



West Basin Municipal Water District



2015 Urban Water Management Plan



West Basin Municipal Water District 2015 Urban Water Management Plan

Prepared with support from:



And Design provided by:



June 2016

Message from the Board of Directors

Since its formation in 1947, West Basin has remained steadfast in its commitment to ensure a safe and reliable water supply for the region. Through the years, West Basin has grown and transformed, seeking innovative and viable solutions to meet the changing needs of its communities. West Basin continues to expand its efforts to meet the growing water demand while preserving our limited and precious water resources. Through our Water Reliability Program, including expanding recycling, maximizing conservation and exploring ocean water desalination, West Basin will continue to diversify its local water supplies to ensure a reliable supply of water for future generations.

We are proud to submit this 2015 Urban Water Management Plan (UWMP or Plan) to the California Department of Water Resources. The Plan reports all current and projected water supplies and demands within West Basin's service area, demonstrates water reliability for the next 25 years and provides a comprehensive overview of West Basin's various programs.

Board of Directors

Division 1 (Director Harold C. Williams): Cities of Carson, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills Estates, Rolling Hills and unincorporated Los Angeles County areas of San Pedro;

Division 2 (Director Gloria D. Gray): City of Inglewood, and unincorporated Los Angeles County areas of South Ladera Heights, Lennox, Athens, Howard and Ross-Sexton;

Division 3 (Director Carol W. Kwan): Cities of Hermosa Beach, Lomita, Manhattan Beach, Redondo Beach, a portion of Torrance and a portion of the unincorporated Los Angeles County area of Harbor-Gateway;

Division 4 (Director Scott Houston): Cities of Culver City, El Segundo, Malibu, and West Hollywood, and unincorporated Los Angeles County areas of Lennox, North Ladera Heights, Del Aire, Marina del Rey, Topanga, View Park and Windsor Hills; and

Division 5 (Director Donald L. Dear): Cities of Gardena, Hawthorne, Lawndale and the unincorporated Los Angeles County area of El Camino Village.

Mission Statement

“To provide a safe and reliable supply of high quality water to the communities we serve.”

Value Statement:

“Through various programs and projects, West Basin ensures that its customer agencies have a safe and reliable supply of water to provide to the residents, businesses and industries within its service area.”



Table of Contents

Executive Summary	ES-1
Section 1 Plan Preparation.....	ES-1
Section 2 West Basin’s Service Area.....	ES-1
Section 3 Water Demands.....	ES-3
Section 4 Water Supplies	ES-4
Section 5 Water Supply Reliability.....	ES-6
Section 6 Water Quality	ES-7
Section 7 Water Use Efficiency	ES-8
Section 8 Water Rates & Charges	ES-8
Section 9 Recycled Water	ES-9
Section 10 Desalination	ES-9
Section 1 Plan Preparation	1-1
1.1 Urban Water Management Planning Requirements.....	1-1
1.2 Regional Alliance UWMP	1-2
1.3 Plan Adoption.....	1-4
1.4 Agency Coordination	1-5
1.5 UWMP Submittal.....	1-7
1.5.1 Review of 2010 UWMP Implementation	1-7
1.5.2 Adoption and Filing of 2015 UWMP	1-7
Section 2 West Basin’s Service Area	2-1
2.1 West Basin’s Regional Relationship.....	2-3
2.2 Climate Characteristics.....	2-4
2.2.1 Climate Change Impacts.....	2-4
2.3 Demographics.....	2-5
Section 3 Water Demands	3-1
3.1 Historical Water Demands.....	3-1
3.1.1 Historical Retail Demand.....	3-1
3.1.2 Historical Replenishment Demand.....	3-4
3.2 Current and Projected Water Demands.....	3-5
3.2.1 Demands for Potable and Raw Water	3-7
3.2.2 Additional Water Uses and Losses.....	3-8
3.2.3 Total Demand Projections	3-8
3.3 Regional Alliance Baseline and Target Demands	3-8
3.3.1 Regional Alliance Membership	3-9
3.3.2 Regional Alliance Base Use.....	3-9
3.3.3 Regional Alliance Water Use Targets	3-17
3.4 Water Use Reduction Plan.....	3-19



Section 4 | Water Supplies 4-1

4.1 West Basin Service Area Water Supply Portfolio..... 4-1
4.2 Imported Water Supply 4-4
4.2.1 Colorado River Resources 4-5
4.2.2 State Water Project Resources..... 4-6
4.2.3 Types of Metropolitan Supply 4-9
4.3 Groundwater Supply..... 4-9
4.4 Water Transfers and Exchanges..... 4-13
4.5 Alternative Sources of Supply 4-14

Section 5 | Water Supply Reliability..... 5-1

5.1 Potential Impacts to Reliability..... 5-1
5.1.1 Imported Water Reliability 5-1
5.1.2 Legal 5-3
5.1.3 Environment..... 5-3
5.1.4 Water Quality 5-3
5.1.5 Climate Change 5-3
5.1.6 Groundwater Reliability..... 5-4
5.1.7 Recycled Water and Ocean Water Desalination Reliability..... 5-4
5.1.8 Climate Change Uncertainties 5-5
5.2 Projected Supply Reliability..... 5-7
5.2.1 Single-Dry Year..... 5-7
5.2.2 Multiple-Dry Year 5-8
5.2.3 Supply and Demand Assessment..... 5-9
5.3 Water Shortage Contingency Plan..... 5-11
5.3.1 Metropolitan Water District of southern California 5-11
5.3.1.1 Water Surplus and Drought Management Plan..... 5-11
5.3.1.2 WSDM Plan Implementation..... 5-11
5.3.1.3 Surplus Stages 5-12
5.3.1.4 Shortage Stages..... 5-12
5.3.2 West Basin Municipal Water District 5-13
5.3.2.1 West Basin's Stages of Action 5-13
5.3.2.2 West Basin's Water Shortage Stages..... 5-14
5.3.2.3 West Basin's Drought Rationing Plan 5-15
5.3.2.4 Establishing Customer Agency Allocations..... 5-15
5.3.2.5 Allocation Penalty Rates 5-18
5.3.2.6 Use of Penalty Revenues..... 5-18
5.3.3 Catastrophic Supply Interruption..... 5-19

Section 6 | Water Quality..... 6-1

6.1 Imported Water6-1

6.1.1 Source Water Protection 6-2

6.1.2 DWR SWP Water Quality Programs6-2

6.1.3 Water Quality Exchanges 6-3

6.1.4 Water Supply Security6-3

6.2 Groundwater6-3

6.2.1 West Basin and Customer Retail Agency Programs 6-3

6.2.2 Water Replenishment District Programs 6-4

6.3 Brackish Desalination6-5

6.4 Recycled Water.....6-5

6.5 Ocean Water Desalination..... 6-6

6.6 Research and Development..... 6-7

6.7 Effects on Water Management Strategies 6-7

6.8 Effects on Supply Reliability..... 6-7

Section 7 | Water Use Efficiency..... 7-1

7.1 Historical Water Conservation Efforts 7-1

7.1.1 Grant Funding 7-4

7.2 West Basin and Retail Agency Water Use Efficiency Master Plans..... 7-5

7.3 External Agency Coordination..... 7-5

7.3.1 Metropolitan Water District 7-6

7.3.2 California Urban Water Conservation Council 7-6

7.4 CUWCC - New BMPs and Reporting Options 7-6

7.5 Current and Future Water Conservation Programs..... 7-7

7.5.1 Current Programs 7-8

7.5.2 Future Programs 7-13

7.5.3 Other Conservation, Education and Outreach Programs..... 7-13

7.6 Current and Future Education Programs 7-15

7.6.1 Current Programs 7-15

7.7 Conservation Program Partnerships..... 7-17

7.8 Utility Operation..... 7-19

7.8.1 Metering..... 7-19

7.8.2 Water Conservation Program Coordination and Staffing Support 7-19

7.8.3 Asset Management..... 7-19

Section 8 | Water Rates & Charges..... 8-1

8.1 Metropolitan Rate Structure 8-1

8.1.1 Purchase Orders..... 8-1

8.1.2 Unbundled Rates and Tier 1 & 2..... 8-2

8.1.3 Metropolitan Capacity Charge 8-3

8.1.4 Readiness-to-Serve Charge 8-4

8.2 West Basin’s Imported Water Rates 8-4

8.2.1 Purchase Agreements 8-4

8.2.2 Reliability Service Charge..... 8-4

8.2.3 Readiness-to-Serve Surcharge 8-4

8.2.4 Water Service Charge 8-4

8.2.5 West Basin’s Capacity Charge 8-5

8.2.6 Desalter Water Charges 8-5

8.3 Recycled Water Rates 8-5

8.3.1 Recycled Water Rates 8-5

8.3.2 Recycled Water Standby Charge..... 8-6

8.4 Future Water Rate Projections 8-6

8.4.1 Imported Water Rate Projections..... 8-6

8.4.2 Recycled Water Rate Projections 8-7

Section 9 | Recycled Water..... 9-1

9.1 Recycled Water Supply and Treatment..... 9-1

9.2 Recycled Water Use..... 9-4

9.2.1 Existing System 9-4

9.2.2 Recycled Water Use by Type 9-6

9.2.3 Historical and Current Sales 9-6

9.2.4 Projected System Expansions..... 9-9

9.2.5 Projected Recycled Water Use 9-11

9.2.6 Encouraging Recycled Water Use 9-12

9.2.7 Funding 9-13

9.2.8 Direct Potable Reuse 9-14

9.2.8.1 Status of Potable Reuse Regulations in California..... 9-16

Section 10 | Desalination..... 10-1

10.1 Ocean Desalination Process 10-3

10.2 West Basin’s Ocean Water Desalination Pilot Project 10-4

10.3 Ocean Water Desalination Demonstration Facility Project 10-6

10.4 Ocean Water Desalination Research Activities 10-7

10.5 Future Ocean Water Desalination Project..... 10-11

10.5.1 Ocean Water Desalination Full-Scale Facility 10-11

10.6 Brewer Desalter Treatment Facility 10-13

Appendix A UWMP Act	AA-1
Appendix B 2015 UWMP Checklist	AB-1
Appendix C Notice of Public Hearing	AC-1
Appendix D Resolution of UWMP Adoption	AD-1
Appendix E Notice of UWMP Preparation	AE-1
Appendix F Drought Rationing Plan Resolution	AF-1
Appendix G Drought Rationing Plan	AG-1
Appendix H DMM Reports	AH-1

List of Tables

Table ES-1: Projected West Basin Service Area Retail Demand (AFY)	ES-3
Table ES-2: Regional Alliance Revised 2020 Target (gpcd).....	ES-4
Table ES-3 West Basin’s Service Area.....	ES-5
Table 1-1: Plan Identification	1-3
Table 1-2: Agency Identification	1-3
Table 1-3: Water Supplier Information Exchange.....	1-4
Table 1-4: Notification to Cities and Counties.....	1-5
Table 1-5: Coordination with Appropriate Agencies.....	1-6
Table 2-1: West Basin Service Area Current and Projected Population	2-6
Table 3-1: Historical Water Demand per West Basin Retail Agency (AF)	3-4
Table 3-2: Historical Groundwater Replenishment Supply (AF).....	3-5
Table 3-3: Average Historical Replenishment Demand (AFY).....	3-5
Table 3-4: Demands for Potable and Raw Water – Actual (AF).....	3-7
Table 3-5: Wholesale: Demands for Potable and Raw Water – Projected (AF).....	3-7
Table 3-6: Total Water Demands (AF)	3-8
Table 3-7: Regional Alliance Recycled Water Deliveries (2008)	3-10
Table 3-8: Regional Alliance 10- to 15-Year Base Periods.....	3-10
Table 3-9: Regional Alliance 5-Year Base Period	3-10
Table 3-10: California Water Service (Hawthorne) Base Daily Per Capita Water Use.....	3-12
Table 3-11: City of El Segundo Base Daily Per Capita Water Use.....	3-13
Table 3-12: City of Lomita Base Daily Per Capita Water Use.....	3-14
Table 3-13: City of Manhattan Beach Base Daily Per Capita Water Use	3-15
Table 3-14: Los Angeles County Waterworks District #29 Base Daily Per Capita Water Use.....	3-16
Table 3-15: Combined West Basin Regional Alliance-Base Daily Per Capita Water Use.....	3-16
Table 3-16: Regional Alliance 2015 Interim and 2020 Targets	3-18
Table 3-18: 2015 Regional Alliance Compliance.....	3-19
Table 3-19: West Basin and Retailer Program Participation.....	3-20

Table 4-1: West Basin’s Service Area Current Water Supplies (AFY) (West Basin-Developed Supplies Only).....	4-2
Table 4-2: West Basin’s Service Area Projected Water Supplies (AFY) (West Basin-Developed Supplies Only).....	4-3
Table 4-3: West Coast Groundwater Pumping Rights (AFY)	4-11
Table 4-4: Groundwater Volume Pumped (AF)	4-12
Table 4-5: Historical Groundwater Replenishment Supply (AF).....	4-12
Table 4-6: Current and Projected Retail Groundwater Supply (AF)	4-13
Table 4-7: Current and Projected Replenishment Groundwater Supply (AF).....	4-13
Table 5-1: Minimum Available Water Supply (AF)	5-1
Table 5-2: Basis of Water Year Data.....	5-8
Table 5-3: Normal Year Supply and Demand Comparison (AF).....	5-9
Table 5-4: Single-Dry Year Supply and Demand Comparison (AF)	5-9
Table 5-5: Multiple-Dry Year Supply and Demand Comparison (AF).....	5-10
Table 5-6: Water Shortage Stages.....	5-14
Table 5-7: Example of Initial Minimum Allocation	5-16
Table 5-8: West Basin Allocation Penalty Rates	5-18
Table 7-1: Metropolitan Demand Forecasting Model for Water Conservation - West Basin AF Savings and Future Projections (AF)	7-2
Table 7-2: Metropolitan Demand Forecasting Model for Water Conservation - Includes MWELo Savings (AF).....	7-2
Table 7-3: Water Use Efficiency Grants Awarded.....	7-5
Table 7-4: West Basin Distribution of Water Saving Activities.....	7-12
Table 7-5: School Tours at Water Treatment Facilities	7-16
Table 8-1: West Basin Purchase Order Terms	8-2
Table 8-2: Metropolitan Rates Adopted for 2016.....	8-3
Table 8-3: Metropolitan Capacity Charge for 2016	8-3
Table 8-4: FY 2015-16 Recycled Water Rates	8-6
Table 9-1: Wastewater Treatment and Discharge within Service Area in 2015 (AF)	9-3
Table 9-2: West Basin Recycled Water Sales FY 2005-2015 (AF).....	9-7
Table 9-3: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AFY) (Inside Service Area Only).....	9-8
Table 9-4: Current and Projected Recycled Water Use Within Service Area (AF).....	9-12
Table 9-5: Current and Projected Recycled Water Use Outside of Service Area (AF).....	9-12
Table 9-6: CIMP Coordination	9-13
Table 9-7: Historical and Current LRP Incentives.....	9-14
Table 10-1: Opportunities for Desalinated Water	10-11

List of Figures

Figure ES-1: Service Area Boundaries.....	ES-2
Figure ES-2: West Basin’s Service Area Projected Retail Water Supplies Projected Retail Water Supplies (AFY).....	ES-5
Figure 2-1: West Basin Service Area by Director Division	2-2
Figure 2-2: West Basin Service Area Water Supplies	2-4
Figure 3-1: West Basin Service Area Historical Retail Water Demand vs. Population	3-3
Figure 4-1: West Basin Service Area Projected Water Supplies	4-4
Figure 4-2: Map of West Coast Groundwater Basin Within the WRD Service Area	4-10
Figure 5-1: Metropolitan Surplus and Shortage Stages.....	5-13
Figure 5-2: Example of Allocation Year Imported Water Demand Projection.....	5-15
Figure 5-3: Example of Initial Minimum Allocation.....	5-16
Figure 7-1: West Basin Water Use Efficiency Program Water Savings (1990 – 2015).....	7-4
Figure 8-1: Projected Imported Water Rates.....	8-7
Figure 9-1: West Basin’s Water Recycling Facilities.....	9-5
Figure 9-2: Recycled Water Use by Type	9-6
Figure 9-3: Historical Recycled Water Sales (FY 2005-2015)	9-7
Figure 9-4: Types of Direct Potable Reuse Processes	9-15
Figure 10-1: Desalination Process.....	10-4
Figure 10-2: Treatment Technologies Used at West Basin’s Pilot Plant.....	10-5
Figure 10-3: West Basin’s Ocean Water Desalination Demonstration Facility	10-7
Figure 10-4: Pipe Loop Set Up.....	10-8
Figure 10-5: Potential Wedge-Wire Intake Configuration	10-10
Figure 10-6: Observed Corrosion on a Screen and the Test Screen Structure.....	10-11
Figure 10-7: Brewer Desalter Treatment Facility.....	10-14





Executive Summary

Executive Summary

Section 1 | Plan Preparation

West Basin Municipal Water District (West Basin) was established in 1947 to help mitigate the over pumping of groundwater by providing imported water from the Metropolitan Water District of Southern California (Metropolitan) as replenishment supplies. Today, this imported water is also provided to supplement local supplies including groundwater, desalination, and recycled supplies developed by West Basin or by retailer agencies operating within West Basin's service area. In addition, a combination of recycled water and imported water is introduced into local aquifers through two seawater barriers to both protect the groundwater supplies from seawater contamination and replace or replenish, what is pumped.

This UWMP provides the Department of Water Resources (DWR) with a detailed summary of present and future water resources and demands within West Basin's service area and assesses West Basin's water resource needs. Specifically, the UWMP provides water supply planning for a 25-year planning period in five-year increments and identifies water supplies needed to meet existing and future demands. The demand analysis must identify supply reliability under three hydrologic conditions: an average year, a single-dry year, and multiple-dry years. West Basin's 2015 UWMP updates the 2010 UWMP in compliance with the requirements of the Act as amended in 2009.

Section 2 | West Basin's Service Area

West Basin has an approximately 185-square mile service area and provides wholesale potable water to 17 cities through three investor-owned utilities, four municipal water departments and one county waterworks district, in southwest Los Angeles County. In addition, West Basin supplies recycled water to over 400 customer meter connections for municipal, commercial and industrial use as well as for injection into the West Coast Basin Seawater Barrier to halt seawater intrusion and replenish the West Coast Groundwater Basin (WCGB) aquifers.



West Basin, governed by an elected five member Board of Directors, serves approximately 900,000 people. The Board of Directors guides the mission and policy of West Basin and each director serves a four-year term once elected. See Figure ES-1 for the service area boundaries.



Figure ES-1: Service Area Boundaries

Section 3 | Water Demands

Consumptive water use in the West Basin service area has been trending lower in recent years after decades of historical increases. This more recent trend in more efficient water use has been due in large part to the continuous efforts by West Basin and its retail water provider's and their customers to promote conservation and recycled water use. Annual reductions experienced in recent years have also been attributed to the economic downturn during the Great Recession which resulted in less consumption beginning in 2009 and aggressive extraordinary conservation program implementation due to drought conditions in 2008-10 and 2012-15. Wet weather and dry, hot weather also contributed to fluctuations in annual demands during this period.

Table ES-1 indicates that although West Basin's service area population is projected to increase, the overall baseline potable demand in acre-feet per year (AFY) is expected to decrease given further water use efficiency and recycled water program implementation.

Table ES-1: Projected West Basin Service Area Retail Demand (AFY)

Year	2020	2025	2030	2035	2040
Baseline Demand ¹	135,719	136,447	136,466	136,706	136,284
Planned Conservation ¹	32,280	35,190	37,928	40,255	42,773
Final Total Demand	167,999	171,637	174,394	176,961	179,057
Recycled Water Demand ²	21,894	27,135	27,135	27,135	27,135
Final Potable Demand	146,105	144,502	147,259	149,826	151,922

[1] Projections based on Metropolitan Demand Forecasting Model.

[2] Projections based on the Capital Improvement Plan, 2015, (excludes replenishment deliveries to the Barrier and deliveries outside service area).

In terms of per capita use (in gallons per capita per day (gpcd)), the West Basin Regional Alliance baseline and targeted water use for 2020 is shown in table ES-2.

Table ES-2: Regional Alliance Revised 2020 Target (gpcd)

Calculation of Regional Compliance Daily per Capita Water Use						
West Basin 20x2020 Regional Alliance	2015 Service Area Population	Individual Targets 2015 (GPCD) ¹	Maximum 2020 Target (95% of 5-year base per capita use)	Calculated 2020 Target ¹	Individual Targets 2020 (GPCD) ²	Selected Compliance Method
California Water Service - Hawthorne	44,504	97	94	142	94	3
El Segundo	17,000	462	435	411	411	1
Lomita	19,696	121	118	115	115	1
LACWWD #29	30,808	291	285	237	237	1
Manhattan Beach	35,454	162	164	144	144	1
Regional Alliance Total	147,462	198	-	-	175	-

NOTES: Cells highlighted in blue indicate if the maximum 2020 target or the calculated 2020 target was used to determine the 2020 target.
 [1] Data from individual retailer SBx7-7 compliance tables.
 [2] Lowest GPCD figure used to determine 2020 Individual Targets.

Section 4 | Water Supplies

West Basin has been able to support the diversification of supplies available to its customer agencies by providing access to imported water supplies from Metropolitan as well as through the development of recycled water supplies. These supplies are served directly to its customer agencies and indirectly as the replenishment supplies necessary to maintain groundwater production. As Table ES-3 shows, West Basin is projecting to increase current recycled water supplies as well as invest in over 20,000 AFY of ocean water desalination supply.

**Table ES-3 West Basin’s Service Area
Projected Retail Water Supplies (AFY)**

Supplies	2020	2025	2030	2035	2040
Groundwater ¹	36,293	36,293	36,293	36,293	36,293
Imported Water ²	98,426	77,654	77,673	77,913	77,491
Recycled Water ³	21,894	27,135	27,135	27,135	27,135
Desalination ⁴	1,000	22,500	22,500	22,500	22,500
Total	157,613	163,582	163,601	163,841	163,419
Conservation ⁵	32,280	35,190	37,928	40,255	42,773
Total	189,893	198,772	201,529	204,096	206,192

- [1] Groundwater production within West Basin service area only.
- [2] Imported retail use only; does not include replenishment deliveries (i.e. Barrier).
- [3] Recycled water does not include replenishment deliveries (i.e. Barrier) and deliveries outside the service area.
- [4] Desalination includes both brackish and ocean water.
- [5] Conservation consists of Active and Passive savings according to Metropolitan’s projected estimates.

Coupled with additional conserved supply through water use efficiency programs, the overall imported water use is expected to be reduced significantly by 2040 as shown in Figure ES-2.

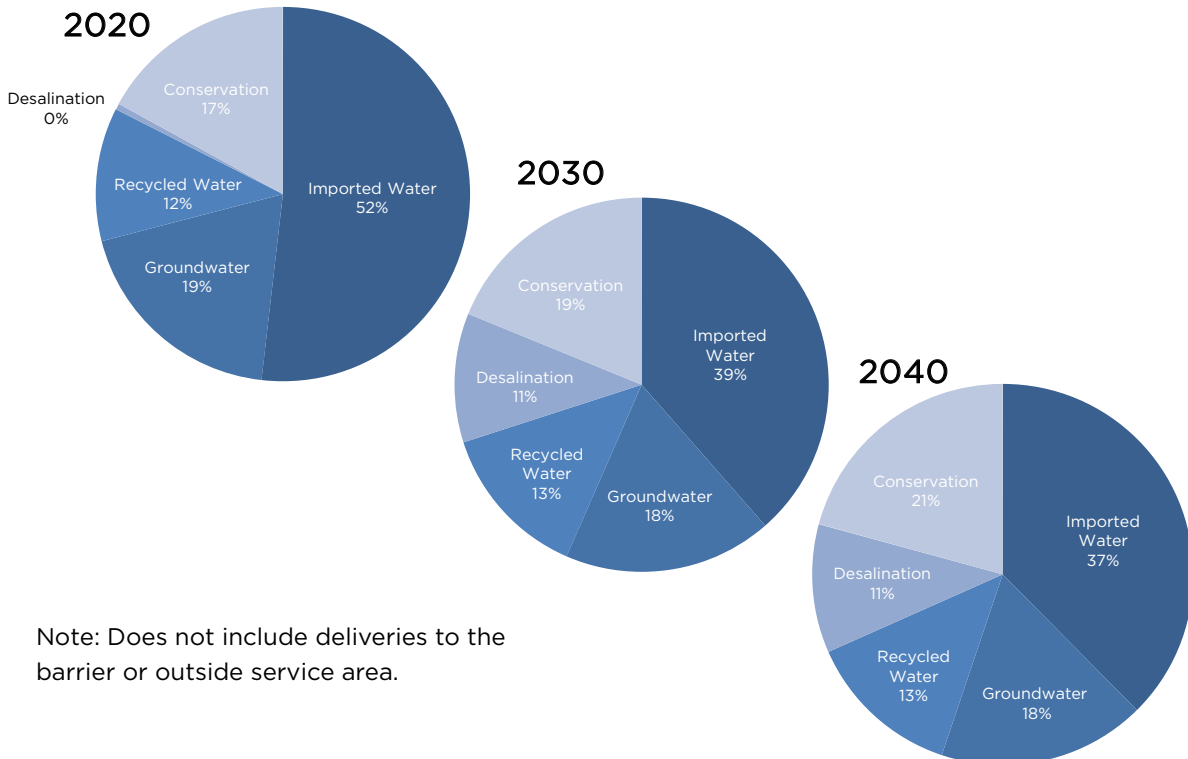


Figure ES-2: West Basin’s Service Area Projected Retail Water Supplies

Section 5 | Water Supply Reliability

West Basin's supply reliability can be greatly impacted by many factors including changes in the availability of supplies due to climatic or infrastructure changes as well as the ability to use those supplies more efficiently in both average and dry periods. West Basin has completed comprehensive water shortage contingency planning to provide reliability during these situations. West Basin's water shortage contingency analysis includes Metropolitan's Water Surplus and Drought Management Plan (WSDM) and Water Supply Allocation Plan (WSAP). The WSDM plan provides Metropolitan with a sequence of resource management actions to execute during surpluses and shortages to minimize the probability of severe shortages and reduce the possibility of extreme shortages and shortage allocations. The WSAP provides Metropolitan with a method for determining imported water allocations for its member agencies, including West Basin, relative to the amount of supplies available.

Metropolitan, in conjunction with its member agencies, conducts a resources planning process that is based on diversification of the region's water supply portfolio and continued efficient water use. This integrated resource planning process has recognized that only through a mix of imported and member agency local supplies along with aggressive implementation of water conservation can the Metropolitan service area attain overall reliability of water supply. The need for diversification and drought-resilient local supplies has only been reinforced in recent years as California and Metropolitan's service area has experienced two severe droughts resulting in water shortages to Metropolitan and cutbacks in supplies to its member agencies.

During this current drought, SWP Table A Allocations were at record lows with 5% of requested deliveries being met in 2014 and 20% of requested deliveries in 2015. With an unprecedented fourth consecutive dry year in 2015 the importance of Metropolitan's stored water to regional reliability is abundantly apparent. It is important for West Basin to analyze its reliability within the current context. Because of the challenges to imported water reliability and the likelihood of similar severe droughts and similar levels of Metropolitan cutbacks, West Basin will continue to develop hydrologically-independent local supplies like ocean water desalination and additional recycled water. These new drought-resilient supplies will improve reliability for West Basin customers and by reducing the need for Metropolitan supplies will protect important storage reserves during future droughts to the benefit of the entire Metropolitan service area.

As part of its water shortage contingency planning, West Basin is moving forward with its plans to expand its water use efficiency programs, further develop recycled water, and add ocean water desalination supplies to improve its immediate, near- and long-term reliability of supplies. Additionally, West Basin's contingency planning includes a comprehensive plan to provide reliable

water supplies under average, single-dry and multiple-dry year hydrologies for current and projected supplies. Under single-dry and multiple-dry year conditions West Basin plans to meet its annual increases in demand by purchasing imported water supplies. West Basin does not anticipate any shortages and will be able to provide reliable water supplies under both single-dry year and multiple-dry year conditions. Any shortfall in supplies will be met through imported water so long as Metropolitan manages its supply and demand balance through its WSDM and WSAP.



Maintaining imported water reliability will continue to remain a challenge however with the development of local resources as well as furthering existing conservation to meet the Water Conservation Act of 2009 targets, Metropolitan will be able to provide a supply buffer for its member agencies, including West Basin, to rely upon in times of drought and longer-term climatic changes.

Section 6 | Water Quality

Compliance with water quality regulations is a regional water management priority and a shared responsibility. West Basin is responsible for the quality of the desalination and recycled water supplies generated at the C. Marvin Brewer Desalter (Desalter) and Edward C. Little Water Recycling Facility (ECLWRF) and its satellite facilities: Carson Water Recycling Facility, Chevron Nitrification Plant and Exxon-Mobil Nitrification Plant. Metropolitan is responsible for complying with State and Federal drinking water regulations on its imported potable water sold to West Basin. West Basin's retail customer agencies are responsible for ensuring compliance in their individual distribution systems and at the customer tap.

West Basin has a dedicated program and budget to engage in research projects that evaluate water quality, efficient operations and new pollution prevention technology and methods. Research projects close the environmental loop by addressing both final product water as well as source control issues to prevent pollution and the need for cleanup technology. West Basin leverages its research dollars by participating on the Boards of water industry research organizations such as WaterReuse, American Water Works Associations, National Water Research Institute, Salinity Management Coalition as well as participating with academic institutions in water quality research.

Section 7 | Water Use Efficiency

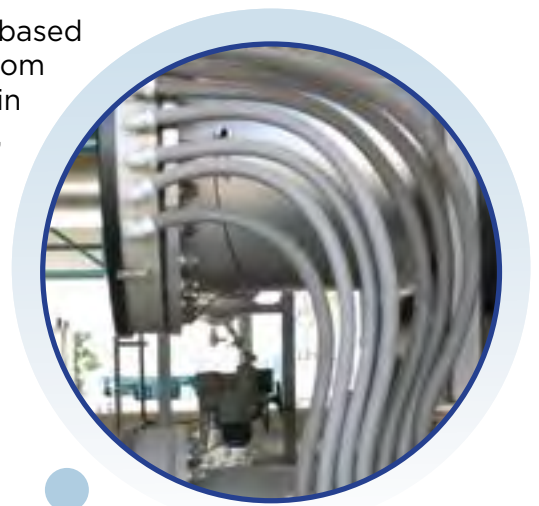
Since the severe drought of the early 1990s, West Basin has been a leader implementing aggressive water conservation programs to help limit water demand within its service area. West Basin's eight retail customer agencies also maintain conservation programs to reduce water waste and manage demand. West Basin programs have included a strong emphasis on education and the distribution of rebate incentives and plumbing retrofit hardware. The results of these programs, in conjunction with passive conservation measures such as modifications to city ordinances, have resulted in significant reductions in retail water use within West Basin's service area. By current estimates, demand management from all active and passive efforts within West Basin have saved over 9.7 billion gallons of imported water (30,000 AF) since 1991, which is equivalent to the average annual water use of almost 60,000 households.

In order to further increase conservation and meet the 2020 water use targets, in 2010 West Basin collaborated with its Regional Alliance agencies to develop a Water Use Efficiency Master Plan for each retail agency. In 2016, West Basin plans on updating its Water Use Efficiency Master Plan and will work closely with its retailers to develop and implement the existing and potential future water use efficiency measures.

Section 8 | Water Rates & Charges

As a water wholesale agency, West Basin does not directly charge residential and other end-use customers for supplies. Instead, West Basin's customer agencies purchase water from West Basin and then combine it with other supplies if available to deliver to their retail customers at a variety of rates.

West Basin's current potable water rates are primarily based upon the cost of imported supplies purchased from Metropolitan. Imported water purchased by West Basin from Metropolitan carries not only the cost of acquiring, importing, treating and distributing the water throughout the region, but also these costs associated with maintaining Metropolitan reliability and "readiness to serve". The total West Basin rate structure must include the value-added costs associated with conservation, imported water and locally-produced recycled and desalinated groundwater supplies provided to customer agencies.



Section 9 | Recycled Water

Since planning and constructing its recycled water system in the early 1990s, West Basin has become an industry leader in water reuse. West Basin's recycled water supply is sold to customers for non-potable applications such as landscape irrigation, commercial and industrial processes, and indirect potable uses through groundwater protection (seawater barrier) and replenishment. While serving to offset imported water supplies, recycled water use also results in less ocean discharge of lesser-treated wastewater into the Santa Monica Bay.

In calendar year 2015, West Basin delivered about 35,250 AF of recycled water to sites inside and outside its service area, saving enough potable water to serve roughly 70,500 households. Within West Basin's service area, municipal and industrial recycled water use totaled 16,707 AF and seawater barrier 12,403 AF, which is about 9 percent of West Basin's current total water supplies. It is projected that recycled water sales could represent 13 percent of total retail water supplies within the West Basin service area by 2040 and 17 percent of total retail water supplies within and deliveries made outside West Basin service area by 2040.

Section 10 | Desalination

In mid-2014, West Basin decommissioned its Ocean Water Desalination Demonstration Facility that ran continuously starting in 2010. Prior to the Demonstration Facility, West Basin operated a Pilot Project for eight years. West Basin used the data acquired from the Pilot Project in the planning and development of the demonstration facility that produced 500,000 gallons of ocean water per day (gpd) to perform various research and testing activities. 100,000 gpd of intake water was treated to produce 50,000 gpd of water meeting drinking water standards. Although all drinking water standards were met, the permit required the treated water to be discharged back into the ocean.

Several research studies have been performed during the demonstration phase as well as after, which are described in greater detail in Section 10. With the findings being reviewed and a Program Master Plan (PMP) for the ocean water desalination project complete, the next step is to move forward with environmental permitting. The Environmental Impact Report (EIR) process has begun and will be complete by the end of 2016. Upon completion of the EIR West Basin will evaluate whether to permit, finance, and construct a full-scale facility by 2023.



Section 1 | **Plan Preparation**

Section 1 | Plan Preparation

Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act) (included in Appendix A) require every urban water supplier providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet (AF) of water annually, to prepare, adopt, and file an Urban Water Management Plan (UWMP or Plan) with the California Department of Water Resources (DWR) every five years in the years ending in zero and five. The 2015 UWMP updates are due to DWR by July 1, 2016.

This UWMP provides DWR with a detailed summary of present and future water resources and demands within West Basin's service area and assesses West Basin's water resource needs. Specifically, the UWMP provides water supply planning for a 25-year planning period in five-year increments and identifies water supplies needed to meet existing and future demands. The demand analysis must identify supply reliability under three hydrologic conditions: a normal year, a single-dry year, and multiple-dry years. West Basin's 2015 UWMP updates the 2010 UWMP in compliance with the requirements of the Act as amended in 2009, and includes a discussion of:

- West Basin's Service Area
- Water Demands
- Water Supplies
- Water Supply Reliability
- Water Quality
- Water Use Efficiency
- Water Rates & Charges
- Recycled Water
- Desalination

1.1 Urban Water Management Planning Requirements

West Basin's 2015 UWMP revises the 2010 UWMP prepared by West Basin and incorporates changes enacted by legislation since 2010. The UWMP also incorporates water use efficiency efforts West Basin has implemented or is considering implementing pursuant to the Memorandum of Understanding Regarding Urban Water Conservation in California (California Urban Water Conservation Council, Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, September 1991). West Basin was one of the first agencies to become a signatory to the MOU in September 1991.

Since the original Act's passage in 1983, several amendments have been added. The most recent changes affecting the 2015 UWMP include Senate Bill 7 as part of the Seventh Extraordinary Session (SBx7-7) and SB 1087. SBx7-7, or the Water Conservation Act of 2009, is part of the Delta Action Plan that stemmed from the Governor's goal to achieve a 20 percent statewide reduction in urban per capita water use by 2020. Reduction in water use is an important part of this Plan that aims to sustainably manage the Bay Delta and reduce conflicts between environmental conservation and water supply. SBx7-7 requires each urban retail water supplier to develop urban water use targets to achieve the 20 by 2020 goal and the interim ten percent goal by 2015. Wholesale water suppliers such as West Basin are required to include an assessment of present and proposed future measures, programs, and policies that would help its retail agencies achieve the 2020 goal.

The other recent amendment, made to the UWMP on September 19, 2014, is set forth by SB 1420, Distribution System Water Losses. SB 1420 requires water purveyors to quantify distribution system losses for the most recent 12-month period available. The water loss quantification is based on the water system balance methodology developed by the American Water Works Association (AWWA).

The sections in this UWMP correspond to the outline of the Act, specifically Article 2, Contents of Plans, Sections 10631, 10632, and 10633. The sequence used for the required information, however, differs slightly in order to present information in a manner reflecting the unique characteristics of West Basin's water utility. The most recent version of DWR's UWMP Checklist has been completed, which identifies the location of Act requirements in this UWMP and is included as Appendix B.

1.2 Regional Alliance UWMP

As a water wholesaler, West Basin is not required to provide SBx7-7 water use reduction targets. However, given its role as a regional water provider, West Basin has elected, in cooperation with a portion of its retail agencies, to use its 2015 UWMP as a Regional Alliance UWMP. According to DWR's 2015 UWMP guidelines, a regional demand reduction target can be developed by a Regional Alliance of multiple agencies to show compliance with SBx7-7. Although each of West Basin's retail agencies must prepare individual 2015 UWMPs with individual baseline and target calculations, West Basin's 2015 UWMP provides a regional target that will allow these retailers and West Basin to collaborate on the most effective programs to ensure that the targeted demand reductions can be met. Additional information is described in Section 3: Water Demands. The Plan and Agency identification are shown below in Tables 1-1 and 1-2.

Table 1-1: Plan Identification

Plan Identification (Select One)	
<input checked="" type="checkbox"/>	Individual UWMP
<input type="checkbox"/>	Regional UWMP (RUWMP)
Select One:	
<input checked="" type="checkbox"/>	RUWMP includes a Regional Alliance
<input type="checkbox"/>	RUWMP does not include a Regional Alliance

Table 1-2: Agency Identification

Agency Identification	
Type of Agency (select one or both)	
<input checked="" type="checkbox"/>	Agency is a wholesaler
<input type="checkbox"/>	Agency is a retailer
Fiscal or Calendar Year (select one)	
<input type="checkbox"/>	UWMP Tables Are in Calendar Years
<input checked="" type="checkbox"/>	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Day that the Fiscal Year Begins (dd/mm)	
<i>July 1 - June 30</i>	
Units of Measure Used in UWMP	
Unit	AF

As a wholesale water provider, West Basin has informed its retail agencies of its water supplies in accordance with CWC 10631, as shown in Table 1-3.

Table 1-3: Water Supplier Information Exchange

Wholesale: Water Supplier Information Exchange (select one)	
<input checked="" type="checkbox"/>	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.
Page 1-6	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	

1.3 Plan Adoption

Recognizing that close coordination among other relevant public agencies is key to the success of its UWMP, West Basin worked closely with many other entities, including representation from diverse social, cultural, and economic elements of the population within its service area, to develop and update this planning document.

This section provides the information required in Article 3 of the Water Code related to adoption and implementation of the UWMP. The UWMP checklist to confirm compliance with the Water Code is provided in Appendix B.

The draft 2015 UWMP was completed on May 6, 2016 and West Basin encouraged public interest and community involvement in this UWMP update through public hearings and inspection of the draft document on June 27, 2016. Public hearing notifications were published in local newspapers. A copy of the published Notice of Public Hearing is included in Appendix C. The hearing provided an opportunity for all constituents in the service area to learn and ask questions about their water supply in addition to West Basin’s plans for providing a reliable, safe, high-quality water supply. Copies of the draft Plan were made available for public inspection at the West Basin headquarters and on West Basin’s website.

Once finalized, the UWMP was adopted by a Resolution of the West Basin Board of Directors on June 27, 2016. A copy of the adopted resolution is provided in Appendix D. A change from the 2004 legislative session to the 2009 legislative session required West Basin to notify any city or county within its service area at least 60 days prior to the public hearing. As shown in Table 1-4, West Basin sent Letters of Notification to cities and counties within its service area on February 9, 2016 with notice that it was in the process of preparing an updated UWMP (Appendix E).

Table 1-4: Notification to Cities and Counties

Wholesale: Notification to Cities and Counties (select one)		
<input checked="" type="checkbox"/>	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.	
Page 1-6	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
County Name	60 Day Notice	Notice of Public Hearing

The UWMP is intended to serve as a general, flexible, and open-ended document that can be updated periodically to reflect changes in the region’s water supply trends and conservation and water use efficiency policies. This UWMP, along with West Basin’s other planning documents, will be used by West Basin staff to guide its service area’s water use and management efforts through the year 2020, when the UWMP is required to be updated again.

1.4 Agency Coordination

West Basin hosted a stakeholder workshop during the draft UWMP public review period on March 30, 2016. At the workshop, West Basin provided its retail agencies with consistent information for use in the development of their 2015 UWMPs and also provided information upon request.

West Basin is a water wholesaler and is fully dependent on the Metropolitan Water District of Southern California (Metropolitan) for its imported water supplies. Therefore, West Basin provided comments and information to Metropolitan during the preparation of its Draft Regional Urban Water Management Plan (RUWMP) which was distributed on February 2, 2016. West Basin staff also attended an information meeting for stakeholders and the public from within Metropolitan’s service area on November 16, 2015.

Table 1-5 describes the coordination among West Basin, its retail agencies, the County of Los Angeles and Metropolitan during the review of the draft UWMP.

Table 1-5: Coordination with Appropriate Agencies

Agency	Participation in Regional Alliance	Received Copy of Draft	Attended Customer Workshop	Commented on Draft	Sent Notice of Intention to Adopt
County of Los Angeles - Water Resources Division		X			X
Metropolitan Water District of Southern California		X			X
California American Water		X			X
California Water Service	X*	X	X		X
City of El Segundo	X	X			X
City of Inglewood		X	X		X
City of Lomita	X	X			X
City of Manhattan Beach	X	X	X		X
Golden State Water Company		X	X		X
LA County Waterworks District #29	X	X			X
Water Replenishment District of Southern California		X			X

* Only the California Water Service - Hawthorne division is participating in the Regional Alliance.

1.5 UWMP Submittal

1.5.1 Review of 2010 UWMP Implementation

As required by California Water Code, West Basin summarized Water Conservation Programs implemented to date, and compared the implementation to those planned in its 2010 UWMP.

Comparison of 2010 Planned Water Conservation Programs with 2015 Actual Programs

As a wholesaler, West Basin did not include a specific implementation plan in its 2010 UWMP. As a signatory to the MOU regarding water use efficiency, West Basin is committed to implementing BMP-based water use efficiency programs. For West Basin's specific achievements in the area of conservation, please see Section 7 of this Plan.

Comparison of 2010 Projected Recycled Water Use with 2015 Actual Use

Recycled water use within West Basin's service area was about 13% lower than previously forecasted for 2015 in the 2010 UWMP, as illustrated in Table 9-2, due to the change in methodology used to forecast demands.

1.5.2 Adoption and Filing of 2015 UWMP

West Basin's Board of Directors approved the 2015 UWMP on June 27, 2016. By July 1, 2016, the Adopted 2015 West Basin UWMP was filed with DWR, California State Library, County of Los Angeles, and cities within West Basin's service area. West Basin will make the plan available for public review no later than 30 days after filing with DWR.





Section 2 | **West Basin Service Area**

Section 2 | West Basin's Service Area

West Basin has an approximately 185-square mile service area and distributes wholesale potable water to 17 cities through investor-owned utilities, municipalities and one waterworks district in southwest Los Angeles County. In addition, West Basin supplies recycled water to over 400 customer sites for municipal, commercial and industrial use as well as for injection into the West Coast Basin Seawater Barrier to halt seawater intrusion and replenish the West Coast Groundwater Basin (WCGB) aquifer.

Several of West Basin's customer agencies also pump groundwater supplies from the underlying WCGB to help meet their demands. California Water Service distributes a small amount of water from West Basin's C. Marvin Brewer Desalter, which treats brackish groundwater from the WCGB for drinking water use.

West Basin, governed by an elected five member Board of Directors, serves approximately 900,000 people. The Board of Directors guides the mission and policy of West Basin and each director serves a four-year term once elected. West Basin's service area delineated by Director Divisions is shown in Figure 2-1. Current directors and the cities and communities within their associated divisions are presented below:

Division 1 (Director Harold C. Williams): Cities of Carson, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills Estates, Rolling Hills and unincorporated Los Angeles County areas of San Pedro;

Division 2 (Director Gloria D. Gray): City of Inglewood, and unincorporated Los Angeles County areas of South Ladera Heights, Lennox, Athens, Howard and Ross-Sexton;

Division 3 (Director Carol W. Kwan): Cities of Hermosa Beach, Lomita, Manhattan Beach, Redondo Beach, a portion of Torrance and a portion of the unincorporated Los Angeles County area of Harbor-Gateway;

Division 4 (Director Scott Houston): Cities of Culver City, El Segundo, Malibu, and West Hollywood, and unincorporated Los Angeles County areas of Lennox, North Ladera Heights, Del Aire, Marina del Rey, Topanga, View Park and Windsor Hills; and

Division 5 (Director Donald L. Dear): Cities of Gardena, Hawthorne, Lawndale and the unincorporated Los Angeles County area of El Camino Village.



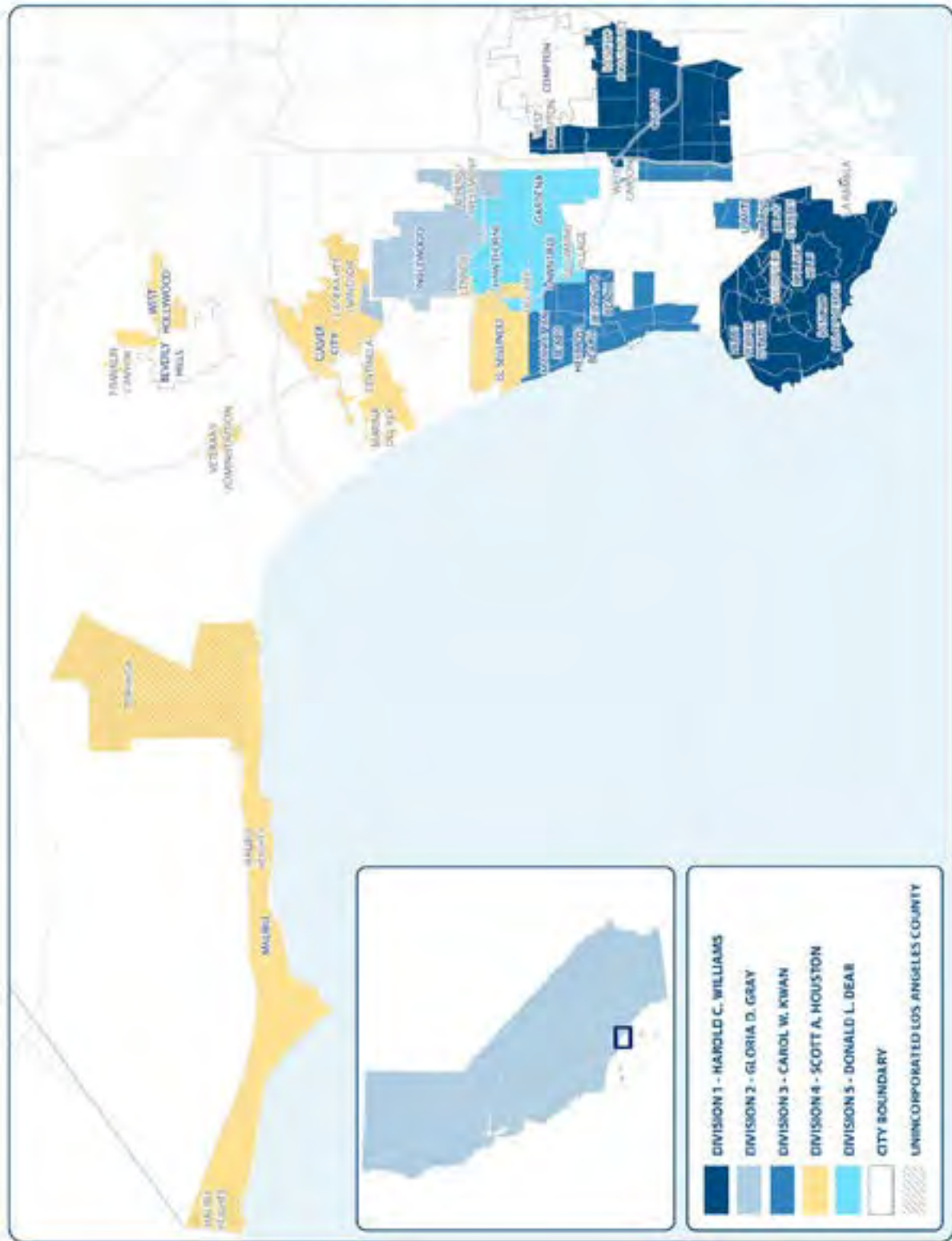


Figure 2-1: West Basin Service Area by Director Division

2.1 West Basin's Regional Relationship

West Basin was established by a vote of the people in 1947 to help mitigate the over pumping in the WCGB by providing the growing region with imported water. West Basin became a member agency of Metropolitan in 1947 to purchase, on a wholesale level, potable water imported from the Colorado River and the State Water Project to sell to local municipalities, investor-owned utilities and one waterworks district.

West Basin imports water to supplement local supplies. West Basin and its customer agencies operating within West Basin's service area develop local supplies including groundwater, brackish desalination, and recycled water. In addition, a blend of recycled and imported water is injected into the WCGB Barrier to protect the groundwater supplies from seawater contamination and replenish the aquifer. West Basin remains one of the largest member agencies of Metropolitan and representation on Metropolitan's Board is critical to making West Basin's customer agencies' voices on regional water issues heard. West Basin's Board of Directors appoints two representatives to serve on the 38-member Metropolitan Board of Directors.

In January 2008, the West Basin Board of Directors adopted a Strategic Business Plan that addresses water supply issues that plague southern California by focusing on producing new sources of local water, improving its environmentally-sound and innovative technologies, and emphasizing customer service and satisfaction.

With a goal to decrease its service area's dependence on imported water, West Basin has been implementing a Water Reliability Program that will expand its recycled water customer base, explore the feasibility of implementing ocean water desalination, and expand its water use efficiency programs and outreach. Through the Water Reliability Program, West Basin ensures that its customer agencies have a safe and reliable supply of water to provide to the residents, businesses and industries within its service area. Figure 2-2 illustrates the relationship West Basin has with Metropolitan and its customer agencies to provide the region with diversified and integrated water supplies.



West Basin Headquarters:
Donald L. Dear Building
- Carson, CA



Figure 2-2: West Basin Service Area Water Supplies

2.2 Climate Characteristics

West Basin’s service area lies in the heart of southern California’s coastal plain. It has a Mediterranean climate, characterized by warm, dry summers and wet, cool winters with moderate precipitation. The combination of mild climate and low rainfall attracts many new residents, creating a challenge for water agencies to accommodate increased water demands with drought affected water supplies.

Southern California is vulnerable to droughts. Historically, West Basin has experienced patterns of multiple dry years that have resulted in severe drought periods in 1977-78, 1989-92, 1999-2004, 2007-09, and most recently, 2012-15. Excessively dry conditions increase the local water demand; less precipitation is available to meet landscaping irrigation needs and often result in water shortages.

Los Angeles County’s average daily temperatures range from 47 °F in December and January to 76 °F in August and September. The average annual precipitation is approximately 12 inches, although the region is subject to significant variations in monthly precipitation. The average evapotranspiration (ETo) is almost 43 inches per year which is three and a half times the annual average rainfall. This generates a high water demand for landscape irrigation for homes, commercial properties, parks, and golf courses. The potential for changes to the local climate and the resulting impacts are further discussed in Section 4: Water Supplies.

2.2.1 Climate Change Impacts

Climate change is having a profound impact on California water resources, as evidenced by changes in snowpack, sea level, and river flows. These changes are expected to continue in the future and more of our precipitation will likely fall as rain instead of snow. This potential change in weather patterns will exacerbate flood risks and add additional challenges for water supply reliability.

The mountain snowpack provides as much as a third of California's water supply by accumulating snow during our wet winters and releasing it slowly when we need it during our dry springs and summers. Warmer temperatures will cause what snow we do get to melt faster and earlier, making it more difficult to store and use. By the end of this century, the Sierra snowpack is projected to experience a 48-65 percent loss from the historical April 1st average. This loss of snowpack means less water will be available for Californians to use.

Climate change is also expected to result in more variable weather patterns throughout California. More variability can lead to longer and more severe droughts. In addition, the sea level will continue to rise threatening the sustainability of the Sacramento-San Joaquin Delta, the heart of the California water supply system and the source of water for 25 million Californians and millions of acres of prime farmland.

Just in the period between the previous and the current UWMP (from 2010 to 2015), climate change has been evident. Since the 2010 UWMP, dry conditions in California have persisted into 2015, resulting in a fourth consecutive year of drought. The year 2015 began with the driest January on record, resulting in the earliest and lowest snowpack peak in recorded history at only 17 percent of the traditional snowpack peak on April 1st. In the ten years since 2006, there were only two wet years, with the other eight years having been below normal, dry, or critically dry. The Colorado River watershed has also experienced an extended reduction in runoff. Within Southern California, continuing dry conditions have impacted the region's local supplies, including its groundwater basins (MWD Draft 2015 UWMP, March 2016).

The uncertainty of continued climate impacts on the region stresses the need for flexibility in planning for future water supplies. West Basin has enacted its Drought Rationing Plan two times between 2010 and 2015 in response to MWD's implementation of its Water Supply Allocation Plan. This scenario where water is likely to be rationed more often in the future will become a typical planning scenario for West Basin. The way in which people use water is becoming increasingly important for southern California and West Basin's projected demands will be met through a variety of supplies, which are described in detail in Section 4.

2.3 Demographics

West Basin's service area encompasses 185-square miles in southwest Los Angeles County and includes 17 cities and several unincorporated areas. Current projections show that population is expected to increase minimally through 2040 because many cities in the service area are older cities that anticipate reaching build-out in the near-term. This will result in nearly 900,000 people living in West Basin's service area by 2040, representing an average growth of 0.4% annually.

The number of households in West Basin’s service area is expected to increase by 4.5% in the next 25 years from 294,293 in 2015 to 308,161 in 2040. The number of persons per household is also projected to increase slightly from 2.82 in 2015 to 2.87 in 2040. Urban employment in West Basin’s service area is expected to rise by 7.2% in the next 25 years.

Table 2-1 displays the current and projected population within West Basin’s service area over the next 25 years. This population projection shows a more conservative increase in population relative to the projection provided in West Basin’s 2010 UWMP.

Table 2-1: West Basin Service Area Current and Projected Population

Wholesale: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040 <i>(opt)</i>
	813,000	823,886	837,059	864,523	878,666	891,617
NOTES: From Metropolitan Demand Projections						



Section 3 | **Water Demands**

Section 3 | Water Demands

With an estimated 2015 population of approximately 813,000 as well as dense commercial and industrial areas, the total retail water demand within West Basin's service area in FY 2015 was 168,363 AFY. West Basin is responsible for meeting the direct retail demand from its customer retail agencies through imported (potable) and recycled water, as well as groundwater replenishment/seawater intrusion barrier demand from the Water Replenishment District of Southern California (WRD).

While demand in West Basin's service area has trended upward, recent years have shown a continued decrease in overall consumptive water use. This trend in more efficient water use can be seen in the decline in future demand projections between the 2005 and 2010 UWMPs. SBx7-7, the Water Conservation Act of 2009, called for an overall 20 percent decrease in per capita water use by the year 2020 and was incorporated into demand projections for the 2010 UWMP. The 2015 actual demand was within 1% of the demand predicted by the 2010 UWMP which reflected compliance with the 20% reduction in per capita demand by 2020 as required under SBx7-7.

This sustained decrease in water use over an extended period of time is due to the continuous efforts by West Basin and its retail water provider's customers to improve water use efficiency and water conservation. West Basin's 2015 UWMP provides a Regional Alliance target for per capita water use reductions by 2020 and an assessment of compliance with the interim target for 2015 that is in accordance with the State's Water Conservation Bill of 2009.

This section will explore in greater detail West Basin's historical, current and projected water demands. As a water wholesaler in the region, West Basin will also provide regional baseline and demand reduction targets for its retail agencies that are part of the Regional Alliance.

3.1 Historical Water Demands

Total water use within West Basin's service area includes retail demand for potable (including imported and groundwater production) and recycled water, and groundwater replenishment. Retail demand is defined as a population's direct consumption, or all municipal (residential, firefighting, parks, etc.) and industrial uses. Replenishment demand is the supply needed to maintain the groundwater operations in the WCGB and is not used directly by residents, municipalities or industries.

3.1.1 Historical Retail Demand

Historically within the West Basin service area, increases in population have not always resulted in increases in overall water demand, as shown in Figure 3-1. In fact, within the last five years, demand decreased while population increased. On an annual basis demand can fluctuate because of other factors such as climate change, economic development, longer drought cycles

and conservation programs during a severe and prolonged drought. West Basin, along with much of California, has experienced the effects of two major droughts within the last five years both resulting in the allocation of imported water supplies by Metropolitan. During those years when supplies are constrained or cutbacks from Metropolitan are experienced, water use efficiency is more aggressive, decreasing demand further during those periods.

During the period of FY 2010-2011 and FY 2015-2016, Metropolitan cut back its delivery of imported water by 15% which required more aggressive conservation activities and changes in consumer behavior. Once severe droughts and allocations of supplies have passed, demand will often begin to slightly rise again. Also, increased economic activity, such as was experienced in 2014 and 2015 after the Great Recession typically results in an increase in water use. While these patterns may represent a fluctuation in per capita usage, the fact that during this period total water demand has not risen along with the population indicates sustained increases in water use efficiency in average or wet years and when economic activity increases.

In FY 2015, the total potable retail water demand consumed by to West Basin customer agencies was approximately 139,253 acre-feet consisting of 105,569 acre-feet of imported water (treated), 690 acre-feet of local surface water and 32,994 acre-feet of groundwater. Overall, West Basin's per capita water demands will continue to decrease in the near future as water conservation efforts and commitment to water use efficiency continues in the region. Future demand growth is projected to remain flat through 2040. This is due to more limitations on new land development (e.g. cost, available space and environmental restrictions) and the continued commitment to water use efficiency in the region.



**Figure 3-1: West Basin Service Area
Historical Retail Water Demand vs. Population**

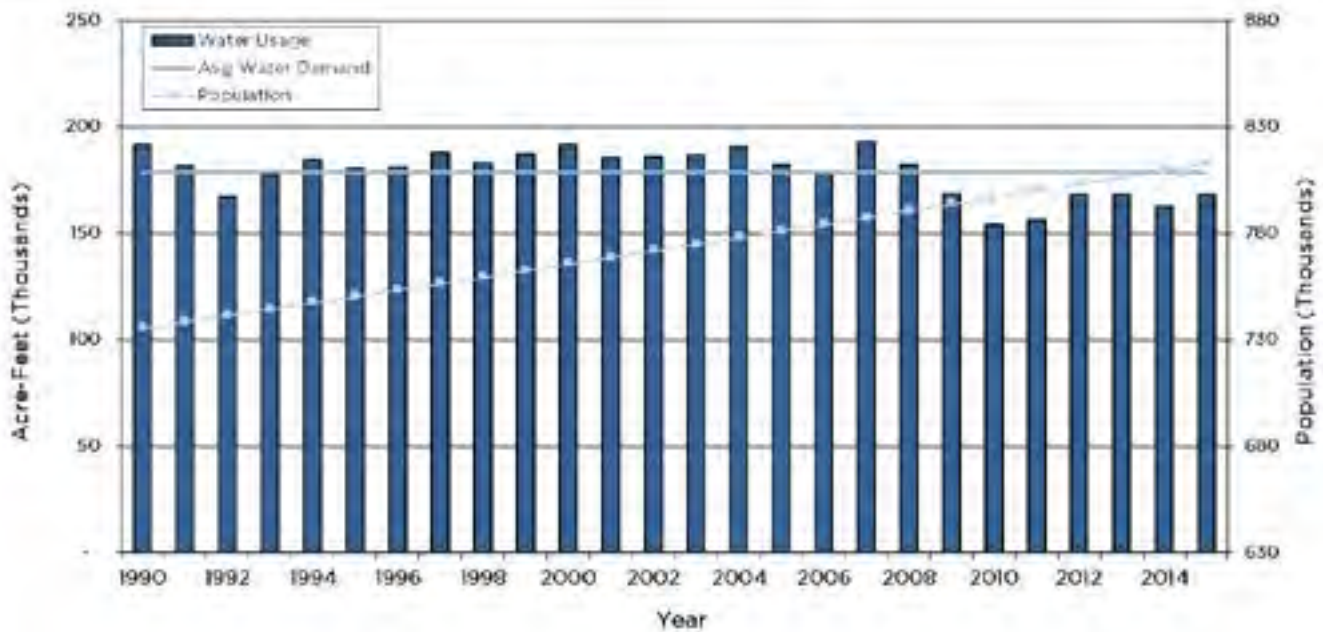


Table 3-1 shows the historical demand of each of West Basin’s retail agencies as reported to West Basin by those agencies. Although some agencies have seen some dramatic shifts in water demand, there is an overall decrease of retail agency water demand by 7 percent in the last five years relative to the period 2006-2010.

This decreasing trend in groundwater pumping is primarily attributable to water quality and other operational issues that often drive retail agencies to purchase imported water rather than pump.

Table 3-1: Historical Water Demand per West Basin Retail Agency (AF)

Retail Agency	2006-2010	2010-2015	% Change
California American Water Co.	3,896	3,420	-14%
California Water Service - Dominguez	38,402	37,836	-1%
California Water Service - Hawthorne	4,616	4,494	-3%
California Water Service - Hermosa/Redondo	14,450	13,067	-11%
California Water Service - Palos Verdes	21,524	20,092	-7%
City of El Segundo	17,577	17,134	-3%
City of Inglewood	11,667	10,681	-9%
City of Lomita	2,460	2,313	-6%
City of Manhattan Beach	6,366	5,526	-15%
Golden State Water Company	34,184	30,276	-13%
LA County WaterWorks District #29	9,738	9,128	-7%
Total	164,880	153,967	-7%

3.1.2 Historical Replenishment Demand

The WCGB is reliant upon replenishment supplies to not only meet demand but also to maintain water quality levels. Groundwater in this basin is annually extracted beyond the natural level of replenishment, and as a result, seawater begins to intrude into the basin along the coast. The current method in preventing seawater from contaminating the groundwater basin is by injecting water into the West Coast and Dominguez Gap Seawater Intrusion Barriers (supplies shown in Table 3-2).

The Los Angeles County Department of Public Works (LACDPW) maintains these barriers and determines the quantity of injection necessary to maintain protective groundwater elevations along the barrier system to prevent seawater intrusion. WRD is responsible for purchasing the replenishment supply. As the wholesaler in the region, West Basin sells treated imported and recycled water to WRD to inject into the seawater barriers.

Table 3-2: Historical Groundwater Replenishment Supply (AF)

Historical Groundwater Replenishment Supply						
	2010	2011	2012	2013	2014	2015
West Coast Barrier						
Imported Water	8,145	9,914	3,879	8,738	5,826	3,582
Recycled Water	7,797	7,320	6,566	6,622	12,372	12,403
Sub-Total	15,941	17,233	10,445	15,360	18,198	15,985
Dominguez Gap Barrier						
Imported Water	4,909	3,620	4,625	2,582	3,460	3,772
Total	20,851	20,853	15,070	17,942	21,658	19,757

Source: WRD, monthly Production Reports

As Table 3-3 shows, WRD’s demands from West Basin over the last five years average about 19,000 acre-feet annually. Water demands at the barriers usually do not shift dramatically due to the limited groundwater production allowed to each customer. The LACDPW determines the quantity of injection based on the need to maintain protective elevations along the barrier system.

Table 3-3: Average Historical Replenishment Demand (AFY)

Retailer	2006-2010	2011-2015
Water Replenishment District	19,011	18,959

3.2 Current and Projected Water Demands

This UWMP will provide some insight into West Basin’s expected potable water demands for the next 25 years. Predicting water usage is an important element in planning future water supplies. In 2010, West Basin completed a Water Demand Forecasting Model that was used to project demand through 2035 for West Basin’s entire service area. The water demand forecasting model projects demand outcomes based on various scenarios adjusted for the level of conservation activities anticipated, change in the cost of water, economic recovery and weather changes. For the 2015 UWMP, West Basin relied solely on Metropolitan’s projections for total demand and water use efficiency.

Metropolitan Methodology for Forecasting Total Demand

Municipal & Industrial (M&I) Demand

According to its Draft 2015 UWMP “Metropolitan updates its retail M&I projection periodically based on the release of official regional demographic and economic projections.” As it relates to projections of retail M&I water demands for West Basin conducted by Metropolitan, data is used from the Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan/Sustainable Community Strategy (April 2012).

The SCAG regional growth forecasts are the core assumptions that drive the estimating equations of the retail demand forecasting in Metropolitan's Econometric Demand Model (MWD-EDM). SCAG's projections undergo extensive local review, incorporate zoning information from city and county general plans, and are supported by Environmental Impact Reports.

Forecasting M&I Conservation

Within Metropolitan's forecast of total demand for West Basin is an estimate of water conservation and a projection of retail demand after future water conservation is taken into account. This includes water conserved by Best Management Practices from active, code-based, and price-effect conservation. Active conservation levels are derived by calculating water savings from all active program device-based savings installed to date. Code-based conservation levels are derived by calculating water savings from devices covered by existing water conservation ordinances and plumbing codes, including the state Model Water Efficient Landscape Ordinance, with replacement and new construction rates driven by demographic growth consistent with SCAG land use and transportation plans used to derive retail demand. Price-effect conservation is derived by calculating water savings by retail customers attributable to the effect of changes in the real (inflation adjusted) price of water.

West Basin Methodology for Forecasting Replenishment and Recycled Water Demands

Replenishment/Barrier Water Demands

The LACDPW maintains these barriers and determines the quantity of injection necessary to maintain protective groundwater elevations along the barrier system to prevent seawater intrusion. WRD is responsible for purchasing the replenishment supply. As the wholesaler in the region, West Basin sells treated imported and recycled water to WRD to inject into the seawater barriers.

Recycled Water Demands

The recycled water demands are continuously analyzed and in 2009, West Basin completed a Capital Implementation Master Program (CIMP). The CIMP includes all of the planned projects for recycled water and desalination through 2030.

3.2.1 Demands for Potable and Raw Water

Table 3-4 provides the current total potable and raw water demand from West Basin’s eight retail agencies, including the level of treatment and volume of water delivered. This does not include water needs that were met by conservation or groundwater pumped by individual agencies. West Basin does not sell raw water.

Table 3-4: Demands for Potable and Raw Water - Actual (AF)

Wholesale: Demands for Potable and Raw Water - Actual			
Use Type	2015 Actual		
	Additional Description	Level of Treatment When Delivered	Volume
Sales to other agencies	Imported Water	Drinking Water	105,569
Sales to other agencies	Desalination (Brackish GW)	Drinking Water	690
TOTAL			106,259

West Basin’s potable and raw water retail demand projections through 2040 are shown in Table 3-5. These demand projections include water use for residential, commercial, industrial, and other uses within West Basin’s service area. Retail demands are served through West Basin’s retail agencies. Additional information about demand use will be included within the retail agency UWMPs.

Table 3-5: Wholesale: Demands for Potable and Raw Water - Projected (AF)

Wholesale: Demands for Potable and Raw Water - Projected						
Use Type	Additional Description	Projected Water Use <i>Report To the Extent that Records are Available</i>				
		2020	2025	2030	2035	2040
Sales to other agencies	Imported Water	98,426	77,654	77,673	77,913	77,491
Sales to other agencies	Desalination (Brackish GW)	1,000	1,000	1,000	1,000	1,000
Sales to other agencies	Desalination (Ocean)	0	21,500	21,500	21,500	21,500
TOTAL		99,426	100,154	100,173	100,413	99,991

3.2.2 Additional Water Uses and Losses

A detailed calculation of water system losses, including unbilled authorized consumption (e.g. hydrant flushing, fire-fighting, and blow-off water from well start-ups), real losses (leakage), and apparent losses (unauthorized consumption and metering inaccuracies) is included in each of West Basin’s retail agencies’ UWMP. As West Basin does not own any distribution pipeline of potable water it is not subject to this requirement.

3.2.3 Total Demand Projections

Total demand for all potable, raw and recycled water delivered by West Basin is listed in Table 3-6. Recycled water demands are described in further detail in Section 9.

Table 3-6: Total Water Demands (AF)

Wholesale: Total Water Demands						
	2015	2020	2025	2030	2035	2040
Potable and Raw Water <i>From Tables 3-4 and 3-5</i>	106,259	99,426	100,154	100,173	100,413	99,991
Recycled Water Demand <i>From Table 9-4*</i>	29,110	38,894	44,135	44,135	44,135	44,135
TOTAL WATER DEMAND	135,369	138,320	144,289	144,308	144,548	144,126

* Only includes recycled water deliveries within the West Basin service area and deliveries to the Barrier.

3.3 Regional Alliance Baseline and Target Demands

The Water Conservation Bill of 2009 (SBx7-7) requires individual retail water suppliers to set water conservation targets for 2015 and 2020 to support an overall state goal of reducing urban potable per capita water use by 20 percent by 2020. Individual supplier conservation targets must be determined using one of four methods with a baseline consumption that is calculated using the specific guidelines described in DWR’s 2015 Urban Water Management Plans Guidebook for Urban Water Suppliers (DWR Guidebook).

As a regional water supply wholesale agency, West Basin is not required to report baseline or target demands in keeping with the Water Conservation Act of 2009. However, West Basin has elected to use its 2015 UWMP as the reporting mechanism for a Regional Alliance formed by some of its retail agencies to meet the per capita baseline and target reporting requirements of the Water Conservation Bill of 2009. Since not all of West Basin’s retail

agencies elected to participate in the Regional Alliance, the overall historical and projected demand within West Basin’s service area described in Section 3.1 and 3.2 will be greater than the Regional Alliance per capita baseline described in this Section 3.3.

The Investor-owned companies (California American Water Company, California Water Service, and Golden State Water Company) decided not to participate in the Regional Alliance because much of their jurisdictions are outside of West Basin’s service area and they prefer to comply individually. The City of Inglewood also chose to comply themselves.

3.3.1 Regional Alliance Membership

The West Basin Regional Alliance members include the following West Basin retail agencies:

- California Water Service (Hawthorne region)
- City of El Segundo
- City of Lomita
- City of Manhattan Beach
- Los Angeles County Waterworks District #29

As a Regional Alliance, these agencies worked with West Basin to establish a regional baseline of water use and conservation targets for 2015 and 2020. They will also collaborate on implementing the recycled water and conservation programs and projects that will be required to meet these targets.

3.3.2 Regional Alliance Base Use

The Regional Alliance members used the step by step process described in the DWR Guidebook to determine the base daily water use for each member. The process and resulting calculations are described in this section.

Step 1: Determine Supplier Base Period Year Ranges

Table 3-7 provides the recycled water deliveries in 2008 for each member of the Regional Alliance. The resulting analysis shows that the city of El Segundo meets over 10 percent of their demand through recycled water deliveries. Therefore, the City of El Segundo is allowed to use a range up to 15 years from which to calculate their baseline water use, however, they have chosen to use a 10 year range. The remaining members of the Regional Alliance delivered less than 10 percent of their supply with recycled water and therefore can only use a 10 year range to calculate their baseline use.

Table 3-7: Regional Alliance Recycled Water Deliveries (2008)

Agency	Total Water Deliveries	Total Recycled Water Deliveries	Percentage of Recycled Water Deliveries
California Water Service - Hawthorne	4,685	103	2.2%
El Segundo	16,950	7,865	46.4%
Lomita	2,501	0	0.0%
LACWWD #29	10,388	0	0.0%
Manhattan Beach	6,781	272	4.0%
Regional Alliance Total	41,305	8,240	19.9%

Table 3-8 shows the resulting 10- to 15-year base period and Table 3-9 shows the five-year base period that will be used for each Regional Alliance member. The base periods were selected by determining the most appropriate set of years to represent each Regional Alliance members' baseline use given the methodologies available through DWR.

Table 3-8: Regional Alliance 10- to 15-Year Base Periods

West Basin 20x2020 Regional Alliance	Start Year	End Year	Total Years
California Water Service - Hawthorne	1997	2006	10
El Segundo	2001	2010	10
Lomita	1995	2004	10
LACWWD #29	1999	2008	10
Manhattan Beach	1995	2004	10

Table 3-9: Regional Alliance 5-Year Base Period

Regional Alliance 5-Year Base Periods		
West Basin 20x2020 Regional Alliance	Start Year	End Year
California Water Service - Hawthorne	2003	2007
El Segundo	2003	2007
Lomita	2003	2007
LACWWD #29	2004	2008
Manhattan Beach	2003	2007

Step 2: Estimate Distribution System Area and Population

The composition of the Regional Alliance member distribution system boundaries does not match the West Basin service area. Therefore, the distribution service area descriptions and maps for each member of the Regional Alliance are provided as part of the individual agency 2015 UWMPs and not within West Basin's 2015 UWMP.

The service area population for each agency was determined independently as part of the demand forecasting model development. The service area populations used came from the SCAG and Department of Finance projections based upon 2010 census data and predicted economic growth. The population for each Regional Alliance member for each of the base years is provided in Table 3-10 through Table 3-15.

Step 3: Calculate Gross Water Use

Gross water use for each year within the base year range was provided by each agency. The gross water use for each Alliance member was calculated using DWR's Methodology 1 and is described in more detail within each of the Alliance member 2015 UWMPs.

Step 4: Calculate Base Per Capita Demand

An annual per capita use was determined by dividing the actual potable water produced for each Regional Alliance member by the corresponding service area populations that were determined in Step 3 for each of the base year ranges. A final base gross water use is calculated by taking the average per capita use for all years within the selected 10-year range (as shown in Table 3-10). These calculations are shown in Table 3-10 through Table 3-15.

The five-year base range was used to calculate average gross water use more recently to determine if any Regional Alliance members are already below the DWR 100 gpcd threshold. Those members with use lower than 100 gpcd would not be required to meet any further demand reductions.

**Table 3-10: California Water Service (Hawthorne)
Base Daily Per Capita Water Use**

California Water Service (Hawthorne) Base Daily per Capita Water Use				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1997	42,980	4,898	102
Year 2	1998	42,964	4,772	99
Year 3	1999	43,012	4,623	96
Year 4	2000	43,088	4,765	99
Year 5	2001	42,735	4,737	99
Year 6	2002	42,717	4,739	99
Year 7	2003	42,710	4,817	101
Year 8	2004	42,807	4,936	103
Year 9	2005	42,866	4,804	100
Year 10	2006	42,884	4,665	97
10-15 Year Average Baseline GPCD				99
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
Year 1	2003	42,710	4,817	101
Year 2	2004	42,807	4,936	103
Year 3	2005	42,866	4,804	100
Year 4	2006	42,884	4,665	97
Year 5	2007	42,919	4,613	96
5 Year Average Baseline GPCD				99

**Table 3-11: City of El Segundo
Base Daily Per Capita Water Use**

City of El Segundo Base Daily per Capita Water Use				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2001	16,200	14,528	801
Year 2	2002	16,363	9,331	509
Year 3	2003	16,506	8,543	462
Year 4	2004	16,612	8,320	447
Year 5	2005	16,649	8,492	455
Year 6	2006	16,600	8,363	450
Year 7	2007	16,599	8,861	477
Year 8	2008	16,547	9,085	490
Year 9	2009	16,581	8,795	474
Year 10	2010	16,560	10,632	573
10-15 Year Average Baseline GPCD				514
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
Year 1	2003	16,506	8,543	462
Year 2	2004	16,612	8,320	447
Year 3	2005	16,649	8,492	455
Year 4	2006	16,600	8,363	450
Year 5	2007	16,599	8,861	477
5 Year Average Baseline GPCD				458

**Table 3-12: City of Lomita
Base Daily Per Capita Water Use**

City of Lomita Base Daily per Capita Water Use				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	18,514	2,555	123
Year 2	1996	18,487	2,649	128
Year 3	1997	18,524	2,376	115
Year 4	1998	18,634	2,588	124
Year 5	1999	18,753	2,741	130
Year 6	2000	18,985	2,768	130
Year 7	2001	19,176	2,681	125
Year 8	2002	19,368	2,835	131
Year 9	2003	19,499	2,822	129
Year 10	2004	19,580	2,791	127
10-15 Year Average Baseline GPCD				126
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
Year 1	2003	19,499	2,822	129
Year 2	2004	19,580	2,791	127
Year 3	2005	19,565	2,644	121
Year 4	2006	19,433	2,596	119
Year 5	2007	19,336	2,681	124
5 Year Average Baseline GPCD				124

**Table 3-13: City of Manhattan Beach
Base Daily Per Capita Water Use**

City of Manhattan Beach Base Daily per Capita Water Use				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	32,445	6,390	176
Year 2	1996	32,721	6,674	182
Year 3	1997	32,998	6,897	187
Year 4	1998	33,279	6,598	177
Year 5	1999	33,558	7,011	187
Year 6	2000	33,833	6,807	180
Year 7	2001	33,972	6,641	175
Year 8	2002	34,105	6,817	178
Year 9	2003	34,241	6,740	176
Year 10	2004	34,374	6,907	179
10-15 Year Average Baseline GPCD				180
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
Year 1	2003	34,241	6,740	176
Year 2	2004	34,374	6,907	179
Year 3	2005	34,507	6,666	172
Year 4	2006	34,640	6,809	175
Year 5	2007	34,773	6,303	162
5 Year Average Baseline GPCD				173

**Table 3-14: Los Angeles County Waterworks District #29
Base Daily Per Capita Water Use**

Los Angeles County Waterworks District #29 Base Daily per Capita Water Use				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	29,753	9,552	287
Year 2	2000	29,984	9,804	292
Year 3	2001	30,175	9,326	276
Year 4	2002	30,300	10,403	307
Year 5	2003	30,322	10,307	303
Year 6	2004	30,737	10,714	311
Year 7	2005	30,900	9,817	284
Year 8	2006	31,053	10,241	294
Year 9	2007	31,141	10,969	314
Year 10	2008	31,204	10,388	297
10-15 Year Average Baseline GPCD				297
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AFY)	Daily Per Capita Water Use (GPCD)
Year 1	2004	30,737	10,714	311
Year 2	2005	30,900	9,817	284
Year 3	2006	31,053	10,241	294
Year 4	2007	31,141	10,969	314
Year 5	2008	31,204	10,388	297
5 Year Average Baseline GPCD				300

Table 3-15: Combined West Basin Regional Alliance-Base Daily Per Capita Water Use

Combined West Basin Regional Alliance Base Daily per Capita Water Use	
Baseline Period	Regional Average Baseline (GPCD)
10-15 year	211
5 Year	204

3.3.3 Regional Alliance Water Use Targets

The Regional Alliance water use targets were calculated by first determining which of the four allowable target calculation methods would be used for each member of the Regional Alliance. These methods include the following:

- Method 1: 80 percent of ten-year baseline per capita use
- Method 2: Applying performance standards
- Method 3: 95 percent of the DWR South Coast Region target of 149
- Method 4: Applying savings by water sector

These selected methods were applied to the 10-year base per capita water use calculated in Tables 3-10 through 3-15 to determine a target per capita water use level for 2020. Once these targets were determined, they were confirmed by comparing them against DWR's maximum allowable target. The maximum allowable target is equivalent to 95 percent of each Alliance member's five-year base per capita use calculated in Tables 3-10 through Table 3-15.

If the five-year base per capita use was less than 100 gpcd, then there is no maximum target for that supplier since it would be considered by DWR to be sufficiently efficient in water use. If the 2020 calculated target is greater than the maximum allowable target, then the maximum allowable target must be used instead of the calculated 10-year base targets.

Table 3-16 provides the final per capita targets for each member of the Regional Alliance as well as the overall targets for the combined Regional Alliance. Cells highlighted in blue indicate whether the calculated or maximum allowable target was used to determine the final 2020 target. Once the final 2020 water use target has been calculated, then an interim target is created by calculating the median between the 10-year base per capita use and the final 2020 target.

Table 3-16: Regional Alliance 2015 Interim and 2020 Targets

Calculation of Regional Compliance Daily per Capita Water Use						
West Basin 20x2020 Regional Alliance	2015 Service Area Population	Individual Targets 2015 (GPCD) ¹	Maximum 2020 Target (95% of 5-year base per capita use)	Calculated 2020 Target ¹	Individual Targets 2020 (GPCD) ²	Selected Compliance Method
California Water Service - Hawthorne	44,504	97	94	142	94	3
El Segundo	17,000	462	435	411	411	1
Lomita	19,696	121	118	115	115	1
LACWWD #29	30,808	291	285	237	237	1
Manhattan Beach	35,454	162	164	144	144	1
Regional Alliance Total	147,462	198	-	-	175	-

NOTES: Cells highlighted in blue indicate if the maximum 2020 target or the calculated 2020 target was used to determine the 2020 target.
 [1] Data from individual retailer SBx7-7 compliance tables.
 [2] Lowest GPCD figure used to determine 2020 Individual Targets.

Table 3-17 represents a comparison of the 2015, 5-year base, 10-year base and 2020 target water use for each Regional Alliance member. Table 3-18 shows that the region has achieved the targeted reduction for 2015.

Table 3-17: Regional Alliance Base and Target Use Summary

Regional Alliance Base and Target Use Summary					
2015 Service Area Population	Baseline GPCD (5 year)	Baseline GPCD (10-15 year)	Actual 2015 GPCD	2015 Target GPCD	2020 Target GPCD
147,462	204	211	157	198	175

Table 3-18: 2015 Regional Alliance Compliance

2015 Regional Alliance Compliance		
Actual 2015 GPCD	2015 Interim Target GPCD	Did Supplier Achieve Targeted Reduction for 2015? Y/N
157	198	Yes

3.4 Water Use Reduction Plan

In order to meet the 2020 use targets calculated in Table 3-16, West Basin has collaborated with its Regional Alliance agencies to develop individual Water Use Efficiency Master Plans. These plans were completed in May 2011. Table 3-19 identifies several key programs already identified for implementation that will help the Regional Alliance achieve or even go beyond the required water use targets. These projects have been implemented during the period of 2010-2015 and some of them will continue beyond 2015.

Table 3-19: West Basin and Retailer Program Participation

Programs	California Water Service - Hawthorne	City of El Segundo	City of Lomita	Los Angeles County WaterWorks District #29	City of Manhattan Beach	West Basin
Metropolitan						
Residential Rebate Program	X	X	X	X	X	X
Save A Buck Rebate Program	X	X	X	X	X	X
West Basin						
High-Efficiency Toilet (HET) Distribution Events	X	X	X	X	X	X
Green Living for Apartments and Condos (Direct HET Installations)	X	X	X	X	X	X
Ocean Friendly Landscape Program	X	X	X	X	X	X
Complete Restroom Retrofit Program	X	X	X	X	X	X
Recirc & Save Program	X	X	X	X	X	X
Cash for Kitchens	X	X	X	X	X	X
Education Programs	X	X	X	X	X	X
Water & Energy Efficiency in the Motel/Hotel and Schools Sectors	X	X	X	X	X	X
Greywater Workshops	X	X	X	X	X	X
Rain Barrel Distribution Events	X	X	X	X	X	X
Regional Landscape Water Efficiency Program (Turf Removal)	X	X	X	X	X	X
Landscape Irrigation Efficiency Program (LIEP)	X	X	X	X	X	X
Car Wash Coupon Program	X	X	X	X	X	X
Weather-Based Irrigation Controller (WBIC) Events	X	X	X	X	X	X
Home Depot Plant Sales	X	X	X	X	X	X
West Basin Programs (Funding Pending)						
High-Efficiency Nozzle Program	X	X	X	X	X	X
Water Star Schools Pilot Program	X	X	X	X	X	X
Greywater Workshops	X	X	X	X	X	X
Other Water Retailer						
Turf Removal Program	X	-	-	-	-	N/A
HET Rebates (CII)	-	-	-	X	-	N/A
Landscape Surveys	X	-	-	X	-	N/A
Education Programs	X	X	X	X	X	N/A
Landscape Incentives	X	-	-	X	-	N/A



Section 4 | **Water Supplies**

Section 4 | Water Supplies



It is West Basin’s mission to ensure a safe, adequate and reliable supply of water for the communities it serves. Continued challenges to imported water reliability resulting from shifting climate patterns that are resulting in more frequent droughts, combined with increasing regulatory restrictions on State Water Project (SWP) exports through the Sacramento -San Joaquin Delta, have continued to focus West Basin to further diversify its supply portfolio. West Basin’s diversification strategy consists of expanded recycled water production and distribution, ocean water desalination supply development, and increased conservation savings through its Water Reliability Program.

This section provides an overview of the current and future water supplies needed to meet the expected demands and enhance reliability within the West Basin service area. Although West Basin does not provide all of the supplies needed to meet these demands, this 2015 UWMP provides a complete picture of the historical and projected supplies to be used by its retail agencies to meet the overall demand within West Basin’s service area.

While this section provides a discussion of the more traditional imported and groundwater supplies, alternative supplies, such as recycled water and desalinated ocean water and brackish water, are discussed within Sections 9 and 10 respectively. Water quality for all supplies is discussed in Section 6 of this UWMP.

4.1 West Basin Service Area Water Supply Portfolio

Since its formation in 1947, West Basin has fulfilled its responsibility of providing its customer agencies with supplemental water supplies to meet increasing regional demands. Prior to West Basin, the average customer agency operating within the area relied completely on groundwater.

Historically, West Basin’s primary supply source was imported water from Metropolitan. Initially this was 100% Colorado River Aqueduct (CRA) water until the 1970s when the State Water Project began operating and West Basin received a combination of CRA water and SWP water. However, in the 1990s West Basin began increasing its development of local supplies in response to the declining reliability of imported water. A combination of regulatory constraints on supplies from the Bay-Delta, the increasing frequency of cyclical droughts and uncertainties surrounding climate change have justified the continued need to develop local supplies and aggressively pursue reducing water demand through conservation. West Basin has been able to support the diversification of supplies available to its retail agencies to date primarily through the development of recycled and conserved water supplies. These supplies are served directly to its customer agencies and indirectly as the replenishment supplies necessary to maintain groundwater production.

As Tables 4-1 and 4-2 show, West Basin is projecting to continue to improve the reliability of its supplies to its customer agencies by increasing recycled water supplies as well as potentially investing in over 20,000 AFY of desalinated ocean water supply. Coupled with an additional increase of conserved supply through water use efficiency programs, the overall imported water use is expected to be reduced from current levels by 17 percent within the next 20 years.

**Table 4-1: West Basin’s Service Area Current Water Supplies (AFY)
(West Basin-Developed Supplies Only)**

Wholesale: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield (optional)
Desalinated Water	Brackish groundwater	690	Drinking Water	
Purchased or Imported Water	Direct Use and Replenishment	105,569	Drinking Water	
Recycled Water	Delivery for the West Basin service area only	29,110	Recycled Water	
Total		135,369	-	-

**Table 4-2: West Basin’s Service Area Projected Water Supplies (AFY)
(West Basin-Developed Supplies Only)**

Wholesale: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply <i>Report To the Extent Practicable</i>				
		2020	2025	2030	2035	2040 (opt)
		Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Desalinated Water	Brackish groundwater	1,000	1,000	1,000	1,000	1,000
Desalinated Water	Ocean Water	0	21,500	21,500	21,500	21,500
Purchased or Imported Water	Direct Use and Replenishment	98,426	77,654	77,673	77,913	77,491
Recycled Water	Delivery for the West Basin service area only	38,894	44,135	44,135	44,135	44,135
Total		138,320	144,289	144,308	144,548	144,126

Today, these agencies rely on an increasingly diverse mix of water resources provided by West Basin including: 57 percent imported, 9 percent non-potable recycled water, 16 percent conserved supply through water use efficiency measures, and less than 1 percent desalinated brackish groundwater (18 percent is provided by groundwater that is not managed by West Basin).

It is projected that by 2040, the resource mix on average will be 41 percent imported, 24 percent non-potable recycled water, 12 percent desalinated ocean water and brackish groundwater, and 23 percent conservation as shown in Figure 4-1.

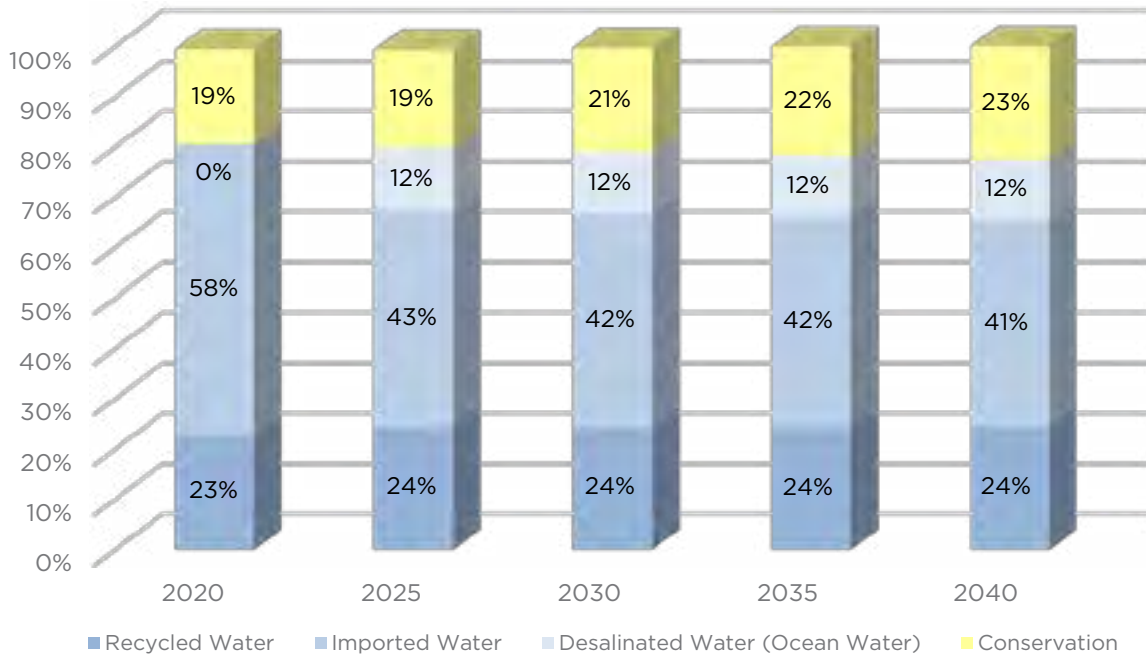
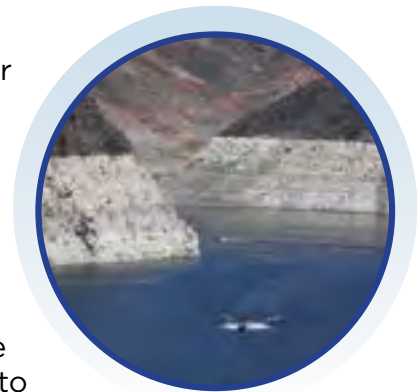


Figure 4-1: West Basin Service Area Projected Water Supplies

4.2 Imported Water Supply

West Basin purchased 105,569 AF of water from Metropolitan to meet retail demand in 2015. Metropolitan supplies originate from the CRA and SWP to meet West Basin’s retail and replenishment demands. In recent years, Metropolitan’s imported supplies have become increasingly restricted given more frequent and prolonged droughts, and recent court-ordered Bay-Delta export restrictions that have limited the amount of SWP water available for use.

These restrictions have resulted in shortage allocations for West Basin in three of the past eight years and limited availability of water for basin replenishment use. As a result, West Basin has been challenged to maximize the efficient use of this supply as well as explore ways to continue to develop alternative supplies. This challenge has resulted in West Basin’s goal of reducing its projected need for imported water supplies from about 57 percent today to 43 percent by 2025, reducing the overall energy use of West Basin’s sources and shifting to locally-produced reliable water supplies.



Lake Mead near Hoover Dam, 2015

4.2.1 Colorado River Resources

Metropolitan owns and operates the CRA, which connects the Colorado River to Metropolitan's regional distribution system. The CRA has a capacity of 1.25 Million AFY (MAF) to transport Metropolitan's current contracted entitlement of 550 Thousand AFY (TAF) of Colorado River water. Metropolitan maintains a full aqueduct of deliveries in most years through a variety of innovative partnerships and programs with other Colorado River users.



Colorado River Aqueduct

Metropolitan and the State of California have acknowledged that they could obtain less water from the Colorado River in the future. The U.S. Secretary of Interior asserted that California had to limit its use of Colorado River supplies to 4.4 MAF per year, plus any available surplus water. California's Colorado River Water Use Plan characterizes how California would develop a combination of programs to meet this limit as well as how to use any available surplus water. In 2003, the Quantification Settlement Agreement (QSA) among California agencies with Colorado River rights established the baseline water use for each of the agencies and facilitates the transfer of water from agricultural agencies to urban uses. The QSA is currently ruled as invalid due to multiple legal proceedings that have taken place over the past eight years. Metropolitan has filed appeals that will stay the ruling until the outcome of the appeal. If the ruling stands, it could delay and potentially increase the cost of the QSA's supply development programs.

Metropolitan has developed a number of supply and conservation programs to increase the amount of supply available from the CRA. However, other users along the River have rights that will allow their water use to increase as their water demands increase. The Colorado River faces long-term challenges of water demands exceeding available supply with additional uncertainties due to climate change. Because Metropolitan holds the lowest priority rights in California during a normal Lake Mead storage condition, future supplies available could decrease.

The Colorado River Basin has been experiencing a prolonged drought, where runoff above Lake Powell has been below average for twelve of the last sixteen years. Within those sixteen years, runoff in the Colorado River Basin above Lake Powell from 2000 through 2007 was the lowest eight-year runoff on record. While runoff returned to near normal conditions during 2008-2010, drought returned in 2012 with runoff in 2012 being among the four driest in history. During these drought conditions, Colorado River system storage has decreased to 50 percent of capacity.

4.2.2 State Water Project Resources

The SWP is operated by DWR and is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water. The SWP is the largest state-built, multipurpose, user-financed water project in the United States. Nearly two-thirds of residents in California receive at least part of their water from the SWP with approximately 70 percent of SWP's contracted water supply going to urban users and 30 percent to agricultural users. The primary purpose of the SWP is to divert and store water during wet periods in Northern and Central California and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California.

The availability of water supplies from the SWP can be highly variable. A wet water year may be followed by a dry or critically dry year. Depending on the water supply availability, water supply agencies may implement increased conservation measures or explore new local projects and supplies.

The Sacramento-San Joaquin River Delta (Delta) is key to the SWP's ability to deliver water to its agricultural and urban contractors. All but five of the 29 SWP contractors receive water deliveries below the Delta (pumped via the Harvey O. Banks or Barker Slough pumping plants). However, the Delta faces many challenges concerning its long-term sustainability such as climate change posing a threat of increased variability in floods and droughts. Sea level rise complicates efforts in managing salinity levels and preserving water quality in the Delta to ensure a suitable water supply for urban and agricultural use. Furthermore, other challenges include continued subsidence of Delta islands, many of which are below sea level, and the related threat of a catastrophic levee failure as the water pressure increases, or as a result of a major seismic event.

Ongoing regulatory restrictions, such as those imposed by federal biological opinions on the effects of SWP and the federal Central Valley Project (CVP) operations on certain marine life, also contributes to the challenge of determining the SWP's water delivery reliability.

In dry, below-normal conditions, Metropolitan has increased the supplies delivered through the California Aqueduct by developing flexible CVP/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Harvey O. Banks pumping plant capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions. In addition, the



California Aqueduct

California State Water Resources Control Board (SWRCB) has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level.

The California WaterFix (formerly the Bay Delta Conservation Plan or BDCP) is being prepared through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties. At the outset of the BDCP process, a planning agreement was developed and executed among the participating parties, and a Steering Committee was formed. The plan was to identify a set of water flow and habitat restoration actions that would contribute to the recovery of endangered and sensitive species and their habitats in California's Bay-Delta. The goal of the BDCP was to provide for both species/habitat protection and improved reliability of water supplies.

The First Administrative Draft of the BDCP was released in March 2012. The Administrative Draft Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) analyzed 15 alternatives, including a broad combination of water delivery configurations, capacities, operations and habitat restoration targets, as well as a no action alternative. The alternatives are the result of public scoping sessions conducted in 2008 and 2009, the Sacramento-San Joaquin Delta Reform Act, ongoing public discussions, and input from responsible/trustee state agencies and NEPA cooperating agencies.

In July 2012, Governor Jerry Brown and U.S. Interior Secretary Ken Salazar outlined revisions to the proposed BDCP plan, along with a full range of alternative proposals. Elements of the preferred proposal include construction of two side-by-side tunnels and water intake facilities with a total capacity of 9,000 cfs - down from the earlier proposal of 15,000 cfs. Operation of the facilities was planned to be phased in over several years.

Throughout 2012 and 2013, additional public meetings were held to answer questions and gather public comments. In August 2013, an optimized proposal was released that balanced costs, engineering design, and ease of construction while significantly reducing local dislocation and disturbance in the Delta. In December 2013, the State released the Draft BDCP and the Draft EIR/EIS. The documents detailed 22 specific actions, called Conservation Measures, which included new water delivery facilities in the north Delta, as well as measures to restore or protect up to 150,000 acres of habitat and measures to address other stressors to fish and wildlife in the Delta.



In April 2015, State agencies announced a modified preferred alternative, Alternative 4A. Alternative 4A (California WaterFix) was developed as the new California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) Preferred Alternative, replacing Alternative 4 (the proposed BDCP). Alternative 4A includes the conveyance facilities proposed under Alternative 4 and those mitigation measures and environmental commitments needed to obtain necessary permits and authorizations for implementation under Section 7 of the Federal Endangered Species Act (ESA) and through the California Department of Fish and Wildlife's 2081(b) process.

California WaterFix and EcoRestore would be implemented under different Federal and State ESA regulatory permitting processes (Section 7 versus Section 10(a) of the Federal ESA, and pursuant to section 2081 of the State ESA instead of the Natural Community Conservation Planning Act). This would fulfill the requirement of the 2009 Delta Reform Act to contribute toward meeting the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem.

The new water conveyance facilities would be constructed and operated under the California WaterFix, which proposes design changes to the water conveyance facilities. Refinements to the design reduce the overall environmental/construction impacts, and increase long term operational and cost benefits. Some of the engineering configuration improvements include moving the tunnel alignment away from local communities and environmentally sensitive areas. Reconfiguration of intake and pumping facilities lessen construction impacts in local communities and longer term operational impacts.

The main objective under the EcoRestore Program is the restoration of at least 30,000 acres of Delta habitat, with the near-term goal of making significant strides toward that objective by 2020. These restoration programs would include projects and actions that are in compliance with preexisting regulatory requirements designed to improve the overall health of the Delta. Other priority restoration projects would also be identified by the Sacramento-San Joaquin Delta Conservancy and other agencies and local governments. Funding would be provided through multiple sources, including various local and federal partners, state bonds, and other state-mandated funds. SWP/CVP contractors would provide funds as part of existing regulatory obligations. The California WaterFix is being evaluated in the partially Recirculated Draft EIR/Supplemental EIS released in July 2015. In that document, the cumulative impacts of the California WaterFix and EcoRestore Program are evaluated, along with other reasonably foreseeable future projects.

4.2.3 Types of Metropolitan Supply

Metropolitan offers different types of imported water to its member agencies depending on the ultimate use. Among them, West Basin has delivered Non-Interruptible Water (treated full-service) and historically, Seasonal Treated Replenishment Water (in-lieu replenishment).

Non-Interruptible Water is the treated firm supply that is available all year and not subject to interruption. Historically, West Basin has delivered an average of about 150,000 AFY of non-interruptible water. It is used as the main supplemental supply to several cities and water agencies that pump groundwater as their base supply and as the only potable supply for the West Basin retail water agencies. Imported water also fulfills a portion of the supplies for the Dominguez Gap Seawater Barrier and the West Coast Basin Seawater Barrier.

Seasonal Treated Replenishment Water was last used by West Basin's customer agencies in FY 2007 and is a program that is no longer available.

4.3 Groundwater Supply

Although West Basin does not supply groundwater to retail agencies, it does supply a portion of the supply used for groundwater replenishment. Groundwater has for many years represented roughly a fifth of the supply used to meet overall demand within West Basin's service area. Today, customer agencies operating within West Basin's service area collectively rely on groundwater production to meet just over 20 percent of their cumulative retail demand and this is expected to continue through 2040. A portion of West Basin's water supply portfolio is desalinated brackish groundwater. Currently, 690 AF of their water supply is from brackish groundwater. More detailed information concerning West Basin's desalinated water usage can be found in Section 10.

The WCGB covers approximately 140 square miles and is bounded on the north by the Baldwin Hills and the Ballona Escarpment, on the east by the Newport-Inglewood Uplift, to the south by San Pedro Bay and the Palos Verdes Hills, and to the west by Santa Monica Bay. Aquifers in the WCGB are generally confined and receive the majority of their natural recharge from adjacent groundwater basins or from the Pacific Ocean (seawater intrusion). Figure 4-2 displays the location of the WCGB within the WRD service area.



West Basin overlies nearly all of the adjudicated WCGB. In the early 1940s, extensive over pumping of the WCGB had led to critically low groundwater levels, resulting in seawater intrusion along the coast, serious overdraft, and the decline of water levels. Annual pumping prior to the adjudication of groundwater rights in the early 1960s reached levels as high as 94,100 AF. This situation precipitated an adjudication that limits the allowable extraction that could occur in any given year and assigned water rights to WCGB pumpers. The adjudication for the WCGB was set at 64,468.25 AFY (as shown in Table 4-3). This amount was set higher than the natural replenishment amounts, creating an annual deficit known as the “Annual Overdraft.” In order to combat this Annual Overdraft, WRD purchases and recharges additional water to make up for the overdraft.

In December 2014, the Superior Court granted a motion by WRD, City of Inglewood, City of Long Beach, City of Manhattan Beach, City of Los Angeles, City of Torrance, California Water Service, Golden State Water Company and other parties to amend the West Coast Basin Judgment to establish a legal framework for the storage and extraction of stored water in the West Coast Basin. The Judgment Amendment will permit the storage of up to 120,000 acre-feet, which is the available, safe storage capacity of that basin. The legal framework permits a groundwater pumper with adjudicated rights to store water and subsequently extract that stored water without the extraction counting against its water rights and without having to pay the Replenishment Assessment (RA). The Judgment Amendment makes possible the storage of

“surplus” imported water in the rare instances when it is available for use in the more frequent instances when it is not, further enhancing the region’s water supply reliability.

The court’s decision culminated a journey that started in 1999. After a failed facilitated process among the multiple water rights stakeholders and WRD and a two-year state-sponsored mediated effort that resulted in the filing of the petition in April 2009, several legal challenges travelled to the Appellate court for resolution. After several rounds of negotiation and modest changes to the petition, the parties that originally opposed the petition ended up supporting it. Pursuant to the Judgment Amendment, WRD assumed administrative Watermaster duties from the California Department of Water Resources on July 1, 2015.

Table 4-3: West Coast Groundwater Pumping Rights (AFY)

Retail Agencies	2014-2015 Pumping Rights
California Water Service - Dominguez	10,417
California Water Service Co. - Hawthorne	1,882
California Water Service Co. - Hermosa/Redondo	4,070
Golden State Water Co.	7,502
City of El Segundo	953
City of Inglewood	4,450
City of Lomita	1,352
City of Manhattan Beach	1,131
Non-Retail Water Pumpers ¹	32,710
Total	64,468

Source: West Coast Basin Watermaster Report, WRD: FY 2014-15.

[1] Water right holders that are not water retail agencies: i.e. Nurseries, Cemeteries, Industries, and Refineries.

To allow full WCGB rights to be pumped while limiting seawater intrusion, WRD purchases non-interruptible imported and recycled water supplies from West Basin for injection by the Los Angeles County Department of Public Works at the West Coast and Dominguez Gap Seawater Intrusion Barriers. WRD is the entity responsible for maintaining and replenishing the WCGB. WRD is a special district created by the State and governed by a five-member elected body to replenish and protect the WCGB with imported water and recycled water (WRD, Engineering Survey and Report, May 2015).

Two of West Basin’s retail agencies also import groundwater from outside the West Basin service area from the adjacent Central Groundwater Basin to meet their demand (California American Water Co. and California Water Service - Dominguez). The financial costs to pump groundwater have been and are projected to remain less than the cost to purchase imported water so it can safely be assumed that water retailers will continue to maximize their groundwater rights.

As evidenced in Table 4-4 below, the volume of groundwater pumped during the last five years from the West Coast and Central Groundwater Basins has been declining due to strong water conservation efforts as a result of the drought, short term water quality problems with some retailer’s systems, and a temporary tightening of the lease market reducing available rights. The reduction in pumping caused a rebound in groundwater levels in the WCGB despite the lack of rainfall.

Table 4-4: Groundwater Volume Pumped (AF)

Basin Name(s)	2010	2011	2012	2013	2014	2015
West Coast Basin	35,782	34,646	33,701	31,381	31,288	28,700
Central Basin	4,909	5,636	4,867	4,793	5,537	4,294
Total	40,691	40,283	38,568	36,174	36,825	32,994

Source: WRD, Monthly Production Reports.

Table 4-5: shows the historical groundwater replenishment supplies for the West Coast and Dominguez Gap Barriers.

Table 4-5: Historical Groundwater Replenishment Supply (AF)

	2010	2011	2012	2013	2014
West Coast Barrier					
Imported Water	8,145	9,914	3,879	8,738	5,826
Recycled Water	7,797	7,320	6,566	6,622	12,372
Sub-Total	15,941	17,233	10,445	15,360	18,198
Dominguez Gap Barrier					
Imported Water	4,909	3,620	4,625	2,582	3,460
Total	20,851	20,853	15,070	17,942	21,658

Source: WRD, Monthly Production Reports.

Table 4-6 shows the projected retail groundwater production to meet West Basin service demands through 2040.

Table 4-6: Current and Projected Retail Groundwater Supply (AF)

Basin Name(s)	2015	2020	2025	2030	2035	2040
West Coast Basin ¹	28,700	31,570	31,570	31,570	31,570	31,570
Central Basin	4,294	4,723	4,723	4,723	4,723	4,723
Total	32,994	36,293	36,293	36,293	36,293	36,293

[1] Inside the service area only.

Source: 2015 figure based on actual usage. Projection based on projected 10 percent increase after 2015 due to the recent amended judgement for the two groundwater basins.

Table 4-7 shows the projected replenishment (or seawater intrusion barrier) supplies to be met by West Basin’s retail agencies through 2040.

Table 4-7: Current and Projected Replenishment Groundwater Supply (AF)

	2015	2020	2025	2030	2035	2040
Imported Water ¹	7,354	3,800	-	-	-	-
Recycled Water ²	12,403	17,000	17,000	17,000	17,000	17,000
Total	19,757	20,800	17,000	17,000	17,000	17,000

[1] Imported water deliveries to the West Coast Barrier end after 2015. Deliveries to the Dominguez Gap Barrier end after 2020 when it is expected to be provided recycled water by the Los Angeles Department of Water and Power.

[2] Recycled water deliveries provided only to the West Coast Barrier.

4.4 Water Transfers and Exchanges

Water transfers and exchanges are management tools to address increased water needs in areas of limited supply. Although transfers and exchanges of water do not generate new supply, these management tools distribute water where it is abundant to where it is limited.

Metropolitan has played an active role statewide in securing water transfers and exchanges as part of their planning goals. Although West Basin is a member of Metropolitan, West Basin has yet the need or opportunity to directly pursue a water transfer. It is important to note that in the current 4-year drought California is experiencing, runoff in northern California watersheds in 2014 and 2015 were so low that virtually no transfer water was available and Metropolitan was not able to use transfers from those sources to supplement available supplies. The lack of transfer water during very severe and prolonged droughts as the state has been experiencing places greater dependence on stored water during shortages and illustrates the benefits of local supplies that reduce the demand on Metropolitan in dry years and times of shortage.

4.5 Alternative Sources of Supply

West Basin is actively diversifying its water supply portfolio beyond traditional imported water and groundwater supplies. This 2015 UWMP dedicates entire sections to discuss the alternative supply projects and programs such as recycled water (Section 9), desalinated ocean water and brackish groundwater (Section 10), and increased water use efficiency programs (Section 7). West Basin is pursuing these alternative supplies as part of its Water Reliability initiative.



Section 5 | **Water Supply Reliability**

Section 5 | Water Supply Reliability

Every urban water supplier is required to assess the reliability of its water service to its retail agencies under normal, dry, and multiple-dry years. There are various factors that may impact reliability of supplies such as legal, environmental, water quality, and climatic, which are discussed below. These factors can result in immediate (facility failures), near-term (SWP limitations), or long-term (climate change) impacts to reliability and must therefore be considered in future planning.

The impacts of these factors on reliability increase under single-dry and multiple-dry year hydrologic patterns. West Basin’s Water Reliability Program goal to expand and further diversify its supply portfolio is the most important step toward improving the reliability of supplies. West Basin has completed comprehensive water shortage contingency planning to provide reliability in the event of a water shortage. Based on current conditions, West Basin’s estimate of the minimum available water supply for the next three years is shown in Table 5-1. Expected water supply for normal and single and multiple-dry years is discussed later in this section.

Table 5-1: Minimum Available Water Supply (AF)

Wholesale: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	138,320	138,320	138,320
NOTES: Metropolitan Demand Forecast.			

5.1 Potential Impacts to Reliability

Reliability within the West Basin service area is a composite of the reliability of each source of supply. Further explanations of some of the factors identified by West Basin that may have an impact on reliability are included in the following subsections.

5.1.1 Imported Water Reliability

As discussed in Section 4, Metropolitan has and will continue to contend with considerable challenges to maintaining a reliable source of imported water supply for its member agencies. After learning from the droughts of 1977-78 and 1989-92, Metropolitan, in conjunction with its member agencies, instituted a resources planning process that is based on diversification of the region’s water supply portfolio and continued efficient water use. This integrated resource planning process has recognized that only through a mix of imported and member agency local supplies, along with aggressive implementation

of water conservation, can the Metropolitan service area attain overall reliability of water supply. This integrated planning effort has resulted in the following documents:

- 1996, 2004, 2010, and 2015 Integrated Resources Plans (IRP): Metropolitan's IRP process assessed potential future regional demand projections based upon anticipated population and economic growth as well as conservation potential. The IRP also includes regional supply strategies and implementation plans to better manage resources, meet anticipated demand, and increase overall system reliability.
- 1999 Water Surplus and Drought Management Plan (WSDM): The WSDM provides the policy guidance to manage the region's water supplies by integrating the operating activities of supply surplus and shortage to achieve the reliability goals of the IRP.
- 2015 Water Supply Allocation Plan (WSAP): The WSAP includes the specific formula for calculating member agency supply allocations and the key implementation elements needed for administering the allocation. The need for the WSAP arose after the 2008 Bay-Delta biological opinions and rulings that limited SWP supplies to its contractors including Metropolitan. The WSAP formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level for shortages of Metropolitan supplies up to 50 percent.

All of these planning documents recognize that the reliability of the Metropolitan service area is dependent on improving the reliability of imported supplies from the Colorado River and State Water Project as well as the successful implementation of future local supplies and conservation. Metropolitan is a supplemental supplier of water to Southern California and that regional reliability cannot be achieved without successfully addressing challenges to imported water reliability, developing reliable local supplies and water use efficiency. This dependence on an integrated approach to water reliability and diversification of supplies has been the foundation of DWR's Bulletin 160, the State Water Plan, through its last several updates and is the cornerstone of Governor Brown's Water Action Plan. Some of the most significant factors affecting reliability for imported water supplies include legal, environmental, water quality and climatic changes. As noted above, successful implementation of Metropolitan's UWMP is dependent on the continued successful implementation by local agencies, such as West Basin, of local water supply projects.

5.1.2 Legal

The federal and state Endangered Species Acts permitting strategy of the California WaterFix has changed from a Section 10 Habitat Conservation Plan (HCP)/ Natural Communities Conservation Plan (NCCP) under the Bay Delta Conservation Plan (BDCP) to a Section 7 Consultation. A HCP/NCCP provides long term guarantees and protection from additional listing of species. A Section 7 Consultation does not provide those same guarantees and the addition of more species under the federal Endangered Species Act and new regulatory requirements could impact SWP operations. These potential future listings and new regulations could result in additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations and supply availability to Metropolitan.



Edward C. Little Water Recycling Facility (El Segundo, CA)

5.1.3 Environment

Endangered species protection needs in the Delta have resulted in operational constraints to the SWP system, as mentioned previously in Section 4.

5.1.4 Water Quality

Metropolitan is responsible for providing high quality potable water throughout its service area. However, changes in water quality due to various reasons may affect the reliability of imported water to Metropolitan. More information concerning the water quality of West Basin's supplies can be found in Section 6.

5.1.5 Climate Change

Changing climate patterns are expected to continue to shift precipitation patterns and affect water supply. Unpredictable weather patterns will make water supply planning more challenging. The areas of concern for California include a reduction in Sierra Nevada Mountain snowpack, increased intensity and frequency of extreme weather events, and rising sea levels causing increased risk of Delta levee failure, seawater intrusion of coastal groundwater basins, and potential cutbacks on the SWP and CVP.

Climatic factors will likely have significantly more impact on future viability of imported supplies than either legal, water quality, or environmental factors. Climatic conditions have been projected based on historical patterns but severe pattern changes are still a possibility in the future. Much of Metropolitan's infrastructure investments over the last 20 years, Diamond

Valley Lake, Central Valley groundwater banks and the Inland Feeder pipeline, have been focused on providing more storage and operational flexibility to place water in storage to better manage changes in the hydrologic cycle. With climate change forecasts for earlier season runoff, the use of storage will only gain in importance.



5.1.6 Groundwater Reliability

The reliability of groundwater supplies dictates how much supplemental supply West Basin will need to provide its retail agencies to meet their demands. Groundwater is a highly reliable supply since it is not immediately susceptible to changes in climate and surface flows. However, the two main factors that impact the reliability of groundwater supplies are legal and water quality.

Because the WCGB is an adjudicated basin, pumping limits are established for rights holders. However, changes to basin operations could result from reallocation of pumping rights, opportunities to utilize the WCGB for storage, remediation of contaminated plumes, and pumping capacity for further extraction. Some of these changes are now possible of recently approved amendments to the existing court-ordered judgment, but are largely out of control of West Basin.

The LACDPW owns and maintains the seawater barrier system and determines how much barrier injection water is required in order to protect the aquifer from seawater intrusion. WRD determines how much water is needed to replenish the WCGB to support pumping. West Basin supplies WRD with recycled and imported water to meet these demands.

During the time in which groundwater pumping was exceeding recharge and replenishment, seawater intruded into the WCGB. Once the intrusion barriers were brought on-line, the intrusion was stopped, but a large plume of saline water has remained trapped within the WCGB. The groundwater supply projections have already considered the presence of the plume and therefore anticipate no change in supply reliability as a result of its existence. The saline plume and the methods being employed by WRD, West Basin and other agencies to manage the plume are further discussed in Section 6: Water Quality.

5.1.7 Recycled Water and Ocean Water Desalination Reliability

Hydrologically-dependent supplies such as surface water and groundwater that is dependent on imported surface water for replenishment, present on-going challenges in terms of availability and reliability. West Basin's focus is on improving reliability by expanding its supply mix with hydrologically-

independent supplies. Recycled water and ocean water desalination are reliable water supplies in the West Basin service area because there is a consistent source of water available for treatment. West Basin has completed an ocean water desalination pilot study and a demonstration facility to further determine environmental safeguards, energy and cost savings possible prior to considering a full scale project. During the current unprecedented 4-year state-wide drought, the SWRCB Emergency Regulation for Urban Conservation has increasingly focused on the importance of drought-resilient supplies like recycled water and ocean water desalination to manage and prepare for what are expected to be more frequent and severe future droughts. The planned recycled water and ocean water desalination projects that West Basin intends to implement to improve long term reliability are further detailed in Sections 9 and 10, respectively.

5.1.8 Climate Change Uncertainties

Climate change adds its own new uncertainties to the challenges of planning. As a Metropolitan member agency, West Basin is contributing to Metropolitan's activities to better understand and plan for potential long-term climate change impacts. As a water supplier to its customer agencies, West Basin is enacting resource strategies such as expanded water recycling and development of ocean water desalination supplies that are key elements of adapting to long-term climate change.

According to Metropolitan's 2015 Draft RUWMP, Metropolitan uses historical hydrological data to forecast both the frequency and the severity of future drought conditions, as well as the frequency and abundance of above-normal rainfall. However, weather patterns can be expected to shift dramatically and unpredictably in a climate driven by increased concentrations of carbon dioxide in the atmosphere. Metropolitan is committed to performing its due diligence with respect to climate change.

While uncertainties remain regarding the exact timing, magnitude, and regional impacts of these temperature and precipitation changes, researchers have identified several areas of concern for California water planners. These include:

- Reduction in Sierra Nevada snowpack
- Increased intensity and frequency of extreme weather events
- Rising sea levels resulting in:
 - Increased risk of damage from storms, high-tide events, and the erosion of levees
 - Potential pumping cutbacks on the SWP and CVP
 - Increased threats to coastal groundwater basins



Other important issues of concern due to global climate change include:

- Changes in urban and agricultural demand levels and patterns
- Impacts to human health from water-borne pathogens and water quality degradation
- Declines in ecosystem health and function
- Alterations to power generation and pumping regimes

In March 2002, the Metropolitan Board adopted policy principles on global climate change as related to water resource planning. The Principles stated in part that ‘Metropolitan supports further research into the potential water resource and quality effects of global climate change, and supports flexible “no regret” solutions that provide water supply and quality benefits while increasing the ability to manage future climate change impacts.’ To date, Metropolitan has completed the following actions to meet these Principles:

- Membership in the Water Utility Climate Alliance that has resulted in completion of several activities including:
 - Letter of support for Western Water Assessment’s continued funding as a Regional Integrated Sciences and Assessments team under the National Oceanic and Atmospheric Administration (NOAA)
 - Letter of support for the 2009 Kerry-Boxer Water Utilities Mitigation and Adaptation Partnerships congressional bill addendum
 - Regular communication and consultations with federal agencies on the U.S. Environmental Protection Agency’s Climate Ready Water Utility Working Group
 - NOAA Climate Service and January 2010 International Climate Change Forum
 - Released “Options for Improving Climate Modeling to Assist Water Utility Planning for Climate Change”
- Working with local water supply agencies, state and federal agencies and non-governmental organizations to collaborate on climate change related planning issues.
- Using Metropolitan’s IRP process to incorporate climate change science into regional plans by providing adaptive management strategies, creating buffer supplies, and encouraging the more efficient use of existing supplies.

5.2 Projected Supply Reliability

West Basin receives imported water from Metropolitan through connection to Metropolitan's regional distribution system. Although pipeline and connected capacity do not guarantee the availability of water, per se, they do guarantee the ability to convey water when it is available to the Metropolitan distribution system. The demand and supplies listed below also include local brackish groundwater supplies that are managed by West Basin.

Like most of California, Metropolitan's service area has experienced two severe droughts in the last nine years. Both droughts resulted in water shortages to Metropolitan and cutbacks in supplies to its member agencies. During this current drought, SWP Table A Allocations were at record lows with 5% of requested deliveries being met in 2014 and 20% of requested deliveries in 2015. With an unprecedented fourth consecutive dry year in 2015 the importance of Metropolitan's stored water to regional reliability has become abundantly apparent. During water shortages it is important to analyze reliability in the context of Metropolitan's service area's current experience. In analyzing West Basin's reliability. It is reasonable to assume that in multiple-dry years there will be similar supply availability in the future comparable to what is currently being experienced during this drought. Similarly, Metropolitan would be allocating water to its member agencies under its Water Shortage Allocation Plan (WSAP) and would have 1.7 million acre feet available. That is the approximate amount of available supplies Metropolitan allocated in 2014 and 2015. Because of its storage reserves it is assumed that in normal weather years and single-dry years Metropolitan will be able to meet demands for imported water.

For the 2015 UWMP, the average year was selected as West Basin's 2015 demand. Due to ongoing drought conditions within California and the increased implementation of mitigation measures, 2015 was determined to represent an average water demand for this UWMP.

5.2.1 Single-Dry Year

A single-dry year is defined as a single year of zero to minimal rainfall within a period that average precipitation is expected to occur. West Basin has documented that it is 100 percent reliable for single-dry year demands from 2020 through 2040 with a demand increase of 3 percent using hydrology from 1977 as the single-dry year. Metropolitan projected demands based on historical data and this was compared with average year demand developed by West Basin and Metropolitan. An average was taken of each five-year increment demand increase for Table 5-2.

The extra demand can readily be met with a slight increase in imported water purchases.

5.2.2 Multiple-Dry Year

Multiple-dry years are defined as three or more years with minimal rainfall within a period of average precipitation based on Metropolitan’s RUWMP analysis. West Basin is capable of meeting all retail demands in multiple-dry years from 2020 through 2040 with an average demand increase of 5 percent using 1990-1992 hydrology as the driest years. However, Metropolitan and West Basin’s current experience reminds us that Metropolitan implemented its Water Supply Allocation Plan during the most recent multiple-dry year period in order to preserve storage reserves. As a result, West Basins and its customer agencies faced shortages of imported water then to account for this current experience, West Basin assumes that it would have insufficient supplies to meet demands during the five year increment 2020-2025 given its current supply portfolio as shown in Table 5-5.

Table 5-2: Basis of Water Year Data

Wholesale: Basis of Water Year Data			
Year Type	Base Year	Available Supplies if Year Type Repeats	
		Agency may provide volume only, percent only, or both	
		Volume Available (AF)	% of Average Supply
Average Year	2015	135,369	100%
Single-Dry Year	1977	139,430	103%
Multiple-Dry Years 1st Year	1990	142,137	105%
Multiple-Dry Years 2nd Year	1991	142,137	105%
Multiple-Dry Years 3rd Year	1992	142,137	105%

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.

NOTES: Provided by WBMWD & Metropolitan Demand Projections. Demand includes recycled water, desalination, and imported water with barrier supplies.

As under single-dry year conditions, imported supplies will be purchased to meet any annual increase in demand. As a result, there are no anticipated shortages under the single-dry year scenario. As noted above, under multiple-dry year scenarios West Basin assumed Metropolitan will be facing similar supply constraints and conditions as currently being experienced and will be in allocation.

5.2.3 Supply and Demand Assessment

A comparison between supply and demand for projected years between 2020 and 2040 is shown in Table 5-3. As stated above, the available supply will meet projected demand due to diversified supply and conservation measures.

Table 5-3: Normal Year Supply and Demand Comparison (AF)

Wholesale: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals (autofill from Table 4-2)	138,320	144,289	144,308	144,548	144,126
Demand totals (autofill from Table 3-6)	138,320	144,289	144,308	144,548	144,126
Difference	0	0	0	0	0

A comparison between supply and demand in a single-dry year is shown in Table 5-4. As stated above, the available supply will meet projected demand due to diversified supply and conservation measures.

Table 5-4: Single-Dry Year Supply and Demand Comparison (AF)

Wholesale: Single-Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	142,470	148,618	148,637	148,884	148,450
Demand totals	142,470	148,618	148,637	148,884	148,450
Difference	0	0	0	0	0
NOTES: From WBMWD supplied demand projections, includes imported and desalination brackish/ocean water only.					

A comparison between the supply and the demand in multiple-dry years is shown in Table 5-5.

This analysis assumes Metropolitan is in a similar water supply condition as presently experienced and is allocating supplies to its member agencies according to its policies and has approximately 1.7 MAF available (a Regional Shortage Level 3 cutback under WSAP). It is assumed under WSAP that West Basin will receive approximately 5% of the available supplies being allocated by Metropolitan.

Table 5-5: Multiple-Dry Year Supply and Demand Comparison (AF)

Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Brackish groundwater	1,000	1,000	1,000	1,000	1,000
	Ocean Water	0	21,500	21,500	21,500	21,500
	Imported Water	85,000	84,868	84,888	85,140	84,697
	Recycled Water	38,894	44,135	44,135	44,135	44,135
	Supply totals	124,894	151,503	151,523	151,775	151,332
	Demand totals	145,236	151,503	151,523	151,775	151,332
	Difference	(20,342)	0	0	0	0
Second year	Brackish groundwater	1,000	1,000	1,000	1,000	1,000
	Ocean Water	0	21,500	21,500	21,500	21,500
	Imported Water	85,000	84,868	84,888	85,140	84,697
	Recycled Water	38,894	44,135	44,135	44,135	44,135
	Supply totals	124,894	151,503	151,523	151,775	151,332
	Demand totals	145,236	151,503	151,523	151,775	151,332
	Difference	(20,342)	0	0	0	0
Third year	Brackish groundwater	1,000	1,000	1,000	1,000	1,000
	Ocean Water	0	21,500	21,500	21,500	21,500
	Imported Water	85,000	84,868	84,888	85,140	84,697
	Recycled Water	38,894	44,135	44,135	44,135	44,135
	Supply totals	124,894	151,503	151,523	151,775	151,332
	Demand totals	145,236	151,503	151,523	151,775	151,332
	Difference	(20,342)	0	0	0	0

NOTES: From WBMWD supplied demand projections, includes imported and desalination brackish/ocean water and recycled water serving West Basin demand.

5.3 Water Shortage Contingency Plan

The SWRCB found that California has historically been subject to multi-year droughts, and that the American Southwest is becoming drier, increasing the probability of prolonged droughts in the future. Due to current and potential future water supply shortages, Governor Brown issued a drought emergency proclamation in January 2014 and signed the 2014 Executive Order which directs urban water suppliers to implement drought response plans to limit outdoor irrigation and wasteful water practices if they are not already in place. Pursuant to California Water Code Section 106, it is the declared policy of the State that the use of water for domestic use is the highest use of water and that the next highest use is for irrigation. In southern California, the development of such policies has occurred at both the wholesale and retail level. This section describes the water supply shortage policies Metropolitan and West Basin have in place to respond to events including catastrophic interruption and up to a 50 percent reduction in water supply.

5.3.1 Metropolitan Water District of southern California

5.3.1.1 Water Surplus and Drought Management Plan

In April 1999, Metropolitan's Board adopted the Water Surplus and Drought Management Plan (WSDM Plan). It provides policy guidance for managing regional water supplies to achieve the reliability goals of the IRP and identifies the expected sequence of resource management actions that Metropolitan will execute during surpluses and shortages to minimize the probability of severe and extreme shortages and shortage allocations. Unlike Metropolitan's previous shortage management plans, the WSDM Plan recognizes the link between surpluses and shortages, and it integrates planned operational actions with respect to both conditions.



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5.3.1.2 WSDM Plan Implementation

Each year, Metropolitan evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage. Each stage is associated with specific resource management actions designed to (1) avoid an Extreme Shortage to the maximum extent possible and (2) minimize adverse impacts to retail agencies if an Extreme Shortage occurs. The current sequencing outlined in the WSDM Plan reflects anticipated responses based on detailed modeling of Metropolitan's existing and expected resource mix.

5.3.1.3 Surplus Stages

Metropolitan's supply situation under the WSDM Plan is considered to be in surplus as long as net annual deliveries can be made to water storage programs. The WSDM Plan further defines five surplus management stages that guide the storage of surplus supplies in Metropolitan's storage portfolio. Deliveries for storage in the Diamond Valley Lake and in the SWP terminal reservoirs continue through each surplus stage provided there is available storage capacity. Withdrawals from Diamond Valley Lake for regulatory purposes or to meet seasonal demands may occur in any stage. Deliveries to other storage facilities may be interrupted, depending on the amount of the surplus.

5.3.1.4 Shortage Stages

The WSDM Plan distinguishes between Shortages, Severe Shortages, and Extreme Shortages. Within the WSDM Plan, these terms have specific meaning relating to Metropolitan's ability to deliver water to its member agencies.

Shortage: Metropolitan can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.

Severe Shortage: Metropolitan can meet full service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, Metropolitan may have to curtail Interim Agricultural Water Program deliveries.

Extreme Shortage: Metropolitan must allocate available supply to full-service customers.

The WSDM Plan also defines seven shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in Metropolitan's storage programs. Thus, a ten percent shortfall in imported supplies could be a stage one shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more Severe Shortage.

When Metropolitan must make net withdrawals from storage to meet demands, it is considered to be in a shortage stage. Under most of these stages, it is still able to meet all end-use water demands. Stages one through four are considered a Shortage, stages five and six are a Severe Shortage, and stage seven is an Extreme Shortage.

Figure 5-1 shows the actions under surplus and shortage stages when a Water Supply Allocation Plan (WSAP) would be necessary to enforce mandatory cutbacks. The overriding goal of the WSDM Plan is to never reach shortage stage seven, an Extreme Shortage. At shortage stage 7 Metropolitan will

implement its WSAP to allocate available supply fairly and efficiently to full-service customers (Metropolitan, 2015 Draft UWMP, December 2015).

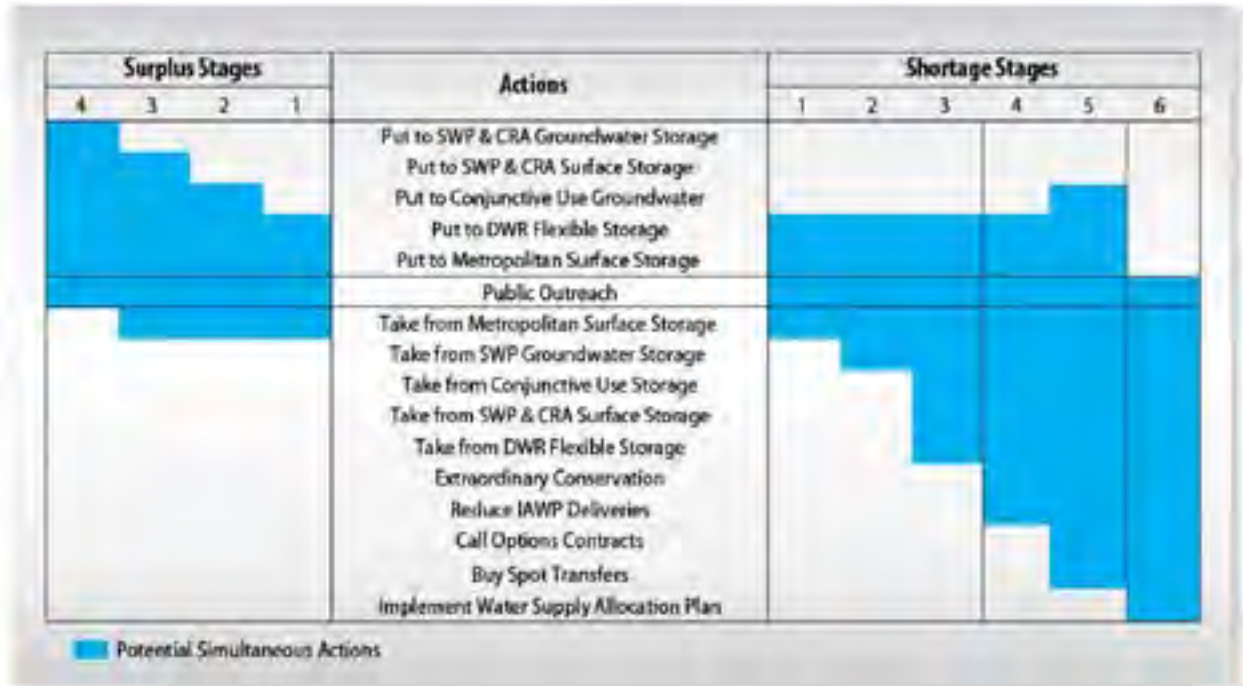


Figure 5-1: Metropolitan Surplus and Shortage Stages

5.3.2 West Basin Municipal Water District

5.3.2.1 West Basin’s Stages of Action

When Metropolitan is operating under a shortage stage, West Basin will take the following stages of action:

Stage 1 - West Basin would request a voluntary effort among its customer agencies to reduce imported water deliveries. In addition, West Basin would pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.

Stage 2 - In addition to the measures described in stage one, West Basin would work with its retail agencies to review and update water waste prohibitions and ordinances to discourage unnecessary water usage.

Stage 3 - In addition to stage one and stage two measures, West Basin would implement its adopted Drought Rationing Plan (DRP) which calls for a curtailment of imported water for each of its customer agencies. This plan includes an adopted allocation methodology and is enforced by a penalty structure. A resolution is included in Appendix F.

5.3.2.2 West Basin’s Water Shortage Stages

West Basin is a wholesale water agency. West Basin is responsible for how imported water will be allocated to each customer agency, which will then determine specific stages of shortage actions in accordance with local ordinances. Water Shortage Stages can be implemented depending on the severity of the water shortage situation, in order to respond to a reduction in potable water available for delivery. In addition to water supply reductions, each Stage typically has water use restrictions that promote the efficient use of water, reduce or eliminate water waste, and enable implementation of Water Shortage Contingency Measures. West Basin has three Water Shortage Stages it can enter. A summary of the Water Shortage Stages is displayed in Table 5-6.

Table 5-6: Water Shortage Stages

Wholesale Stages of Water Storage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction ¹ <i>Numerical value as a percentage</i>	Water Supply Condition <i>(Narrative description)</i>
1		WBMWD would request for a voluntary effort among its customers to reduce imported water deliveries and would pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.
2		WBMWD would work with its customer agencies to review and update as needed water waste prohibitions and ordinances to discourage unnecessary water usage.
3		WBMWD would implement its adopted DRP which calls for a curtailment of imported water for each of its customer agencies.
¹ One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: Percent supply reduction is not available		

5.3.2.3 West Basin’s Drought Rationing Plan

The purpose of West Basin’s DRP is to provide a method for determining allocations for its member agencies relative to the amount of supplies available when Metropolitan has implemented its Water Supply Allocation Plan to determine West Basin’s imported supply allocation. Like Metropolitan, West Basin is a regional wholesaler and cannot enforce end user restrictions – it can only impose allocations relative to its supply. Each of West Basin’s member agencies must then determine how to meet its DRP allocation of imported water to avoid over-use penalties.

This section provides an overview of West Basin’s allocation formula and the requirements contained within its 2015 DRP. The full 2015 DRP is attached as Appendix G.

5.3.2.4 Establishing Customer Agency Allocations

West Basin first calculates each customer agency’s baseline use by taking the average of total supply use (including both local and imported supplies) over the period of 2012-2014 (prior to the implementation of the DRP). The baseline is then projected forward to reflect changes in demand from population trends. This becomes the agency’s allocation year demand and is shown in Figure 5-2.

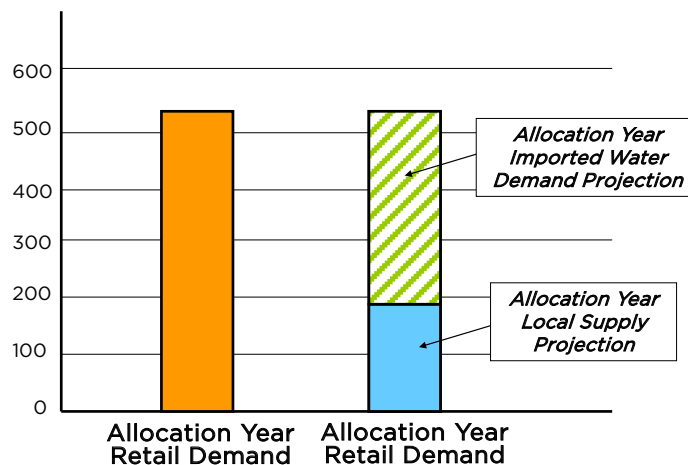


Figure 5-2: Example of Allocation Year Imported Water Demand Projection

As shown in Table 5-10 and Figure 5-3, the projected imported water demand is what is allocated according to the declared Metropolitan regional shortage level (Level 3 for the FY 2015-16 Allocation). The following concepts help explain the allocation further:

- Regional Shortage Levels: each level from one to ten represents a five percent increment of Regional Shortage Percentage from 5 to 50 percent.
- Regional Shortage Percentage: the percentage difference between available supplies and allocation year demands, in 5 percent increments from 5 to 50.
- Wholesale Minimum Allocation: ensures that retail agencies will not experience shortages on the wholesale level (from West Basin) that are greater than one-and-a-half times the Regional Shortage Percentage, according to Table 5-7.

Table 5-7: Example of Initial Minimum Allocation

Regional Shortage Level	Regional Shortage Percentage	Wholesale Minimum Allocation	Retail Impact Adjustment
1	5%	7.5%	2.5%
2	10%	15%	5.0%
3	15%	22.5%	7.5%
4	20%	30.0%	10.0%
5	25%	37.5%	12.5%
6	30%	45.0%	15.0%
7	35%	52.5%	17.5%
8	40%	60.0%	20.0%
9	45%	67.5%	22.5%
10	50%	75.0%	25.0%

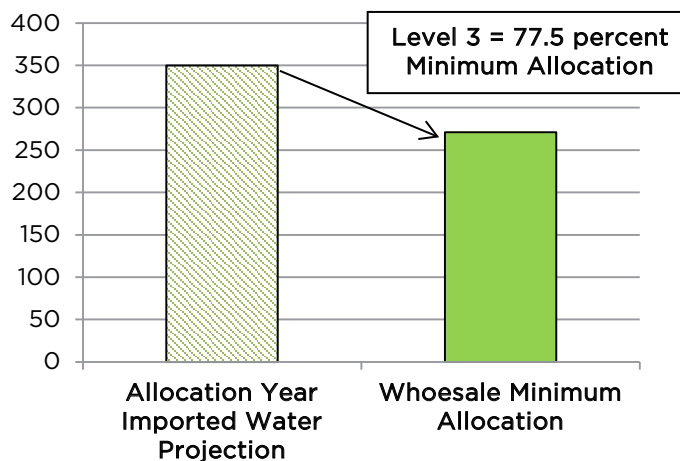


Figure 5-3: Example of Initial Minimum Allocation

Unequal impacts of an across-the-board allocation at the retail level can be dramatic depending primarily on the amount of local supplies, if any, held by each customer agency. That is why the allocation methodology assigns additional water supplies based on the following adjustments and credits:

- Retail Impact Adjustment: Used in Regional Shortage Level 3 and above to ensure that customer agencies with a high level of dependence on imported water do not experience disparate shortages at the retail level compared to other agencies. Agencies that are 100 percent dependent on imported water, for example, are allocated at the Regional Shortage Percentage instead of the Wholesale Minimum Percentage.
- Conservation Demand Hardening: Based on each customer agency's gallons per capita per day (GPCD) from a 10-year selected period's highest average, ending in years between 2004 and 2010, as compared to the 2015 GPCD. The difference in GPCD was converted to acre-feet and the regional shortage percentage and GPCD percent reduction was applied for a resulting amount of additional water given back to the agency for conservation efforts. This is consistent with requirements for SBx7-7 "20x2020" reporting. The calculation for the credit is

$$\text{Credit} = \text{Conservation} \times (10 \text{ percent} + \text{RSL percent}) \times (1 + \text{Conservation percent}) \times \text{Dependence on Metropolitan percent}$$

RSL = Regional Shortage Level

As a member agency of Metropolitan, West Basin is provided the opportunity to request changes to its allocation through an appeals process. Likewise, customer agencies of West Basin are provided the opportunity to appeal to their individual allocations from West Basin based on new or corrected information. Grounds for requesting a change can include, but are not limited to:

- Errors in historical data used in base period calculations
- Unforeseen losses or gains in local supplies
- Extraordinary increases in local supplies
- Adjustments in credits for conservation

In some cases, West Basin has no flexibility to change a retail agency's allocation unless it results in a change to West Basin's total allocation with Metropolitan. West Basin staff will, however, work with retail agencies to determine whether appeals to Metropolitan are warranted, and if so, to prepare an appeal for review by Metropolitan (West Basin, Drought Rationing Plan, July 2015).

5.3.2.5 Allocation Penalty Rates

West Basin will enforce retail agency allocations through a penalty rate structure similar to what West Basin is subject to in Metropolitan's WSAP. Penalty rates will only be assessed to a West Basin retail customer agency if a retail customer agency exceeded its allocation under the DRP AND West Basin exceeded its allocation with Metropolitan under the WSAP. In such a case, West Basin's total penalty will be assessed to each retail customer agency that exceeded its DRP allocation on a pro-rata basis. No billing or assessment of penalty rates will take place until the end of the 12-month allocation period. Penalty rates are in addition to the base rate of water purchased.

Table 5-8 demonstrates that the penalty rate structure is an ascending block structure that provides a lower penalty for minor overuse of allocations and a higher penalty for major overuse of allocations.

Table 5-8: West Basin Allocation Penalty Rates

Usage Above Allocation	Penalty Rate
100 percent-115 percent	\$1,480/AF
Above 115 percent	\$2,960 AF (2 x \$1,480/AF)

- Based on turf removal costs
- Turf removal saves ~44 gallons per year per square foot for 10 years
- \$2/sq.ft program = \$1,480 AF
- \$4/sq.ft. program = \$2,960 AF

5.3.2.6 Use of Penalty Revenues

According to the DRP policy adopted by the West Basin Board of Directors, any penalty funds collected by West Basin from customer agencies will be applied to any penalty owed to Metropolitan.

5.3.3 Catastrophic Supply Interruption

In the event imported water supplies are interrupted from a catastrophic event, West Basin, through coordination with Metropolitan, can respond at both a regional and a local level. In the event that an emergency such as an earthquake, system failure, or regional power outage, etc. affects the entire southern California region, Metropolitan would take the lead and activate its Emergency Operation Center (EOC). The EOC coordinates Metropolitan's and the West Basin's responses to the emergency and concentrates efforts to ensure the system can begin distributing potable water in a timely manner.

If circumstances render the Southern California's aqueducts out of service, Metropolitan's Diamond Valley Lake can provide emergency supplies for its entire service area's firm demand for up to six months. With few exceptions, Metropolitan can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted. Additionally, a contingency plan has been developed for both planned and unplanned electrical outages. It includes back-up generation for all water treatment plants, transporting mobile generators to key locations, and maintaining water supply through gravity feed in regional reservoirs (i.e. Lake Mathews, Castaic Lake, and Silverwood Lake). Furthermore, should additional supplies be needed, Metropolitan also has surface reservoirs and groundwater conjunctive use storage accounts that can be drawn upon to meet additional demands. The WSDM plan guides Metropolitan's management of available supplies and resources during an emergency to minimize the impacts of a catastrophic event.

West Basin does not own or operate any potable water facilities or transmission lines, and therefore, relies exclusively on Metropolitan and its Member Agency Response System (MARS). The MARS is a radio communication system developed by Metropolitan and its member agencies to provide an alternative means of communication in extreme circumstances. While West Basin does not have to comply with the state emergency response act as West Basin owns no potable water systems, West Basin is currently in the process of developing an emergency response plan to outline how its recycled water operations might be able to assist with limited water supplies (i.e. firefighting) when a catastrophic event hits southern California.



Section 6 | **Water Quality**

Section 6 | Water Quality

West Basin’s mission is ‘to provide a safe and reliable supply of water quality to the communities we serve.’ West Basin ensures that water delivered throughout its service area meets or surpasses drinking water standards set by the State Water Resources Control Board-Division of Drinking Water (DDW).

Compliance with water quality regulations is a regional water management priority and a shared responsibility. West Basin is responsible for the quality of desalination and recycled water supplies generated at the Desalter and ECLWRF and its satellite facilities: Carson Water Recycling Facility, Chevron Nitrification Plant and Exxon-Mobil Nitrification Plant. Metropolitan is responsible for complying with state and federal drinking water regulations on its imported potable water sold to West Basin. West Basin’s retail customer agencies are responsible for ensuring compliance in their individual distribution systems and at the customer tap. As a result of these measures, there are no anticipated water quality impacts that will decrease the supply available for use.

6.1 Imported Water

West Basin’s imported water comes from the SWP and Colorado River via Metropolitan pipelines and aqueducts. Metropolitan is proactive in its water quality efforts, protecting its water quality interests through active participation in the regulatory arena and using treatment processes that provide the highest water quality from both sources. Metropolitan has one of the most advanced laboratories in the country where water quality staff can examine the efficacy of existing treatment by performing tests and reviewing results as well as researching new treatment technologies. Over 300,000 water quality tests are performed per year on Metropolitan’s water to test for regulated contaminants and additional contaminants of concern to ensure the safety of its waters. Metropolitan’s supplies originate primarily from the CRA and from the SWP. A blend of these two sources, proportional to each year’s availability of the source, is then delivered throughout Metropolitan’s service area.



Metropolitan’s primary water sources face individual water quality issues of concern. The CRA water source contains higher total dissolved solids (TDS) and lower levels of organic matter, conversely the SWP contains a lower TDS, but higher levels of organic matter, lending to the formation of disinfection byproducts. To remediate the CRA’s high level of salinity and the SWP’s high level of organic matter, Metropolitan blends CRA and SWP supplies and provides updated treatment processes to decrease the formation of disinfection byproducts. In addition, Metropolitan has been engaged in efforts to protect its Colorado River supplies from threats of uranium, perchlorate, and chromium VI while also investigating the potential water

quality impact of emerging contaminants, N-nitrosodimethylamine (NDMA), and pharmaceuticals and personal care products (PPCPs). While unforeseeable water quality issues could alter reliability, Metropolitan's current strategies ensure the deliverability of high quality water.

The presence of Quagga mussels in water sources is a water quality concern. Quagga mussels are an invasive species that was first discovered in 2007 at Lake Mead, on the Colorado River. This species of mussels form massive colonies in short periods of time, disrupting ecosystems and blocking water intakes. They are capable of causing significant disruption and damage to water distribution systems. Controlling the spread and impacts of this invasive species within the CRA requires extensive maintenance and results in reduced operational flexibility.

6.1.1 Source Water Protection

Source water protection is the first step in a multi-barrier approach to provide safe and reliable drinking water. In accordance with California's Surface Water Treatment Rule, Title 22 of the California Code of Regulations, DDW requires large utilities delivering surface water to complete a Watershed Sanitary Survey every five years to identify possible sources of drinking water contamination, evaluate source and treated water quality, and recommend watershed management activities that will protect and improve source water quality. The most recent sanitary surveys for Metropolitan's water sources were completed in 2010 and 2011. The next Sanitary Surveys for the watersheds of the Colorado River and the SWP will report on water quality issues and monitoring data through 2015. Metropolitan has an active source water protection program and continues to advocate on behalf of numerous SWP and Colorado River water quality protection issues.

6.1.2 DWR SWP Water Quality Programs

Metropolitan supports DWR's policies and programs aimed at maintaining or improving the quality of SWP water delivered to Metropolitan, especially the ability to govern the quality of non-project water conveyed by the California Aqueduct. In addition, Metropolitan has supported the expansion of DWR's Municipal Water Quality Investigations Program beyond its Bay-Delta core water quality monitoring and studies to include enhanced water quality monitoring and forecasting of the Delta and SWP. These programs are designed to provide early warning of water quality changes that will affect treatment plant operations both in the short-term (hours to weeks) as well as seasonally. The forecasting model is currently suitable for use in a planning mode. It is expected that with experience and model refinement, it will be suitable to use as a tool in operational decision making.



6.1.3 Water Quality Exchanges

Metropolitan has implemented selective withdrawals from the Arvin-Edison storage program and exchanges with the Kern Water Bank to improve water quality. Although these programs were initially designed to provide dry-year supply reliability, they can also be used to store SWP water at periods of higher water quality for withdrawal at times of lower water quality, thus diluting SWP water deliveries.

Although, elevated arsenic levels have been a particular concern with groundwater banking programs. However, there are short-term water quality benefits that can be realized such as groundwater pumped into the California Aqueduct with lower total organic carbon (TOC) levels, lower bromide levels, and lower TDS.

6.1.4 Water Supply Security

Changes in national and international security have led to increased concerns about protecting the nation's water supply. In coordination with its member agencies, Metropolitan added new security measures in 2001 and continues to upgrade and refine procedures. Metropolitan increased the number of water quality tests conducted each year to over 300,000 analytical tests on samples collected within its service area and source waters and developed contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.

6.2 Groundwater

Although West Basin does not serve traditional groundwater supplies, it works to support its retail agencies and WRD to protect and promote the quality of groundwater supplies within its service area. For details pertaining to the WCGB, refer to WRD's most recent Engineering Survey and Report.

6.2.1 West Basin and Customer Retail Agency Programs

As part of West Basin's customer service, the Water Quality Department works closely with regulatory agencies to assist retail agencies in meeting State and Federal drinking water regulations through the Cooperative Basin-Wide Title 22 Groundwater Quality Monitoring Program. Title 22 refers to the section of the California Code of Regulations pertaining to both domestic drinking water and recycled water standards.





This voluntary program offers water quality testing to retail agencies. Two agencies in West Basin's service area participate in the monitoring program. West Basin's water quality staff coordinates wellhead and reservoir water quality testing at approximately six groundwater wells in the service area and a contract laboratory provides sampling as well as analytical and reporting services. Laboratory results are reported to West Basin, retail agencies, and the DDW. The program helps retail agencies save time and expense while providing a valuable service for public health.

The program also provides for the production of an annual Customer Water Quality report upon request of West Basin's retail agencies. The Customer Water Quality Report is required by State and Federal law and West Basin's water quality staff has prepared them for several agencies for over 15 years.

6.2.2 Water Replenishment District Programs

As the regional groundwater management agency for the Central and West Coast Groundwater Basins, WRD has several active programs to monitor, evaluate and mitigate water quality issues.

Groundwater can become impaired through leaching of contaminants into an aquifer, or by excessive concentrations of naturally-occurring constituents that impact quality, such as arsenic. Surface water sources become contaminated from human activities in the watershed or through deliberate contamination.

Groundwater Quality Program: WRD continually evaluates current and proposed water quality compliance in agency production wells, monitoring wells, and recharge/injection waters of the WCGB. If non-compliance is identified, WRD staff develops a recommended course of action and associated cost estimates to address the problem and to achieve compliance. WRD also evaluates the impacts of pending drinking water regulations and proposed legislation.

Regional Groundwater Monitoring Program: This program has a network of over 250 WRD and USGS-installed monitoring wells at nearly 50 locations throughout West Basin's service area. Monitoring well data is supplemented with information from production wells to capture the most accurate data available. WRD staff, comprised of certified hydrogeologists and registered engineers, provides the in-house capability to collect, analyze and report groundwater data. This information is stored in WRD's GIS database and supports a better understanding of the characteristics of the Central and West Coast Groundwater Basins.

Safe Drinking Water Program: This program promotes the cleanup of groundwater resources at specific well locations. By installing wellhead treatment facilities at existing production wells, WRD hopes to remove contaminants from the underground supply and deliver the extracted water for potable purposes. WRD works directly with well owners on the projects implemented through this program. It currently focuses on the removal of volatile organic compounds (VOCs) and offers financial assistance for the design of and equipment for the selected treatment facility.

WRD provides extensive information on groundwater quality in its Engineering and Survey Reports as well as Regional Groundwater Monitoring Reports. Both reports have a section devoted solely to groundwater quality management, and can be accessed through WRD's website, www.wrd.org (WRD, Regional Groundwater Monitoring Report, February 2015).


6.3 Brackish Desalination

Although construction of seawater barriers was effective in halting the intrusion of seawater into the WCGB, historic plumes of brackish water still remain in the WCGB behind the barriers. In the early 1990s, West Basin completed the C. Marvin Brewer Desalter facility as a demonstration project for removing and treating the brackish water using two existing drinking water wells that were impacted by the seawater intrusion. In 2005, those two wells were replaced with a new, more productive well. This well has the capability to pump 1,600 to 2,400 AFY of brackish groundwater to be treated at the desalting facility for use by West Basin's retail agency, California Water Service.

Since 2002, WRD has also been operating the Robert W. Goldsworthy Desalter, located adjacent to West Basin's desalter. Product water from the Goldsworthy Desalter is delivered for potable use to the City of Torrance's water distribution system. Since 2001 it has been removing 2.3 MGD of brackish groundwater from the WCGB. This desalter will soon begin its second phase, increasing its capacity to 5 MGD. By mid-2017, the desalter will be purifying nearly two billion gallons of local water per year.

6.4 Recycled Water

West Basin's Edward C. Little Water Recycling Facility (ECLWRF), located in El Segundo, has been in continuous operation since 1995 and has conserved over 170 billion gallons of imported water by serving reliable supplies of recycled water for a wide variety of non-potable uses. A full description of West Basin's recycled water program is provided in the Water Recycling section (Section 9) of this report.



West Basin is committed to monitoring and maintaining the high quality of recycled water produced for injection at the West Coast Seawater Barrier and the surrounding groundwater from migrating contamination sources. Groundwater quality within the aquifer is monitored through more than a dozen monitoring wells inland of the Barrier. These wells represent the quality of the groundwater down-gradient of the Barrier and are essential in providing critical water quality data for the surrounding groundwater. Annual water quality data reports and groundwater modeling reports are submitted to both the DDW and the Los Angeles Regional Water Quality Control Board to ensure compliance and security.

6.5 Ocean Water Desalination

West Basin has been actively researching the feasibility of an ocean water desalination program as part of the drinking water supply. From 2002 to 2009, West Basin operated the Desalination Pilot Project, which marked the first use of microfiltration as a pretreatment to reverse osmosis for ocean water desalination.

To ensure that this process was effectively treating the ocean water, West Basin performed extensive water quality research at the pilot plant. The water produced at the pilot project had a lower salt concentration than does typical tap water in southern California, with 350 parts per million (ppm). The pilot project's analytical test results indicated that the quality of the desalinated ocean water meets current State and Federal drinking water standards set by DDW and the Environmental Protection Agency (EPA). Along with 500 monthly analytical tests, additional water quality studies were completed under the auspices of the American Water Works Association Research Foundation.

The research and testing conducted at the pilot project informed the design of the Ocean Water Desalination Demonstration Facility, dedicated in November 2010. The Demonstration Facility operated for four years, enabling West Basin to evaluate the feasibility of permitting and siting of a full-scale desalination plant capable of providing 20,000 AFY of potable water, enough to supply 40,000 families for a year.

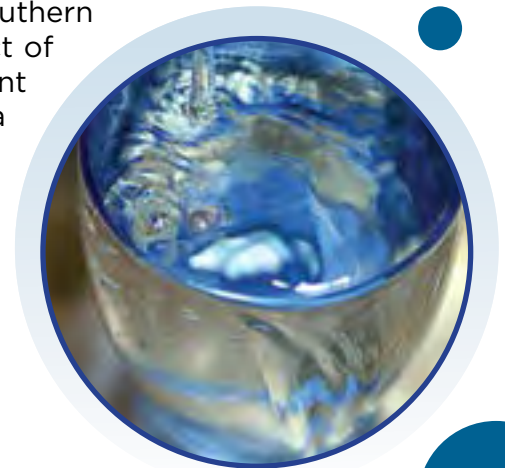
While the Demonstration Facility was operational, West Basin pursued a program master plan in partnership with Metropolitan. The master plan effort evaluated all water quality and other aspects necessary to develop a full-scale desalination facility with the option of integrating product water into the Metropolitan distribution system. More information on West Basin's ocean water desalination efforts is included in Section 10.

6.6 Research and Development

West Basin has a dedicated program and budget to selectively engage in research projects that evaluate water quality, efficient operations and new pollution prevention technology and methods. Research projects close the environmental loop by addressing both final product water as well as source control issues to prevent pollution and the need for cleanup technology. West Basin leverages its research dollars by participating on the Boards of water industry research organizations such as WaterReuse, American Water Works Associations, National Water Research Institute, and the Salinity Management Coalition, as well as participating with academic institutions in water quality research.

6.7 Effects on Water Management Strategies

Retail water agencies in densely populated southern California are acutely aware of the economic impact of water quality on a public water system. Management strategies must be developed to maintain a safe, reliable supply at reasonable cost without jeopardizing water quality and public health. Water quality is maintained through operational practices that can include wellhead treatment for contaminated groundwater sources, or blending down contaminated groundwater with purchased imported surface water from Metropolitan or high quality groundwater from adjacent purveyors.



6.8 Effects on Supply Reliability

Poor water quality makes a water source unreliable, affects overall supply and increases the cost of serving water to the public. More importantly, it results in a loss of customer confidence, which is difficult to overcome even after water quality is restored. A water source that fails drinking water regulations must be taken out of service. The source can be restored through treatment or other management strategies.





Section 7 | **Water Use Efficiency**

Section 7 | Water Use Efficiency

Water Use Efficiency (WUE) and conservation continues to play a foundational role in West Basin's water supply portfolio. Between the years of 2010 and 2015, the state of California experienced a severe four year drought that is continuing into a fifth year.

The drought conditions were so severe that in 2014 California Governor Edmund G. Drown Jr. mandated a statewide 25% water reduction and in 2015, the SWRCB implemented mandatory monthly water reporting in order to track the water reductions of each water retailer.

West Basin's customer agencies have achieved an overall total reduction of 19% water conservation for the period June 2015 to February 2016 as compared to the same months in 2013. The total reduction has fluctuated over time but significant efforts have been made by the customer agencies to meet the mandatory conservation standards. The melded average conservation target for the West Basin customer agencies is 20%. In February 2016, and effective March 2016, the State Water Board adjusted the conservation standards for many retailers throughout the state, including four of West Basin's, which provided some latitude in the conservation requirements they must meet. The revised regulation responds to calls for greater consideration of certain factors that influence water use in different parts of the state, including hotter-than-average climate, population growth, and significant investments in new local, drought resilient water sources such as wastewater reuse and desalination.

The four customer agencies that received an adjustment in their conservation standard was a direct result of credit received for the advanced treated recycled water injected to replenish the groundwater supply used by many of our customer agencies, in the form of reduced conservation targets. These customer agencies include California Water Service - Hermosa/Redondo, Golden State Water Company - Southwest, and the Cities of Inglewood and Manhattan Beach.

7.1 Historical Water Conservation Efforts

Since the drought of the early 1990s, West Basin has been a leader in implementing aggressive water conservation programs to help limit water demand within its service area. From 1990 through 2015, the state has experienced several long-term droughts, with the most recent drought occurring from 2010-2015.

During this period, West Basin has continued to provide a strong emphasis on plumbing retrofit hardware, education, distribution of devices and a stronger message on conserving water outdoors. West Basin has also implemented several new innovative programs such as the distribution of free rain barrels and offering free greywater



workshops to the public. The results of these programs, in conjunction with passive conservation measures such as modifications to city ordinances, have resulted in significant reductions in retail water use within West Basin’s service area.

According to the Metropolitan’s conservation tracking model, a total of 28,512 AF of imported water has been conserved in 2015 in the West Basin service area. A summary of the current and projected conservation savings is shown in Tables 7-1 and 7-2 below:

Table 7-1: Metropolitan Demand Forecasting Model for Water Conservation – West Basin AF Savings and Future Projections (AF)

Conservation	2015	2020	2025	2030	2035	2040
Active	3,711	4,279	3,226	2,192	1,601	1,036
Passive	15,943	18,598	21,015	23,213	24,569	26,064
Price	6,675	6,861	8,256	9,701	11,177	12,662
System Losses	2,184	2,542	2,693	2,823	2,908	3,011
Total	28,512	32,280	35,190	37,928	40,255	42,773

Table 7-2: Metropolitan Demand Forecasting Model for Water Conservation – Includes MWELo Savings (AF)

Conservation	2015	2020	2025	2030	2035	2040
Single-Family	122	330	349	463	548	455
Multi-Family	25	78	145	173	183	206
CII	130	141	197	234	195	264
Total	276	550	691	870	926	925

Metropolitan’s assumptions are:

1. Active – Devices installed as of end of 2016 (based on the 2-year conservation budget of \$450 million);
2. Passive – Savings described in the MWELo;
 - a. Used demographic and employment data consistent with retail demand forecast;
 - b. Assumed savings from MWELo for new home construction up to 50% and 0% for existing homes;
3. Price savings – Based on retail demand econometric model; and
4. System Losses – Savings from reduced demands due to conservation.

By current estimates, demand management from West Basin and its water retailers saved over nine billion gallons of imported water (28,512 AF) in 2015, which is equivalent to the average annual water use of 57,000 households.

West Basin's conservation efforts have been comprised of a wide array of cost-effective programs that contribute to conserving water, improving water quality, reducing energy, reducing imported water needs and increasing the region's water supply reliability. The effect of water conservation is defined by two main elements: active and passive. Active conservation is water savings produced from incentive based programs, such as rebate programs, giveaways, and retrofits. Passive conservation is water savings produced from building and plumbing codes, consumer behavioral changes, and response to price shifts.

West Basin prides itself in the partnerships it has created with federal, state, and local entities to offer water efficiency programs. By developing integrated programs with its partners, West Basin has been able to leverage funding and resources to provide effective programs throughout its service area. As a result, West Basin has been successful in obtaining more than \$1.2 million in local, state and federal grant funds for conservation programs since 2010. Due to its successes in acquiring grants, West Basin leveraged its funding and in 2015 provided \$3 worth of programs to the public for every \$1 it invested.



California poppy,
Eschscholzia californica

In addition, West Basin actively promotes Metropolitan's water conservation programs and incentives. From 2010-2015, Metropolitan provided nearly \$5.6 Million in rebate money to West Basin residents (including \$4.9 Million for turf removal alone) and nearly \$2.5 Million to West Basin commercial customers (including \$1.8 Million for turf removal alone).

West Basin's current conservation programs target water efficiency and conservation efforts in the residential, commercial, industrial, institutional and landscape sectors. These programs were identified as part of the 2010 Water Use Efficiency Master Plan and were made available to residents, businesses, and institutional customers within West Basin's service area.

Figure 7-1 below shows the total Active and Passive Savings from 1990 to 2015 on an annual basis. This does not include assumptions for price effect, system losses or water savings attributed to rebates received by Metropolitan. This data only includes savings from programs directly implemented by West Basin.

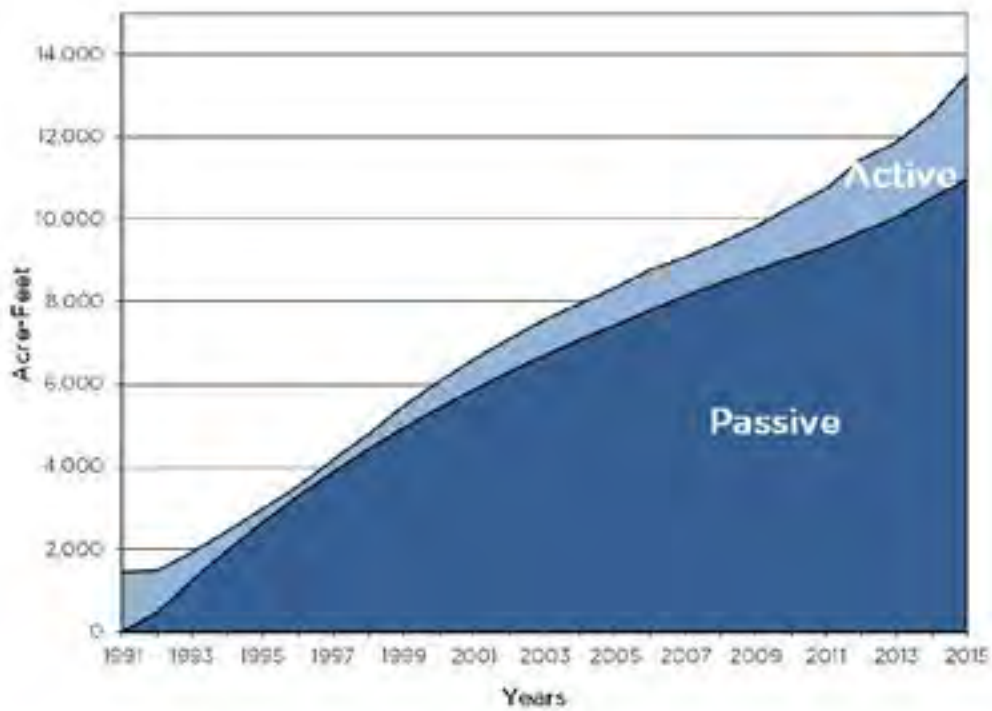


Figure 7-1: West Basin Water Use Efficiency Program Water Savings (1990 - 2015)

7.1.1 Grant Funding

West Basin has been successful in obtaining several water use efficiency grants over the last five years. These awards are shown in Table 7-3.

Table 7-3: Water Use Efficiency Grants Awarded

Awarding Agency / Program	2010	2011	2012	2013	2014	2015	Total
Metropolitan Water District of Southern California							
Smart Landscape Expo	\$2,000	\$2,000					\$4,000
Water Harvest Festival		\$2,000	\$2,000		\$2,000		\$6,000
Department of Water Resources							
Complete Restroom Retrofit - Phase II	\$296,250						\$296,250
Water and Energy in the Hotel / Motels and School Sector	\$452,880						\$452,880
United States Bureau of Reclamation							
Landscape Irrigation Efficiency Program (LIEP)		\$100,000					\$100,000
Regional Landscape Water Use Efficiency (Turf Removal)						\$300,000	\$300,000
2016 Water Use Efficiency Master Plan						\$60,000	\$60,000
California Native Plant Society							
Hermosa Beach Demonstration Garden					\$8,000		\$8,000
Total	\$751,130	\$104,000	\$2,000	\$-	\$10,000	\$360,000	\$1,227,130

7.2 West Basin and Retail Agency Water Use Efficiency Master Plans

In 2006, West Basin developed its first Water Use Efficiency Master Plan (Plan) and in 2010, updated this Plan with the help of a USBR grant. The Plan included a five year timeline for cost-effective program implementation. Since adoption of the Plan, West Basin has been successfully implementing the programs shown above.

These programs have helped keep water demand steady as the population continues to grow in West Basin’s service area, as discussed in Section 3.

7.3 External Agency Coordination

As a part of conservation planning and implementation, West Basin also works with other regional and statewide agencies and groups such as the Alliance for Water Efficiency (AWE), Metropolitan, and the CUWCC.

7.3.1 Metropolitan Water District

In 2015, Metropolitan began a process to update its Integrated Resources Plan (IRP) that includes a strong commitment to water conservation. Metropolitan's 2015 IRP establishes water supply targets for southern California through 2040, specifically a conservation target of 1,519,000 AF. This target represents Metropolitan's goal of achieving a 20% reduction in per capita water use across its service area. Metropolitan is currently developing a long-term conservation plan to implement the IRP conservation target. This plan focuses on conducting more research, providing device incentives and funding, assisting with market transformation and legislation and helping to support its member agencies with water conservation efforts.

As a member agency of Metropolitan, West Basin actively participated in both the IRP Working Group and the Long Term Conservation Plan development, and will benefit from the conservation implementation strategies outlined in the plan. Metropolitan has completed its 2015 updated IRP.

7.3.2 California Urban Water Conservation Council

In 1991, the CUWCC was created to increase water use efficiency by integrating urban water conservation BMPs into the planning and management of California water agencies. It is a partnership of agencies and organizations concerned with water supply and conservation of natural resources in California.

To encourage water use efficiency, the CUWCC asked water agencies and organizations to sign a Memorandum of Understanding (MOU) regarding urban water conservation in California, which committed participating urban water suppliers to use their "good faith efforts" to implement the CUWCC's two wholesale BMPs.

West Basin was one of the first urban water suppliers to sign the CUWCC's MOU. Every two years, water agency signatories, including West Basin, must submit their BMP reports to the CUWCC. West Basin has submitted BMP Wholesaler Water Agency Reports to the CUWCC that detail West Basin's progress in implementing the two BMPs as currently specified in the MOU. In Appendix H, West Basin has attached its most recent FY 2013-14 CUWCC Report.

7.4 CUWCC - New BMPs and Reporting Options

In 2015, the CUWCC completed an ambitious project to revamp, streamline and improve its 14 BMPs and to develop several ways that an agency can report its water conservation targets and savings. Along with this process, the Draft Urban CUWCC created a new reporting database that agencies may use to report their achievements. Wholesale agencies are required to report Foundational BMPs including the following:

BMP 1: Utility Operations

Water utilities throughout California are implementing water conservation programs and providing essential services to their retailers. Water conservation includes traditional demand management measures, but also includes important utility-management based conservation measures. An important component of utility water conservation is assessing the efficiency of how water is delivered to retailers. There are four subcategories that comprise signatory utility operation program responsibilities: 1. Operational Practices; 2. Water Loss Control; 3. Metering and Billing; and 4. Retail Conservation Pricing.

BMP 2: Public Education and School Education

Public information programs inform customers and other stakeholders about water resources so they understand why it is important to use water wisely. Effective programs also engage listeners in water-efficient behaviors so they make life-long changes in how they use water. Water conservation education, especially for school-aged children, can encourage a lifelong understanding of and commitment to responsible use of water.

Due to new legislation and new water reporting requirements established by the SWRCB and DWR, the CUWCC continues to evolve from a reporting agency to an educational and resource organization.

7.5 Current and Future Water Conservation Programs

As the water wholesaler for eight water retail agencies and one groundwater agency, West Basin has collaborated with many important stakeholders and leveraged funding to develop and implement cost-effective programs that conserve water and energy, reduce runoff and provide other important environmental benefits.

In 2013, the water industry began a market transformational shift from indoor plumbing devices to outdoor water conservation because up to 50% of water is used outdoors to irrigate landscapes. However, there are still opportunities available for indoor plumbing improvements and rebates for residential high-efficiency toilets and high-efficiency clothes washers were made available by Metropolitan during the period of 2010-2015. In FY 2013-14, Metropolitan began offering higher incentives for turf removal. The payment started with \$0.30/ft² in 2013, but that did not achieve a significant response, so in 2014 Metropolitan raised the incentive to \$1/ft² and in 2015 it was raised again to \$2/ft². The higher incentive motivated many residents to replace their water-intensive turf with less demanding native plants.

7.5.1 Current Programs

Between the period of 2010-2015, West Basin and its partners offered the following programs:

Cash for Kitchens

West Basin continues to partner with the South Bay Cities Council of Governments (SBCCOG) and its South Bay Environmental Services Center (SBESC) to offer a program called, “Cash for Kitchens” for commercial kitchen facilities in the South Bay portion of our service area. Food service customers receive combined water and energy assessment and training materials for employees. Sites may also qualify to receive high-efficiency device upgrades such as pre-rinse kitchen sprayers, faucet aerators, flow restrictors and waterbrooms. The SBESC coordinates and conducts site visits with Southern California Gas Company commercial service technicians to provide a comprehensive water and energy review for the customers they visit.



In 2015 West Basin hired a company to provide the Cash for Kitchen surveys in West Basin’s Division IV, which includes the cities of Malibu, Culver City, West Hollywood, El Segundo and the Los Angeles County unincorporated area of Marina del Rey and Topanga. With the addition of Division IV, the program is now available to all customers in the West Basin service area.

Commercial Restroom Retrofit

The Commercial Restroom Retrofit program provided qualifying businesses, schools, restaurants and other commercial and public facilities with installation of High Efficiency Toilets (HETs), urinals and flow restriction devices to increase water-use efficiency in the non-residential sector.

Greywater Workshops

In 2015, West Basin, with the assistance of grant funding from DWR and the CUWCC, piloted its first ever greywater workshop. West Basin hired a non-profit organization called Greywater Action to provide residents with two free greywater workshops. These workshops taught residents how to redirect and reuse their clothes washer machine water into their landscape in a safe and legal manner.

High-Efficiency Toilet (HET) Distribution Program

In 2015, legislation was passed that mandates the use of toilets that are 1.28 gallon per flush or less. With funding contributions from Metropolitan and several member agencies, West Basin provided free HETs through several one-day toilet distribution events. The annual goal was to distribute 2,000 HETs, estimated to conserve more than 26 million gallons of drinking water per year.



Landscape Irrigation Efficiency Program (LIEP)

The LIEP program provides free water audits for customers. Funded by the United States Bureau of Reclamation (USBR), the LIEP program includes a site survey or evaluation, a list of recommended improvements and repairs, a recommended water budget and schedule, and water efficient rotating sprinkler nozzles.

Ocean-Friendly Landscape Program

In 2006, West Basin received a Proposition 50 grant from DWR to implement a comprehensive program called the Ocean-Friendly Landscape Program. Since 2006, this program has provided the public with the resources, education, devices and rebates to conserve water used in outdoor landscaping. This program is anticipated to end in December 2016 when the funding is exhausted. The components of this program are described below.

- **Ocean-Friendly Demonstration Gardens**

West Basin has worked with its cities and schools to construct 12 Ocean Friendly Demonstration Gardens to date. Four additional gardens are expected to be completed by the end of 2016. These gardens provide great examples of how California-friendly landscapes can conserve water, reduce runoff, reduce turf waste and pollution and also provide benefits to local wildlife, birds and insects.

- **California Friendly Landscape Classes and “Hands-On-Workshops”**

During the period of 2010-2015, West Basin worked closely with the SBCCOG, its cities and water retail agencies to implement over 30 California Friendly Landscape Classes and Ocean-Friendly Garden “Hands-on-Workshops” to teach residents how to construct a water-conserving garden. West Basin used the opportunity of constructing the gardens to also have a trained professional teach residents how to install the water conserving plants and drip irrigation.



California Friendly
Landscape Class

- **Ocean-Friendly Landscape Program – Smart Irrigation Controllers**
As part of the Ocean-Friendly Landscape Program, West Basin provides rebates and exchange programs for smart weather-based irrigation controllers to residents. In addition, these controllers have been installed at large landscape sites, such as parks, schools and city facilities throughout the West Basin service area. Ocean Safe Car Wash Program

Ocean Safe Car Wash Program

Ocean Safe Car Washes clean and recirculate their water to use 50-85% less than the average home car wash and help prevent runoff from entering the ocean. These car washes provide discount coupons to customers.

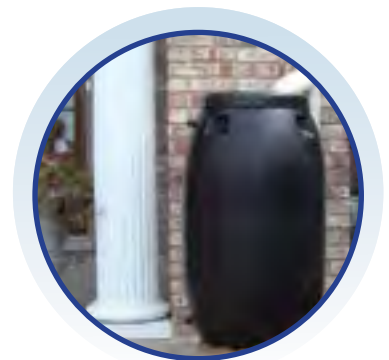


Rain Barrel Distribution Programs

In 2013, with the financial support of Metropolitan, West Basin piloted its first rain barrel distribution event. The event was a huge success and in 2014, West Basin conducted five events, one in each of its five Divisions, in which 1,000 rain barrels were distributed to the public. In 2015, West Basin doubled the quantity to 2,000 rain barrels. These rain barrels were re-purposed food barrels that were sterilized and converted to be functional and safe.

Recirc And Save

West Basin offered audits and performance incentives for industrial process improvement and cooling tower efficiency. This program is designed to help industrial water users involved in manufacturing and facilities that have cooling towers save water by improving the efficiency of their systems.



Smart Landscape Expo

The Smart Landscape Expo was held in 2010 and 2011 and was conducted at the ECLWRF. It featured two classroom workshops, two hands-on demonstrations, tours of the water recycling facility, and self-guided tours of the demonstration garden. There were 20-25 vendors including irrigation equipment vendors, water agencies and information booths as well as a native plant sale with local nurseries selling plants that could be found in the demonstration garden.



Hawthorne City Hall Ocean Friendly Demonstration Garden

Turf Removal Rebates

In 2015, West Basin was able to add an additional \$1/ft² to the Metropolitan incentive of \$2/ft² through a grant received by USBR. The \$3/ft² rebate incentive for turf removal was a very successful program and funding only lasted for a few months.

Water Efficient Rebates

During this period Metropolitan, with support from West Basin and the local water retailers, provided rebates to encourage the public to purchase and install water efficient devices.

Water Efficiency Master Plan

In 2010, West Basin updated its first Conservation Master Plan (now the “Water Efficiency Master Plan”) in collaboration with its retail agencies to develop programs to save additional water through 2015. The 2010 Plan showed the results and the lessons learned since the Plan was first developed in 2005. Funding for the planning effort was provided by USBR and required a 1:1 match from each retail agency.

The 2010 Plan was a framework for establishing a mix of conservation programs to comply with the California state legislation requiring a 20 percent reduction of urban water consumption by the year 2020 as well as to achieve West Basin’s own 2020 goals. The 2010 Plan will be updated in 2016 through a new competitive grant received by USBR.

With the help of these programs, it is estimated that West Basin has distributed and installed over 300,000 water saving devices from 1990 to 2015, with the most recent five years shown in Table 7-4.

Table 7-4: West Basin Distribution of Water Saving Activities

MEASURE/PROGRAM	2010	2011	2012	2013	2014	2015	Totals
Cash for Kitchens							
Flow Restrictors	38	38	38	38	38	1,091	1,281
Pre-Rinse Spray Valves	34	36	31	15	34	34	184
Waterbrooms	27	27	27	27	27	-	135
Commercial Restroom Retrofit							
HET Direct Install	575	1,041	352	1,176	375	62	3,581
Urinal Direct Install	20	352	1	100	-	20	493
Greywater Program							
Workshops	-	-	-	-	-	3	3
HET Distribution Events							
High Efficiency Toilets	2,000	2,000	2,000	1,500	1,500	-	9,000
Landscape Irrigation Efficiency Program (LIEP)							
Residential Landscape Surveys	200	-	200	84	200	200	884
Residential Rotating Irrigation Nozzles	1,082	-	5,000	5,364	500	15,418	27,364
Large Landscape Audits	0	-	200	101	200	200	701
Ocean Friendly Landscape Program							
Smart Residential Irrigation Controllers	225	225	-	100	200	261	1,011
Large Landscape Controllers	200	200	200	200	200	200	1,200
Turf Removal	-	-	-	-	100,000 ft ²	300,000 ft ²	400,000 ft ²
Demonstration Gardens	-	1	1	3	5	2	12
California Friendly Landscape Classes & "Hands-on-Workshops"	5	6	6	5	4	5	31
Rain Barrel Distribution Events							
Rain Barrels	-	-	-	200	1,000	2,000	3,200
Recirc & Save							
PH Controllers	1	3	3	8	4	1	20
Water-Efficient Rebates							
High Efficiency Toilets	-	-	-	-	-	9,440	9,440
High Efficiency Clothes Washer Rebates	-	-	-	-	-	800	800

7.5.2 Future Programs

In 2016, West Basin will update its Water Use Efficiency Master Plan that will evaluate potential programs to be considered for implementation. For example, West Basin would like to continue to expand the following two existing programs:

Rain Barrel Events - West Basin will continue to provide residents with free rain barrels through one day distribution events. A new \$300 rebate has been provided by Metropolitan for cisterns that hold 200 or more gallons of water. West Basin plans on promoting these larger cisterns starting in 2016.

Greywater Workshops - In 2015, West Basin launched its first greywater pilot workshop and in 2016, West Basin plans on offering several greywater workshops to teach residents how to create a safe and legal Laundry-to-Landscape (L2L) greywater system.



Comprehensive Water Conservation Program - In 2015, West Basin, as a longtime member of the Malibu Area Conservation Coalition (MACC), partnered with the City of Malibu and the local water retailer, Los Angeles County Waterworks District #29, to develop the Comprehensive Water Conservation Program. These partners will implement the program beginning in 2016. The program components include:

- Free one-on-one consultations to educate and motivate residents to make changes; and
- A suite of incentives and rebates for available water conservation measures.

7.5.3 Other Conservation, Education and Outreach Programs

Public Information Programs

West Basin uses many strategies to help promote its free water education programs to the public and is very active in the community. West Basin developed and launched its Water Reliability Program to reduce dependence on imported water and increase drought-proof, locally-controlled water supplies. West Basin strives to achieve this imported water reduction goal by continuing to maximize its water recycling, conservation and groundwater

replenishment programs, as well as evaluating responsible ocean water desalination as a future drinking water supply. As part of the Water Reliability Program, West Basin offers the conservation and water education related programs described below.

Water Reliability Program – Speakers Bureau

Each year West Basin hosts presentations to local community groups that have included city councils, service clubs, chambers of commerce and others. The presentations provide information on current and future water supply challenges and what West Basin is doing to meet those demands through its Water Reliability Program. More than 10,000 people have pledged their support for the Program as it continues to grow.

Imported Water Supply Tours

West Basin, in cooperation with Metropolitan, provides inspection tours of the Colorado River Aqueduct and the State Water Project to legislators, local elected officials, retail water agency staff, and the general public at various times throughout the year. The purpose of the trips is to give local decision-makers a better understanding and appreciation of the water supply issues impacting the region.



Water Harvest Festival

Water Harvest Festival

In October 1999, West Basin began its first annual Water Harvest Festival in El Segundo. West Basin invites the community to learn about the value of water in a fun, family-friendly atmosphere that includes informational booths, shows, games, tours and contests. The event features local agencies, community groups, and water conservation vendors that provide the public with information about water-saving devices, rebates, and programs. West Basin provides free tours of its water recycling facility and demonstrates how wastewater is purified into usable recycled water. This free event attracts thousands of visitors each year.

Water Recycling and Ocean Water Desalination Tours

Once a month, West Basin provides the public with a water recycling and ocean water desalination tour at its Edward C. Little Water Recycling Facility. Visitors learn about the water purification process at the only facility in the world that produces five designer waters and see wastewater purified to drinking water quality in 20 minutes. Ocean water desalination tours provide information about Southern California’s water supply and how West Basin is safely researching ocean water desalination to diversify its water supply portfolio while protecting the marine ecosystem.

Media Outreach

West Basin maintains a strong link with local news media through press releases, social media, community events, one-on-one tours and talks, and small group briefings to inform them about West Basin’s ongoing activities in providing a safe and reliable supply of high-quality water to the communities it serves.



School Education Programs

West Basin provides free water education programs to youth, ages elementary through high school, in its service area. Program topics include the origin of our water supply, water conservation, and environmental issues. All education programs are grade specific and incorporate California’s Common Core Standards. The goal of these award-winning programs is to inspire students to become water ambassadors in our local communities. Descriptions of each program can be found in the following section.

7.6 Current and Future Education Programs

West Basin is dedicated to working with Metropolitan and its retail agencies to provide water conservation educational opportunities for the communities they serve. West Basin manages and supports several innovative water education programs that are offered for free to public and private schools in its service area.

7.6.1 Current Programs

Solar Cup

Solar Cup is an annual solar-powered boat building and racing competition held for high school students in Southern California. The goal of the seven-month program is to encourage students to learn about science, mathematics, water quality issues, conservation, and alternative energy and fuel sources. This year, Metropolitan, the lead sponsor of the program, allowed member agencies, including West Basin, to sponsor three teams. In 2015, the West Basin sponsored teams were divided into veteran and rookie teams.



Solar-powered boat

- Veteran Teams
 - Environmental Charter High School, Lawndale
 - California Academy of Math and Science, Carson
- Rookie Team
 - Lennox Math, Science and Technology Academy, Lennox

Water is Life Student Art Contest

This program encourages 3rd -12th grade students to learn about their water supply and design a water conservation slogan illustrated with original artwork. Grand prize and honorable mention winners in the elementary, middle and high school categories receive an iPad through the generous support of Suez Water and the Law Offices of Lemieux and O’Neill.

Water Educators Newsletter

West Basin keeps in touch with educators and administrators regarding our programs through our quarterly newsletter Waterworks.

Water Treatment Facility School Tours

West Basin offers a free field trip experience for 3rd - 12th grade students to visit the ECLWRF in El Segundo and the Water Education Center and Temporary Ocean Water Desalination Facility in Redondo Beach. During these field trips, students interact with water supply and conservation exhibits that teach them about water efficiency and water stewardship. The students are then taken to visit a local community aquarium to learn how local marine life is protected by West Basin’s environmentally sustainable water treatment processes. Table 7-5 shows the number of students who participated in these tours over the past five years.

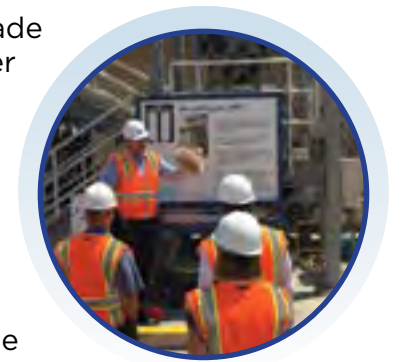


Table 7-5: School Tours at Water Treatment Facilities

Grade Level	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	Total
Grades K-3rd	901	1,548	1,937	1,752	2,593	8,731
Grades 4th-6th	4,547	3,579	3,831	3,992	2,795	18,744
Grades 7th-8th	585	146	391	1,130	572	2,824
High School	113	361	68	327	412	1,281
Total	6,146	5,634	6,227	7,201	6,372	31,580

Water Star Program

West Basin's Water Star Program encourages students to save 20 gallons a day, reducing the region's dependence on imported water and reducing runoff to the ocean. Students receive a water star conservation kit complete with fix-it tickets, a five-minute shower timer, and water-saving tips. More than 10,000 students received Water Star kits during the 2013-2015 school years.



Surfrider Foundation Teach and Test Program

The Surfrider Foundation South Bay Chapter's Teach and Test Program is an exciting project pairing high school students with laboratory staff from Loyola Marymount University and the Algalita marine education program to study the water quality of the South Bay beaches. West Basin sponsors this on-going effort to improve the water quality of Santa Monica Bay and introduce youth to water quality research and careers.

Teams volunteer to collect water samples from 18 local beaches to then analyze and publish their results in an on-going database. Students have participated from several schools within West Basin's service area.

Career Training Programs

Every February, West Basin partners with Suez Water to participate in the Inglewood/Airport Chamber of Commerce's Annual Youth Business and Industry Job Shadow Day. West Basin serves as a business host and conducts a five-hour water career program and facility tour that accommodates ten students. Students are introduced to West Basin's mission, water sustainability projects, agency organization and variety of job positions. Students then go on a tour of the ECLWRF to see the result of the public/private partnership with Suez Water. Students are exposed to a wide range of careers in chemistry, biology, engineering, human resources, finance, water resource planning, public affairs, and operations and maintenance. West Basin also hosts high school summer internships in partnership with the South Bay Workforce Investment Board.

7.7 Conservation Program Partnerships

By partnering with various entities, West Basin is able to leverage its funding and resources in order to develop targeted programs that have been identified in its Water Efficiency Master Plan.

Over the last five years, West Basin has partnered with local, state and federal agencies and has received several grants. These grants have allowed West Basin to develop and offer the public free water conservation programs. For every \$1 that West Basin invests, it provides \$3 worth of programs to the public. West Basin's funding partners have included the following:

- California Department of Water Resources
- California Native Plant Society
- Metropolitan Water District of Southern California
- Retail Water Agencies
- Southern California Edison
- Southern California Gas Company
- United States Bureau of Reclamation

West Basin has continued utilizing the services of the South Bay Environmental Services Center and has also continued its partnership with the Surfrider Foundation.



- South Bay Environmental Services Center (SBESC): In 2006, West Basin formed a partnership with the SBESC. The SBESC is a program of the SBCCOG that promotes programs provided by Edison, the Gas Company, Los Angeles County Sanitation District and LA Metro as well as West Basin's water conservation programs throughout 16 cities in the South Bay. From 2010 - 2015, the SBESC has distributed West Basin's education and conservation information at over 500 tabling events and has helped disseminate information to tens of thousands of people.
- Surfrider Foundation: In 2006, West Basin formed a partnership with Surfrider for the purpose of creating the Ocean-Friendly Landscape Program. Since that time, West Basin has collaborated with Surfrider and constructed 12 Ocean-Friendly Demonstration Gardens (OFGs).



West Basin also continues to sponsor Surfrider’s Teach & Test Program. Surfrider works with high school students to teach them about water runoff issues and pollution to the ocean.

- Southern California Edison and Southern California Gas Company: West Basin continues to collaborate with the local energy utilities to share information and cross promote programs. West Basin attends a monthly partners meeting at the SBESC where agencies share their programs and identify ways to collaborate on water and energy programs.

7.8 Utility Operation

7.8.1 Metering

As a wholesaler, West Basin does not directly meter customers’ water use. However, every water agency within West Basin’s service area bills their customers according to meter consumption. By encouraging installation of dedicated landscape meters, agencies will be able to recommend the appropriate irrigation schedules through future landscape programs.

7.8.2 Water Conservation Program Coordination and Staffing Support

West Basin’s Conservation Department employs a Senior Water Use Efficiency Specialist and a Water Resources Analyst, both full time employees. The Water Resources Analyst supports the Water Efficiency Specialist with 50% of his time. The other 50% is spent on water resource planning issues. This department works on implementing the various programs described in this section, seeks funding to support these projects and supports the functions of West Basin and its Board of Directors on water efficiency issues.

For every \$3 spent in the Water Efficiency Program, only \$1 is contributed from West Basin’s budget; the other \$2 is contributed from grant funding and local partnerships.

7.8.3 Asset Management

West Basin allocates annual funds as a part of its Capital Improvement Plan for maintenance and repair of its recycled water distribution system and Desalter operations. West Basin has an asset management program for the recycled water distribution system and Desalter operations for maintenance and improvements. West Basin responds to needed repairs as they arise and via scheduled maintenance as identified through the Asset Management Program.

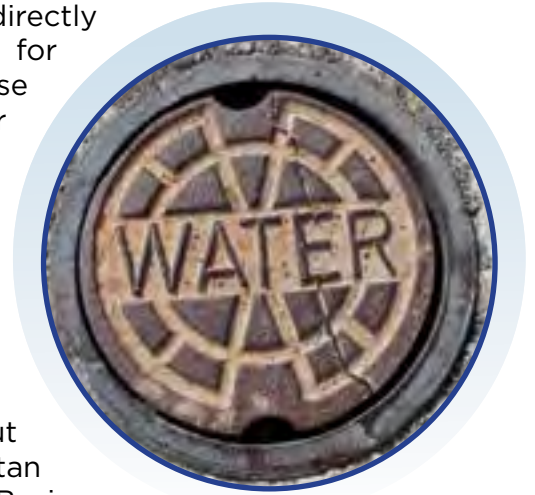


Section 8 | **Water Rates**

Section 8 | Water Rates & Charges

As a water wholesale agency, West Basin does not directly charge residential and other end-use customers for supplies. Instead, West Basin’s retail agencies purchase water from West Basin and then combine it with other supplies to deliver to their customer agencies at a variety of rates.

West Basin’s current potable water rates are primarily based upon the costs of imported supplies purchased from Metropolitan. Imported water purchased by West Basin from Metropolitan carries not only the cost of acquiring, importing, treating and distributing the water throughout the region, but also the costs associated with maintaining Metropolitan reliability and “readiness to serve”. The total West Basin rate structure must include the value-added costs associated with representing retail agencies at Metropolitan, and distributing locally-produced recycled and desalinated groundwater supplies.



8.1 Metropolitan Rate Structure

In 2002, the Metropolitan Board adopted a new rate structure to support its strategic planning vision to encourage the development of local supplies through recycled water, promote local conservation efforts, and ensure a reliable supply of imported water. To achieve these objectives, Metropolitan called for voluntary purchase orders from its member agencies, unbundled its water rates, established a tiered supply rate system, and added a capacity charge. The new rate structure components provide a better opportunity for Metropolitan and its member agencies to manage their water supplies and proactively plan for future demands. This same structure remains in effect today.

8.1.1 Purchase Orders

The Purchase Order was an agreement between Metropolitan and a member agency, whereby the member agency agreed to purchase a minimum amount of non-interruptible water over a ten-year purchase period. The Annual Maximum was the amount of lower cost (Tier 1) non-interruptible water that a member agency was entitled to purchase annually as a result of that Purchase Order.

Table 8-1 shows how both the current annual maximum and purchase commitment were calculated for West Basin. West Basin’s highest delivery of non-Order interruptible water was 150,464 AF in the most recent 12-year period of FY 2003-2014. Therefore, West Basin’s Tier 1 annual maximum is calculated as 90 percent of 150,464 AF – or 135,417 AF. The total purchase commitment is 60 percent of 150,464 AF multiplied by the 10 year Purchase Order period - or 902,780 AF to be purchased by the end of 2024. West Basin has remained below its Tier 1 annual maximum for the first 10 years of the Purchase Order, signed in 2002, and is projected to meet its Purchase Commitment by the year 2024.

Table 8-1: West Basin Purchase Order Terms

Initial Base Allocation (AF)	Tier 1 Annual Maximum (90% of Base) (AF)	Purchase Order (60% of Base x 10) (AF)
150,464	135,417	902,780

8.1.2 Unbundled Rates and Tier 1 & 2

To justify the different components of the cost of water on a per acre foot basis, Metropolitan rates are comprised of the following components:

- Supply Rate Tier 1: Reflects the average supply cost of water from the Colorado River and State Water Project.
- Supply Rate Tier 2: Reflects the Metropolitan costs associated with developing new supplies, which are assessed when an agency exceeds its Tier 1 limit of firm deliveries.
- System Access Rate: Recovers a portion of the costs associated with the conveyance and distribution system, including capital and operating and maintenance costs.
- Water Stewardship Rate: Recovers Metropolitan’s cost of providing incentives to member agencies for conservation, water recycling, groundwater recovery, and other water management programs approved by the Metropolitan Board.
- System Power Rate: Recovers Metropolitan’s electricity-related costs, such as pumping water through the conveyance and distribution system.
- Treatment Surcharge: Recovers the treatment cost and is assessed only for treated water deliveries, whether firm or non-firm.

The Metropolitan rates for 2016 calendar year are displayed in Table 8-2.

Table 8-2: Metropolitan Rates Adopted for 2016

Category of Water	\$/AF
Supply Rate Tier 1	\$156
Supply Rate Tier 2	\$290
System Access Rate	\$259
Water Stewardship Rate	\$41
System Power Rate	\$138
Treatment Rate	\$348
Total Tier 1 Treated Rate	\$942
Total Tier 2 Treated Rate	\$1,076

8.1.3 Metropolitan Capacity Charge

The Metropolitan capacity charge was developed to recover the costs of providing distribution capacity during peak summer demands. The aim of this charge is to encourage member agencies to reduce peak day demands during the summer months (May 1 thru September 30) and shift usages to the winter months (October 1 thru April 30), which results in more efficient utilization of Metropolitan’s existing infrastructure and defers capacity expansion costs. Currently, Metropolitan’s capacity charge for CY 2016 is set at \$10,900 per cubic foot per second (cfs).

The capacity charge is applied to an agency’s maximum usage flow rate, which is the highest daily average usage (per cfs) for the past three summer periods. Table 8-3 shows this data for West Basin.

Table 8-3: Metropolitan Capacity Charge for 2016

Peak Flow 2012 (cfs)	Peak Flow 2013 (cfs)	Peak Flow 2014 (cfs)	3-Year Max (cfs)	Capacity Charge
223	230	218	230	\$2,509,180

8.1.4 Readiness-to-Serve Charge

Metropolitan's readiness-to-serve charge recovers a portion of Metropolitan's debt service costs associated with regional infrastructure improvements and is determined by the member agencies' firm imported deliveries for the past ten years. West Basin meets this obligation through its commodity rates.

8.2 West Basin's Imported Water Rates

To deliver water from Metropolitan to its customer agencies, West Basin must pass along the Metropolitan costs as well as an additional administrative surcharge to its retail agencies. West Basin's rate structure is described below.

8.2.1 Purchase Agreements

In order to meet the Purchase Order commitment with Metropolitan, West Basin established its own purchase contract policy with its retail agencies from 2002-2007 and 2008-2012. When Metropolitan renewed the Purchase Orders with its member agencies, West Basin decided not to require Purchase Orders with its customer agencies.

8.2.2 Reliability Service Charge

One of the main revenue sources for West Basin is the reliability service charge applied to all imported water sold. Revenue from this charge recovers West Basin's administrative costs including planning, outreach and education, and conservation efforts, as well as a portion of the recycled water system's operating costs. As of July 1, 2015, West Basin's reliability service charge is \$194/AF.

8.2.3 Readiness-to-Serve Surcharge

West Basin passes along Metropolitan's readiness-to-serve (RTS) charge within its commodity rates for non-interruptible and Barrier water supplies. As of January 1, 2016, West Basin's RTS surcharge is at \$118/AF.

8.2.4 Water Service Charge

Water utility revenue structures benefit from a mix of fixed and variable sources. West Basin's water service charge recovers a portion of the agency's fixed administrative costs, but is a relatively small portion of its overall revenue from water rates. As of July 1, 2015, the water service charge is \$56/cfs of a customer agency's meter capacity for imported water meters.

8.2.5 West Basin's Capacity Charge

Metropolitan's capacity charge is intended to encourage customers to reduce peak day demands during the summer months, which will result in more efficient utilization of Metropolitan's existing infrastructure. West Basin has passed through Metropolitan's capacity charge to its customer agencies based upon their highest daily average usage (per cfs) for the past three summer periods. The capacity charge that West Basin is assessed by Metropolitan is \$8,500/cfs effective January 1, 2016.

8.2.6 Desalter Water Charges

West Basin also sells water produced by the C. Marvin Brewer Desalter at the effective Metropolitan rate. This includes the Metropolitan non-interruptible base rate and an acre-foot equivalent for the Capacity Charge. The rate for Desalter water is \$1,060/AF as of January 2016.

8.3 Recycled Water Rates

West Basin's Edward C. Little Water Recycling Facility provides five different qualities of water to meet the needs of landscape irrigation, cooling towers, refineries, and industries within and outside its service area. Since 1995, West Basin has encouraged the maximum use of recycled water by providing an economic incentive through specialized rates and charges.

8.3.1 Recycled Water Rates

West Basin uses seven different rates for recycled water to account for differing treatment quality, power requirements, and customer location. All rates are assessed to include the operation and maintenance, labor, and power costs associated with the delivery of recycled water. A majority of these rates are set up in a declining tiered structure to further encourage the use of recycled water, while the others are set up to service one or more customers at a uniform rate. Most of the recycled water rates are set lower than potable water rates except for highly treated recycled water for use by refineries. The rates for the 2015 - 2016 fiscal year are shown in Table 8-4.



Recycled water irrigation
at StubHub Center -
Carson, CA



Recycled water irrigation
at Marriot Golf Course -
Manhattan Beach, CA



Recycled water irrigation
at King Harbor Park -
Redondo Beach, CA

Table 8-4: FY 2015-16 Recycled Water Rates

Volume (AF/Month)	Within West Basin Service Area						Outside Service Area
	Basic	West Coast Barrier (<4,500 AF)	West Coast Barrier (4,500+ AF)	Low Pressure Boiler Feed	Nitrified	High Pressure Boiler Feed	
0-25	\$1,005/AF	\$1,168/AF	\$605/AF	\$1,233/AF	\$985/AF	\$1,589/AF	\$1,047/AF
25-50	\$995/AF	\$1,168/AF	\$605/AF	\$1,233/AF	\$985/AF	\$1,589/AF	\$1,037/AF
50-100	\$985/AF	\$1,168/AF	\$605/AF	\$1,233/AF	\$985/AF	\$1,589/AF	\$1,027/AF
100-200	\$975/AF	\$1,168/AF	\$605/AF	\$1,233/AF	\$985/AF	\$1,589/AF	\$1,017/AF
200+	\$965/AF	\$1,168/AF	\$605/AF	\$1,233/AF	\$985/AF	\$1,589/AF	\$1,007/AF

Customers outside of West Basin’s service area boundaries pay an additional \$42/AF per tier. This additional charge is applied to make up for the recycled water standby charge that is not levied on their parcels.

8.3.2 Recycled Water Standby Charge

The recycled water standby charge is levied by West Basin to each parcel within the service area. A rate of \$24 per parcel (up to one acre for residential) is administered by West Basin to provide a source of non-potable water completely independent of drought-sensitive supplies. The revenue collected from this charge is used to pay the debt service obligations on the West Basin water recycling facilities. Each year West Basin holds a public hearing to adopt the West Basin Municipal Water District Engineer’s Report and Resolution to assess this charge.

8.4 Future Water Rate Projections

As the demand for water increases in southern California so does the cost to administer, treat, and distribute imported and recycled water. However, West Basin has worked diligently to ensure that stable and predictable rates are managed for the future. This section discusses projections of imported and recycled water rate trends for the next ten years.

8.4.1 Imported Water Rate Projections

In 2004, the Metropolitan Board adopted its Long Range Financial Plan. This plan was developed to forecast future costs and revenues necessary to support its operations and capital investments. Furthermore, it lays out the financial policy Metropolitan will pursue over the next ten years. According to projected Metropolitan sales and planned investments into local resources, Metropolitan estimates imported water rates will increase three to five percent annually. As

a result, West Basin’s water reliability service charge is projected to increase at an annual average rate of five to seven percent. This increase is determined by West Basin’s own Long Range Financial analysis and revenue requirements. Figure 8-1 displays West Basin’s imported water rate projections for the next ten years.

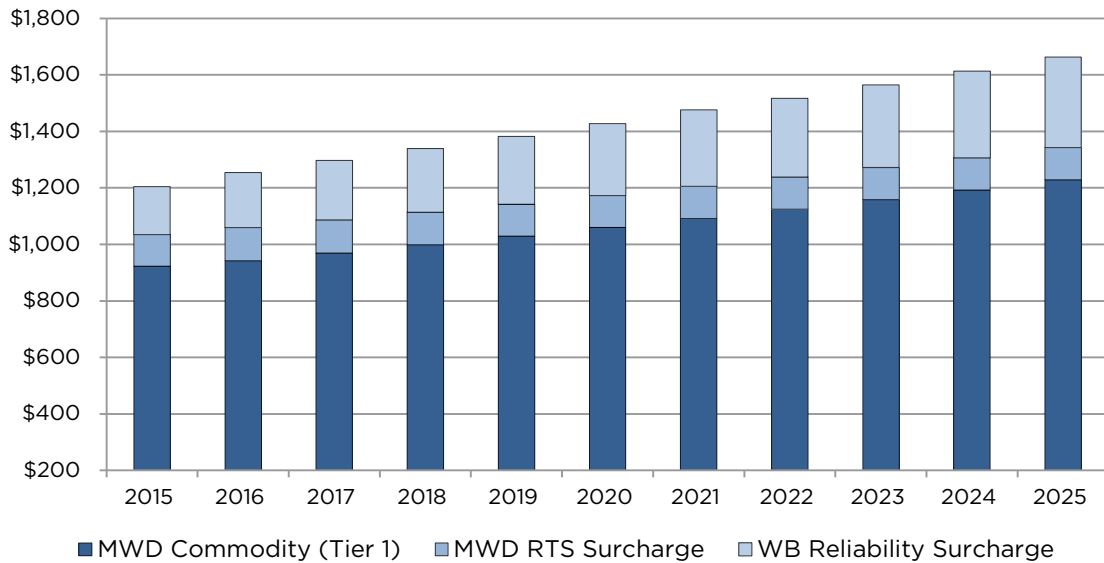


Figure 8-1: Projected Imported Water Rates

8.4.2 Recycled Water Rate Projections

Like imported water rates, recycled water rates are expected to increase due to higher treatment, maintenance, and power costs. However, West Basin believes in setting recycled water rates at a competitive level to help offset the use of imported water. To achieve this economic incentive, recycled water rates have been projected to increase at a slightly lower level than imported water. Rates are projected to increase for all types of recycled water by an average of five percent annually. However, these rates may vary depending upon energy and chemical costs.



Section 9 | **Recycled Water**

Section 9 | Recycled Water

Recycled water is the cornerstone of West Basin's efforts to increase water reliability by augmenting local supplies and reducing dependence on imported water. West Basin has become an industry leader in water reuse since planning and constructing its recycled water system in the early 1990s. West Basin's recycled water supply is sold to customers for non-potable applications such as landscape irrigation, and commercial and industrial processes, as well as used for indirect potable reuse through groundwater replenishment. While serving to offset imported water supplies, recycled water use also results in less ocean discharge of lower quality effluent into the Santa Monica Bay.

West Basin delivered a total of approximately 35,250 AF of recycled water to sites located within and outside its service area in FY 2014-15. Municipal and industrial recycled water use within West Basin's service area totaled approximately 16,707 AF, seawater barrier use was approximately 12,403 AF, and use outside its service area was approximately 6,140 AF. It is projected that recycled water sales could represent 13 percent of total retail water demand by 2040 within West Basin's service area.

9.1 Recycled Water Supply and Treatment

West Basin's recycled water supply source is treated wastewater effluent from the City of Los Angeles's Hyperion Water Reclamation Plant (Hyperion). The City of Los Angeles has operated Hyperion, located adjacent to West Basin's service area, since 1894. Hyperion was initially built as a raw sewage discharge plant that has been upgraded over the years from partial secondary to full secondary treatment, improving discharge into the Santa Monica Bay. Hyperion has a maximum daily flow capacity of 450 MGD and a peak wet weather flow capacity of 800 MGD.

West Basin purchases approximately 37,600 AF, or roughly 13 percent of Hyperion's secondary effluent for treatment at West Basin's ECLWRF. West Basin opened ECLWRF in 1995, which is still the only recycled water plant of its kind in the nation. This facility has a current capacity of 62,700 AF with its fifth expansion completed in 2014. Although the City of Los Angeles strives to provide West Basin with a consistent quality of secondary effluent, the ECLWRF has to accommodate inevitable fluctuations in influent quality.



Most of West Basin's recycled water is treated to meet California Code of Regulations Title 22 (Title 22) disinfected tertiary recycled water standards. Title 22 addresses specific treatment requirements for recycled water and lists approved uses. Approximately 2,000 tests are performed monthly at the West Basin ECLWRF to ensure water quality meets all State and Federal requirements.

In 2002, West Basin's ECLWRF was recognized by the National Water Research Institute as one of the six National Centers for Water Treatment Technologies in the country. West Basin's recycled water program is unique in that it provides a variety of recycled water qualities beyond basic tertiary Title 22 levels. These five types of recycled product water are developed to meet specific customer specifications and needs as follows:



- **Disinfected Tertiary Water:** Secondary treated wastewater meeting Title 22 regulations is produced for non-potable irrigation through a conventional treatment process of coagulation, flocculation, clarification, filtration and disinfection.
- **Nitrified Water:** Disinfected tertiary water that is nitrified to remove ammonia is produced for use in refinery cooling towers.
- **Reverse Osmosis Water:** Secondary treated wastewater pretreated by ozone and microfiltration followed by reverse osmosis (RO), ultra-violet light and peroxide treatment, stabilization, and disinfection for groundwater recharge.
- **Pure Reverse Osmosis Water:** Secondary treated wastewater and tertiary disinfected recycled water that has undergone micro-filtration and RO for low-pressure boiler feed water.
- **Ultra-Pure Reverse Osmosis Water:** Secondary treated wastewater and tertiary disinfected recycled water that has undergone micro-filtration and two passes through RO for high-pressure boiler feed water.

Within a few years and before the next UWMP update in 2020, a sixth water quality is expected to be available:

- **Nitrified/Tertiary Membrane Bioreactor (t-MBR):** Disinfected tertiary water that is nitrified to remove ammonia and filtered and produced for use at the Carson Regional Water Recycling Facility for the Tesoro Refinery cooling towers.

In addition to providing recycled water for commercial and industrial uses, West Basin produces reverse osmosis water that the WRD purchases and blends with potable water for injection into the West Coast Basin Seawater Barrier (Barrier). This injected water has the dual benefit of preventing seawater intrusion into the aquifers of the WCGB, but also replenishing the water that is extracted by drinking water wells.



Ultraviolet advanced oxidation system at the ECLWRF

Seawater barriers are a series of coastal injection wells that form a barrier to ensure the groundwater level near the ocean stays high enough to keep seawater from seeping into a basin. The Barrier has 153 injection wells. In April 2009, West Basin and WRD signed an agreement to increase the amount of RO recycled water supplied to the barrier to 100 percent by 2012, so blending is no longer required. Currently, potable water is only injected when recycled water production is unable to meet the expected deliveries to the barrier or if injection exceeds the recycled water capacity.

West Basin also operates three satellite facilities that provide additional treatment after tertiary treatment at the ECLWRF in order to supply the different types of recycled product water to large customers that are often a long distance from the ECLWRF. Figure 9-1 shows the locations of the ECLWRF in the city of El Segundo as well as the satellite treatment facilities including: the Exxon-Mobil Nitrification Facility in Torrance, the Chevron Nitrification Facility in El Segundo, and the Juanita Millender-McDonald Carson Regional Water Recycling Treatment Facility in Carson. Table 9-1 gives the treatment level and quantity of water treated by the ECLWRF.

Table 9-1: Wastewater Treatment and Discharge within Service Area in 2015 (AF)

Wholesale: Wastewater Treatment and Discharge Within Service Area in 2015									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 volumes			
						Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
ELCWRF	Brine permit: NPDES #CA0063401	Brine is sent 5 miles offshore through the City of Los Angeles' ocean outfall	Ocean outfall	Yes	Tertiary	35,250	0	29,110	6,140
Total						35,250	0	29,110	6,140

9.2 Recycled Water Use

9.2.1 Existing System

West Basin has saved over 169 billion gallons of imported potable water from Northern California and the Colorado River which otherwise would have been used for non-potable applications. All recycled water is initially produced at the ECLWRF where it is distributed to either end-users or one of the three satellite facilities.

As Figure 9-1 shows West Basin's recycled water system serves the cities of Carson, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Manhattan Beach, Redondo Beach, and unincorporated areas of Los Angeles County within its service area, as well as the cities of Torrance and Los Angeles outside of its service area.

The recycled water distribution infrastructure is separate from the potable drinking water system. All pipes, pumps and other equipment used to transport recycled water are clearly identified as recycled water to distinguish them from the potable drinking water system.

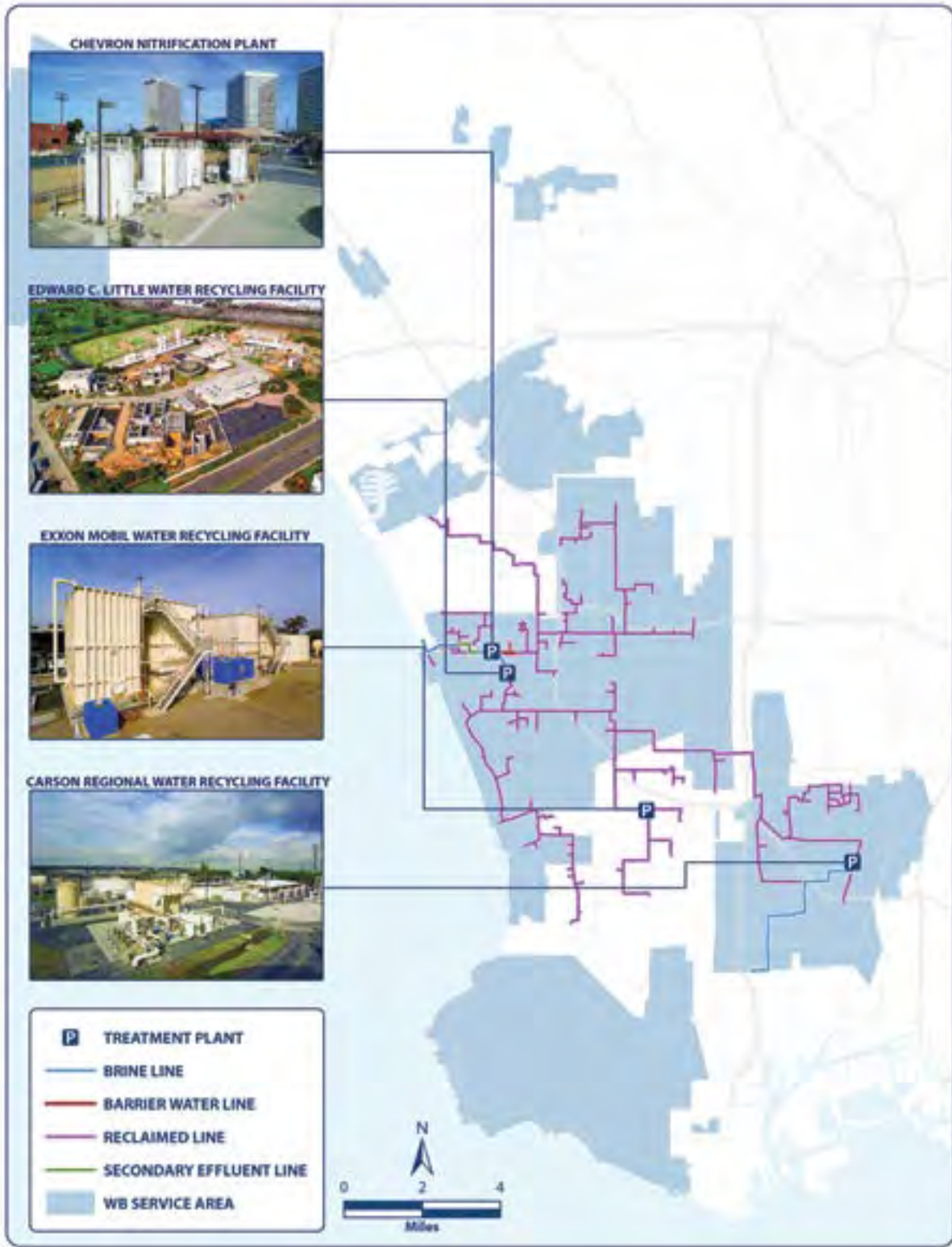


Figure 9-1: West Basin's Water Recycling Facilities

9.2.2 Recycled Water Use by Type

A breakdown of West Basin’s recycled water end-users is shown in Figure 9-2. West Basin supplies recycled water for a wide-variety of uses including:

- Seawater Barrier
- Construction
- Industrial: Multi-Use and Nitrified
- Irrigation: Cal-Trans, cemetery, colleges, golf courses, landscape, medians, multi-use, parks, and schools
- Street Sweeping

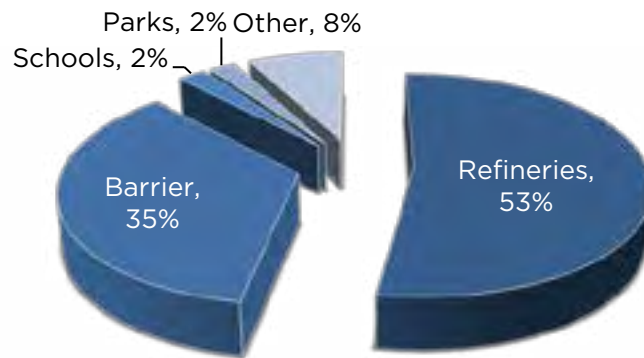


Figure 9-2: Recycled Water Use by Type

9.2.3 Historical and Current Sales

West Basin’s recycled water sales over the past ten years are illustrated in Figure 9-3 and Table 9-2. Sales have fluctuated over the years but have increased to approximately 36,000 AF over the past two years.

West Basin has been able to deliver over 300,000 AF of recycled water over the last ten years to customers within and outside of its service area. West Basin anticipates recycled water production and use to increase in the future due to system expansions, new applications, increasing public acceptance and economic incentives.

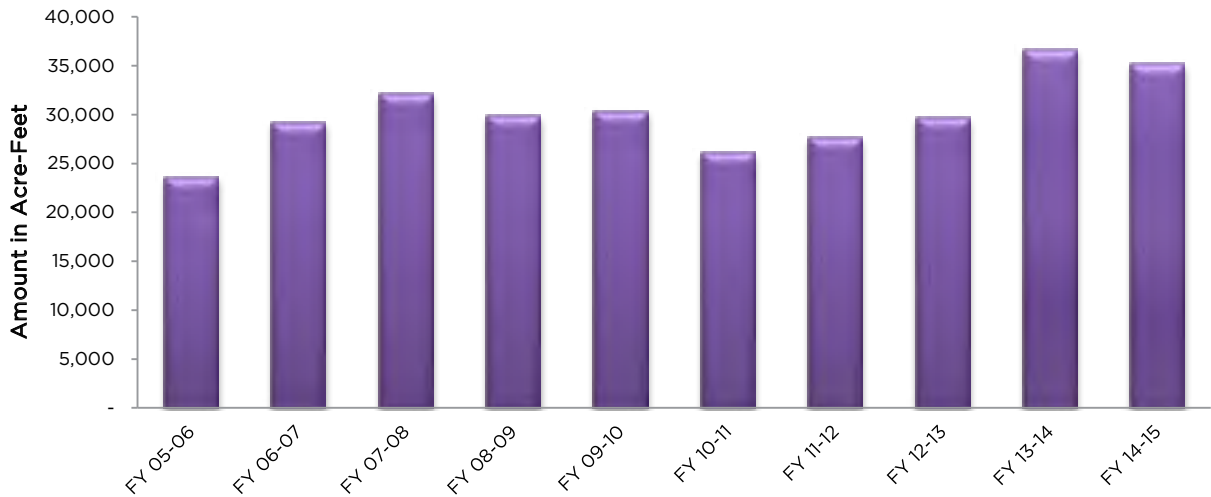


Figure 9-3: Historical Recycled Water Sales (FY 2005-2015)

Table 9-2: West Basin Recycled Water Sales FY 2005-2015 (AF)

West Basin	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	Total
California Water Service-Dominguez	3,665	3,610	4,690	5,293	4,959	4,392	5,522	5,841	6,245	5,669	49,886
California Water Service-Hawthorne	111	118	85	99	90	79	90	108	118	98	994
California Water Service-Hermosa/Redondo	119	141	145	163	150	133	136	162	167	147	1,462
City of El Segundo	7,405	8,201	7,865	8,978	9,035	6,638	6,888	7,665	8,616	9,300	80,589
City of Inglewood	625	865	706	742	677	606	642	783	827	728	7,201
City of Manhattan Beach	249	316	288	251	264	264	291	396	305	313	2,938
Golden State Water Company	429	523	552	410	360	148	333	538	573	452	4,319
Municipal & Industrial	12,604	13,774	14,330	15,936	15,535	12,259	13,901	15,492	16,852	16,707	147,390
WRD (Barrier)	4,383	9,104	11,129	7,652	7,797	7,320	6,531	6,622	12,372	12,403	85,312
Within Service Area	16,987	22,878	25,459	23,588	23,331	19,579	20,431	22,114	29,224	29,110	232,702
City of Torrance	253	285	311	277	272	234	283	271	346	333	2,866
City of Torrance-Mobil	6,156	5,774	6,078	5,599	6,173	5,551	6,069	6,364	6,183	4,937	58,883
Los Angeles Department of Water & Power	257	313	360	444	608	763	876	968	998	870	6,457
Outside of Service Area	6,666	6,372	6,750	6,320	7,053	6,548	7,228	7,602	7,527	6,140	69,206
TOTAL	23,653	29,250	32,209	29,908	30,384	26,127	27,659	29,716	36,751	35,250	300,908

West Basin’s recycled water system also serves the cities of Torrance and Los Angeles located outside of its service area. Therefore, the total usage within West Basin’s service area was 29,110 AF and the total amount of recycled water delivered by West Basin was 35,250 AF in FY 2014-15.

According to West Basin’s 2010 UWMP, deliveries of recycled water within the service area were projected to reach 33,348 AF by 2015. As shown in Table 9-3, actual sales in FY 2014-15 were lower than the projection by approximately 4,000 AF. This was mainly due to seawater barrier improvements that hindered the amount of recycled water that could be delivered to the barrier in 2014. The construction was performed by the Los Angeles County Department of Public Works (LACDPW), who own and operate the barrier. However, West Basin delivered more recycled water than expected to irrigation and industrial customers.

Table 9-3: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual (AFY) (Inside Service Area Only)

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
Irrigation/Industrial	16,368	16,707
West Coast Barrier	16,980	12,403
Total	33,348	29,110

9.2.4 Projected System Expansions

In 2009, West Basin completed a Capital Implementation Master Program (CIMP). The CIMP includes all of the planned projects for recycled water and desalination through 2030. The major recycled water capital projects are described below.

Tesoro Refinery Capacity Expansion Project

This project will provide 2.59 MGD of increased supply to the Tesoro Refinery by constructing a Tertiary-Membrane Bioreactor (t-MBR) facility and fully restoring the Microfiltration (MF) capacity to contract requirements. This project will provide the following benefits: increase the recycled water supply to Tesoro; improve water quality of the nitrified water; reduce breakpoint chlorination to the current nitrified effluent, thereby reducing the chloride content of the wastewater; optimize the blend of RO & nitrified water used in Tesoro's cooling towers; and remove total suspended solids and colloidal iron concentrations. The expected completion date for this project is FY 2017-18.

ECLWRF Reverse Osmosis Clean-In-Place (CIP) Waste Discharge Project

The RO CIP waste and RO brine are currently discharged into the existing brine line that connects to the Hyperion ocean outfall. This project allows West Basin to discharge the RO CIP waste to the sewer system to ensure compliance with the brine permit issued by the Regional Water Quality Control Board (RWQCB) to maintain continuous production for the Barrier System and Chevron's Boiler Feedwater system. The expected completion date for the project is FY 2016-17.

Hyperion Secondary Effluent Pump Station Expansion

As West Basin's recycled water demand continues to increase, the demand for Hyperion's effluent will eventually exceed the capacity of the Hyperion Secondary Effluent Pump Station. A pump station expansion would be able to provide a capacity of up to 70 MGD for ECLWRF. West Basin is working closely with the Los Angeles Department of Water & Power (LADWP), the provider of electrical power to the pump station, to construct a second electrical feeder to the pump station that will increase the reliability of the pump facilities. The expected completion date for the project is FY 2016-17.

Water Quality Facility Improvements

Water quality facility improvements are made to existing facilities to improve or sustain the water quality provided to recycled water customers. The project provides customers with a consistent recycled water quality for their specific needs. The expected completion date for the project is FY 2015-16.

West Basin Pipeline Lateral Extensions

West Basin is continuously extending its recycled water distribution system as demand increases. These projects will increase the supply of West Basin's disinfected tertiary recycled water for irrigation and cooling towers to various facilities within the West Basin service area and reduce the use of imported potable water. The additional supply also improves the water quality within the distribution system by moving water through the system faster, reducing the potential for biological growth, scaling, and corrosion within the pipeline. Many of these laterals are part of the Harbor-South Bay Recycled Water Expansion Project.

The Harbor-South Bay Recycled Water Expansion Project is a partnership between West Basin and the United States Army Corps of Engineers (USACE) to expand West Basin's current recycled water distribution system as well as improve overall system reliability. This expansion will provide additional recycled water supplies to the cities of Carson, Torrance, Palos Verdes, Gardena, and unincorporated areas of Los Angeles County. The expected completion date for the project is ongoing pending funding availability.

Expansion of West Coast Basin Barrier Production

West Basin desires to maximize the available production for injection into the Barrier. The MF systems constructed as part of the Phase IV and V expansions at ECLWRF include expansion slots for new membrane units to be installed. This project's first phase will include the engineering design and construction of additional Phase V MF units starting in FY 2015-16. West Basin will benefit from reduced potable water use for Barrier injection and an increase in revenue through additional sales of recycled water to WRD. The expected completion date for the project is FY 2017-18.

Nitrified Water Alkalinity Process Upgrades

This project will aim to improve the alkalinity of the recycled water provided to the Chevron and Exxon-Mobil Refineries to facilitate the removal of ammonia. This project will provide the customers with an improved water quality as well as reduce operational chemical costs associated with breakpoint chlorination for ammonia removal. The expected completion date for the project is FY 2015-16.

Carson Mall Lateral Phase II

This is a new recycled water pipeline project to be constructed in cooperation with USACE under the Harbor-South Bay Recycled Water Expansion Project. The project will provide disinfected tertiary recycled water for approved irrigation uses to the city of Carson's medians and parks. In addition, this pipeline will connect to a future recycled water system to be built by the city of Carson that will expand the delivery of recycled water to additional medians, City Hall green areas, parks, and schools. The expected completion date for the project is FY 2015-16.

South Gardena Lateral

The South Gardena Lateral will connect three new recycled water customers: Gardena High School, South Garden Park, and Roosevelt Memorial Association. These sites will reduce their reliance on imported water. Once completed, the project is anticipated to serve approximately 120 AFY of recycled water. The expected completion date for the project is FY 2016-17.

Universal Microfiltration Pilot

The Universal Microfiltration Pilot will allow West Basin to determine design conditions for a non-proprietary, universal microfiltration system using a variety of commercially available membrane modules. A non-proprietary, universal microfiltration system will provide greater competition in bidding situations and allow flexibility to change manufacturers as technology, feed water quality, and treatment objectives change. The expected completion date for the project is FY 2015-16.

Customer Development and Retrofit Projects

Customer developed projects assist in making connections and retrofits to new recycled water customers, providing them with recycled water and reducing dependence on imported water. This is an on-going project.

9.2.5 Projected Recycled Water Use

The 2009 CIMP identified and prioritized areas where recycled water has the potential to expand based upon potential future customers. Converting fabric and carpet dyeing industrial users to recycled water use are examples of significant opportunities for increased use.

The CIMP projects described in Section 9.2.4 are expected to result in an additional 15,000 AF of recycled water use within West Basin's service area by 2040. West Basin will continue to pursue new cost-effective projects both within and outside its service area.

Tables 9-4 and 9-5 illustrates the projected increase of recycled water over the next 25 years within and outside the service area.



**Table 9-4: Current and Projected Recycled Water Use
Within Service Area (AF)**

Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
<input type="checkbox"/>	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	2015	2020	2025	2030	2035	2040 (opt)
WBMWD	Tertiary	16,707	21,894	27,135	27,135	27,135	27,135
WBMWD (IPR)	Advanced	12,403	17,000	17,000	17,000	17,000	17,000
Total		29,110	38,894	44,135	44,135	44,135	44,135

**Table 9-5: Current and Projected Recycled Water Use
Outside of Service Area (AF)**

Agency	2015	2020	2025	2030	2035	2040
City of Torrance	5,270	5,421	5,433	9,156	9,156	9,156
City of Los Angeles	870	970	970	970	970	970
Central Basin Municipal Water District	0	0	675	675	675	675
Total	6,140	6,391	7,078	10,801	10,801	10,801

9.2.6 Encouraging Recycled Water Use

West Basin generates interest in recycled water by contacting potential customers and cities with sites meeting the following conditions:

- Located near an existing recycled water main pipeline;
- High water use potential; and
- Mandated to use recycled water and/or express interest in using recycled water.

For commercial and industrial customers, West Basin emphasizes recycled water is an important tool for businesses, beyond the benefits of water conservation. West Basin markets recycled water as a resource that is:

- Less expensive than potable water treated to similar quality standards;
- More reliable than imported water; and
- Consistent with statewide goals for water supply and ecosystem improvement in the State Water Project and Colorado River systems.

The applications are expanding from traditional irrigation uses such as golf courses and parks to unconventional commercial and industrial uses. Through innovative marketing, recycled water is now being used by oil refineries and for cooling towers. In addition, West Basin is investigating recycled water use in fabric dye houses, co-generation plants, and commercial laundries.

Other financial incentives are used to encourage recycled water use aside from West Basin wholesaling recycled water at a rate lower than potable water. Some potential recycled water customers do not have the financial capability to pay for onsite plumbing retrofits necessary to receive recycled water. In some of these situations, West Basin advances funds for retrofitting that can later be reimbursed through water billing. Table 9-6 illustrates West Basin’s coordinated effort with key stakeholders during the development of the CIMP.

Table 9-6: CIMP Coordination

Participating Agencies	Role in Plan Development
Water Purveyors	Customer Development, Facilities, Impacts, Rates
Wastewater Agencies	Recycled Water Supply, Water Quality, Reliability
Groundwater Agencies	Rates and Customer Involvement
Planning Agencies	Economic Analysis, Rates, Data Assessment, Customer Assessment, Rates, Community Impacts, Customer Involvement, Conceptual Pipeline Routes, Cost Estimates

9.2.7 Funding

Capital costs for projects planned over the next five years have been budgeted to average approximately \$32 million a year. These costs will be covered by the sources identified below and other sources as they become available.

Metropolitan Local Resources Program (LRP) Incentive: In order to qualify for LRP incentives, proposed desalination and recycled water projects by member agencies must cost more than projected Metropolitan treated non-interruptible water rates and reduce potable water needs. West Basin is eligible to receive a sliding scale incentive up to \$340 per AF of produced recycled water over 25 years as a member agency of Metropolitan. This incentive is competitive and requires an application and review process by Metropolitan in coordination with West Basin staff.

Table 9-7 below shows historical and current LRP incentives provided by Metropolitan. The future full-scale ocean water desalination facility would be eligible under this program when financing is needed.

Table 9-7: Historical and Current LRP Incentives

LRP Project	Expiration Date (FY)
Historical	
Groundwater	
C. Marvin Brewer Desalter	2012/13
Existing	
Recycled Water	
Edward C. Little Water Recycling Facility Phases I-IV	2019/20
Edward C. Little Water Recycling Facility Phase I-IV (Seawater Barrier)	2019/20
Edward C. Little Water Recycling Facility Phase V	2036/37

Grant Funding: West Basin often applies for Federal and State grant funding for recycled water projects through the USACE, which awards qualified programs 75 percent of their project funding. West Basin has utilized this funding arrangement for several of its previous water recycling projects.

9.2.8 Direct Potable Reuse

Direct potable reuse (DPR) is the direct reuse of purified recycled water in a water supply system. Purified potable drinking water is created from treated wastewater and introduced directly into a municipal water supply system without an environmental “buffer”.

The WaterReuse Research Foundation (WRRF), in partnership with WaterReuse California (WRCA), launched the DPR Initiative in June of 2012 to advance DPR as a water supply option in California. This was driven by the establishment of statewide recycled water use goals and a mandate from the California legislature to come up with a feasibility study by 2016 to investigate developing uniform water recycling criteria for DPR. This Initiative was built upon research that started in 2011 when WRRF began funding research identified in WaterReuse’s Direct Potable Reuse: A Path Forward publication. That effort informed a DPR Research Needs meeting held in December 2012 which forged the framework of the WRRF’s DPR research agenda.

Since 2012, the DPR Initiative has raised over \$6 million for cutting-edge DPR research. To date, WRRF has allocated \$4.5 million to fund 26 DPR research projects. This research is important to address the regulatory, utility, and community barriers and is valued at \$11.5 million.

All of the research under the DPR Initiative is made available to an Expert Panel for their consideration as they navigate the important task of determining the feasibility of DPR. An uninformed public may be the biggest obstacle to DPR, despite the technical feasibility and safety of the practice.

WRRF and WRCA are taking a three-phased approach to gain public acceptance of DPR in California:

1. Develop Strategic Communication Plans (state and local)
2. Develop Messaging Material and Methods
3. Implement, Evaluate and Refine Plan

There are currently five types of DPR methods as shown in Figure 9-4 below. West Basin’s injection into the WCGB seawater barrier qualifies in the second type - Groundwater Recharge: Subsurface Injection. In the future, West Basin would potentially pursue the fifth type of DPR method called AWT (advanced water treatment) water as an approved drinking water supply. The State Water Resources Control Board has not developed regulations for methods other than groundwater recharge.

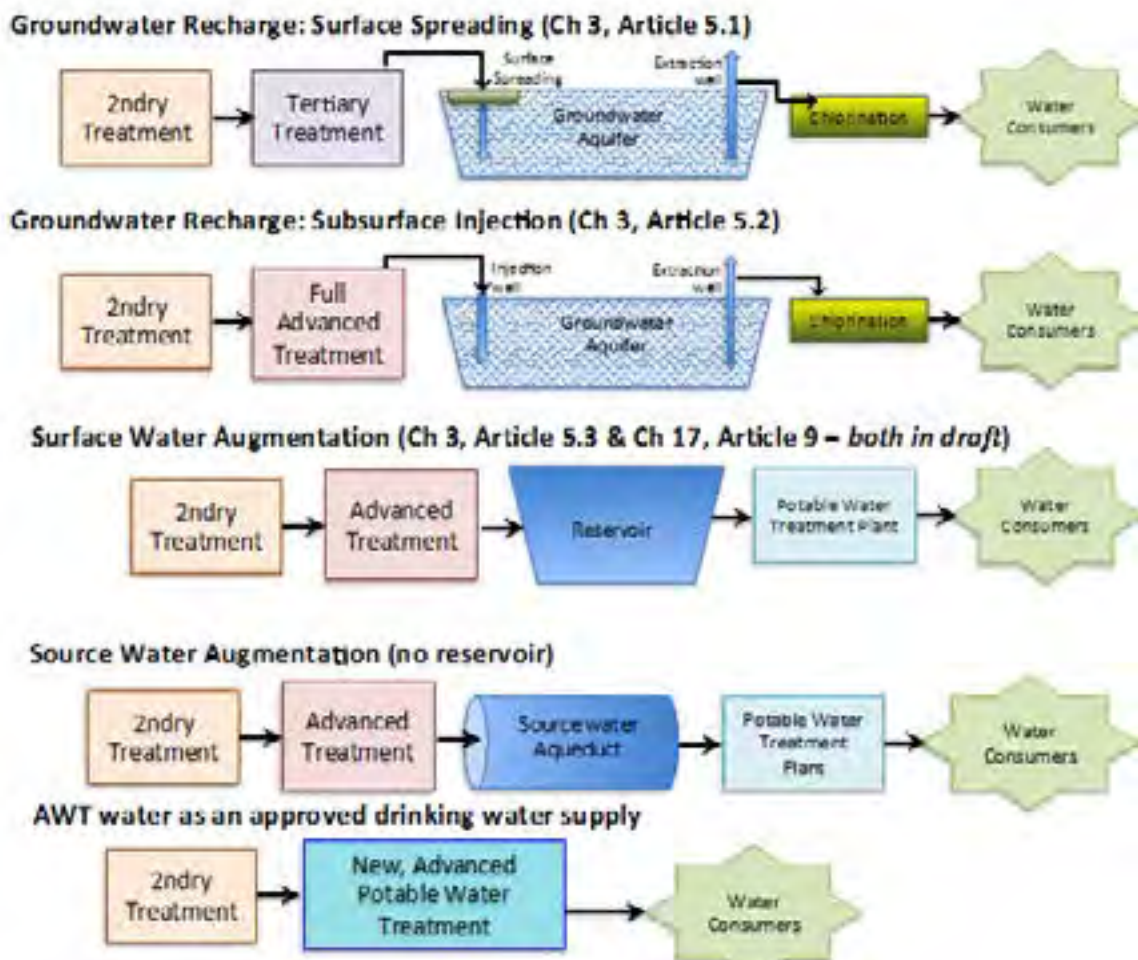


Figure 9-4: Types of Direct Potable Reuse Processes

9.2.8.1 Status of Potable Reuse Regulations in California

DPR is not currently practiced or permitted in California, but is being reviewed by an expert panel of the DDW. By December 2016, this expert panel is charged with advising DDW on public health issues and scientific/technical matters regarding the feasibility of developing criteria for DPR as well as determining the additional research requirements to establish criteria for DPR. Also, in 2016 the State Water Resources Control Board will issue regulations for Surface Water Augmentation, the third method shown in the figure above.

In general, the likelihood of DPR being used in California in a scheme where it is introduced into groundwater or surface water before additional treatment for potable use is more feasible than direct connection to a potable distribution system, at least for the foreseeable future.



Section 10 | **Desalination**

Section 10 | Desalination


There are many reasons why West Basin is evaluating the feasibility of producing desalinated ocean water as an additional potable supply for its service area. The West Basin Board of Directors is committed to a water reliability strategy based on supply diversification to manage future risk and uncertainty. As a coastal water agency with viable sites for locating an ocean desalination facility, West Basin's Board has felt compelled to investigate how full scale production can be accomplished in a cost-effective and environmentally responsible manner.

Since the early 1990s, West Basin has been at the forefront of the development of reliable local supplies that are independent of weather-induced shortages and offset a need for less reliable imported water from the oversubscribed Colorado River and the environmentally sensitive Sacramento-San Joaquin Bay Delta. This has taken the form of large scale implementation of non-potable reuse and cutting edge industrial uses of recycled water along with potable reuse through groundwater recharge and brackish groundwater recovery. As part of West Basin's continued effort to diversify its sources of supply and improve the reliability of its customer agencies, the identification and planning for ocean water desalination has been a logical and anticipated next step in the diversification program.

West Basin, as a Metropolitan member agency, has been a part of long term regional efforts by Metropolitan to develop an integrated and effective resources strategy that will improve supply reliability locally as well as benefit the entire Metropolitan service area. The foundation of the integrated strategy can be found in the responsibility that southern California water agencies share in developing local supplies. The Integrated Resources Plan (IRP) is Metropolitan's long term water reliability plan, updated about every five years. As in previous IRPs, the 2015 IRP calls for a mix of imported and member agency local supply development and water use efficiency enhancements to meet future regional demands. In other words, the ability of southern California to meet long term demands for water is predicated in part on member and local agencies developing locally sourced water supplies not subject to the hydrologic variations that affect imported supplies.

Supply diversity is also the cornerstone of the state's guiding water policy document developed during the current drought. The Brown Administration has used the Water Action Plan as the roadmap to sustainable water management in California. Similar to Metropolitan's IRP, the Water Action





Plan notes that water to meet new demand in the State “will come from a combination of improved conservation and water use efficiency, conjunctive water management (i.e., coordinated management of surface and groundwater), recycled water, drinking water treatment, groundwater remediation, and brackish and seawater desalination.”

West Basin has been conducting testing and research into responsible ocean desalination since 2001. Some of this research has helped inform the development of the first-ever regulations for ocean desalination in California, approved by the State Water Resources Control Board in 2015. With these new regulations, West Basin could potentially add a new potable water source to its water supply portfolio in addition to non-potable and indirect potable recycled water.

West Basin’s experience in recycled water treatment has provided it with substantial knowledge on methods used for salt removal from water supplies. This experience has proven useful to West Basin in pursuing both groundwater and ocean water desalination programs to further develop local water supplies. Since 1993, West Basin has operated the C. Marvin Brewer Desalter Facility to treat brackish (salt laden) groundwater that exists on the inland side of the West Coast Seawater Barrier. In 2001 West Basin also began a stepwise program to explore the systematic development of an environmentally responsible ocean water desalination facility.

This stepwise approach has been based on scientific research and testing with a small pilot facility to test basic treatment technology. Following the pilot, West Basin recently completed operation of the Ocean Water Desalination Demonstration Facility and Water Education Center to evaluate and demonstrate ocean protection, energy recovery and cost reduction technologies. This approach will ensure a full-scale ocean water desalination facility will be developed in a cost and energy efficient manner that also protects the ocean and environment. Research results from the Demonstration Facility have been shared throughout the water industry and worldwide in the Comprehensive Report via the West Basin web site.

As noted in Chapter 5, Water Reliability, West Basin’s multiple dry year analysis indicates that an appropriately sized 20 million gallons per day (MGD) ocean desalination facility will provide the quantity of water necessary to make up the expected shortfall in imported water supplies under future drought conditions. The analysis in Chapter 5 identifies a Regional Shortage Level 3, or an approximate 15% supply cutback by Metropolitan, similar to what has been experienced twice in the last seven years. In the event that future shortages are more severe due to higher cutbacks in imported water supplies a 20 MGD ocean desalination facility may not be sufficient to close the supply gap. Because desalination technology is modular in nature, future expansions of the project can be contemplated to better balance reliability. However, West Basin is only considering a 20 MGD ocean desalination project as part of the 2015 update to the UWMP.

10.1 Ocean Desalination Process

Desalination is the process of removing salinity from ocean water to provide a consumable water supply. Typical salt content in ocean water is over 35,000 milligrams per Liter (mg/L) and U.S. Standards require drinking water salt levels to be below 100 mg/L. Today's ocean water desalination process removes salt, minerals and impurities from ocean water with cutting edge membrane technologies and uses the following general process as described on West Basin's website:

1. Intake System: ocean water is brought to the desalination facility through an intake system. Several different types of intake systems exist including open ocean intakes, screened intakes, subsurface intakes, and some facilities draw spent ocean water from a cooling system from an existing near-by power plant. The intakes are designed for marine protection and must be designed to inhibit growth that would clog the intake pipes or facility.
2. Filtration: filter the raw water to remove coarse material such as shells, sand, particles, and red tide material that can damage or prohibit the desalination process from occurring downstream. Filters can include sand filters, plastic disk filters, and cloth filters.
3. Ultrafiltration (UF) / microfiltration (MF): filtered water is passed through a membrane that has thousands of hollow strands with pores on the walls that are 5,000 times smaller than a pinhole to remove microscopic material. UF/MF are a low pressure membrane process that are designed to remove turbidity causing particles such as suspended solids, bacteria, colloidal matter, and proteins. The water is still very salty after this process and is not ready for human consumption.
4. Reverse osmosis: UF/MF water then passes through RO membranes for separation of fresh water molecules from salt and other dissolved compounds. RO is a pressure driven process where water passes through the molecular structure of a thin membrane that removes salts, minerals, and impurities resulting in 99.8 percent removal of dissolved compounds in ocean water. As RO requires high pressures, large pumps are required to drive the process and result in high energy costs. Figure 10-1 shows a diagram of the typical desalination process.





Figure 10-1: Desalination Process

5. Post Treatment: after the UF/MF and RO process, the water has to be re-mineralized and polished for human consumption as all minerals have been removed that are needed for water stabilization. The water is run through a calcite filter or lime saturator followed by chlorine dosing for disinfection to meet drinking water standards.
6. Brine Disposal: The RO reject water, referred to as brine, must be disposed of. Brine consists of dissolved salt molecules and the concentration is twice as much as when the water was drawn into the facility.

Ocean water desalination has been considered cost prohibitive for many years compared to other sources of potable water in the West Basin service area. Recent advancements in membrane technologies and energy recovery systems, as well as the increasing cost of imported water supplies, have made ocean water desalination a more economically viable water source that is cost competitive with other drinking water sources.

10.2 West Basin’s Ocean Water Desalination Pilot Project

In May 2002, West Basin initiated a multi-phase pilot study program to desalinate ocean water and evaluate the potential to provide desalinated water as a viable drinking water supply for the region. The pilot project was located at the El Segundo Power Generating Station in the city of El Segundo and the siting took advantage of the power generating station’s existing cooling intake and outfall infrastructure (SPI, Ocean Water Desalination Pilot Program Final Comprehensive Report 2002-2009, September 2010). The pilot study began using MF pretreatment with RO, but expanded over the course of the study to include pre-straining, UF pretreatment, use of ocean water temperature versus warmed power plant ocean water discharge, latest generation RO membrane evaluations, seasonal variations in source water characteristics, water quality, and techniques for biogrowth control. The pilot operated through mid-2009

and desalinated approximately 20 gpm of ocean water. The goal of the pilot was to: 1) identify optimal performance conditions and 2) evaluate the water quality characteristics. The research findings are being shared among industry partners.

West Basin used membrane filtration and RO to evaluate whether the treatment process was effective for ocean water and performed extensive water quality monitoring on the raw ocean water, discharge concentrate, and product (treated) water quality. Tens of thousands of water quality test results indicated that the treatment approach provides a reliable and consistent water quality that meets all State and Federal drinking water standards. The water produced at the pilot project had a concentration of approximately 300 parts per million (ppm) of total dissolved solids which is lower than tap water in southern California. Figure 10-2 shows the MF and RO membrane technology used in the pilot project.



Figure 10-2: Treatment Technologies Used at West Basin’s Pilot Plant

The pilot study demonstrated the viability of ocean water desalination for West Basin, advanced the understanding of key process components on local ocean water conditions, and resulted in data that was not previously available.

Multi-year operation allowed exposure to variations in feed water quality and operational challenges (SPI, Ocean Water Desalination Pilot Program Final Comprehensive Report 2002-2009, September 2010).

West Basin’s ocean water desalination pilot project was designed to be a regional and national asset and was an open, collaborative effort that has benefited the water industry. To fund the \$7 million cost of the pilot project, West Basin partnered with major agencies within and related to the water industry, including the American Water Works Association Research Foundation, California Avocado Commission, City of Tampa Bay, DWR,

East Bay Municipal Utility District, Long Beach Water Department, LADWP, Metropolitan, National Water Research Institute, San Diego County Water Authority, South Florida Water Management District, and the USBR.

10.3 Ocean Water Desalination Demonstration Facility Project

After the pilot project was completed, West Basin set up a small full-scale desalination demonstration project that evaluated several critical components of the ocean water desalination process including: operational protocols and challenges from piloting to establish environmentally-effective and sustainable intake technologies, determined an approach to energy usage and optimization/ minimization, developed process optimization protocols, determined operational requirements, established target water quality goals, and evaluated concentrate discharge management options (Malcolm Pirnie/ Arcadis, Ocean Water Desalination Program Master Plan, January 2013). The Ocean Water Desalination Demonstration Facility (OWDDF) included an evaluation of passive screening and subsurface intake systems, energy consumption and optimization analysis and an intensive brine discharge study. The results provided a foundation for development of a full-scale design, permitting, and operations approach.

In early 2009, all necessary permits were received for construction of the OWDDF and Water Education Center located at the SEA Lab Marine Educational Facility in Redondo Beach. The data acquired from the pilot project was used to plan and develop the demonstration facility. The OWDDF was completed in 2010 and operated continuously until it was decommissioned in June 2014. The OWDDF withdrew 500,000 gallons of ocean water per day to perform various research and testing activities. 100,000 gpd of intake was treated to produce 50,000 gpd of water meeting drinking water standards. Although all drinking water standards were met, the permit required the treated water to be discharged back into the ocean. Figure 10-3 shows the components of the OWDDF within the facility.



Figure 10-3: West Basin's Ocean Water Desalination Demonstration Facility

The process performed for the pilot and demonstration projects developed a basis of design for future full-scale desalination plants by accomplishing the following goals:

- Evaluate environmentally responsible intake and concentrate discharge technologies and impacts;
- Optimize operation and maintenance procedures using full-scale elements;
- Optimize energy recovery device performance;
- Analyze water quality (as a continuation of the pilot plant testing); and
- Provide opportunities for public and stakeholder education.

10.4 Ocean Water Desalination Research Activities

Water Quality Integration Study

West Basin led a Desalinated Ocean Water Quality Integration Study in partnership with Metropolitan to evaluate potential impacts of a new, desalinated ocean water source being introduced into a distribution system that has previously only been exposed to Metropolitan imported water and/or groundwater sources.

Over the course of four months, a pipe loop study was conducted to evaluate corrosion-related impacts of stabilized desalinated ocean water when blended with Metropolitan water and a West Basin retail agency's groundwater on different pipe and household plumbing materials as part of a pilot-scale pipe loop as shown in Figure 10-4. The testing also investigated disinfectant residual stability and disinfection byproduct formation at the pilot-scale along with additional in-depth testing in the laboratory by Metropolitan.



Figure 10-4: Pipe Loop Set Up

Because the removal of calcium and alkalinity by the RO process makes the water corrosive to some pipe materials, the desalinated ocean water must be stabilized before entering distribution systems. Through stabilization, or post treatment, select minerals and other buffering constituents are added, including calcium and alkalinity, in combination with pH adjustment to condition the water. The desalinated product water from West Basin's OWDDF was stabilized using calcite (calcium carbonate) contactors prior to introducing the water to the pipe loops and bench-scale studies.

As the study commenced, a literature search and utility survey were conducted to review current knowledge and research water utility experience on desalinated ocean water stabilization and water quality targets for corrosion control. It was found that the major water quality parameters known to primarily influence pipe corrosion include alkalinity, calcium and pH. Calcium Carbonate Precipitation Potential (CCPP) and Langelier Saturation Index (LSI) are common indices for evaluating water corrosivity toward cementitious materials and for determining how protective films are applied to metal surfaces. Additional parameters such as chloride, sulfate, disinfectant, and dissolved oxygen may have impacts on the potential corrosion of piping materials but with a less definitive impact than the aforementioned parameters.

Overall, the introduction of a stabilized desalinated ocean water source into a potable water distribution system did not negatively impact water quality, corrosion or disinfectant residual. Furthermore, the study results indicate that desalinated ocean water can be successfully integrated into existing potable water distribution systems when stabilized and with management of initial chloramine decay (Hazen and Sawyer, Ocean Water Desalination Water Quality Integration Study, June 2014).

Subsurface Intake Feasibility Study

West Basin recently completed a subsurface seawater intake (SSI) study partially funded by USBR to determine the feasibility of different intake options for a full-scale desalination facility. West Basin's previous research of ocean water desalination intake strategies had focused on wedge-wire screen technology as shown on Figure 10-5. However, the California State Water Board's updated Ocean Plan requires a site-specific evaluation to determine the feasibility of SSIs before considering another type of intake system. The SSI study evaluation of sub-surface intakes was consistent with West Basin's planning assumptions for the project and confirmed in the Chapter 5 multi-dry year analysis. The production of 20 MGD of desalinated ocean water meeting all drinking water standards will require 40 MGD of ocean water as the source for the facility. The recovery rate for reverse osmosis based desalination of ocean water is approximately 50%, thus 20 MGD is produced as desalinated drinking water and the balance in concentrated brine discharged back to the ocean through a newly constructed outfall with pressurized diffusers in compliance with the standards set in the recently amended State Ocean Plan.

Furthermore, the SSI study developed a comprehensive, systematic procedure to evaluate the feasibility of subsurface intake technology at a given project site. The study evaluated the following seven technologies:

1. Vertical wells
2. Slant wells
3. Radial Collector Wells
4. Horizontal directional-drilled (HDD) wells
5. Seabed infiltration galleries (SIG)
6. Beach (surf zone) infiltration galleries (BIG)
7. Deep infiltration galleries (DIG)

The Study determined that none of the seven SSI technologies are feasible for a design intake rate of 40 MGD at the NRG Facility, and construction of SSIs outside of the NRG Facility would be subject to the same issues and challenges making these technologies not feasible.

The procedure will be detailed in a guidance manual that can be used by project proponents, regulators, and environmental stakeholders when evaluating intake technologies during the planning phase of an ocean water desalination project. West Basin's full-scale ocean water desalination facility will be used as a case study for the application of the guidance manual once completed. The case study would include performing several offshore and onshore field tests such as boring, offshore vibracore samples, and mapping of the ocean floor (Geosyntec, Feasibility Assessment of Subsurface Seawater Intakes, November 2015).



Figure 10-5: Potential Wedge-Wire Intake Configuration

Biofouling and Corrosion Study

West Basin recently completed an Intake Biofouling and Corrosion Study on the different screen materials and intake piping chemicals. When subsurface intake systems are impractical for a specific project, open intake systems are considered, which must minimize impingement and entrainment of sea life. The use of wedge wire screens at the intake was an approach demonstrated by West Basin at the OWDDF. This demonstration work has generated data documenting the effectiveness of the screens for reducing impingement and entrainment, but has also shown the importance of material selection, material quality control and proper installation of the screens. Also, the control of biological activity (e.g. mussels, bacteria and marine organisms) within the intake lines is a critical operational challenge. Attachment of mussels on the interior of intake piping is a common challenge in seawater desalination facilities, which is influenced by material selection and biofouling control strategies. Bacterial activity within the intake piping may promote biofilm formation within the downstream treatment processes. Several control strategies are in use at full-scale facilities and others are developmental.

The samples were exposed to the ocean environment and removed occasionally to assess biofouling and different rates of corrosion as shown in Figure 10-6. This study has provided West Basin with data to establish full-scale design criteria.

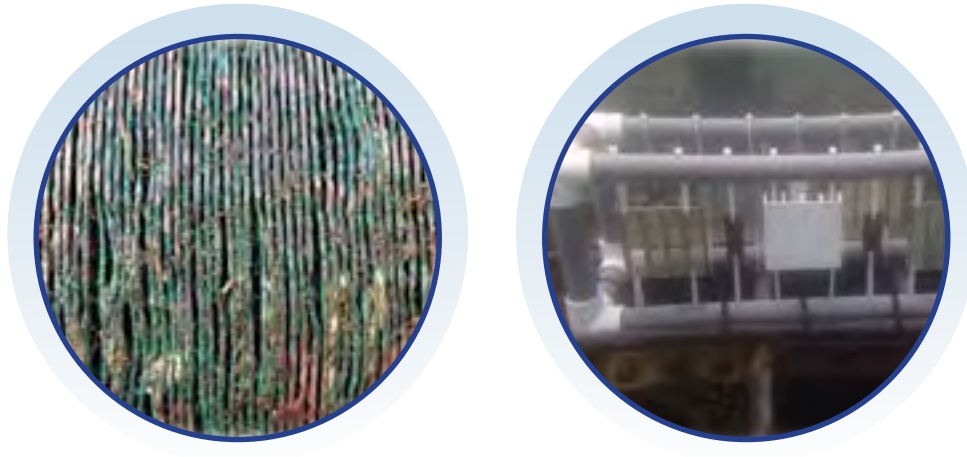


Figure 10-6: Observed Corrosion on a Screen and the Test Screen Structure

10.5 Future Ocean Water Desalination Project

10.5.1 Ocean Water Desalination Full-Scale Facility

The OWDDF evaluated the viability of a future, full-scale Ocean Water Desalination Facility capable of providing 20 MGD (21,500 AFY) of water in the initial phase at a site located in either Redondo Beach or El Segundo. With the findings being reviewed and a Program Master Plan (PMP) for the ocean water desalination project complete, the next step is to move forward with environmental permitting. The Environmental Impact Report (EIR) process has begun and will be complete by the end of 2016. Upon completion of the EIR, West Basin will evaluate whether to permit, finance, and construct a full-scale facility by 2023, as shown in Table 10-1. Potable water produced by the future ocean water desalination facility would be supplied to local and/or regional drinking water distribution systems.

Table 10-1: Opportunities for Desalinated Water

Sources of Water	Yield AFY	Start Date	Type of Use
Ocean Water	21,500	June 2023	Potable

Program Master Plan

The purpose of the PMP was to define the overall desalination program scope and key project components (intake, pretreatment, RO desalination system, post-treatment and product delivery) in the form of a technical study that can be used for the California Environmental Quality Act (CEQA)/EIR process and to support the basis of design of the full-scale facility. The PMP consisted of the following:

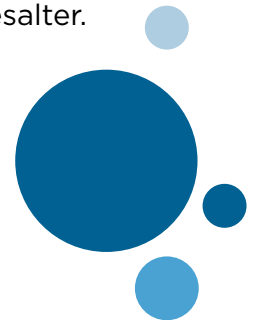
1. Conceptual System Design and Program Requirements
 - a. Defined alternatives for key project components
 - b. Assessed and prioritized alternatives
 - c. Provided recommendations for narrowing down key components
2. Power Supply Development – estimated the electrical power consumption for the desalination facility and evaluated several power supply alternatives.
3. Project Entitlements and Acquisition – identified land purchase or lease agreements needed for program implementation along with plan and schedule for acquisition.
4. Environmental Review Plan – defined and scoped the environmental impact investigation requirements related to facilities and equipment to determine critical issues and decision points for environmental review.
5. Project Permitting Plan – provided major regulatory permits required along with critical issues and data to prepare permits.
6. Facility Operations & Maintenance Plan – identified operational requirements, resources, staffing, management, and other considerations required to operate and maintain a desalination facility.
7. Project Costs & Funding Plan – provided an overview of project costs for all plant sizes and capacity buildout scenarios and potential funding sources.

8. Project Delivery – provided an overview of Alternative Project Delivery options with advantages and disadvantages to each and scheduling and contractor procurement impacts. Alternative delivery options included:
 - a. Design-Bid-Build
 - b. Design-Build
 - c. Design-Build Operate
 - d. Construction Manager at Risk
 - e. Design Build Own Operate Transfer
 - f. Alliance

10.6 Brewer Desalter Treatment Facility

West Basin owns the C. Marvin Brewer Desalter Facility (Desalter) which began operating in July 1993. The Desalter was built on a site owned by California Water Service (CWS) in the City of Torrance where it removes chloride from groundwater impacted by seawater intrusion in the WCGB. The Desalter was initially intended to be a five year pilot program to determine if brackish water could be economically treated to drinking water standards.

The Desalter originally used two wells to pump brackish water from a saline plume remaining within the WCGB and treats the water using cartridge filters and RO as shown in Figure 10-7. The treated water from the Desalter is blended with potable water, stored on the CWS site in a 5 million gallon storage reservoir, and then delivered to the distribution system. Under the terms of an agreement with CWS, West Basin reimburses CWS to operate and maintain the Desalter.



In 2005, the original two wells were replaced with one, more productive well. This well has the capability to pump 1,600 to 2,400 AFY of brackish groundwater to be treated at the Desalter.



Figure 10-7: Brewer Desalter Treatment Facility



Appendix A | UWMP Act

CALIFORNIA WATER CODE DIVISION 6 PART 2.6. URBAN WATER MANAGEMENT PLANNING

All California Codes have been updated to include the 2010 Statutes.

CHAPTER 1.	GENERAL DECLARATION AND POLICY	10610-10610.4
CHAPTER 2.	DEFINITIONS	10611-10617
CHAPTER 3.	URBAN WATER MANAGEMENT PLANS	
Article 1.	General Provisions	10620-10621
Article 2.	Contents of Plans	10630-10634
Article 2.5.	Water Service Reliability	10635
Article 3.	Adoption and Implementation of Plans	10640-10645
CHAPTER 4.	MISCELLANEOUS PROVISIONS	10650-10656

WATER CODE SECTION 10610-10610.4

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

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

- (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
- (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
- (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
- (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
- (6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
- (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
- (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
- (9) The quality of source supplies can have a significant impact

on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

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

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

WATER CODE

SECTION 10611-10617

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

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

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

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

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

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

10616. "Public agency" means any board, commission, county, city

and county, city, regional agency, district, or other public entity.

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

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

WATER CODE

SECTION 10620-10621

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

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

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

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water

supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

WATER CODE

SECTION 10630-10634

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

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

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

- (A) An average water year.
- (B) A single dry water year.
- (C) Multiple dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(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.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(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.
- (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), 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) 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) 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 (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 water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

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

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

10631.5. (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.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.

(2) 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's water supply.

(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(6) Penalties or charges for excessive use, where applicable.

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(8) A draft water shortage contingency resolution or ordinance.

(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(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.

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

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's

service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

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

WATER CODE

SECTION 10635

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

WATER CODE

SECTION 10640-10645

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

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

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

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

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

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section

10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

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

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

WATER CODE

SECTION 10650-10656

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

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) 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 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

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

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the

"Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

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

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.



Appendix B | **2015 UWMP Checklist**

Appendix B | 2015 UWMP Checklist

This checklist is developed directly from the Urban Water Management Planning Act and SB X7-7. It is provided to support water suppliers during preparation of their UWMPs. Two versions of the UWMP Checklist are provided – the first one is organized according to the California Water Code and the second checklist according to subject matter. The two checklists contain duplicate information and the water supplier should use whichever checklist is more convenient. In the event that information or recommendations in these tables are inconsistent with, conflict with, or omit the requirements of the Act or applicable laws, the Act or other laws shall prevail.

Each water supplier submitting an UWMP can also provide DWR with the UWMP location of the required element by completing the last column of either checklist. This will support DWR in its review of these UWMPs. The completed form can be included with the UWMP.

If an item does not pertain to a water supplier, then state the UWMP requirement and note that it does not apply to the agency. For example, if a water supplier does not use groundwater as a water supply source, then there should be a statement in the UWMP that groundwater is not a water supply source.

Checklist Arranged by Subject

<i>CWC Section</i>	<i>UWMP Requirement</i>	<i>Subject</i>	<i>Guidebook Location</i>	<i>UWMP Location (Optional Column for Agency Use)</i>
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	Section 2.1	Section 1.3
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 2.5.2	Section 1.4
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 2.5.2	Section 1.3
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 2
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 2.2
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 2.3
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 2.3
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 2.3
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 3.1 and 3.2
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 3.2.2
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	N/A
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	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	Chapter 5 and App E	<i>N/A</i>
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	Section 5.7.2	<i>N/A</i>
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	<i>N/A</i>
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	Section 5.8.2	<i>N/A</i>
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 5.1	Section 3.4
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	Section 5.8 and App E	<i>N/A</i>
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Section 4.1
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 4.1
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	Section 6.2.2	<i>N/A</i>
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 4.3
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	Section 6.2.2	<i>N/A</i>
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	Section 6.2.3	Section 4.3
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	Section 6.2.4	Section 4.3
10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	Section 4.3

10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Section 4.4
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	Section 6.8	Section 4.5 and 9.2.4
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 10.5
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	Section 2.5.1	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 2.5.1	Section 5
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 6.5.1	Section 9.2.6
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 6.5.2	Section 9.1
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)	Section 6.5.2.2	Section 9.1
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 9.2
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 6.5.4	Section 9.2.4
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 6.5.4	Section 9.2.5 and 9.2.3
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 6.5.5	Section 9.2.6
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 9.2.4 - 9.2.6
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	Section 7.4	Section 7.5

10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 5.1
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 5.2
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 7.1	Section 4.1
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 7.1	Section 6
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 7.3	Section 5.2
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 8.1	Section 5.3
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 8.9	Section 5.2
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 8.8	Section 5.3.3
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 5.3.2
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Section 5.3.2.4
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 5.3.2.5
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 8.6	Section 8.2
10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Appendix F
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 8.5	Section 7.5.1 and 7.5.2
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	Sections 9.2 and 9.3	N/A

10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	Section 7.2 and 7.4 – 7.8
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	Section 9.5	Section 7.4 - 7.8 and Appendix H
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	Section 10.3	Section 1.3 and Appendix C
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 10.2.1	Section 1.3 and Appendix E
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	Sections 10.3.1 and 10.4	Section 1.5.2
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 10.4.4	Section 1.5.2
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	Sections 10.2.2, 10.3, and 10.5	Section 1.3 and Appendices C and D
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 10.2.1	Appendix C
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Appendix D
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 10.4.3	Section 1.5.2
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 10.4.4	Section 1.5.2
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Section 1.5
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 10.5	Section 1.5.2



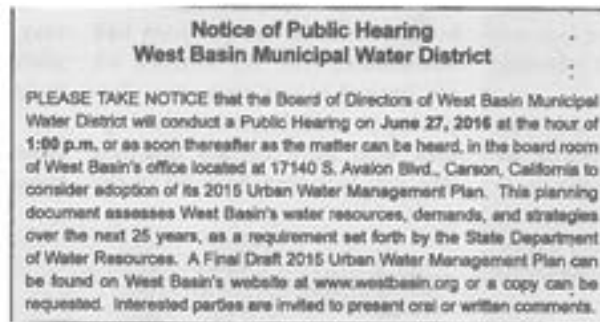
Appendix C | **Notice of Public Hearing**

Appendix C | Notice of Public Hearing

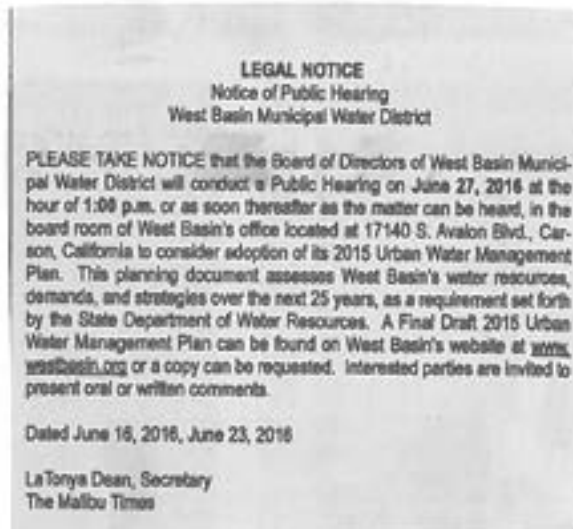
Published in the Daily Breeze



Published in Inglewood Today



Published in The Malibu Times



SPORTS

Minnesota Hands Sparks' First Loss

By Steve Finley

After winning their first 14 games (that included three preseason games), the Minnesota Lynx showed the Sparks why there are two excellent teams in the WNBA when they beat Los Angeles 72-69 last Tuesday at the Staples Center.

The 9,112 fans that included summer camps throughout the Los Angeles area saw Lynn quiet Robin Montgomery hit a three-point shot in the corner with 2.9 seconds left on the clock.

The Lynx, who are 13-0, exposed the 11-1 Sparks in several categories. The Sparks were out-rebounded 42 to 29 and they gave up one offensive rebound in the first half. The Sparks also turned the ball over 17 times.

"When you play against a quality opponent they bring out your weaknesses and that's not all bad because they need to be addressed," said Sparks head coach Brian Agler after the loss.

Although the Sparks were dejected for the first time this year the coaches and players are still looking

for near perfection. "We are not where we want to be," said Agler. "We need to be better in our offensive execution. We need to find ways to get Nikki (Ogbumike) more opportunities. We need to make the defense work harder. There are a lot of areas that we need to improve on."

Ogbumike is the Sparks' leading scorer this season, averaging over 17 points per game. Against the Lynx she made two out of three shots and scored nine points. Kristi Toliver led the Sparks with 20 points. Essence Carson scored 11 and Alana Beard had 10.

"We can learn from this loss and clean some things up," said Beard. "We did not pay attention to detail. The little things we can control. We are a good team but we can be a great team. It all depends on how great we want to be. I also think a game like we had today is great for women's basketball."

Jintel Lavender, one of the Sparks' most consistent players off the bench realizes the team needs to be ready in the final minutes of a close game.

"This was the first time this season we had to execute in the final minutes of a game and we did not do a



Below: Essence Carson of the Sparks drives past 6'6" Sylvia Fowles of the Minnesota Lynx during the Sparks 72-69 loss last Tuesday at the Staples Center. Right: Alana Beard, right of the Sparks steals the ball from Minnesota Lynx star Maya Moore last Tuesday at the Staples Center. Photos by George Laasa



god job," she said. "We did not get the ball to the right people but we will be alright. We just need to keep doing the things that we do well."

The Sparks' next game will be at Minnesota, today (Friday) at 5 p.m. and they return home for a six-game home stand starting Sunday against Connecticut, Sunday at 2 p.m. On Tuesday, June 28, they'll battle Dallas

at 7 p.m. and next Thursday at 12:30 p.m. they play Atlanta, coached by former Lakers star Michael Cooper.

They continue their home stand against New York on Sunday, July 3 at 2 p.m. They will face Indiana on Wednesday, July 6, at 7:30 p.m. and their last game of the home stand will be against Washington on Sunday, July 10 at 4 p.m.

LEGAL NOTICE

Notice of Public Hearing
West Basin Municipal Water District



PLEASE TAKE NOTICE that the Board of Directors of West Basin Municipal Water District will conduct a Public Hearing on June 27, 2016 at the hour of 1:00 p.m. or as soon thereafter as the matter can be heard, in the Board room of West Basin's office located at 17140 S. Avalon Blvd., Carson, California to consider adoption of its 2015 Urban Water Management Plan. This planning document assesses West Basin's water resources, demands, and strategies over the next 25 years, as a requirement set forth by the State Department of Water Resources. A Final Draft 2015 Urban Water Management Plan can be found on West Basin's website at www.westbasin.org and a copy can be requested. Interested parties are invited to present oral or written comments.

Dated June 13, 2016. June 20, 2016.

LaTonya Dean
Secretary

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Dated June 13, 2016, June 20, 2016



La Torre Dean
Secretary

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Appendix D | **Resolution of UWMP Adoption**

Appendix D | Resolution of UWMP Adoption

RESOLUTION NO. 6-16-1039

A RESOLUTION OF THE BOARD OF DIRECTORS OF WEST BASIN MUNICIPAL WATER DISTRICT APPROVING THE 2015 URBAN WATER MANAGEMENT PLAN

BE IT RESOLVED, by the BOARD OF DIRECTORS that the Board of Directors hereby adopt and sign a Resolution approving the 2015 Urban Water Management Plan, and

BE IT RESOLVED, that the West Basin Municipal Water District hereby agrees and further authorizes that the aforementioned document complies with all applicable requirements set forth in the California Urban Water Management Planning Act of 1983, as amended, and

BE IT FURTHER RESOLVED, that the President of the Board of Directors of the West Basin Municipal Water District is hereby authorized to sign the 2015 Urban Water Management Plan.

PASSED, APPROVED, AND ADOPTED on the 6/27 day, June 2016.



President

ATTEST.



Secretary

(SEAL)

W:\westbasinboard\resos\wb1039



Appendix E | **Notice of UWMP Preparation**

Appendix E | Notice of UWMP Preparation



17140 S. Avalon Blvd.
Suite 210
Carson, CA 90746
310.217.2411
www.westbasin.org

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February 9, 2016

Garry Hofer
Operations Manager
California American Water Company
8657 Grand Ave.
Rosemead, CA 91770

Notice of Preparation of West Basin Municipal Water District's 2015 Urban Water Management Plan

West Basin Municipal Water District (West Basin) is in the process of preparing its 2015 Urban Water Management Plan (UWMP). UWMPs are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides over 3,000 acre-feet of water annually or serves 3,000 or more connections is required to prepare an UWMP every five years.

Pursuant to the requirement of California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

A workshop for West Basin's retail water agencies will be held on March 30, 2016 at the West Basin headquarters to provide a summary of the draft UWMP. The draft UWMP will be available for review prior to the public hearing, which is tentatively scheduled for Monday, May 23, 2016 at 1:00 P.M. at West Basin's headquarters. Subsequent to the Public Hearing, the West Basin Board of Directors will consider adoption of the UWMP.

If you have any concerns, please contact Fernando Paludi, Water Policy and Resources Development Manager and Associate General Manager at (310) 660-6214 or fernandop@westbasin.org.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Rich Nagel'.

Rich Nagel
General Manager



17140 S. Avalon Blvd.
Suite 210
Carson, CA 90746
310.217.2411
www.westbasin.org

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February 9, 2016

Dan Trejo
Assistant District Manager
California Water Service Company
2632 West 237th Street
Torrance, CA 90505

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Rich Nagel
General Manager



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Stephanie Katsouleas
Public Works Director
City of El Segundo
350 Main St.
El Segundo, CA 90245

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Rich Nagel
General Manager



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Louis Atwell
Public Works Director
City of Inglewood
One Manchester Blvd.
Inglewood, CA 90301

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General Manager



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Mark McAvoy
Public Works Director
City of Lomita
PO Box 340
Lomita, CA 90717

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February 9, 2016

Tony Olmos
Dir. of Public Works
City of Manhattan Beach
3621 Bell Avenue
Manhattan Beach, CA 90266

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Rich Nagel
General Manager



17140 S. Avalon Blvd.
Suite 210
Carson, CA 90746
310.217.2411
www.westbasin.org

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February 9, 2016

Katherine Nutting
District Manager
Golden State Water Company
1600 W. Redondo Beach Blvd, #101
Gardena, CA 90247-3226

Notice of Preparation of West Basin Municipal Water District's 2015 Urban Water Management Plan

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If you have any concerns, please contact Fernando Paludi, Water Policy and Resources Development Manager and Associate General Manager at (310) 660-6214 or fernandop@westbasin.org.

Sincerely,

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Rich Nagel
General Manager



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February 9, 2016

Sami Kabar
Water Resources Manager
LA County Waterworks District #29
900 S. Fremont Ave.
Alhambra, CA 91803

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West Basin Municipal Water District's
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General Manager



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Robb Whitaker
General Manager
Water Replenishment District
4040 Paramount Blvd
Lakewood, CA 90712

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February 9, 2016

Dave Pettijohn
Water Resources Manager
Los Angeles Department of Water and Power
P.O. Box 51111, Rm. 1315
Los Angeles, CA 90051

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February 9, 2016

Rob Beste
Public Works Director
City of Torrance
20500 Madronna Ave
Torrance, CA 90503

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Rich Nagel
General Manager



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February 9, 2016

Public Works Director
Los Angeles County Department of Public Works
900 S. Fremont Ave.
Alhambra, CA 91803

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February 9, 2016

Director of Public Works
City of Rolling Hills Estates
4045 Palos Verdes Dr. North
Rancho Palos Verdes, CA 90275

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Rich Nagel
General Manager



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February 9, 2016

Director of Public Works
City of Rolling Hills
Two Portuguese Bend Road
Rolling Hills, CA 90274

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February 9, 2016

Director of Public Works
City of Rancho Palos Verdes
30940 Hawthorne Blvd.
Rancho Palos Verdes, CA 90275

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Rich Nagel
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February 9, 2016

Director of Public Works
City of Palos Verdes Estates
340 Palos Verdes Drive West
Palos Verdes, CA 90274

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February 9, 2016

Director of Public Works
City of Carson
701 E. Carson
Carson, CA 90745

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February 9, 2016

Director of Public Works
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

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Rich Nagel
General Manager



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February 9, 2016

Director of Public Works
City of Gardena
1700 W. 162nd Street
Gardena, CA 90247

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February 9, 2016

Director of Public Works
City of Lawndale
14717 Buran Ave.
Lawndale, CA 90260

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Director of Public Works
City of Hawthorne
4455 W. 126th Street
Hawthorne, CA 90250

Notice of Preparation of West Basin Municipal Water District's 2015 Urban Water Management Plan

West Basin Municipal Water District (West Basin) is in the process of preparing its 2015 Urban Water Management Plan (UWMP). UWMPs are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides over 3,000 acre-feet of water annually or serves 3,000 or more connections is required to prepare an UWMP every five years.

Pursuant to the requirement of California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), every urban water supplier required to prepare a plan shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

A workshop for West Basin's retail water agencies will be held on March 30, 2016 at the West Basin headquarters to provide a summary of the draft UWMP. The draft UWMP will be available for review prior to the public hearing, which is tentatively scheduled for Monday, May 23, 2016 at 1:00 P.M. at West Basin's headquarters. Subsequent to the Public Hearing, the West Basin Board of Directors will consider adoption of the UWMP.

If you have any concerns, please contact Fernando Paludi, Water Policy and Resources Development Manager and Associate General Manager at (310) 660-6214 or fernandop@westbasin.org.

Sincerely,

Rich Nagel
General Manager



17140 S. Avalon Blvd.
Suite 210
Carson, CA 90746
310.217.2411
www.westbasin.org

BOARD OF DIRECTORS

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February 9, 2016

Director of Public Works
City of Culver City
9770 Culver Blvd.
Culver City, CA 90232

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February 9, 2016

Director of Public Works
City of West Hollywood
8300 Santa Monica Blvd.
West Hollywood, CA 90069

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February 9, 2016

Director of Public Works
City of Hermosa Beach
1315 Valley Drive
Hermosa Beach, CA 90254

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February 9, 2016

Planning Department
 City of Malibu
 23825 Stuart Ranch Road
 Malibu, CA 90265

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February 9, 2016

Director of Public Works
City of Beverly Hills
345 Foothill Road
Beverly Hills, CA 90210

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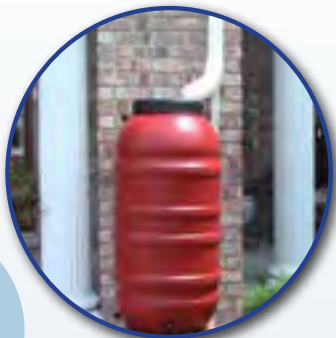
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Sincerely,

Rich Nagel
General Manager



Appendix F | **Drought Rationing Plan Resolution**

RESOLUTION NO. 4-15-1009

A RESOLUTION OF THE BOARD OF DIRECTORS OF WEST BASIN MUNICIPAL WATER DISTRICT ESTABLISHING A DROUGHT RATIONING PLAN FOR CONSERVATION PURPOSES

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF WEST BASIN MUNICIPAL WATER DISTRICT as follows:

WHEREAS, the State of California is now in its fourth consecutive year of drought, with the Sierra Nevada snowpack at its lowest level in recorded history for April 1, and storage in the State's reservoir system is at below normal levels; and

WHEREAS, the State Department of Water Resources' allocation of State Water Project water available to Southern California State Water Contractors is only 20% of the contracted supply amount; and

WHEREAS, the Metropolitan Water District of Southern California (Metropolitan) used approximately half of its regional storage reserves in 2014 to balance supply and demand for imported water; and

WHEREAS, increased conservation within Metropolitan's service area will help minimize further withdrawal of, and preserve regional storage reserves in the event the current drought continues; and

WHEREAS, on April 14, 2015, the Metropolitan Water District of Southern California implemented its Water Supply Allocation Plan under which the Metropolitan board may determine that a regional shortage exists, establish a regional shortage level, and implement allocation surcharge rates for water use in excess of a member agency's annual allocation; and

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE WEST BASIN MUNICIPAL WATER DISTRICT DOES HEREBY RESOLVE, DETERMINE AND ORDER AS FOLLOWS:

- 1. The West Basin Municipal Water District Board of Directors declare that there currently is a regional water shortage in the West Basin service area; and**
- 2. The West Basin Municipal Water District Drought Rationing Plan shall be implemented by the District's General Manager, effective July 1, 2015 through June 30,**

2016, at a level equivalent to the Regional Shortage Level declared by the Metropolitan Water District; and

3. The West Basin Municipal Water District General Manager is hereby authorized and directed to take all necessary action to implement the West Basin Drought Rationing Plan, consistent with its terms.

PASSED, APPROVED AND ADOPTED on April 27, 2015.



President

I hereby certify that the foregoing is a full, true and correct copy of the Resolution adopted by the Board of Directors of the West Basin Municipal Water District at its meeting held on April 27, 2015.

ATTEST:



Secretary

[SEAL]



Appendix G | **Drought Rationing Plan**



**West Basin
Municipal Water District**

**Drought Rationing Plan
Allocation Year 2015**

**Adopted March 23, 2015
Declared April 27, 2015
Effective July 1, 2015**

1. Introduction

West Basin Municipal Water District is a member public agency of the Metropolitan Water District of Southern California (MWD), and is responsible for the wholesale delivery of potable imported water by Metropolitan to eight retail water agencies and one groundwater replenishment agency, which collectively serve about 900,000 people within the West Basin service area.

West Basin is pursuing a water reliability strategy of increasing local control over its water supplies within its service territory by increasing water conservation and water recycling, expanding education programs and introducing ocean desalination to the water supply portfolio by the year 2022. Today, however, our region still relies on water from Northern California and the Colorado River for nearly two-thirds of our supply. This reliance on hydrologically-dependent supplies leaves our region vulnerable to drought and the long-term impacts of changing climate patterns.

Drought periods in Southern California are happening more frequently and with greater severity. When MWD does not have access to the supplies necessary to meet total demands and has to allocate shortages in supplies to West Basin and its other member agencies, it enacts the Water Supply Allocation Plan as a demand management tool to extend the availability of storage reserves.

On March 23, 2015, the West Basin Board adopted an update to the “Water Shortage Allocation Plan” and changed the name to Drought Rationing Plan (Plan). When MWD implements the WSAP, the Drought Rationing Plan is necessary for two primary reasons: 1) to help achieve MWD’s (and the Governor’s) conservation goal; and 2) equitably recover any financial penalties from our customer agencies should West Basin fall short of the goal. The Plan includes a “regional penalty assessment” policy that only assesses financial penalties to West Basin’s customer agencies if West Basin itself incurs penalties.

The current drought (2012 to present) has been unprecedented in terms of increasing average temperatures and the scarcity of snowpack in the Sierra Nevada. In 2014, MWD was forced to withdraw almost one-half of the available balance of the region’s collective stored water. Without a significant decrease in demand in 2015, MWD was projecting that another one-half of the remaining balance would need to be withdrawn. Governor Brown’s April 1, 2015 Executive Order required a statewide reduction in water use by 25% compared to 2013 and added urgency to MWD’s consideration of implementing the WSAP. Also in April 2015, the MWD Board of Directors approved enacting the WSAP at a Level 3, which targets a 15% reduction in demand (5% for each Level).

2. Metropolitan Water District’s *Water Supply Allocation Plan*

Metropolitan’s Board of Directors approved the first Water Supply Allocation Plan in February 2008 and updated its WSAP in December 2014. It is based on a guiding

principle developed over fifteen years prior as part of the Water Surplus and Drought Management (WSDM) Plan. The guiding principle states:

“Metropolitan will encourage storage of water during periods of surplus and work jointly with its member agencies to minimize the impacts of water shortages on the region’s retail consumers and economy during periods of shortage.”

Fairness in allocation and minimizing regional hardship to retail water consumers remained central themes in the development of a specific formula for allocating shortages across southern California. The formula uses different adjustments and credits to balance impacts of shortage at the retail level, where local supplies can vary dramatically, and provide equity on the wholesale level among member agencies. It also attempts to take into account; growth in demand, local investments, changes in local supply conditions, the reduction in potable water demand from recycled water, and the implementation of water conservation programs.

The WSAP was updated for the current period to reflect minimal changes in the formula and to address issues that arose as a result of the prior allocation. These changes are described below.

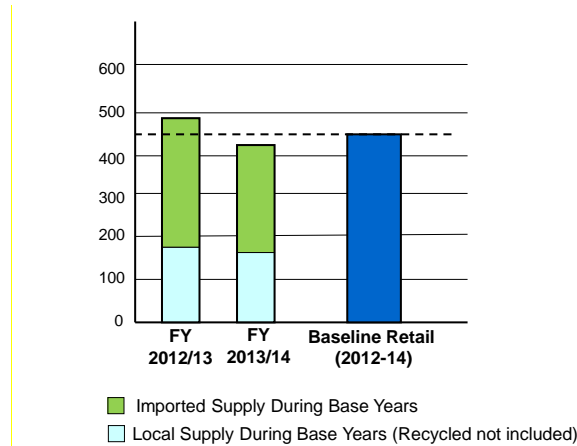
3. West Basin’s Shortage Allocation Methodology

Based closely on Metropolitan’s methodology, West Basin’s Plan model has five basic components in determining each customer agency’s share of West Basin’s allocation from Metropolitan, briefly described as follows.

A. Establishing Baseline Water Use

In order to project a customer agency’s retail demand and imported supply needs for the year in which an allocation occurs, it is necessary to first establish a historical base period for water supply and delivery data. The base period for *local supplies* (groundwater production and recovery) and *imported water demand* (full-service, seawater barrier, seasonal shift and in-lieu groundwater replenishment) are calculated using data from the previous two non-shortage fiscal years, 2012-2013 and 2013-2014. The sum of *local supplies* and *imported water demand* provides an estimate of the average *retail demand* for each customer agency over the base period. Non-potable recycled water is not included in this calculation due to its demand-hardening effect. Figure 1 provides an example of how the baseline water use is established.

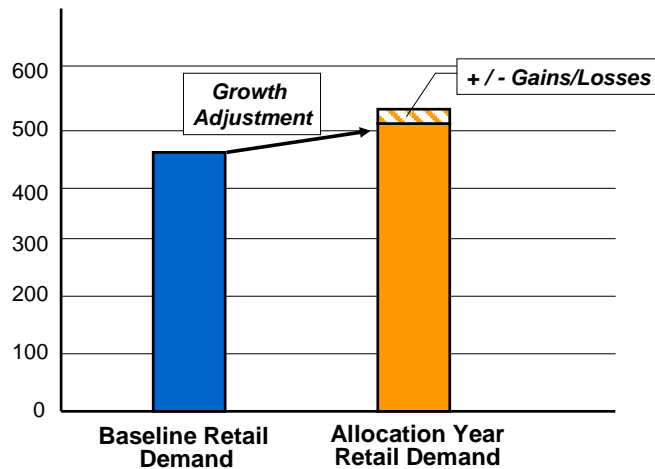
Figure 1. Example of Baseline Calculation



B. Establishing Allocation Year Information

Base period *retail demand* is adjusted forward for growth using a factor that is based on the population increase from the base period to the year of allocation (a 2015 allocation is one year after the end of the base period). As Figure 2 shows, gains or losses are also added to the base period *local supplies* to more accurately estimate actual supplies in the allocation year. Gains in *local supplies* must be increases that are planned and scheduled, such as groundwater production that does not mine a basin, or a new brackish water treatment facility. Losses of *local supplies* due to hydrology or water quality are subtracted from the base period.

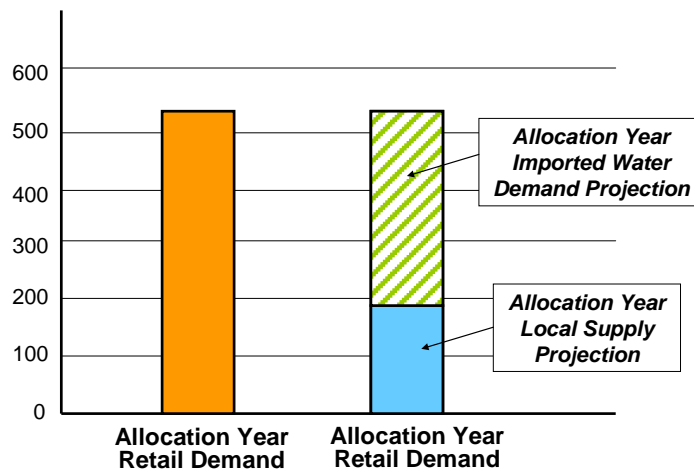
Figure 2. Example of Allocation Year Adjustments



C. Calculating Initial Minimum Allocation

After adjustments are made to *local supplies* to reflect allocation year conditions, and subtracted from *retail demand*, which has been adjusted for growth to the allocation year, the result is an agency's estimated need for imported water from West Basin.

Figure 3. Example of Allocation Year Imported Water Demand Projection

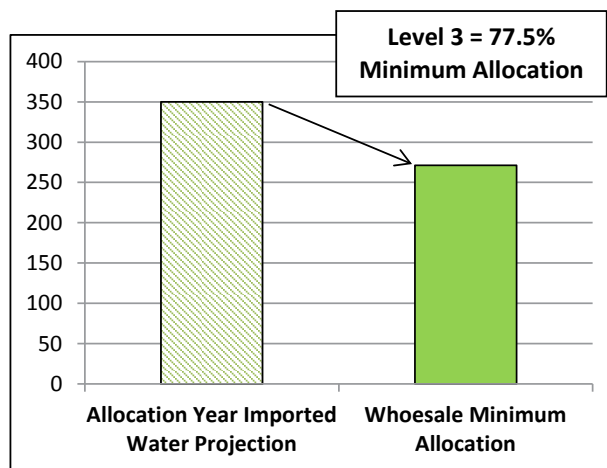


As shown in Figure 4, the projected imported water demand is what is allocated according to the declared regional shortage level (Level 3 for the 2015 Allocation). The following concepts help explain the allocation further:

- **Regional Shortage Levels:** each level from one to ten represents a five percent increment of Regional Shortage Percentage from 5 to 50 percent.
- **Regional Shortage Percentage:** the percentage difference between available supplies and allocation year demands, in 5 percent increments from 5 to 50 percent.
- **Wholesale Minimum Allocation:** ensures that customer agencies will not experience shortages on the wholesale level (from West Basin) that are greater than one-and-a-half times the Regional Shortage Percentage, according to the following table:

Regional Shortage Level	Regional Shortage Percentage	Wholesale Minimum Allocation	Retail Impact Adjustment
1	5%	7.5%	2.5%
2	10%	15.0%	5.0%
3	15%	22.5%	7.5%
4	20%	30.0%	10.0%
5	25%	37.5%	12.5%
6	30%	45.0%	15.0%
7	35%	52.5%	17.5%
8	40%	60.0%	20.0%
9	45%	67.5%	22.5%
10	50%	75.0%	25.0%

Figure 4. Example of Initial Minimum Allocation



D. Minimum Allocation Adjustments and Credits

Unequal impacts of across-the-board allocation at the retail level can be dramatic depending primarily on the amount of local supplies, if any, held by each customer agency. That is why the allocation methodology assigns additional water supplies based on the following adjustments and credits:

- Retail Impact Adjustment:** Used in Regional Shortage Level 3 and above to ensure that customer agencies with a high level of dependence on imported water do not experience disparate shortages at the retail level compared to other agencies. Agencies that are 100% dependent on imported water, for example,

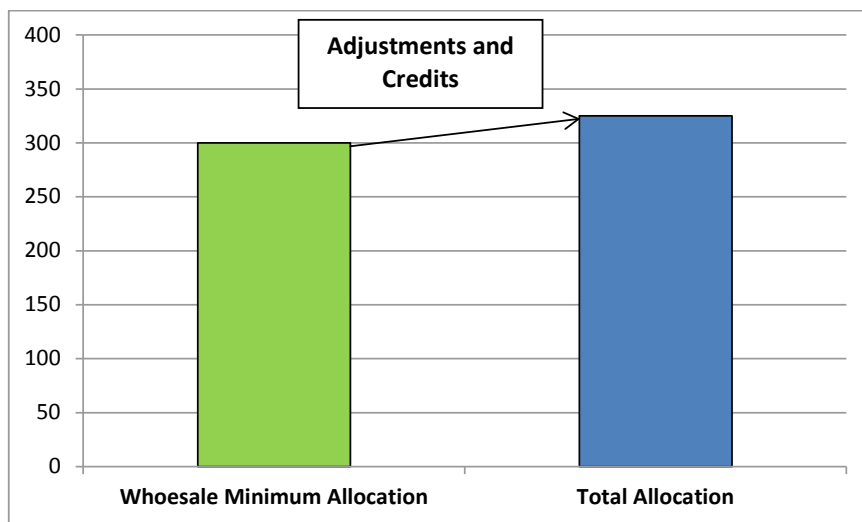
are allocated at the Regional Shortage Percentage instead of the Wholesale Minimum Allocation.

- Conservation Demand Hardening:** Based on each customer agency’s gallons per capita per day (GPCD) from a 10-year selected period’s highest average, ending in years between 2004 and 2010, as compared to the 2015 GPCD. The difference in GPCD was converted to acre-feet and the regional shortage percentage and GPCD percent reduction was applied for a resulting amount of additional water given back to the agency for conservation efforts. This is consistent with requirements for SBx7-7 “20x2020” reporting. The calculation for the credit is:

$$\text{Credit} = \text{Conservation} \times (10\% + \text{RSL}\%) \times (1 + \text{Conservation}\%) \times \text{Dependence on MWD}\%$$

RSL = Regional Shortage Level

Figure 5. Example of Adjustments to Minimum Allocation at Level 3



E. Total Allocation

The total amount of imported water a customer agency will receive from West Basin at any given Regional Shortage Level, factoring in local supplies, wholesale minimum allocation, retail impact adjustment, and conservation.

4. Plan Implementation

A. Declaration of Regional Shortage

On April 14, 2015, Metropolitan's Board of Directors declared a regional drought within their service territory, and triggered the implementation of their Water Supply Allocation Plan at a Regional Shortage Level 3, seeking at minimum a 15% reduction in regional water use. In order to pass through rationing down to the retail level, and assign any penalties to its customer agencies that West Basin may incur from exceeding its allocation from Metropolitan, the West Basin Board of Directors also approved implementing their Drought Allocation Plan at Level 3 on April 27, 2015.

B. Key Dates for Implementation

The generic allocation calendar below demonstrates that declarations of regional drought are typically made in April when hydrologic conditions statewide are sufficiently understood. To allow time for retail level agencies to adequately prepare their operations and customers for allocation conditions, the allocation effective period begins July 1 and runs 12 consecutive months through June 30 of the following year. Final accounting of customer agency imported water use and assessment of penalties, if applicable, occurs after the end of the allocation period, beginning in August of that year.

Figure 6. Allocation Timeline

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

C. Allocation Adjustments

As a member agency of Metropolitan, West Basin is provided the opportunity to request changes to its allocation through an appeals process. Likewise, customer agencies of West Basin are provided the opportunity to appeal to their individual allocations from West Basin based on new or corrected information. Grounds for requesting a change can include, but are not limited to:

- Errors in historical data used in base period calculations
- Unforeseen losses or gains in local supplies
- Extraordinary increases in local supplies
- Adjustments in credits for conservation

In some cases, West Basin has no flexibility to change a customer agency's allocation unless it results in a change to West Basin's total allocation with Metropolitan. West Basin staff will, however, work with customer agencies to determine whether appeals to Metropolitan are warranted, and if so, to prepare an appeal for review by Metropolitan.

D. Tracking and Reporting

Subsequent to the implementation of its Plan, West Basin will produce monthly reports of each customer agency's imported water use compared to its allocations based on monthly delivery patterns (historical averages) for the purposes of tracking and communicating potential underage/overage of an agency's annual allocation.

E. Allocation Penalty Rates and Billing

Allocation Penalty Rates

West Basin will enforce customer agency allocations through a penalty rate structure similar to what West Basin is subject to in Metropolitan's WSAP. Penalties will only be assessed to a West Basin retail customer agency if a retail customer agency exceeded its allocation under the Drought Rationing Plan AND West Basin exceeded its allocation with MWD under the Water Supply Allocation Plan. In such a case, West Basin's total penalty will be assessed to each retail customer agency that exceeded its Drought Rationing Plan allocation on a pro-rata basis. No billing or assessment of penalty rates will take place until the end of the twelve-month allocation period. Penalty rates are in addition to the base rate of the water purchased.

Table 1 demonstrates that the penalty rate structure is an ascending block structure that provides a lower penalty for minor overuse of allocations and a higher penalty for major overuse of allocations.

Table 1. West Basin Allocation Penalty Rates

Usage Above Allocation	Penalty Rate
100% - 115%	\$1,480/AF
Above 115%	\$2,960 AF (2 x \$1,480/AF)

- Based on turf removal costs
- Turf removal saves ~44 gallons per year per square foot for 10 years
- \$2/sq. ft. program = \$1,480 AF
- \$4/sq. ft. program = \$2,960 AF

Use of Penalty Revenues

According to the Drought Allocation Plan policy adopted by the West Basin Board of Directors, any penalty funds collected by West Basin from customer agencies will be applied to any penalty owed to Metropolitan.

West Basin Billing

During the allocation period, customer agency water bills from West Basin will remain the same. Only at the end of the twelve-month allocation period will West Basin calculate each customer agency's potable water use (imported plus local supply) based on the local supply certification and the West Basin allocation model, and determine which agencies exceeded their annual allocation. West Basin will then apply the penalty rate structure discussed above to usage in excess of the annual allocation.

In recognition that penalties can be potentially significant to a customer agency, West Basin will allow payment of the total penalty for a customer agency to be spread evenly over three consecutive monthly billing periods, beginning in August following the allocation period.

5. Water Reliability 2020

West Basin is planning and investing in its WR 2020 program to reduce its dependence on imported water to mitigate future water shortages and allocation impacts on West Basin's customers.

6. West Basin Contact Information

For questions directly related to West Basin's Drought Allocation Plan, please contact the following staff:

Leighanne Kirk
Senior Water Resources Analyst
leighannek@westbasin.org
310-660-6225

Fernando Paludi
Associate General Manager
fernandop@westbasin.org
310-660-6214



Appendix H | DMM Reports



CUWCC BMP Wholesale Coverage Report 2013

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

259 West Basin MWD

Name: Gus Meza Email: gusm@westbasin.org

a) Financial Investments and Building Partnerships

BMP Section	Monetary Amount for Financial Incentives	Monetary Amount for Equivalent Resources	
BMP 3 Residential		741856.00	
BMP 4 CII		1226633.00	
BMP 2.1 Public Outreach		2507629	
BMP 2.2 School Education Program		271620	
BMP 5 Landscape		165100	

b) Technical Support

c) Retail Agency

d) Water Shortage Allocation

Adoption Date: 3/23/2015

File Name:

e) Non signatory Reporting of BMP implementation by non-signatory Agencies

No.

f) Encourage CUWCC Membership List Efforts to Recruit Retailers

Yes.

At Least As effective As

No.

Exemption

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

259 West Basin MWD

Completed Standard Water Audit Using AWWA Software? No

AWWA File provided to CUWCC? No

AWWA Water Audit Validity Score?

Complete Training in AWWA Audit Method No

Complete Training in Component Analysis Process? No

Component Analysis? No

Repaired all leaks and breaks to the extent cost effective? No

Locate and Repair unreported leaks to the extent cost effective? No

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. No

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)

At Least As effective As

Exemption

Comments:

West Basin is a water wholesaler and does not own and potable water infrastructure or water meters.



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

ON TRACK

BMP 1.3 Metering With Commodity

Exempt

259 West Basin MWD

Numbered Unmetered Accounts No

Metered Accounts billed by volume of use No

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 No

At Least As effective As No

Exemption Yes Legal

Comments:

West Basin is a water wholesaler and does not own any potable water meters.



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

259

West Basin MWD

Wholesale

Does your agency perform Public Outreach programs? Yes

The list of retail agencies your agency assists with public outreach

California American Water - Los Angeles Service Area, California Water Service Company - Dominguez, California Water Service Company - Hermosa / Redondo, California Water Service Company - Palos Verdes, Los Angeles County Waterworks District 29 - Malibu & Marina del Rey
City of Culver City, City of Lomita, City of Inglewood, City of Manhattan Beach.

Agency Name	ID number
California American Water - Los Angeles Service Area	5021
California Water Service Company - Dominguez	6295
California Water Service Company - Hermosa / Redondo	5006
California Water Service Company - Palos Verdes	5013
Los Angeles County Waterworks District 29 - Malibu & Marina del Rey	5026

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year? Yes

Public Outreach Program List	Number
Website	20000
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	5000
Newsletter articles on conservation	5000
Landscape water conservation media campaigns	12
General water conservation information	10000
Email Messages	15000
Total	55012

Did at least one contact take place during each quarter of the reporting year? Yes

Number Media Contacts	Number
News releases	12
Newspaper contacts	5
Radio contacts	2
Television contacts	2
Total	21

Did at least one website update take place during each quarter of the reporting year? Yes

Public Information Program Annual Budget



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Annual Budget Category	Annual Budget Amount
	2507629
Total Amount:	2507629

Public Outreach Additional Programs
Free Water 101 Classes to the public
Free Water Reliability 2020 Talks

Description of all other Public Outreach programs

Partner with all 8 water agencies, and the City of Torrance and the Water Replenishment District (WRD).

Comments:

At Least As effective As

Exemption



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

259 West Basin MWD

Wholesale

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

California American Water - Los Angeles Service Area, California Water Service Company - Dominguez, California Water Service Company - Hermosa / Redondo, California Water Service Company - Palos Verdes, City of El Segundo, Golden State Water Company - Metro, Los Angeles County Waterworks District 29 - Malibu & Marina del Rey

City of Lomita, City of Manhattan Beach, City of Inglewood

Agencies Name	ID number
California American Water - Los Angeles Service Area	5021
California Water Service Company - Dominguez	6295
California Water Service Company - Hermosa / Redondo	5006
California Water Service Company - Palos Verdes	5013
City of El Segundo	7033
Golden State Water Company - Metro	5041
Los Angeles County Waterworks District 29 - Malibu & Marina del Rey	5026

Materials meet state education framework requirements? Yes

Yes, the curriculum does meet the state education framework requirements.

Materials distributed to K-6? Yes

West Basin's programs include, Water Exploration School Tour Program, Splash Science, Traveling Tidepool Program, Water is Life Student Art Contest.

Materials distributed to 7-12 students? Yes (Info Only)

Programs include, Water Exploration School Tour Program, Water is Life Student Art Contest, Teach and Test Program and Solar Cup Competition.

Annual budget for school education program: 257824.00

Description of all other water supplier education programs

Water Education - School Tours, Planet Protector Water Explorations, Splash Science, Art Contest, and Scholarships.

Comments:

At Least As effective As No

Exemption No 0



CUWCC BMP Wholesale Coverage Report 2014

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Wholesale Agency Assistance Programs

ON TRACK

259 West Basin MWD

Name: Gus Meza

Email: gusm@westbasin.org

a) Financial Investments and Building Partnerships

BMP Section	Monetary Amount for Financial Incentives	Monetary Amount for Equivalent Resources	
BMP 2.1 Public Outreach		2398820.00	
BMP 2.2 School Education Program		287120.00	
Other		1204523.00	

b) Technical Support

c) Retail Agency

d) Water Shortage Allocation

Adoption Date: 3/23/2015

File Name:

e) Non signatory Reporting of BMP implementation by non-signatory Agencies

N/A

f) Encourage CUWCC Membership List Efforts to Recruit Retailers

N/A

At Least As effective As

N/A

Exemption

Comments:

N/A





CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

259 West Basin MWD

Completed Standard Water Audit Using AWWA Software? No

AWWA File provided to CUWCC? No

AWWA Water Audit Validity Score?

Complete Training in AWWA Audit Method No

Complete Training in Component Analysis Process? No

Component Analysis? No

Repaired all leaks and breaks to the extent cost effective? No

Locate and Repair unreported leaks to the extent cost effective? No

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. No

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)

At Least As effective As

Exemption

Comments:

West Basin is a water wholesaler and does not own and potable water infrastructure or water meters.



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

ON TRACK

BMP 1.3 Metering With Commodity

Exempt

259 West Basin MWD

Numbered Unmetered Accounts No

Metered Accounts billed by volume of use No

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 No

At Least As effective As

Exemption

Comments:

West Basin is a water wholesaler and does not own any potable water meters.





CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

259

West Basin MWD

Wholesale

Does your agency perform Public Outreach programs? Yes

The list of retail agencies your agency assists with public outreach

California American Water - Los Angeles Service Area, California Water Service Company - Dominguez, California Water Service Company - Hermosa / Redondo, California Water Service Company - Palos Verdes, Los Angeles County Waterworks District 29 - Malibu & Marina del Rey
City of Culver City, City of Lomita, City of Inglewood, City of Manhattan Beach.

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year? Yes

Public Outreach Program List	Number
Website	30000
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	4000
Newsletter articles on conservation	400
Landscape water conservation media campaigns	50
General water conservation information	10000
Email Messages	15000
Total	59450

Did at least one contact take place during each quarter of the reporting year? Yes

Number Media Contacts	Number
News releases	20
Newspaper contacts	30
Radio contacts	8
Television contacts	7
Total	65

Did at least one website update take place during each quarter of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
	2398820
Total Amount:	2398820

Public Outreach Additional Programs



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

Description of all other Public Outreach programs

Partner with all 8 water agencies, and the City of Torrance and the Water Replenishment District (WRD).

Comments:

At Least As effective As

Exemption



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

259 West Basin MWD

Wholesale

Does your agency implement School Education programs? Yes

The list of retail agencies your agency assists with public outreach

California American Water - Los Angeles Service Area, California Water Service Company - Dominguez, California Water Service Company - Hermosa / Redondo, California Water Service Company - Palos Verdes, City of El Segundo, Los Angeles County Waterworks District 29 - Malibu & Marina del Rey

City of Lomita, City of Manhattan Beach, City of Inglewood

Agencies Name	ID number
California American Water - Los Angeles Service Area	5021
California Water Service Company - Dominguez	6295
California Water Service Company - Hermosa / Redondo	5006
California Water Service Company - Palos Verdes	5013
City of El Segundo	7033
Los Angeles County Waterworks District 29 - Malibu & Marina del Rey	5026

Materials meet state education framework requirements? Yes

Yes, the curriculum does meet the state education framework requirements.

Materials distributed to K-6? Yes

West Basin's programs include, Water Exploration School Tour Program, Splash Science, Traveling Tidepool Program, Water is Life Student Art Contest.

Materials distributed to 7-12 students? Yes (Info Only)

Programs include, Water Exploration School Tour Program, Water is Life Student Art Contest, Teach and Test Program and Solar Cup Competition.

Annual budget for school education program: 287120.00

Description of all other water supplier education programs

Water Education - School Tours, Planet Protector Water Explorations, Splash Science, Art Contest, and Scholarships.

Comments:

At Least As effective As No

Exemption No 0



West Basin Municipal Water District