213	30,665	92.0%
Total	**245,650**	**25,695**	**271,345**	**299,355**	

Total Regional Level of Service - (271,351 / 299,355) = 91%

Regional Reliability Adjustment Calculation

The regional reliability floor effectively reallocates a portion of the Water Authority's supplies necessary to bring all agencies up to the minimum level of service. This floor is set at 5 percent below the region's total level of service and is triggered when the net cutback to total Water Authority supplies reaches or exceeds 20 percent. The volume of imported supplies required to meet this shortfall is provided by those agencies with a total level of service exceeding the region's total level of service. An agency's contribution is calculated by multiplying its pro-rata percent share of the aggregated exceedance volumes by the total level of service shortfall. However, an agency's contribution cannot exceed quantities that would lower its total level of service below the regional level of service.

Data from the previous example is used to illustrate the regional reliability floor adjustment procedure. In this scenario the reduction in Metropolitan's supply is elevated to 30 percent. As a result, the net cutback in Water Authority total supplies increases to 28 percent, which triggers the reliability adjustment. A detailed summary of the regional reliability floor calculation is shown in **Table 5-13**.

5.2.10 Data Reconciliation

Since allocations are based on estimated values, an assessment of each agency's actual demand and supply utilization during a cutback is necessary. Through this process, a final accounting of appropriate allocation volumes will be calculated. The reconciliation of certified and actual data will occur at the end of the allocation period or at the end of twelve months, whichever comes first. Agencies are required to certify the following information: total and SAWR demands, base period GPCD, local potable use and recycled water use.

Area intentionally left blank.

Table 5-13
Regional Reliability Floor (AF)
30% Cutback to Metropolitan Supply

Available Supply: 192,358

Regional Reliability

Regional Level of Service(233,341/299,355)=	**78%**
Regional Reliability Floor (-5%)	**73%**

Level of Service

Agency	SDCWA Initial Allocation Volume	Estimated Local Supplies	Loss of Local Supply Adjustment	CSP Allocation	Total Supply	Projected Total Demand	Level of Service
A	1,539	70	0	80	1,689	2,290	73.7%
B	4,617	0	0	240	4,857	6,920	70.2%
C	134,458	20,100	4,250	7,010	165,818	212,700	78.0%
D	33,086	1,400	0	1,700	36,186	46,780	77.4%
E	18,659	4,125	744	970	24,497	30,665	79.9%
Total	192,358	**25,695**	**4,994**	**10,000**	**233,047**	**299,355**	

Regional Reliability Floor Reallocation

Agency	Total Floor Check	Total Shortfall	Pro-rata Share of Total Shortfall	Exceedance of Regional Reliability Average	Exceedance Volume	Pro-rata Share of Exceedance	Exceedance Agency Contribution	Revised SDCWA Initial Allocation	Revised Total Supply	Revised Level of Service
A	0.0%	0	0.00%	0.00%	0	0.0%	0	1,539	1,691	73.7%
B	-2.8%	195	100.00%	0.00%	0	0.0%	0	4,812	5,052	73.0%
C	0.0%	0	0.00%	0.00%	0	0.0%	0	134,458	165,975	78.0%
D	0.0%	0	0.00%	0.00%	0	0.0%	0	33,086	36,236	77.4%
E	0.0%	0	0.00%	1.90%	583	100.0%	195	18,464	24,387	79.3%

$\underbrace{\hspace{8em}}_{\text{Shortfall Calculation}}$ $\underbrace{\hspace{12em}}_{\text{Exceedance Calculation}}$ $\underbrace{\hspace{9em}}_{\text{Reallocation}}$

5.3 Member Agency Transfers Secured Following Allocation Methodology

The Water Authority's member agencies have the option of purchasing water from an entity and using, among other facilities, the State Water Project, the Colorado River Aqueduct, Metropolitan's distribution system, and the Water Authority's distribution system to wheel the water. In addition to the cost of the transfer water, the member agency would pay the applicable wheeling rates to utilize these facilities. This transfer water would not be considered a Water Authority supply or local supply when allocating Water Authority supplies under the methodology included in the WSDRP. Rather, the transfer water would be "on top" of the allocation, and thus, not factored into the allocation methodology base period or be eligible for the local project development adjustment.

However under the Metropolitan WSAP, these tranfer supplies would be considered an "extraordinary" increase in production as discussed in Section 5.2.6. With extraordinary increases, only the portion of the production equal to Metropolitan's regional shortage is added to the base period local supply. The remainder of the supply is outside of the Metropolitan WSAP and adds directly to the agency's supply. For example, during a 10 percent shortage, 10 percent of the extraordinary increase is added to the base period local supplies while 90 percent is not. It is through this addition to the base period local supplies that the Metroplitan allocation to the Water Authority is reduced.

Consistent with the Water Authority's alignment methodology, the net effect on the Water Authority's allocation from Metropolitan will be directly passed through to member agencies with the extraordinary increases in production. The change in the amount of water allocated to the Water Authority by Metropolitan will be identified and the member agency's allocation will be adjusted accordingly by that amount of water. If more than one agency is involved, each participating agency's Water Authority allocation will be adjusted on a pro-rata basis relative to the participating agency's share of the extraordinary local supply increase.

Water Authority staff will assist member agencies in entering into agreements with the wheeling entities. Additionally, the Water Authority may need to be a signatory to some of the wheeling agreements, such as an agreement with Metropolitan. However, it will be the member agency's responsibility to find the transfer water, enter into an agreement with the selling entity, and comply with any other requirements (e.g. CEQA, NEPA). Any transfer water identified by the Water Authority during its search that it chooses not to purchase will also be available for purchase by its member agencies.

Section 6 - Water Authority/Member Agency Coordination

6.1 Introduction

Communication and coordination between agencies, the public, and public officials are vital for the successful implementation of the DMP elements. To facilitate this effort, two member agency groups will be formed to handle coordination of activities and communication. The first group is the Member Agency Advisory Team (advisory team) that will assist the Water Authority's General Manager with issues that arise during the implementation of the DMP. This will include actions related to implementation of the Drought Response Matrix (**Section 4**) and the Allocation Methodology (**Section 5**). The second group is a Drought Communication Team (communication team) that will aid in the coordination of communications with the press and public. The existing Joint Public Information Council (JPIC) can sit as the communication team.

Please note that while the communication team will only need to convene once a drought has begun, as with the advisory team, communications about water supplies and conservation are an on-going activity by the Water Authority and its member agencies. These activities currently occur through the JPIC, making that body the logical group to assume the responsibilities of the communication team. During a supply shortage, communication activities will increase and closer coordination will be necessary. This section describes the advisory team and the communications strategy.

6.2 Member Agency Advisory Team

The advisory team will be made up of the general managers of the Water Authority's member agencies or their representatives. The advisory team will focus on decisions related to actions included in the Drought Response Matrix, including the Allocation Methodology. The intensity of the drought will determine how often the advisory team meets. It may meet infrequently if water is only being withdrawn from storage, or the meetings may be scheduled monthly and possibly more often if the allocation of water begins. Also, during the implementation of the Drought Response Matrix actions, policy issues may arise where the Water Authority's General Manager may desire input from the member agencies before making a recommendation to the Water Authority's Board of Directors. The advisory team could be convened at this time to provide input. The policy decisions related to implementation of the matrix actions could include recommendations on:

1. What drought response action(s) to take to avoid rationing;
2. How much to spend to avoid rationing;
3. Adding a new rule to adjust the base period for an exception; and
4. Modifying a portion of the DMP that is not working as expected.

The advisory team will also be the body to which a member agency may appeal should the Water Authority's General Manager deny an adjustment during rationing. Should the member agency want to appeal the advisory team's recommendation, it may then ask the Water Authority's Board of Directors for a review.

Additionally, the Water Authority's General Manager may wish to convene the advisory team to provide an update on supply conditions or conservation performance during a drought. This meeting may simply be for communication purposes or for further input to develop new programs to help avert the impacts of a drought.

6.3 Communication Strategy

During drought periods, it is necessary for any responsible water agency to activate an established drought communication strategy. The purposes of such a strategy are manifold, but all activities need to result in the reduced consumption of water during the drought period.

Given that priority, the remaining purposes include:

1. To ensure that all constituents believe they are being treated fairly in relationship to all other constituents;
2. To satisfy the political community that the agencies have done a good job managing the drought;
3. To cause constituents to understand that all reasonable steps have been taken to avoid the need to restrict water consumption during a drought;
4. To avoid the confusion of different jurisdictions asking their constituents to react substantially differently from other, proximate jurisdictions; and
5. To emerge from the drought period having demonstrated an agency's ability to provide leadership, good planning, equality and to have minimized the impacts of water shortages on its constituents.

For our purposes, communications is defined as the following:

> "A two-way flow of information contrasted to the one-way dictates of a person or entity in power."

Communication involves making plans, discussing those plans with those who are impacted, taking suggestions from those impacted and modifying the plan to respond to those needs. Issuing a press release that states, "everyone must reduce their water consumption by 10 percent," is not sufficient communication. Thus, any communications strategy must include a process for feedback and plan modification. By the very nature of drought, the impacts can range from slight (during the early years of a drought period) to dramatic or onerous (during the latter years of a drought period). A communications strategy must account for the level of alarm to avoid later non-compliance due to the "cry-wolf" syndrome and to maintain credibility in the media.

A communication team has been established as part of the DMP to address this two-way flow of information on a Water Authority and member agency level. Additionally, the communication team will be able to coordinate information flow to/from the media, public officials, and the general public when needed. As part of the communication strategy, the Water Authority should also make an effort to coordinate communications with water agencies in Riverside County that share the same source of water from Metropolitan.

6.4 Five Phases of Drought Response

The Communications Strategy has five phases with respect to drought conditions, including a normal period. While the correlation between events (available water supply) and the duration of the drought is imperfect, experience indicates that Southern California, in general, can manage through three years of drought without great inconvenience to consumers. Historically, year four and beyond of a drought have resulted in calls for serious reductions in water use. A drought continuing beyond year four could result in mandatory reductions of deliveries to member agencies of Metropolitan and corresponding reductions in deliveries to sub-agencies of Metropolitan's member agencies, including reductions to, and by, the Water Authority.

Since the Water Authority is dependent on Metropolitan for water imported from other hydrologic basins, a drought period localized to San Diego County may not result in water shortages if adequate imported water is available. At the same time, heavy rainfall in San Diego County occurring during a lengthy dry period on the watersheds of the Colorado River and the California State Water Project could result in water-use restrictions during a local deluge. These anomalies are likely not well understood by most consumers in San Diego County (or any other county, for that matter) and will need to be part of a consumer education process.

Each of the five phases of drought response is described below, along with suggested activities to take.

6.4.1 Normal Periods

A normal period is the condition where available water supplies more or less match demand with little water left over for storage for use in some future year. This occurs prior to the stages included in the Drought Response Matrix, which are shown in **Section 4**. This condition is permanent in Southern California. Without regard to calendar year 2005, and in all probability, 2006, Metropolitan and its member agencies tend to be in water balance give or take a few hundred thousand acre-feet of water. While demand remains somewhat constant, supply hits peaks and valleys over any running period of time. On average, water supply and demand tend to be close to one another. Averages only work, however, when there is adequate storage to hold water made available by the peak wet years in order to deliver that water during the dry years. Absent such storage, the ability to meet consumer demands year in and year out would be seriously hampered.

Southern California water agencies would be oscillating from drought to abundance on a regular basis.

Actions taken by the Water Authority and its member agencies during normal periods to diversify supplies include implementation of Best Management Practices, development of brackish groundwater and seawater desalination projects, increasing the use of recycled water, and increasing the amount of local storage. The Water Authority and its member agencies will continue the effort to educate consumers about the need for, and the cost of, these types of projects.

Urging people to conserve water as part of a daily routine is a continuous process. Such lifestyle conservation often causes a "hardening of demands." Demand hardening makes it more difficult to conserve additional supplies during a drought. This is taken into account in the Communication Strategy and accommodated during drought planning. Activities during this phase are considered part of "normal" business activities, the communication team does not need to convene for normal periods other than to continue its work as the JPIC.

Normal Period Activities

Normal period communication represents essentially what the Water Authority and its member agencies currently do – offer a high quality, multifaceted public outreach and education program in the form of news releases, publications, brochures, participation in special events, tours, and the remainder of its comprehensive program. As part of this DMP, the following steps will be added to the "everyday" communication tasks:

1. A current list of all people who have attended tours of Water Authority facilities will be maintained. Communications with these people will be held from time to time by way of letters or broadsides addressed to this special group of community leaders who have some inside information and may be viewed by their peers as a "water expert".
2. An e-mail list of drought coordinators at all member agencies, cities, and the county will be created and maintained. The coordinators for member agencies would include the agency's general manager or representative and communication team member. The list will be updated on a continuous basis. This list will be used to communicate how the Water Authority and its member agencies need to react to whatever drought stage is current. Suggestions from these people will be encouraged. The people on this list will be contacted before a program or drought event goes public. Such a list may already exist as the JPIC. Special efforts should be made to keep this list current.
3. A separate list of contacts at the offices of all municipal, county, state and federal elected officials will be created and maintained. During a drought emergency, a quick message to them about what the Water Authority's message will be to the general public will be distributed.

4. E-mail lists will be kept current by sending a message to each list once every three months with the following message: "The Water Authority is attempting to keep this list current in the event of a drought emergency. If there is change in your organization, please respond to this message with the name of the new person." If e-mails are returned as undeliverable, staff will need to research the reason.

6.4.2 Phase One

Phase One of the Communication Strategy occurs when Metropolitan experiences shortages in its imported water supply (from either the Colorado River or the State Water Project, or both) and must remove water from storage to meet normal demand. In all likelihood, during Phase One, the Water Authority will be in the "Voluntary" column of its Drought Response Matrix. This could be the first year of a multi-year dry period, but that cannot be known in advance. What is known is that Metropolitan will likely begin the following year with less water in storage than it had at the beginning of the year. If year two is a wet year and Metropolitan is able to restore its storage while meeting all normal demands, the period has passed with little notice or concern by most consumers. Nonetheless, as part of the communications process, consumers will need to be made aware that the water agencies are dipping into their savings account to meet demand. Consumers will also need to be reminded that conserving water now leaves more water for the future. The communication team will convene to discuss the supply situation, review any new communication messages that the Water Authority is formulating as a result of the supply situation and provide feedback. The Water Authority's obligation is to take into account comments received from the member agencies through the communication team and make modifications as appropriate. Because the communication team is, by its nature, a large group, team members have an obligation to ensure that comments are on point and additive to the communication process.

Phase One Activities

Phase One communications will include monthly updates to the drought coordinators list that might coincide with a meeting of the board of directors where a similar update might be provided. An advisory will also be prepared for the media – print and electronic – that explains what the current drought means to the state and region and how the Water Authority has prepared to cope with it. This advisory is, in effect, a status report to the media that is not intended for publication, but rather for the media's edification. If it does get published, that's acceptable, but it is important for the Water Authority to continue maintaining personal relationships with members of the media by making them insiders to what is going on. Thus, if the drought should worsen, the media is not surprised as events unfold and also does not need a crash education course on water supplies. Media outlets in Riverside County that may be outside the Water Authority's usual media program should be included in drought news. Contact with media that primarily serve consumers outside of the Water Authority's service area should, as a courtesy, be coordinated with the local Metropolitan Water District member agency or agencies. The communication team will be able to review and provide feedback to the Water Authority on advisories, as well as other messages to be distributed to the public.

The media's help will be sought to urge people to be conscious of how they are using water and advising them that reducing use now will help everyone in the future if the drought continues. This will be used as an opportunity to help ensure people understand how well the Water Authority and Metropolitan have positioned themselves to deal with the early stages of drought. The elected officials' e-mail list will also be employed. Hearing news from the Water Authority first, before being read in or heard on the media will establish the Water Authority as the primary message carrier on drought. Brief messages on a monthly basis to this list should be adequate unless conditions approach very serious levels of water shortages.

6.4.3 Phase Two

Phase Two could occur in year three or four of a dry period and represents that point in time when Metropolitan may restrict water deliveries to its member agencies through one means or another, but the Water Authority has adequate water either in storage or purchased from outside the region to avoid rationing to its member agencies. In all likelihood, the Water Authority would be in the "SDCWA Supply Enhancement" column of its Drought Response Matrix under Phase Two.

Phase Two communications require that people substantially reduce their use of water to retain water in storage for the following year. Phase Two should communicate the importance of water-use reductions without implying a sense of dire urgency. Consumers should be told that the more they conserve during Phase Two, the less would be the impact in the event of a Phase Three. The communication team will continue to convene to discuss the supply situation, review any new communication messages that the Water Authority is formulating as a result of the supply situation and provide feedback.

Phase Two Activities

Phase Two communications are essentially the same as in Phase One, except the communication is more frequent and the communication team is drawn into the message-building activities. This is an even more important opportunity to explain the Authority's preparedness in relation to other parts of the drought-stricken area that may not be as well prepared and that the Water Authority and its member agencies have anticipated this problem and are dealing with it. The communication team e-mail list will be used in making sure that messages are reasonably consistent throughout the service area. Coordination with Metropolitan's drought team will also be a priority, because they will have materials and easy access to data and to media contacts that may be of use to the Water Authority. Because of the joint reliance on the Skinner Treatment Plant by multiple agencies, coordination with other Metropolitan member agencies is important. During Phase Two it would be appropriate to begin preparing print and broadcast advertising that can be placed very quickly, if needed, in Phase Three.

6.4.4 Phase Three

Phase Three could occur in year four or five of an ongoing drought. It represents the period when Metropolitan is unable to meet all member agency demands and locally supplied or purchased and wheeled water is inadequate to make up the difference. In all likelihood, the Water Authority will be in the "Mandatory Cutbacks" column of its Drought Response Matrix under Phase Three.

Phase Three Activities

In this phase, the communications strategy needs to have solid results in terms of reducing demand, and a sense of urgency must be communicated to consumers. At the same time, consumers must understand the nature of the matter – that this is the fourth or fifth year of an on-going drought; that the Water Authority and its member agencies have been managing their resources well; that the duration of the drought cannot be known and that every gallon saved this year is a gallon that will be available next year should the drought continue. Communication during this period will likely result in the most contentiousness as member agencies and consumers are asked to make significant sacrifices. Because of differing levels of local supplies and local political philosophies, member agencies may perceive different levels of concern and want to protect their customers from more urgent messages. The communication team should be sensitive to this potential. Differences in localized responses to a drought emergency should be discussed openly within the communication team in order to avoid conflicting messages in media that transcends political borders and tends to confuse consumers.

One of the possible consequences of calls for urgent conservation is that after such sacrifices it could start raining during the winter months negating the effects of the drought and allowing some people to be critical of the agencies because they seemingly sacrificed for nothing. Because water sales are reduced, sales revenue to that agency is reduced. That, in turn, raises the water rate to cover fixed costs. Nearly every staff member and board member has heard consumers complain that "I reduced my water use and they raised my rates. Maybe I should have used more." These are potential outcomes that must be addressed in any communications strategy.

Most agencies established a separate fund made available to stabilize rates during such periods. The DMP TAC endorsed the use of rate stabilization funds during this period. In this phase, communication with the communication team and the elected officials list is critical. The Water Authority must determine how all of its member agencies will be impacted; are there opportunities outside of what has been identified to supplement supplies?; can elected officials help spread the message? The communication team will involve the media in weekly briefings either in person or via e-mail. High demand water users, such as the California Landscape Contractors Association, Biotech Trade Assoc., agriculture, and hotel/motels, will be contacted by the Water Authority or the member agencies as appropriate to determine to what degree, if any, they can reduce water use. Paid advertising on radio, television, and newspapers will be considered if it is determined necessary to supplement media outreach through news contacts, interviews, reporter briefings, and news releases. The tour guest list should be considered as a source of information within local neighborhoods where community leaders are regarded by some as water experts. To the extent that their peers approach them for information about the drought or how well the Water Authority and its member agencies are responding, the better informed they are, the better will be the information they pass along to their peer group.

Before the DMP allocation methodology is implemented, the elected officials e-mail list should be used to explain to them what is about to happen. The Water Authority should post a graphic on its website showing reservoir capacities and levels and the media should be advised that they are welcome to pull that graphic off the website for use as often as they can use it. Trained people will be assigned to take media calls at all hours. These people must be available and they must know how to respond.

6.4.5 Phase Four

Phase Four is a situation where water must be reserved for health and safety purposes. The Water Authority would be in the "Mandatory Cutbacks" column of its Drought Response Matrix under Phase Four. This is the unlikeliest of events, but plans must be made to address it. In this phase, Metropolitan is drastically restricting deliveries through one means or another and the Water Authority, although enhancing Metropolitan's supplies with its own, is passing a large portion of the shortage through to its member agencies. The drought event will be major news within the region and the communication team will likely be in reactive mode rather than a proactive mode. If the steps noted below in the first four phases are taken, the Water Authority and member agencies will be well positioned to be viewed as having acted proactively during the first four phases and are responding honestly and competently to the drought.

Phase Four Activities

In Phase Four, the media will be covering this story on a daily basis and severe water restrictions will be in place. The communication team will be prepared to receive numerous complaints of inequities and the wasting of water. Additionally, water sensitive businesses (nurseries, car washes, etc.) will be seeking relief and it is possible that the state will have declared a drought emergency. Communications during this phase will be largely reactive. Nonetheless, the e-mail lists noted above, as well as the steps the Water Authority and its member agencies took prior to this phase will provide the perception in the media that the agencies are drought experts. If Sacramento has ordered certain severe conservation measures, as Metropolitan will have done already, the Water Authority will be chasing the story rather than managing it. A program of paid advertising specific to water conservation activities should be developed as part of the Phase Two activities and discussed with the communication team so they can be distributed in short order. While the Water Authority would likely be the primary "spokesagency" in the *San Diego Union-Tribune* for the region, member agencies will be encouraged to play the same role with local newspapers as well as with local politicians to explain their own situation since local supplies may vary. Because of Metropolitan's size and significance in supplying water, it is possible that the media will turn to that organization for drought information. The Water Authority will ask Metropolitan, should the local media contact them, to refer the media to the Water Authority for information specific to the region.

Table 6-1, on the following page, provides a summary of the phases of the General Communication Strategy discussed above. The Drought Response Matrix stage anticipated under each phase is also identified in the table. Please refer to **Section 4** for details on Drought Response Matrix stages.

6.5 Conclusion

The Communication Strategy presented in this section serves as a guidebook for the Water Authority if the San Diego region is ever faced with a prolonged drought situation. The phases and corresponding activities may vary because each drought situation is unique, but with a strategy available, the Water Authority and its member agencies will be able to be proactive if a long-term drought scenario occurs. The advisory team is also a critical element in implementation of the Drought Response Matrix and Allocation Methodology of the DMP. Successful implementation of these two elements will only occur through coordination with the member agencies.

Area intentionally left blank.

Table 6-1
General Communication Strategy

Normal Period Supplies and Demands Balance	Phase One (Response Matrix Stage: Voluntary)[1] Metropolitan Withdraws Water From Storage to Meet Demands	Phase Two (Response Matrix Stage: Supply Enhancement) Metropolitan Supplies Short, Water Authority Total Supplies Meet Demands	Phase Three (Response Matrix Stage: Mandatory Cutbacks) Metropolitan Supplies Restricted, Water Authority Supplies Restricted	Phase Four (Response Matrix Stage: Mandatory Cutbacks) Supplies at Health and Safety Level
Current Outreach	Convene communication team as needed	Communication team meets monthly	Communication team meets at a minimum weekly	Communication team meets daily
Create and maintain list of tour attendees, drought coordinators, elected officials	Monthly updates to drought coordinators	Same activities as Phase One	Weekly media briefings	Continue media briefings
Check e-mail lists every three months	Prepare, review, and distribute media advisory	Coordinate with Metropolitan's Drought Team	Weekly elected officials briefing	Continue elected official briefings
Utilize Public Access Television	E-mail elected officials on monthly basis		Drought speakers bureau implemented	Paid Advertising
			Advertising if possible	Continue other steps taken previously
			Graphics on website	
			Utilize trained phone personnel to respond to drought-related inquiries	

[1] Refer to Section 4 for details on the Drought Response Matrix stages shown.

Section 7– Summary

The Water Authority anticipates that through implementation of member agency and Water Authority planned projects and successful implementation of Metropolitan's Integrated Water Resources Plan, a higher degree of reliability will be attained in the region to avoid rationing levels experienced during the 1987-1992 drought. While the region has plans to provide a high level of reliability, there will always be some level of uncertainty associated with maintaining and developing local and imported supplies. The DMP encompasses not only a way to allocate water when supplies fall short of demands, but it addresses ways to avoid rationing through supply enhancement. The DMP also contains a strategy to communicate with the Water Authority's stakeholders regarding water supplies. The DMP, combined with the Water Authority's Urban Water Management Plan and Regional Facilities Master Plan, serve as excellent planning tools to provide guidance to the Water Authority and its member agencies on maintaining and planning for water supply reliability within the San Diego region.

Working collaboratively with the member agencies, the Water Authority was able to prepare a comprehensive DMP that contains the following elements:

1. *Initial principles that helped frame the issues and guide discussions at the TAC meetings in development of the DMP elements, including the supply allocation methodology included in **Section 2**.*

2. *A Drought Response Matrix that identifies potential actions that the Water Authority can take to avoid an allocation of water supplies to the member agencies. The Drought Response Matrix is described in **Section 4**.*

3. *A methodology for the allocation of Water Authority supplies **(Section 5)** that achieves the following:*
    1. *Encourages local supply development and increased regional reliability through the use of the local supply development adjustment, conservation credits, and tying an allocation of water to Water Authority demands rather than total retail demands;*
    2. *Achieves equity among member agencies by adjusting for local supply development, growth, loss of local supplies, and demand hardening; and*
    3. *Avoids large uneven retail impacts to the region during the deepest stage of a drought by implementing the regional reliability adjustment which brings agencies up to a minimum allocation floor.*

4. *A communication strategy that identifies a phased approach to coordinating with member agencies, public, and media in response to drought conditions. **(Section 6)***

The DMP serves as guidance to the Water Authority and its member agencies. With the many unknown conditions associated with any potential long-term drought, the Water Authority understands that elements of this plan may need to be modified to meet the needs at that time. With the DMP in place, the Water Authority and its member agencies will be better prepared to work with the public to minimize the effects of a prolonged drought.

APPENDICES

The Appendices for the Water Shortage and Drought Response Plan can be viewed online via the Water Authority's website at:

http://www.sdcwa.org/water-shortage-and-drought-response-plan

Appendix H

Model Drought Ordinance

ORDINANCE NO. ______

AN ORDINANCE OF [AGENCY] ADOPTING A DROUGHT RESPONSE CONSERVATION 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 that are the result of drought 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, 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, adoption and enforcement of a comprehensive water conservation program will allow the [AGENCY] 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, 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 San Diego County Water Authority has adopted 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 [AGENCY]. 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 ordinance is consistent with the Water Authority's Urban Water Management Plan; and

WHEREAS, as anticipated by its Urban Water Management Plan, the San Diego County Water Authority, in cooperation and consultation with its member public agencies, has adopted a Drought Management Plan, which establishes a progressive program for responding to water supply limitations resulting from drought conditions. This ordinance is intended to be consistent with and to implement the Water Authority's Drought Management Plan; and

WHEREAS, the Water Authority's Drought Management Plan contains three stages containing regional actions to be taken to lessen or avoid supply shortages. This ordinance contains drought response levels that correspond with the Drought Management Plan stages; and

WHEREAS, the [AGENCY], due to the geographic and climatic conditions within its territory and its dependence upon water imported and provided by the San Diego County Water Authority, may experience shortages due to drought conditions, regulatory restrictions enacted upon imported supplies and other factors. The [AGENCY] 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 [AGENCY's] Urban Water Management Plan also includes a contingency analysis of actions to be taken in response to water supply shortages. This ordinance is consistent with the Urban Water Management Plan adopted by the [AGENCY]; and

WHEREAS the water conservation measures and progressive restrictions on water use and method of use identified by this ordinance provide certainty to water users and enable [AGENCY] 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.

NOW, THEREFORE, the [LEGISLATIVE BODY] of [AGENCY] does ordain as follows:

SECTION 1.0 DECLARATION OF NECESSITY AND INTENT

(a) This ordinance 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 [AGENCY] 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 ordinance establishes regulations to be implemented during times of declared water shortages, or declared water shortage emergencies. It establishes four levels of drought response actions to be implemented in times of shortage, with increasing restrictions on water use in response to worsening drought conditions and decreasing available supplies.

(c) Level 1 condition drought response measures are voluntary and will be reinforced through local and regional public education and awareness measures that may be funded in part by [AGENCY]. During drought response condition Levels 2 through 4, all conservation measures and water-use restrictions are mandatory and become increasingly restrictive in order to attain escalating conservation goals.

(d) During a Drought Response Level 2 condition or higher, the water conservation measures and water use restrictions established by this ordinance are mandatory and violations are subject to criminal, civil, and administrative penalties and remedies specified in this ordinance and as provided in [AGENCY] Administrative or Municipal Code.

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 Metropolitan Interim Agricultural Water Program or the Water Authority Special Agricultural Rate programs.

2. "Water Authority" means the San Diego County Water Authority.

3. "DMP" means the Water Authority's Drought Management Plan in existence on the effective date of this ordinance and as readopted or amended from time to time, or an equivalent plan of the Water Authority to manage or allocate supplies during shortages.

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 [AGENCY].

SECTION 3.0 APPLICATION

(a) The provisions of this ordinance apply to any person in the use of any water provided by the [AGENCY].

(b) This ordinance is intended solely to further the conservation of water. It is not intended to implement any provision of federal, State, or local statutes, ordinances, 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 ordinances and stormwater management plans.

(c) Nothing in this ordinance is intended to affect or limit the ability of the [AGENCY] to declare and respond to an emergency, including an emergency that affects the ability of the [AGENCY] to supply water.

(d) The provisions of this ordinance do not apply to use of water from private wells or to recycled water.

(e) Nothing in this ordinance shall apply to use of water that is subject to a special supply program, such as the Metropolitan Interim Agricultural Water Program or the Water Authority Special Agricultural Rate programs. 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 [AGENCY] is subject to this ordinance in the use of the other water.

SECTION 4.0 DROUGHT RESPONSE LEVEL 1 – DROUGHT WATCH CONDITION

(a) A Drought Response Level 1 condition is also referred to as a "Drought Watch" condition. A Level 1 condition applies when the Water Authority notifies its member agencies that due to drought or other supply reductions, there is a reasonable probability there will be supply shortages and that a consumer demand reduction of up to 10 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. The General Manager shall declare the existence of a Drought Response Level 1 and take action to implement the Level 1 conservation practices identified in this ordinance.

(b) During a Level 1 Drought Watch condition, [AGENCY] will increase its public education and outreach efforts to emphasize increased public awareness of the need to implement the following water conservation practices. [The same water conservation practices become mandatory if [AGENCY] declares a Level 2 Drought Alert condition]:

1. Stop 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.

2. Stop water waste resulting from inefficient landscape irrigation, such as runoff, low head drainage, or overspray, etc. Similarly, stop water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

3. Irrigate residential and commercial landscape before 10 a.m. and after 6 p.m. only.

4. Use a hand-held hose equipped with a positive shut-off nozzle or bucket to water landscaped areas, including trees and shrubs located on residential and commercial properties that are not irrigated by a landscape irrigation system.

5. Irrigate nursery and commercial grower's products before 10 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 re-circulated water to operate ornamental fountains.

7. 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.

8. Serve and refill water in restaurants and other food service establishments only upon request.

9. Offer guests in hotels, motels, and other commercial lodging establishments the option of not laundering towels and linens daily.

10. Repair all water leaks within five (5) days of notification by the [AGENCY] unless other arrangements are made with the General Manager.

11. Use recycled or non-potable water for construction purposes when available.

(c) During a Drought Response Level 2 condition or higher, all persons shall be required to implement the conservation practices established in a Drought Response Level 1 condition.

SECTION 5.0 DROUGHT RESPONSE LEVEL 2 – DROUGHT ALERT CONDITION

(a) A Drought Response Level 2 condition is also referred to as a "Drought Alert" condition. A Level 2 condition applies when the Water Authority notifies its member agencies that due to cutbacks caused by drought or other reduction in supplies, a consumer demand reduction of up to 20 percent is required in order to have sufficient supplies available to meet anticipated demands. The [AGENCY] Board of Directors shall declare the existence of a Drought Response Level 2 condition and implement the mandatory Level 2 conservation measures identified in this ordinance.

(b) All persons using [AGENCY] water shall comply with Level 1 Drought Watch water conservation practices during a Level 2 Drought Alert, and shall also comply with the following additional conservation measures:

1. Limit residential and commercial landscape irrigation to no more than three (3) assigned days per week on a schedule established by the General Manager and posted by the [AGENCY]. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established by the General Manager and posted by the [AGENCY]. This section shall not apply to commercial growers or nurseries.

2. Limit lawn watering and landscape irrigation using sprinklers to no more than ten (10) minutes per watering station per assigned day. This provision does not apply to landscape irrigation systems using water efficient devices, including but not limited to: weather based controllers, drip/micro-irrigation systems and stream rotor sprinklers.

3. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 5 (b) (1), on the same schedule set forth in section 5 (b) (1) by using a bucket, hand-held hose with positive shut-off nozzle, or low-volume non-spray irrigation.

4. Repair all leaks within seventy-two (72) hours of notification by the [AGENCY] unless other arrangements are made with the General Manager.

5. Stop operating ornamental fountains or similar decorative water features unless recycled water is used.

SECTION 6.0 DROUGHT RESPONSE LEVEL 3 – DROUGHT CRITICAL CONDITION

(a) A Drought Response Level 3 condition is also referred to as a "Drought Critical" condition. A Level 3 condition applies when the Water Authority notifies its member agencies that due to increasing cutbacks caused by drought or other reduction of supplies, a consumer demand reduction of up to 40 percent is required in order to have sufficient supplies available to meet anticipated demands. The [AGENCY] Board of Directors shall declare the existence of a Drought Response Level 3 condition and implement the Level 3 conservation measures identified in this ordinance.

(b) All persons using [AGENCY] water shall comply with Level 1 Drought Watch and Level 2 Drought Alert water conservation practices during a Level 3 Drought Critical condition and shall also comply with the following additional mandatory conservation measures:

1. Limit residential and commercial landscape irrigation to no more than two (2) assigned days per week on a schedule established by the General Manager and posted by the [AGENCY]. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established by the General Manager and posted by the [AGENCY]. This section shall not apply to commercial growers or nurseries.

2. Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 6 (b) (1), 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.

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 a drought response level under this ordinance.

4. Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems.

5. Repair all leaks within forty-eight (48) hours of notification by the [AGENCY] unless other arrangements are made with the General Manager.

(c) Upon the declaration of a Drought Response Level 3 condition, 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 provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of [AGENCY].

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 a Drought Response Level 3 condition, [AGENCY] will suspend consideration of annexations to its service area.

(e) The [AGENCY] may establish a water allocation for property served by the [AGENCY] using a method that does not penalize persons for the implementation of conservation methods or the installation of water saving devices. If the [AGENCY] 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 [AGENCY] 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 [AGENCY], any person that uses water in excess of the allocation shall be subject to a penalty in the amount of $___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 penalty that may be imposed for violation of this ordinance.

SECTION 7.0 DROUGHT RESPONSE LEVEL 4 – DROUGHT EMERGENCY CONDITION

(a) A Drought Response Level 4 condition is also referred to as a "Drought Emergency" condition. A Level 4 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 4 requires a demand reduction of more than 40 percent in order for the [AGENCY] to have maximum supplies available to meet anticipated demands. The [AGENCY] shall declare a Drought Emergency in the manner and on the grounds provided in California Water Code section 350.

(b) All persons using [AGENCY] water shall comply with conservation measures required during Level 1 Drought Watch, Level 2 Drought Alert, and Level 3 Drought Critical conditions and shall also comply with the following additional mandatory conservation measures:

1. Stop all landscape irrigation, except crops and landscape products of commercial growers and nurseries. This restriction shall not apply to the following categories of use unless the [AGENCY] has determined that recycled water is available and may be lawfully applied to the 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 (2) 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.

2. Repair all water leaks within twenty-four (24) hours of notification by the [AGENCY] unless other arrangements are made with the General Manager.

(c) The [AGENCY] may establish a water allocation for property served by the [AGENCY]. If the [AGENCY] 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 [AGENCY] 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 [AGENCY], any person that uses water in excess of the allocation shall be subject to a penalty in the amount of $___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 penalty that may be imposed for violation of this ordinance.

SECTION 8.0 CORRELATION BETWEEN DROUGHT MANAGEMENT PLAN AND DROUGHT RESPONSE LEVELS

(a) The correlation between the Water Authority's DMP stages and the [AGENCY'S] drought response levels identified in this ordinance is described herein. Under DMP Stage 1, the [AGENCY] would implement Drought Response Level 1 actions. Under DMP Stage 2, the [AGENCY] would implement Drought Response Level

1 or Level 2 actions. Under DMP Stage 3, the [AGENCY] would implement Drought Response Level 2, Level 3, or Level 4 actions.

(b) The drought response levels identified in this ordinance correspond with the Water Authority DMP as identified in the following table:

Drought Response Levels	**Use Restrictions**	**Conservation Target**	**DMP Stage**
1 - Drought Watch	Voluntary	Up to 10%	Stage 1 or 2
2 - Drought Alert	Mandatory	Up to 20%	Stage 2 or 3
3 - Drought Critical	Mandatory	Up to 40%	Stage 3
4 - Drought Emergency	Mandatory	Above 40%	Stage 3

SECTION 9.0 PROCEDURES FOR DETERMINATION AND NOTICATION OF DROUGHT RESPONSE LEVEL

(a) The existence of a Drought Response Level 1 condition may be declared by the General Manager upon a written determination of the existence of the facts and circumstances supporting the determination. A copy of the written determination shall be filed with the Clerk or Secretary of the [AGENCY] and provided to the [AGENCY] Board of Directors. The General Manager may publish a notice of the determination of existence of Drought Response Level 1 condition in one or more newspapers, including a newspaper of general circulation within the [AGENCY]. The [AGENCY] may also post notice of the condition on their website.

(b) The existence of Drought Response Level 2 or Level 3 conditions may be declared by resolution of the [AGENCY] Board of Directors adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation measures applicable to Drought Response Level 2 or Level 3 conditions shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, the [AGENCY] shall publish a copy of the resolution in a newspaper used for publication of official notices.

(c) The existence of a Drought Response Level 4 condition may be declared in accordance with the procedures specified in California Water Code sections 351 and 352. The mandatory conservation measures applicable to Drought Response Level 4 conditions shall take effect on the tenth (10) day after the date the response level is declared. Within five (5) days following the declaration of the response level, the [AGENCY] shall publish a copy of the resolution in a newspaper used for publication of official notices. If the [AGENCY] 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 [AGENCY] customarily mails the billing statement for fees or charges for on-going water service. Water allocation shall be effective on the fifth (5) day following the date of mailing or at such later date as specified in the notice.

(d) The [AGENCY] Board of Directors may declare an end to a Drought Response Level by the adoption of a resolution at any regular or special meeting held in accordance with State law.

SECTION 10.0 HARDSHIP VARIANCE

(a) If, due to unique circumstances, a specific requirement of this ordinance would result in undue hardship to a person using agency water or to property upon which agency water is used, that is disproportionate to the impacts to [AGENCY] water users generally or to similar property or classes of water uses, then the person may apply for a variance to the requirements as provided in this section.

(b) The variance may be granted or conditionally granted, only upon a written finding of the existence of facts demonstrating an undue hardship to a person using agency water or to property upon with agency water is used, that is disproportionate to the impacts to [AGENCY] water users generally or to similar property or classes of water use due to specific and unique circumstances of the user or the user's property.

1. Application. Application for a variance shall be a form prescribed by [AGENCY] and shall be accompanied by a non-refundable processing fee in an amount set by resolution of the [AGENCY] Board of Directors.

2. Supporting Documentation. The application shall be accompanied by photographs, maps, drawings, and other information, including a written statement of the applicant.

3. Required Findings for Variance. An application for a variance shall be denied unless the approving authority finds, based on the information provided in the application, supporting documents, or such additional information as may be requested, and on water use information for the property as shown by the records of the [AGENCY], all of the following:

    A. That the variance does not constitute a grant of special privilege inconsistent with the limitations upon other [AGENCY] customers.

    B. That because of special circumstances applicable to the property or its use, the strict application of this ordinance would have a disproportionate impact on the property or use that exceeds the impacts to customers generally.

    C. That the authorizing of such variance will not be of substantial detriment to adjacent properties, and will not materially affect the ability of the [AGENCY] to effectuate the purpose of this chapter and will not be detrimental to the public interest.

D. That the condition or situation of the subject property or the intended use of the property for which the variance is sought is not common, recurrent or general in nature.

4. Approval Authority. The General Manager shall exercise approval authority and act upon any completed application no later than 10 days after submittal and may approve, conditionally approve, or deny the variance. The applicant requesting the variance shall be promptly notified in writing of any action taken. Unless specified otherwise at the time a variance is approved, the variance applies to the subject property during the term of the mandatory drought response.

5. Appeals to [AGENCY] Board of Directors. An applicant may appeal a decision or condition of the General Manager on a variance application to the [AGENCY] Board of Directors within 10 days of the decision upon written request for a hearing. The request shall state the grounds for the appeal. At a public meeting, the [AGENCY] Board of Directors shall act as the approval authority and review the appeal de novo by following the regular variance procedure. The decision of the [AGENCY] Board of Directors is final.

SECTION 11.0 VIOLATIONS AND PENALTIES

(a) Any person, who uses, causes to be used, or permits the use of water in violation of this ordinance is guilty of an offense punishable as provided herein.

(b) Each day that a violation of this ordinance occurs is a separate offense.

(c) Administrative fines may be levied for each violation of a provision of this ordinance as follows:

1. One hundred dollars for a first violation.
2. Two hundred dollars for a second violation of any provision of this ordinance within one year.
3. Five hundred dollars for each additional violation of this ordinance within one year.

(d) Violation of a provision of this ordinance is subject to enforcement through installation of a flow-restricting device in the meter.

(e) Each violation of this ordinance may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than thirty (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 Section 7.0 and applicable during a Level 4 Drought

Emergency condition may be enforced by discontinuing service to the property at which the violation occurs as provided by Water Code section 356.

(g) All remedies provided for herein shall be cumulative and not exclusive.

SECTION 12.0 EFFECTIVE DATE

This ordinance is effective immediately upon adoption or as otherwise established by State law for [AGENCY].

PASSED, APPROVED AND ADOPTED this [DATE] by the following vote:

AYES;

NOES:

ABSTAIN:

ABSENT:

____
[President/Chair of Legislative Body]

Appendix I

Water Authority Demands Provided by Metropolitan

Draft

(November 13, 2015)

San Diego County Water Authority

Average Year

(Average of 1922-2004 Hydrology)

Demographics[1]	2020	2025	2030	2035	2040
Population	3,340,594	3,495,978	3,630,542	3,745,684	3,825,041
Occupied Housing Units	1,145,024	1,199,948	1,240,883	1,288,739	1,321,960
Single Family	673,874	689,306	695,576	703,652	703,580
Multi-Family	471,150	510,642	545,307	585,087	618,380
Persons Per Household	2.83	2.83	2.84	2.82	2.81
Urban Employment	1,470,261	1,519,021	1,557,700	1,604,184	1,646,022

Conservation	2020	2025	2030	2035	2040
Conservation[2]	135,882	151,203	166,897	182,011	195,965
Installed Active Device Through 2015	24,040	16,166	12,773	11,668	10,770
Code-Based and Price-Effect Savings	111,842	135,037	154,124	170,344	185,196

Total Demands After Conservation	2020	2025	2030	2035	2040
Total Demand	629,178	660,592	671,597	684,815	690,960
Retail Municipal and Industrial[3]	589,472	610,382	622,461	636,753	643,973
Retail Agricultural	37,838	48,316	47,216	46,117	45,017
Seawater Barrier	0	0	0	0	0
Groundwater Replenishment	1,868	1,894	1,919	1,945	1,970

Local Supplies	2020	2025	2030	2035	2040
Total Local Supplies	156,062	161,822	165,931	168,545	170,287
Groundwater Production	11,800	11,800	11,800	11,800	11,800
Surface Production	49,190	49,190	49,190	49,190	49,190
Los Angeles Aqueduct	0	0	0	0	0
Seawater Desalination	50,637	50,637	50,637	50,637	50,637
Groundwater Recovery	11,950	13,667	14,789	15,794	16,568
Recycling	32,484	36,527	39,514	41,123	42,091
M&I and Agricultural	30,616	34,634	37,595	39,178	40,121
Groundwater Replenishment	1,868	1,894	1,919	1,945	1,970
Seawater Barrier	0	0	0	0	0
Other Non-Metropolitan Imports	0	0	0	0	0

Demands on Metropolitan	2020	2025	2030	2035	2040
Total Metropolitan Demands	473,117	498,770	505,666	516,270	520,674
Consumptive Use	473,117	498,770	505,666	516,270	520,674
Seawater Barrier	0	0	0	0	0
Replenishment Water[4]	0	0	0	0	0

All units are acre-feet except in Demographics Section.

1. **Growth projections are based on SCAG 2012 Regional Transportation Plan and SANDAG Series 13 Forecast.**
2. **Includes code-based, price-effect and existing active savings through FY2014; does not include future active conservation savings. Conservation is 1990 base year. Pre-1990 add 250,000 acre-feet.**
3. **Retail M&I projections include conservation.**
4. **Replenishment Water include direct and in-lieu replenishment.**

Draft

(November 13, 2015)

San Diego County Water Authority

Single Dry-Year

(Repeat of 1977 Hydrology)

Demographics[1]	2020	2025	2030	2035	2040
Population	3,340,594	3,495,978	3,630,542	3,745,684	3,825,041
Occupied Housing Units	1,145,024	1,199,948	1,240,883	1,288,739	1,321,960
Single Family	673,874	689,306	695,576	703,652	703,580
Multi-Family	471,150	510,642	545,307	585,087	618,380
Persons Per Household	2.83	2.83	2.84	2.82	2.81
Urban Employment	1,470,261	1,519,021	1,557,700	1,604,184	1,646,022

Conservation	2020	2025	2030	2035	2040
Conservation[2]	135,882	151,203	166,897	182,011	195,965
Installed Active Device Through 2015	24,040	16,166	12,773	11,668	10,770
Code-Based and Price-Effect Savings	111,842	135,037	154,124	170,344	185,196

Total Demands After Conservation	2020	2025	2030	2035	2040
Total Demand	631,857	663,405	674,457	687,732	693,904
Retail Municipal and Industrial[3]	591,989	612,989	625,120	639,473	646,724
Retail Agricultural	38,000	48,522	47,418	46,314	45,210
Seawater Barrier	0	0	0	0	0
Groundwater Replenishment	1,868	1,894	1,919	1,945	1,970

Local Supplies	2020	2025	2030	2035	2040
Total Local Supplies	150,137	155,897	160,006	162,620	164,362
Groundwater Production	11,800	11,800	11,800	11,800	11,800
Surface Production	45,903	45,903	45,903	45,903	45,903
Los Angeles Aqueduct	0	0	0	0	0
Seawater Desalination	48,000	48,000	48,000	48,000	48,000
Groundwater Recovery	11,950	13,667	14,789	15,794	16,568
Recycling	32,484	36,527	39,514	41,123	42,091
M&I and Agricultural	30,616	34,634	37,595	39,178	40,121
Groundwater Replenishment	1,868	1,894	1,919	1,945	1,970
Seawater Barrier	0	0	0	0	0
Other Non-Metropolitan Imports	0	0	0	0	0

Demands on Metropolitan	2020	2025	2030	2035	2040
Total Metropolitan Demands	481,721	507,508	514,452	525,112	529,542
Consumptive Use	481,721	507,508	514,452	525,112	529,542
Seawater Barrier	0	0	0	0	0
Replenishment Water[4]	0	0	0	0	0

All units are acre-feet except in Demographics Section.

1. Growth projections are based on SCAG 2012 Regional Transportation Plan and SANDAG Series 13 Forecast.
2. Includes code-based, price-effect and existing active savings through FY2014; does not include future active conservation savings. Conservation is 1990 base year. Pre-1990 add 250,000 acre-feet.
3. Retail M&I projections include conservation.
4. Replenishment Water include direct and in-lieu replenishment.

Draft

(November 13, 2015)

San Diego County Water Authority

Multi Dry-Year

(Repeat of 1990-1992 Hydrology)

Demographics[1]	2020	2025	2030	2035	2040
Population	3,340,594	3,495,978	3,630,542	3,745,684	3,825,041
Occupied Housing Units	1,145,024	1,199,948	1,240,883	1,288,739	1,321,960
Single Family	673,874	689,306	695,576	703,652	703,580
Multi-Family	471,150	510,642	545,307	585,087	618,380
Persons Per Household	2.83	2.83	2.84	2.82	2.81
Urban Employment	1,470,261	1,519,021	1,557,700	1,604,184	1,646,022

Conservation	2020	2025	2030	2035	2040
Conservation[2]	135,882	151,203	166,897	182,011	195,965
Installed Active Device Through 2015	24,040	16,166	12,773	11,668	10,770
Code-Based and Price-Effect Savings	111,842	135,037	154,124	170,344	185,196

Total Demands After Conservation	2020	2025	2030	2035	2040
Total Demand	635,692	670,150	685,658	698,737	706,505
Retail Municipal and Industrial[3]	588,702	620,933	635,146	649,326	658,195
Retail Agricultural	37,461	47,329	48,598	47,472	46,345
Seawater Barrier	0	0	0	0	0
Groundwater Replenishment	9,530	1,889	1,914	1,939	1,965

Local Supplies	2020	2025	2030	2035	2040
Total Local Supplies	144,884	151,670	155,957	158,880	160,919
Groundwater Production	11,800	11,800	11,800	11,800	11,800
Surface Production	39,983	39,983	39,983	39,983	39,983
Los Angeles Aqueduct	0	0	0	0	0
Seawater Desalination	50,667	50,667	50,667	50,667	50,667
Groundwater Recovery	10,970	13,369	14,575	15,598	16,489
Recycling	31,464	35,852	38,933	40,832	41,981
M&I and Agricultural	29,601	33,963	37,019	38,893	40,016
Groundwater Replenishment	1,863	1,889	1,914	1,939	1,965
Seawater Barrier	0	0	0	0	0
Other Non-Metropolitan Imports	0	0	0	0	0

Demands on Metropolitan	2020	2025	2030	2035	2040
Total Metropolitan Demands	490,808	518,480	529,701	539,857	545,586
Consumptive Use	483,142	518,480	529,701	539,857	545,586
Seawater Barrier	0	0	0	0	0
Replenishment Water[4]	7,667	0	0	0	0

All units are acre-feet except in Demographics Section.

1. **Growth projections are based on SCAG 2012 Regional Transportation Plan and SANDAG Series 13 Forecast.**
2. **Includes code-based, price-effect and existing active savings through FY2014; does not include future active conservation savings. Conservation is 1990 base year. Pre-1990 add 250,000 acre-feet.**
3. **Retail M&I projections include conservation.**
4. **Replenishment Water include direct and in-lieu replenishment.**

Appendix J

Distribution System Water Losses

AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.1

Back to Instructions

? Click to access definition

Water Audit Report for: San Diego County Water Authority
Reporting Year: 2013 | 7/2012 - 6/2013

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 (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

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	?	10	72,300.000	acre-ft/yr
Master meter error adjustment (enter positive value):	?	7	90.100	over-registered acre-ft/yr
Water imported:	?	10	123,298.000	acre-ft/yr
Water exported:	?	n/a	0.000	acre-ft/yr
WATER SUPPLIED:			195,507.900	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:
Billed metered:	?	9	189,347.000	acre-ft/yr			
Billed unmetered:	?	10	0.000	acre-ft/yr			
Unbilled metered:	?	10	3,574.000	acre-ft/yr			
Unbilled unmetered:	?	10	1,720.000	acre-ft/yr		○ ●	1,720.000
AUTHORIZED CONSUMPTION:	?		194,641.000	acre-ft/yr			

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption)			866.900	acre-ft/yr			
Apparent Losses					Pcnt:		Value:
Unauthorized consumption:	?	6	1.000	acre-ft/yr		○ ●	1.000
Customer metering inaccuracies:	?	10	94.000	acre-ft/yr		○ ●	94.000
Systematic data handling errors:	?	6	500.000	acre-ft/yr			
Apparent Losses:	?		595.000				
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:	?		271.900	acre-ft/yr			
WATER LOSSES:			866.900	acre-ft/yr			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value ?

NON-REVENUE WATER

NON-REVENUE WATER:	?	6,160.900	acre-ft/yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	10	131.8	miles
Number of active AND inactive service connections:	?	10	67	
Connection density:			1	conn./mile main
Average length of customer service line:	?	10	110.0	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	10	135.0	psi

COST DATA

Total annual cost of operating water system:	?	10	$192,263,055	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	10	$2.23	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	?	10	$849.00	$/acre-ft/yr

---

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	3.2%
Non-revenue water as percent by cost of operating system:	2.8%
Annual cost of Apparent Losses:	$577,976
Annual cost of Real Losses:	$230,843

Operational Efficiency Indicators

Apparent Losses per service connection per day:	7928.09	gallons/connection/day
Real Losses per service connection per day*:	N/A	gallons/connection/day
Real Losses per length of main per day*:	1,841.70	gallons/mile/day
Real Losses per service connection per day per psi pressure:		gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	36.15	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	271.90	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.45	

* only the most applicable of these two indicators will be calculated

---

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 93 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: Master meter error adjustment
2: Unauthorized consumption
3: Systematic data handling errors

For more information, click here to see the Grading Matrix worksheet

AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.1

Back to Instructions

? Click to access definition

Water Audit Report for:

Reporting Year:

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 (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

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	?	10	67,534.000	acre-ft/yr
Master meter error adjustment (enter positive value):	?	7	520.700	over-registered acre-ft/yr
Water imported:	?	10	130,123.000	acre-ft/yr
Water exported:	?	n/a	0.000	acre-ft/yr
WATER SUPPLIED:			197,136.300	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:
Billed metered:	?	9	193,112.000	acre-ft/yr			
Billed unmetered:	?	10	0.000	acre-ft/yr			
Unbilled metered:	?	10	1,369.000	acre-ft/yr			
Unbilled unmetered:	?	10	1,174.000	acre-ft/yr		○ ●	1,174.000
AUTHORIZED CONSUMPTION:	?		195,655.000	acre-ft/yr			

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

					Pcnt:		Value:
WATER LOSSES (Water Supplied - Authorized Consumption)			1,481.300	acre-ft/yr			
Apparent Losses							
Unauthorized consumption:	?	6	1.000	acre-ft/yr		○ ●	1.000
Customer metering inaccuracies:	?	10	176.000	acre-ft/yr		○ ●	176.000
Systematic data handling errors:	?	6	500.000	acre-ft/yr			
Apparent Losses:	?		677.000				
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:	?		804.300	acre-ft/yr			
WATER LOSSES:			1,481.300	acre-ft/yr			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value ?

NON-REVENUE WATER

NON-REVENUE WATER:	?	4,024.300	acre-ft/yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	10	131.8	miles
Number of active AND inactive service connections:	?	10	67	
Connection density:			1	conn./mile main
Average length of customer service line:	?	10	110.0	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	10	135.0	psi

COST DATA

Total annual cost of operating water system:	?	10	$196,930,924	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	10	$2.31	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	?	10	$867.00	$/acre-ft/yr

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	2.0%	
Non-revenue water as percent by cost of operating system:	1.8%	
Annual cost of Apparent Losses:	$681,222	
Annual cost of Real Losses:	$697,328	

Operational Efficiency Indicators

Apparent Losses per service connection per day:	9020.70	gallons/connection/day
Real Losses per service connection per day*:	N/A	gallons/connection/day
Real Losses per length of main per day*:	5,447.90	gallons/mile/day
Real Losses per service connection per day per psi pressure:		gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	36.15	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	804.30	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	7.25	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 93 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: Master meter error adjustment

2: Unauthorized consumption

3: Systematic data handling errors

For more information, click here to see the Grading Matrix worksheet

Appendix K

Water Authority's Energy Intensity Calculations

Appendix K:
San Diego County Water Authority's Energy Intensity Calculations

Introduction

Formed in 1944, the San Diego County Water Authority (Water Authority) provides wholesale water supply to 24 member agencies that span the vast majority of San Diego County and serve 97% of the county's population. The Water Authority imports approximately 90% of the water used in San Diego County and operates and maintains the San Diego region's aqueduct delivery system, which consists of approximately 300 miles of large-diameter pipeline in two aqueducts and 1,600 aqueduct-related structures.

Water-Related Greenhouse Gases

The Water Authority utilizes a primarily gravity flow system, so the actual energy costs to distribute water are only two percent of total energy use. The majority of energy use goes toward treating, conveying, and storing the water.

The State of California has adopted policies and goals to reduce human emissions of greenhouse gases (GHGs). In response, the Water Authority has voluntarily developed a Climate Action Plan (CAP). The Water Authority's GHG emissions inventory for 2009 totaled 5,837 metric tons, predominately from electricity required for water conveyance and treatment. This does not include water conveyance to end-users as those are captured in communitywide or member-agency inventories, as the Water Authority does not have operational control over those deliveries.

The Water Authority's Twin Oaks Valley Water Treatment Plant (WTP) was responsible for 43% of its emissions in 2009 (2,513 MT CO_2e). Pump stations were the next largest source of emissions, accounting for 17% of total emissions (980 MT CO_2e).

Voluntary Energy Use Reporting

The Water Authority has chosen to voluntarily provide information on its estimated energy usage in its Urban Water Management Plan (SB1036, Pavely-2014). Water Energy intensity is the total amount of energy, calculated on a whole-system basis, required for the delivery and treatment of a given amount of water. This section describes the total amount of energy directly expended by the Water Authority on a per acre-foot basis to take water from the Water Authority's source of supply to the point of delivery to its retail agency customers. It does not include energy used to convey or treat water outside of the Water Authority's control. This includes: the estimated amount of energy used to convey raw water supplies to the water treatment plants or member agency connections; the amount of energy used to treat water supplies; and the estimated energy used to distribute treated water supplies. It also includes consequential energy generation which is produced concurrent with water deliveries and non-consequential energy generation that is not directly associated with water deliveries. The following assumptions were made in calculating the Water Authority's energy intensity:

Water Data (Volume-AF): This analysis includes water flow data from FY 2013 and FY 2014. Untreated water conveyance includes deliveries from Metropolitan, except deliveries to the Twin Oaks Water Treatment Plant. Distribution system deliveries include treated water supplies delivered from Metropolitan and the Twin Oaks Water Treatment Plant.

Energy Consumption (kWh):

1. Energy Consumption includes only facilities that Water Authority operates and maintains related to the delivery of water. These are :
    (a) Aqueduct facilities with the energy allocated accordingly between untreated water conveyance and treated deliveries;
    (b.) Twin Oaks Valley Water Treatment Plant;
    (c) Water Authority pump stations located on the aqueduct system.
2. Consequential energy includes Hodges pumping operations for deliveries to the aqueduct and Rancho Peñasquitos PCHF because without water flowing, these facilities would not generate energy
3. Non-Consequential energy production includes the Hodges water management generation used to regulate lake levels.
4. Solar generation behind meter is netted out to zero against usage and is not directly counted.

Source

Water is imported through the Metropolitan Water District of Southern California, from the Colorado River and the State Water Project. The Water Authority's delivery system includes pipelines delivering untreated and treated water supplies.

Untreated water supplies come from the Colorado River Aqueduct and the State Water Project and are blended together at the San Diego Canal. Lake Skinner, owned by the Metropolitan Water District (MWD), is the primary storage for the San Diego Aqueduct. Untreated water from Lake Skinner flows directly into pipelines 3 and 5 while pipelines 1, 2 and 4 receive treated water from the Skinner Filtration Plant. The Water Authority takes delivery of imported water from MWD in the five pipelines within the two San Diego Aqueducts, approximately six miles south of the of Riverside-San Diego County line.

Conveyance (Untreated Water Deliveries)

Gravity flow is the primary means of delivering water to Member Agencies and, therefore, very little pumping (and electricity use) is required for treated water deliveries. Conveyance includes energy used for: Escondido , San Vicente, Olivenhain and Lake Hodges Pump Stations; untreated small facilities (miscellaneous, flow control, rectifiers) with Oceanside 2-3-5 and San Diego Santa Fe 3-4-5 split as both untreated and treated with 66 percent of their energy used for conveyance. Rancho Peñasquitos PCHF not only provides pressure control for water delivery but also uses generators to produce electricity from water flowing through the pipeline. This energy is counted as consequential and is included as a negative number. This results in a net negative energy for the operation of the conveyance system.

	FY 2013	FY 2014
Water Delivered (AF)	266,353	334,338
Energy Used (kWh)	(17,047,555)	(20,114,831)
Energy Intensity (kWh/AF)	-64	-60.16

Treatment

The Water Authority's Twin Oaks Valley Water Treatment Plant is used to provide treated water to its Member Agencies. The estimated amount of energy used to treat water supplies has been calculated by dividing the annual amount of energy consumed at the plant by the amount of water treated.

	FY 2013	FY 2014
Water Delivered (AF)	72,300	67,534
Energy Used (kWh)	4,695,033	3,741,132
Energy Intensity (kWh/AF)	64.9	55.4

Distribution (Treated Water Deliveries)

Energy is consumed by other small facilities as well as the Valley Center Pump Station for the delivery of treated water. Twin Oaks Water Treatment Plant was not included, since its energy was counted under the Treatment section.

	FY 2013	FY 2014
Water Delivered (AF)	195,598	197,657
Energy Used (kWh)	253,143	167,284
Energy Intensity (kWh/AF)	1.29	0.85

Non-Consequential

Lake Hodges' non-consequential use applies to generated energy produced when managing reservoir levels. This is included as a negative number per DWR. Energy related to pumped storage at Lake Hodges is not included.

	FY 2013	FY 2014
Water Delivered (AF)	220,663	220,663
Energy Used (kWh)	(1,324,884)	(1,770,513)
Energy Intensity (kWh/AF)	-6.0	-6.0

Summary

The Water Authority's highest energy intensity comes from treating water. Due to the clean energy generated from the Rancho Peñasquitos PCHF facility this energy intensity is offset to make the total utility energy intensity negative for the Water Authority.

Appendix L

DWR's Standardized Tables

Table 2-2: Plan Identification

Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* *drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		

NOTES:

Table 2-3: Agency Identification

Type of Agency (select one or both)	
☑	Agency is a wholesaler
☐	Agency is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF

NOTES: Historical data are on a fiscal-year basis (July 1-June 30).

Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with CWC 10631. Completion of the table below is optional. If not completed include a list of the water suppliers that were informed.
	Provide page number for location of the list.
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with CWC 10631. **Complete the table below.**
Water Supplier Name *(Add additional rows as needed)*	
	Carlsbad Municipal Water District
	Del Mar, City of
	Escondido, City of
	Fallbrook Public Utilities District
	Helix Water District
	Lakeside Water District
	National City, City of (Sweetwater Authority)
	Oceanside, City of
	Olivenhain Municipal Water District
	Otay Water District
	Padre Dam Municipal Water District
	Camp Pendleton Marine Corps Base
	Poway, City of
	Rainbow Municipal Water District
	Ramona Municipal Water District
	Rincon del Diablo Municipal Water District
	San Diego, City of
	San Dieguito Water District
	Santa Fe Irrigation District
	South Bay Irrigation District (Sweetwater Authority)
	Vallecitos Water District
	Valley Center Municipal Water District
	Vista Irrigation District
	Yuima Municipal Water District
NOTES: National City and South Bay Irrigation District are administered through Sweetwater Authority, a joint powers authority (JPA).	

Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	3,146,771	3,340,594	3,495,978	3,630,542	3,745,684	3,825,041

NOTES: Estimated 2015 population is from the Water Authority 2015 annual report. Projections are based on SANDAG 2050 Regional Growth Forecast (Series 13).

Table 4-1 Wholesale: Demands for Potable and Raw Water - Actual

Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times* *These are the only use types that will be recognized by the WUE data online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Sales to other agencies	Municipal & Industrial	Drinking Water	136,097
Sales to other agencies	Municipal & Industrial	Raw Water	308,010
Agricultural irrigation	Water Authority program agriculture	Drinking Water	37,275
Agricultural irrigation	Water Authority program agriculture	Raw Water	3,780
Other	Member Agency Supplies (includes Recycled)	Raw Water	54,199
		TOTAL	539,361

NOTES: Additional agricultural demands (non-Water Authority program agriculture) are included in the Municipal & Industrial volumes.

Table 4-2 Wholesale: Demands for Potable and Raw Water - Projected

Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times* *These are the only Use Types that will be recognized by the WUEdata online submittal tool.*		2020	2025	2030	2035	2040 *(opt)*
Sales to other agencies	Baseline M&I (excludes Recycled/Potable Reuse)	558,341	626,912	666,632	694,952	731,275
Sales to other agencies	Baseline Agricultural	52,961	51,379	49,897	48,460	47,214
Sales to other agencies	Near-Term Annexations	4,029	7,162	7,162	7,162	7,162
Sales to other agencies	Accelerated Forecast	2,632	4,807	6,806	9,038	11,186
Other	Additional Conservation	-74,141	-89,110	-102,834	-114,599	-128,222
	TOTAL	543,822	601,150	627,663	645,013	668,615

NOTE: Figures from Table 2.2 (less recycled use) and Table 2.4, 2015 UWMP Update.

Table 4-3 Wholesale: Total Water Demands

	2015	2020	2025	2030	2035	2040*(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	539,361	543,822	601,150	627,663	645,013	668,615
Recycled Water Demand* *From Table 6-4*	29,095	43,759	46,974	49,058	49,418	50,158
TOTAL WATER DEMAND	568,456	587,581	648,124	676,721	694,431	718,773

**Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES:

Table 4-4 Wholesale: 12 Month Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
07/2013	1481

** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*

NOTES: See Appendix J of 2015 Urban Water Management Plan Update, second sheet.

Table 6-1 Wholesale: Groundwater Volume Pumped

☑ Supplier does not pump groundwater.
The supplier will not complete the table below.

Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Fractured Rock	Helix WD (El Monte)	159	132	127	124	93
Fractured Rock	Lakeside WD (Santee)	659	665	584	551	700
Fractured Rock	Oceanside (San Luis Rey)	4,525	3,371	4,575	4,735	3,300
Fractured Rock	Pendleton MCB (Santa Margarita)	7,129	6,285	7,261	7,468	6,480
Fractured Rock	San Diego (Santee/El Monte)	758	675	857	679	500
Fractured Rock	San Diego (San Diego Formation)	0	0	0	0	0
Fractured Rock	etwater Authority (National City wellf	2,113	1,798	2,103	1,996	3,600
Fractured Rock	etwater Authority (San Diego Format	3,514	2,907	3,363	3,023	2,100
Fractured Rock	Yuima MWD (Pauma)	7,646	10,933	10,972	8,644	7,000
	TOTAL	26,502	26,765	29,842	27,219	23,773

NOTES: Member agency volumes for 2011-2014 are historical; 2015 projections shown in Appendix F-2, UWMP Update.

Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2015

☑ Wholesale supplier neither distributes nor provides supplemental treatment to recycled water.
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)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
						Total	0	0	0	0

NOTES: Member agency wastewater facilities and respective plant capacitiies are shown in Appendix F, Table 3, 2015 Urban Water Management Plan Update.

Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area

☑ Recycled water is not directly treated or distributed by the supplier. The supplier will not complete the table below.

Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 *(opt)*
Add additional rows as needed							
Carlsbad Municipal Water District	Tertiary	4,150	5,078	5,078	5,078	5,078	5,078
City of Del Mar	Tertiary	90	100	125	150	150	150
City of Escondido	Tertiary	600	3,000	3,650	4,400	4,400	4,400
Fallbrook Public Utility District	Tertiary	600	1,200	1,200	1,200	1,200	1,200
City of Oceanside	Tertiary	130	400	1,700	2,900	3,060	3,500
Olivenhain Municipal Water District	Tertiary	1,928	2,443	2,443	2,443	2,443	2,443
Otay Water District	Tertiary	4,400	5,670	5,900	6,000	6,200	6,500
Padre Dam Municipal Water District	Tertiary	2,016	2,016	2,016	2,016	2,016	2,016
Camp Pendleton Marine Corps Base	Tertiary	1,048	990	990	990	990	990
City of Poway	Tertiary	645	645	645	645	645	645
Ramona Municipal Water District	Tertiary	710	730	755	755	755	755
Rincon del Diablo Municipal Water	Tertiary	3,300	3,100	4,000	4,000	4,000	4,000
City of San Diego	Tertiary	8,195	13,650	13,650	13,650	13,650	13,650
San Dieguito Water District	Tertiary	736	800	800	800	800	800
Santa Fe Irrigation District	Tertiary	500	500	500	500	500	500
Valley Center Municipal Water	Tertiary	47	137	222	231	231	231
City of Oceanside	Advanced	0	3,300	3,300	3,300	3,300	3,300
	Total	29,095	43,759	46,974	49,058	49,418	50,158

NOTES: Member agency recycled and potable reuse water facilities and projections are shown in Appendix F, 2015 Urban Water Management Plan Update. Figures for 2015 represent normal year projections and not actuals.

Table 6-5 Wholesale: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

☑	Recycled water was not used or distributed by the supplier in 2010, nor projected for use or distribution in 2015. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2010 Projection for 2015	2015 actual use
Add additional rows as needed		
Carlsbad Municipal Water District	5,142	4,206
City of Del Mar	90	135
City of Escondido	1,500	576
Fallbrook Public Utility District	543	482
City of Oceanside	550	135
Olivenhain Municipal Water District	3,200	2,673
Otay Water District	4,400	4,186
Padre Dam Municipal Water District	2,016	886
Camp Pendleton Marine Corps Base	4,100	485
City of Poway	425	396
Ramona Municipal Water District	815	651
Rincon del Diablo Municipal Water District	5,279	3,138
City of San Diego	9,253	6,866
San Dieguito Water District	700	758
Santa Fe Irrigation District	600	524
Valley Center Municipal Water District	47	387
Total	38,660	26,485

NOTES: Member agency recycled water facilities and 2015 projections are shown in Appendix F, Table 4, 2010 Urban Water Management Plan Update.

Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	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.					
☐	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 agencies?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Agency
	Drop Down Menu	*If Yes, Agency Name*				
Add additional rows as needed						
IID Transfer	*No*		100 TAF => 130 TAF	2018	Average Year	30,000
IID Transfer	*No*		130 TAF => 160 TAF	2019	Average Year	30,000
IID Transfer	*No*		160 TAF => 190 TAF	2020	Average Year	30,000
IID Transfer	*No*		190 TAF => 200 TAF/YR	2021	Average Year	10,000
NOTES:						

Table 6-8 Wholesale: Water Supplies — Actual

Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Purchased or Imported Water		173,372	Drinking Water	
Purchased or Imported Water		131,667	Raw Water	
Transfers	Imperial Irrigation District	100,000	Raw Water	
Exchanges	All American/Coachella Canal Linings	80,123	Raw Water	
Other	Member Agency Supplies	27,714	Raw Water	
Other	Member Agency Supplies	26,485	Recycled Water	
	Total	539,361		0

NOTES: Wholesaler supplies match member agency demands.

Table 6-9 Wholesale: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*									
		2020		**2025**		**2030**		**2035**		**2040** *(opt)*	
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed											
Transfers		190,000		200,000		200,000		200,000		200,000	
Exchanges		80,200		80,200		80,200		80,200		80,200	
Desalinated Water		50,000		50,000		50,000		50,000		50,000	
Other		131,379		136,084		139,108		139,368		140,008	
Purchased or Imported Water		136,002		181,840		207,413		224,863		248,565	
	Total	587,581	0	648,124	0	676,721	0	694,431	0	718,773	0

NOTES: 1) Figures are from Table 9.1 of 2015 Urban Water Management Plan Update. 2) "Other" represents Member agency verifiable supplies.

Table 7-1 Wholesale: Basis of Water Year Data

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 1999-2000, use 2000*	**Available Supplies if Year Type Repeats**	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location ______________________________	
		☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available	**% of Average Supply**
Average Year	2013	480048	100%
Single-Dry Year	2015	485162	100%
Multiple-Dry Years 1st Year	2013	480048	100%
Multiple-Dry Years 2nd Year	2014	505985	100%
Multiple-Dry Years 3rd Year	2015	485162	100%
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			

Agency 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 an agency 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. Suppliers may create an additional worksheet for the additional tables.

NOTES: Average year are supplies based on 1960-2013 average hydrology.

Table 7-2 Wholesale: Normal Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	587,581	648,124	676,721	694,431	718,773
Demand totals *(autofill fm Table 4-3)*	587,581	648,124	676,721	694,431	718,773
Difference	0	0	0	0	0

NOTES:

Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 (Opt)
Supply totals	666,684	694,147	725,006	720,083	718,863
Demand totals	629,198	694,147	725,006	743,990	770,765
Difference	37,486	0	0	(23,907)	(51,902)

NOTES: Figures from Tables 2.6 and 9.2. Supply totals include carryover storage utilization.

Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	718,652	722,741	728,330	749,030	
	Demand totals	640,932	699,895	728,330	749,030	
	Difference	77,720	22,846	0	0	0
Second year	Supply totals	677,395	706,894	720,132	718,564	
	Demand totals	647,342	706,894	735,613	756,521	
	Difference	30,053	0	(15,481)	(37,957)	0
Third year	Supply totals	653,815	684,649	683,539	682,327	
	Demand totals	653,815	713,963	742,969	764,086	
	Difference	0	(29,314)	(59,430)	(81,759)	0
Fourth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

NOTES: Each year as labeled is populated with the three successive years; e.g., 2020 is populated with 2021-2023; 2025 is populated with 2026-2028, etc. Terminal projection year is 2040. Supplies include carryover storage utilization.

Table 8-1 Wholesale
Stages of Water Shortage Contingency Plan

Stage	Complete Both	
	Supply Reduction[1]	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
Voluntary	Up to 10%	Voluntary
pply Enhancem	Up to 10%	Voluntary
pply Enhancem	Up to 20%	Mandatory
Mandatory	Up to 20%	Mandatory
Mandatory	Up to 40%	Mandatory
Mandatory	40% and above	Mandatory

[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*

NOTES: See Table 11-2 of the 2015 Urban Water Management Plan Update for Water Authority "Water Shortage and Drought Response Plan (WSDRP)."

Table 8-4 Wholesale: Minimum Supply Next Three Years

	2016	2017	2018
Available Water Supply	525,710	558,634	586,587

NOTES: Figures for 2017-2019 are shown in the table and are from Table 11-5, 2015 Urban Water Management Plan Update.

Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☑	Supplier has notified more than 10 cities or counties in accordance with CWC 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Appx B	Provide the page or location of this list in the UWMP.	
☐	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
	☐	☐
	☐	☐
	☐	☐
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
	☐	☐
	☐	☐
NOTES: Refer to Appendix B, 2015 Urban Water Managemen Plan Update.		