Appendix I: WBMWD Urban Water Management Plan

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West Basin Municipal Water District

2005 Urban Water Management Plan

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Table of Contents

Section	Title	Page
ES.0	**EXECUTIVE SUMMARY**	**ES-0**
ES.1	A Brief History	ES-1
ES.2	A Different Approach to Water Management	ES-1
ES.3	Water Demand	ES-2
ES.4	Impacts of Conservation and Education: Reduced Demand	ES-3
ES.5	Water Supply	ES-4
ES.6	Planning for Increased Diversification	ES-5
ES.7	Water Supply Reliability	ES-6
ES.8	Water Quality	ES-6
ES.9	Water Conservation	ES-7
ES.10	Water Rates and Charges	ES-7
ES.11	Recycled Water	ES-8
ES.12	Ocean Desalination	ES-9
1.0	**INTRODUCTION**	**1-0**
1.1	Purpose and UWMP Summary	1-1
1.2	Urban Water Management Plan Update Preparation	1-1
	1.2.1 Plan Adoption	1-2
	1.2.2. Agency Coordination	1-2
1.3	The District's Service Area	1-3
	1.3.1 Background	1-3
	1.3.2 District's Service Area	1-4
	1.3.3 Relationship to Metropolitan Water District	1-4
2.0	**WATER DEMAND**	**2-0**
2.1	Overview	2-1
2.2	Climate Characteristics	2-1
2.3	Demographics	2-2
2.4	Historical and Current Water Demands	2-3
	2.4.1 Historical Per Capita Water Usage	2-4
	2.4.2 Replenishment Demands	2-5
	Barrier Demands	2-5
	2.4.3 Retail Water Demand by Customer Agency	2-6
2.5	Projected Water Demands	2-7
	2.5.1 Projected Per Capita Water Usage	2-8
	2.5.2 Projected Replenishment Demand	2-9
3.0	**WATER SUPPLY**	**3-0**
3.1	Overview	3-1
3.2	West Basin's Water Supply Portfolio	3-1
3.3	West Basin's Water Source	3-3
	3.3.1 Imported Water Supply	3-3

Colorado River *3*-3
State Water Project 3-4
Types of Imported Supplies *3*-4
3.3.2 Groundwater Supply 3-5
Groundwater Recharge 3-7
3.3.3 Recycled Water Supply 3-8
3.4 Alternative Water Supply Projects 3-9
3.4.1 Seawater Barrier Water Conservation Project 3-9
3.4.2 Ocean Water Desalination 3-9
3.4.3 Conjunctive Use Groundwater Storage 3-10
3.4.4 Water Transfers & Exchanges 3-10

4.0 WATER RELIABILITY 4-0
4.1 Overview 4-1
4.2 MWD Water Supply Reliability 4-1
4.2.1 MWD Integrated Resource Plan 4-1
4.2.2 MWD Water Surplus and Drought Management Plan 4-3
4.2.3 MWD Local Resource Investments 4-3
4.3 West Basin's Water Supply Reliability 4-4
4.3.1 Normal-Year Reliability Comparison 4-5
4.3.2 Single Dry-Year Reliability Comparison 4-5
4.3.3 Multiple Dry-Year Reliability Comparison 4-6
4.4 Water Shortage Contingency Plan 4-8
4.4.1 Minimum Supply 4-8
4.4.2 Stages of Action to Reduce Imported Deliveries 4-9
4.4.3 Prohibitions, Penalties and Consumption Reduction Methods 4-10
4.4.4 Impacts to Revenue 4-11
4.4.5 Catastrophic Supply Interruption 4-11

5.0 WATER QUALITY 5-0
5.1 Overview 5-1
5.2 Quality of Existing Water Supplies 5-1
5.2.1 Imported Water 5-2
5.2.2 Groundwater 5-3
Water Replenishment District Programs 5-3
5.2.3 Groundwater Recovery- Saltwater Plume 5-4
5.2.4 Recycled Water 5-5
5.2.5 West Coast Barrier Monitoring Well 5-5
5.2.6 Ocean Water Desalination 5-5
5.3 Effects on Water Management Strategies 5-6
5.4 Effects on Supply Reliability 5-6

6.0 WATER CONSERVATION 6-0
6.1 Overview 6-1
6.2 West Basin's Past and Current Water Conservation

Efforts 6-1
6.2.1 Metropolitan Water District's Conservation Goal.....6-3
6.3 California Urban Water Conservation Council 6-3
6.3.1 Best Management Practices (BMPs) 6-4
6.4 West Basin's Conservation Programs.....6-5
6.4.1 BMP #1- Water Survey Programs for Single-family Residential and Multi-family Customers.....6-5
6.4.2 BMP #2- Residential Plumbing Retrofit.....6-6
6.4.3 BMP #3- System Water Audits, Leak Detection, and Repair 6-6
6.4.4 BMP #4- Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections 6-6
6.4.5 BMP #5- Large landscape Conservation Programs and Incentives.....6-7
Irrigation Controller Programs 6-7
Protector Del Agua Irrigation Program 6-7
Ocean Friendly Gardens 6-8
6.4.6 BMP #6- High-Efficiency Washing Machine Rebate Programs 6-8
6.4.7 BMP #7- Public Information Programs.....6-9
6.4.8 BMP #8- School Education Programs.....6-10
6.4.9 BMP #9- Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts 6-10
6.4.10 BMP #10- Wholesale Agency Programs.....6-11
6.4.11 BMP #11- Conservation Pricing 6-12
6.4.12 BMP #12- Water Conservation Coordinator.....6-12
6.4.13 BMP #13- Water Waste Prohibition 6-12
6.4.14 BMP #14- Residential Ultra-Low-Flush Toilet Replacement Programs 6-12
6.4.15 Additional Conservation Programs.....6-13
Synthetic Turf Program 6-13
California Heritage 6-13
Community Partnering Program.....6-14
6.5 Current and Future Education Programs 6-14
6.5.1 Current Programs 6-14
Planet Protector Water Explorations 6-14
Think Earth It's Magic 6-15
Conservation Connection.....6-15
Think Earth Curriculum Kits 6-16
Water Awareness Month Poster Contest 6-16
6.5.2 Future Programs 6-16
Water Wanderings: A Journey Through Water District 6-16
SEWER SCIENCE 6-17
6.6 Funding Partnerships.....6-17
6.6.1 Proposition 50 Programs 6-17
6.7 West Basin's Conservation Master Plan 6-17
6.7.1 Water Conservation Master Plan 6-18

7.0 RATES & CHARGES 7-0
7.1 Overview.....7-1
7.2 MWD Rate Structure.....7-1
7.2.1 Purchase Orders.....7-1
7.2.2 Unbundled Rates and Tier 1 & 2.....7-2
7.2.3 Replenishment Service 7-3
7.2.4 MWD Capacity Charge 7-3
7.2.5 Readiness-to-Serve-Charge 7-4
7.3 West Basin's Imported Water Rates 7-4
7.3.1 Purchase Agreements 7-4
7.3.2 Administrative Surcharge.....7-5
7.3.3 Readiness-to-Service Surcharge 7-5
7.3.4 Water Service Charge.....7-5
7.3.5 West Basin's Capacity Charge.....7-5
7.3.6 Desalter Water charges 7-5
7.4 Recycled Water Rates 7-6
7.4.1 Recycled Water Rates 7-6
7.4.2 Recycled Water Standby Charge.....7-7
7.5 Future Water Rate Projections.....7-7
7.5.1 Imported Water Rate Projections.....7-7
7.5.2 Recycled Water Rate Projections 7-8

8.0 WATER RECYCLING.....8-0
8.1 Overview.....8-1
8.2 Recycled Water Sources and Treatment 8-1
8.2.1 Source Water.....8-1
8.2.2 Treatment Process.....8-2
8.3 West Basin's Recycled Water System.....8-4
8.3.1 Existing System 8-4
8.3.2 Recycled Water Use by Type 8-5
8.3.3 Historical and Current Sales 8-6
Historical Water Sales.....8-6
8.3.4 System Expansions and Projected Sales 8-8
Harbor/South Bay Water Recycling Project 8-8
West Basin Water Recycling Plant Phase IV Expansion 8-9
Madrona/Palos Verdes Lateral Extension.....8-9
Projected Sales.....8-10
8.3.5 Potential Recycled Water Use 8-12
8.3.6 Encouraging Recycled Water Use 8-12
Optimizing Recycled Water Use 8-13
Coordination Efforts 8-13
8.3.7 Funding.....8-14

9.0 DESALINATION.....9-0
9.1 Overview.....9-1

9.2 Desalting Process and Quality of Ocean Water Desalination 9-1
9.3 West Basin's Ocean Water Desalination Pilot Project 9-2
9.4 Future Ocean Water Desalination Projects.....9-3
9.5 Brewer-Desalter Treatment Facility 9-4

APPENDICES

Appendix A Urban Water Management Planning Act of 1983, as amended 2005
Appendix B Department of Water Resources UWMP "Review for Completeness" Form
Appendix C Notice of Public Hearing and Resolution for UWMP Adoption
Appendix D Notice of Preparation
Appendix E Water Shortage contingency Plan Resolution
Appendix F Best Management Practices Report 2003-2004

List of Figures

No.	Title	Page
ES-1	Historical Retail Demand Compared to Population	ES-3
ES-2	Per Capita Water Usage, 1990-2005	ES-4
ES-3	Comparison of Water Supply Portfolio, 2005 vs. 2030	ES-5
1-1	Imported Water Supply Chain	1-5
2-1	West Basin's Historical Total Retail Water Demand vs. Population	2-4
2-2	Historical Per Capita Retail Water Usage	2-5
2-3	Replenishment Demands in West Basin MWD's Service Area	2-6
3-1	West Basin's Service Area Projected Water Supplies	3-2
6-1	West Basin Conservation Water Savings	6-2
6-2	Total Retail Water Demand vs. Population Growth	6-3
7-1	West Basin Imported Water Rates	7-8
8-1	West Basin's Water Recycling Treatment Plant	8-2
8-2	West Basin Recycled Water System	8-4
8-3	West Basin Recycled Water Use by Type of Site FY 2004-05	8-6
8-4	Historical Recycled Water Sales	8-7
8-5	Madrona and Palos Verdes Lateral Projects	8-11
9-1	MF-RO Research Pilot Unit	9-3
9-2	Brewer Desalter Location Map	9-4
9-3	Brewer Desalter Facility Equipment	9-5

List of Tables

No.	Title	Page
ES-1	West Basin's Current and Projected Water Demands	ES-2
ES-2	Current and Projected Water Supply	ES-4
ES-3	Projected Recycled Water Deliveries by West Basin MWD	ES-9
1-1	Coordination with Appropriate Agencies	1-2
2-1	Climate Characteristics	2-2
2-2	Demographic Projections for West Basin's Service Area	2-3
2-3	Total Water per West Basin Customer Agency	2-7
2-4	West Basin's Current and Projected M&I Water Demands	2-8
2-5	Projected Per Capita Retail Water Usage in West Basin's Service Area	2-8
2-6	Projected Replenishment Demands	2-9
3-1	Historical and Projected Retail Water Supplies	3-2
3-2	Groundwater Pumping Rights 2003-2004	3-6
3-3	Amount of Groundwater Pumped from Central Basin	3-6
3-4	Total Amount of Groundwater Pumped	3-7
3-5	Total Amount of Groundwater Projected to be Pumped	3-7
3-6	Historical Replenishment Deliveries	3-8
4-1	Supply Reliability	4-4
4-2	Projected Normal Water Year Supply and Demand	4-5
4-3	Projected Single Dry-Year Water Supply and Demand	4-6
4-4	Projected Water Supply and Demand during Multiple Dry-Year 2008-2010	4-6
4-5	Projected Water Supply and Demand during Multiple Dry-Year 2013-2015	4-7
4-6	Projected Water Supply and Demand during Multiple Dry-Year 2018-2020	4-7
4-7	Projected Water Supply and Demand during Multiple Dry-Year 2023-2025	4-7
4-8	Projected Water Supply and Demand during Multiple Dry-Year 2028-2030	4-8
4-9	Three- Year Estimated Minimum Water Supply	4-9
6-1	List of Best Management Practices for California Urban Water Conservation Council	6-4
6-2	Residential Plumbing Retrofit Devices	6-6
6-3	High-Efficiency Washing Machine	6-9
6-4	ULFT Rebate Program	6-13
6-5	ULFT Replacement Program	6-13
6-6	School Education Program	6-15
7-1	West Basin MWD Purchase Order Terms	7-2
7-2	MWD Unbundled Water Rate Components	7-3
7-3	MWD Replenishment Service Rate	7-3
7-4	MWD Capacity Charge for 2006	7-4

7-5 Recycled Water Rates- Fiscal Year 2005-06 7-6
8-1 Wastewater Collected and Treated..... 8-3
8-2 Types of Recycled Water Customers..... 8-5
8-3 West Basin Historical Recycled Water Sales 8-7
8-4 Recycled Water Uses (2000 Projections compared with 2005 Actuals)..... 8-8
8-5 Projected Recycled Water Use 8-12
8-6 Recycled Water Master Plan Coordination 8-14
9-1 Opportunities for Desalinated Water..... 9-4

Glossary of Abbreviations and Terms

Agencies

AWWARF	American Water Works Association Research Foundation
CalWater	California Water Service Company
CDHS	California Department of Health Services
Central Basin	Central Basin Municipal Water District
City	City of Los Angeles
CPUC	California Public Utilities Commission
CSDLAC	County Sanitation Districts of Los Angeles County
CUWCC	California Urban Water Conservation Council
CWAC	California Water Awareness Campaign
District	Central Basin Municipal Water District
DWR	California Department of Water Resources
Edison	Southern California Edison
EPA	United States Environmental Protection Agency
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
MWD	Metropolitan Water District of Southern California
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
USBR	United States Bureau of Reclamation
West Basin	West Basin Municipal Water District
WRD	Water Replenishment District of Southern California

Facilities and Locations

Barrier	Alamitos Barrier
Bay-Delta	San Francisco- San Joaquin Bay Delta
CGB	Central Groundwater Basin
CRA	Colorado River Aqueduct
CSUDH	California State University at Dominguez Hills
CVP	Central Valley Project
Hyperion	Hyperion Wastewater Treatment Plant
Ibbetson Century Project	E. Thornton Ibbetson Century Recycled Water Project
Pilot Project	West Basin's Desalination Pilot Project
SWP	State Water Project
SWRP	Southeast Water Reliability Project
Torres Project	Esteban E. Torres Rio Hondo Recycled Water Project
WCGB	West Coast Groundwater Basin
WRP	Water Recycling Plant

Measurements

AFY	Acre-Feet Per Year
CFS	Cubic Feet Per Second
GPCD	Gallons Per Capita Per Day
GPM	Gallons Per Minute
MAF	Million Acre-Feet
MGD	Million Gallons per Day
TAF	Thousand Acre-Feet
WF	Water Factor

Miscellaneous

BMPs	Best Management Practices
CBIC	Weather0Based Irrigation Program
CII	Commercial, Industrial & Institutional
Harbor/South Bay	Harbor/South Bay Water Recycling Project
HECW	High-Efficiency Clothes Washer Program
HET	High-Efficiency Toilets
IRP	Integrated Resources Plan
Marketing Plan	Recycled Water Marketing Plan
Master Plan	Recycled Water Master Plan
MOU	Memorandum of Understanding
MWD-MAIN	Metropolitan Water District's Municipal and Industrial Needs
NPDES	National Pollutant Discharge Elimination System
PAC	Project Advisory Committee
PIC	Public Information Committee
Plan	Conservation Master Plan
Program	Water Audit and Leak Detection Program
QSA	Quantification Settlement Agreement
RTS	Readiness-to-Serve Charge
Title 22	California Code of Regulations Title 22 standards
ULFT	Ultra-Low Flush Toilet
UWMP	Urban Water Management Plan
VOCs	Volatile Organic Compounds
WBIC	Weather-Based Irrigation Controller
WQPP	Water Quality Protection Project
WSDM	Water Surplus and Drought Management Plan

Executive Summary

This section is a summary of the components of this Plan

ES.1 A Brief History

The legislative requirement to prepare an Urban Water Management Plan (UWMP) every five years provides West Basin Municipal Water District (West Basin) with an opportunity to affirm and support its primary purpose – to ensure the long-term water supply reliability of its region. Although the District's overall mission has not changed in over five decades, techniques for meeting its objective are continuously evolving.

The history of West Basin is representative of how water resource management has evolved in southern California over the past half a century. Ensuring that residents and businesses in southern California have an adequate and reliable supply of water, requires the cooperation of local water purveyors as well as regional wholesalers.

When native groundwater supplies in the growing southeastern part of Los Angeles County became critically over-drafted in the 1940s, groundwater producers formed a regional agency, West Basin Municipal Water District in 1947. Prior to joining MWD, the District explored alternative sources of water including recycled water and even ocean desalination. Due to the extraordinary cost in developing these sources, West Basin joined the Metropolitan Water District of Southern California (MWD). MWD had been created in 1928 by 11 cities (13 in 1933 and now 26 member agencies), for the purpose of constructing a 240 mile aqueduct from the Colorado River. The era of "imported water" and mega-projects that began at the turn of the last century, with construction of the Los Angeles Aqueduct from the Owens Valley by the City of Los Angeles, and continued with the extension of the California Aqueduct into southern California in the 1970s, was well underway. West Basin joined this era to provide a new source of water for groundwater replenishment and to meet the needs of many cities and agencies with little or no access to groundwater.

Imported water was the fuel that drove the economic engine of southern California for decades. Through the 1960s, 70s, and 80s, imported water provided by West Basin offered the reliability enjoyed by retail water agencies across most of coastal Los Angeles County. During this time, population within West Basin's service area grew by 238 percent from about 320,000 in 1950 to over 760,000 people by 1990.

ES.2 A Different Approach to Water Management

The paradigm of ensuring reliability while continuing to provide unlimited supplies of imported water began to change with the drought of 1989-1992. Even before the near-reality of mandatory water rationing in the spring of 1992, plans had begun to enhance conservation practices and to consider the development of locally-produced sources of

water that, over the long-term, would significantly reduce southern California's reliance on supply systems subject to hydrology and environmental pressures.

West Basin was at the forefront of this change in approach to water management. By 1990, funding mechanisms were in place and designs were being drawn-up for a world-class recycled water production and distribution system that would directly offset potable imported water for non-potable uses such as irrigation and industrial applications. West Basin would also become renowned for its highly successful conservation and education programs that, combined with recycled water, have helped conserve over 63 billion gallons of potable water over the past decade.

By 1996, local water supply programs were accounted for within MWD's Southern California Integrated Resources Plan (IRP) which established a rolling 20-year roadmap for diversified supply investments in recycled water, brackish groundwater treatment, surface and groundwater storage, water transfers and exchanges, conservation practices, and accessibility to imported water. A recent update of the IRP also includes ocean water desalination as an additional resource for ensuring the long-term reliability of regional water supplies.

West Basin's aggressive pursuit of the resource development targets within the IRP is bringing supply diversity to a region originally dependent on groundwater.

ES.3 Water Demand

Total water use, or demand, within West Basin's service area includes retail demand and groundwater replenishment (i.e. Barriers). Retail demand is defined as all municipal (residential, firefighting, parks, etc.) and industrial uses, and represents the population's total direct water consumption. Replenishment includes deliveries to the West Coast and Dominguez Gap Barriers to protect the West Coast groundwater basin. Table ES-1 summarizes the current and projected retail and replenishment demands.

Table ES-1
West Basin's Current and Projected Water Demands
(In Acre-Feet)

District Water Demands	2005[1]	2010	2015	2020	2025	2030
Retail Municipal & Industrial Use						
Groundwater[2]	41,535	52,000	52,000	52,000	52,000	52,000
Imported Water	129,316	123,000	97,319	98,665	100,140	101,747
Recycled Water[3]	13,065	21,848	32,500	36,250	40,000	43,750
Desalinated Water	0	0	20,000	20,000	20,000	20,000
Total Retail Demand	**183,916**	**196,848**	**201,819**	**206,915**	**212,140**	**217,497**
Replenishment						
Imported Water	15,000	10,000	10,000	10,000	10,000	10,000
Recycled Water	7,500	17,500	17,500	17,500	17,500	17,500
Total Replenishment Demand	**22,500**	**27,500**	**27,500**	**27,500**	**27,500**	**27,500**

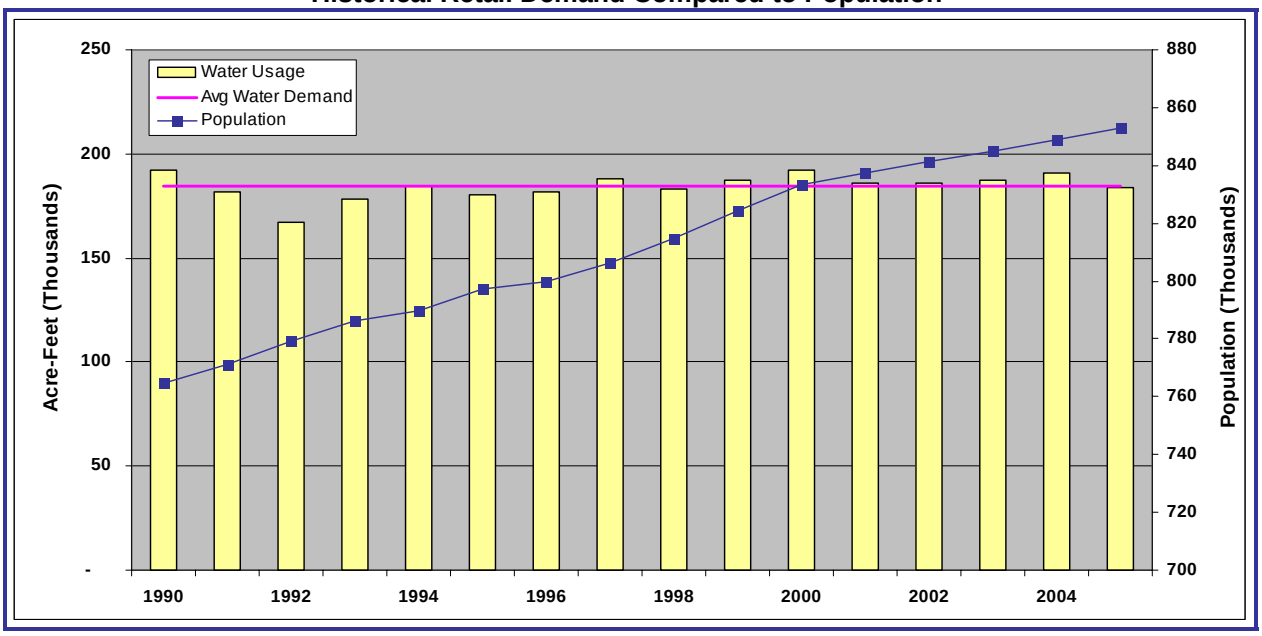
Total Demand	**206,416**	**224,348**	**229,319**	**234,415**	**239,640**	**244,997**

[1] The 2005 demands are based on the FY 2004-05, which was recorded as one of the "wettest" years on record.
[2] Groundwater demands include the amount of groundwater pumped from the West Coast and Central (avg. 2,000 AFY) groundwater basins to satisfy groundwater demands within West Basin's service area.
[3] Includes M&I recycled water sales from West Basin's service area; it does not include recycled water sales to Los Angeles Department of Water and Power and the City of Torrance or Replenishment sales (Barrier).

ES.4 Impacts of Conservation and Education: Reduced Demand

Although not a traditional "wet" water supply like imported water or recycled water, water use efficiency, including conservation and education, is considered part of West Basin's water supply portfolio because it results in less retail need, or demand, for wet supplies than would otherwise be the case. Perhaps the most telling picture of the impact of conservation and education on retail demand is conveyed by Figure ES-1.

Figure ES-1
Historical Retail Demand Compared to Population



Retail water use within West Basin's service area is largely the same today as it was 15 years ago despite the addition of over 100,000 people. The average retail demand for the past 15 years is approximately 184,000 AFY. Clearly, residents are now using less water on an individual, or "per capita," basis, as shown in Figure ES-2, than in the past 15 years.

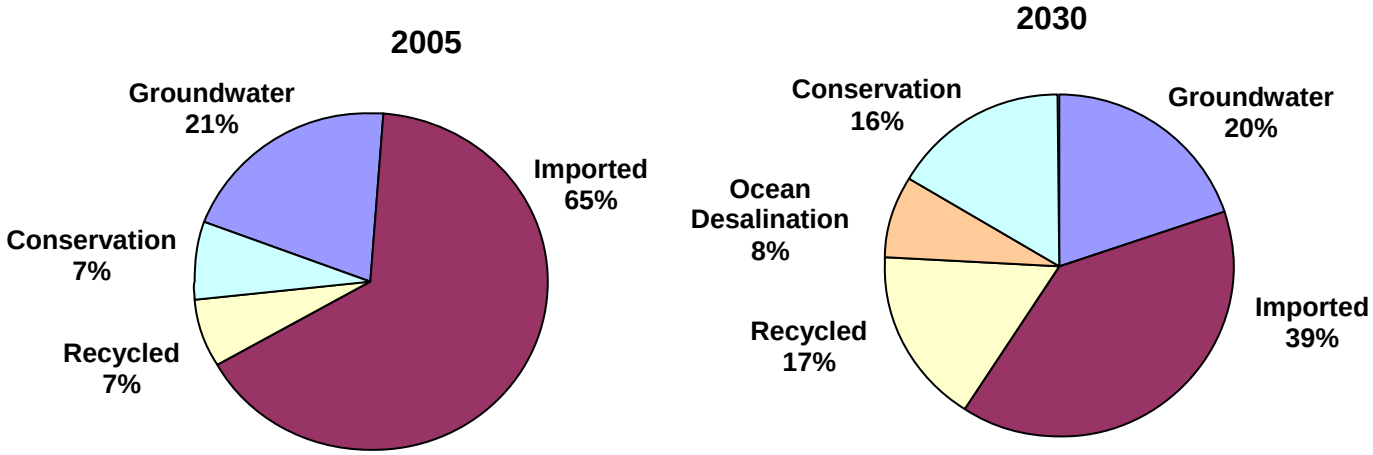
[1] The 2005 demands are based on the 2004-05 year, which is also considered one of the "wettest" years on record.
[2] Groundwater production within West Basin's service area only, including imported groundwater production from California American Water Company (average of 2,000 AFY).
[3] Imported retail use only; does not include replenishment deliveries i.e. Barrier.
[4] Recycled M&I use only; does not include replenishment deliveries i.e. Barrier.
[5] Conservation consists of Active and Passive savings according to the District's projected estimates.

ES.6 Planning for Increased Diversification

Given the critical importance of water to the region's growth, economic health and quality of life, the desirable quantity and mix of supply must be planned well in advance of the actual need. Implementing water projects and changing behavior and attitudes regarding water usage are lengthy and complex endeavors. While the UWMP Act requires a 20-year planning horizon for water reliability, West Basin has used a 25-year planning horizon to ensure a minimum 20-year planning period each year until the next 5-year update of the District's UWMP.

Although implementation of supply targets is challenging, West Basin's plan is relatively simple: continue to reduce the risk of future shortage by distributing the responsibility for supply among several, well-balanced options. West Basin's projected supply portfolio for 2030, as compared to the current mix, is shown in the following figure.

Figure ES-3
Comparison of Water Supply Portfolio, 2005 vs. 2030



West Basin's diversification plan includes expansion of the District's recycled water system, increased conservation efforts, and groundwater storage opportunities. The District's dependence on imported water will continue to decrease with the expansion of these alternative resources. Over the next 25 years, conservation is expected to have a significant dampening effect on retail water demand, lowering projected water use by roughly 42,800 AF in 2030.

West Basin's ambitious 2030 target for conservation will be directed by a Conservation Master Plan (scheduled for completion in 2006) that will identify the programs, strategies, and actions that will guide policy development and commitment of resources in the future.

West Basin's increase in recycled water supply to 17% by 2030 will nearly triple recycled water use. Treatment expansions as well as distribution system extensions will provide more recycled water to meet growing demands.

Across southern California, alternative water supplies are being explored, studied, and in some cases, implemented, to enhance the area's water supply reliability. In addition to recycled water, alternative water supply projects include seawater barrier water projects, conjunctive use groundwater storage, water transfers and exchanges, and ocean and groundwater desalination. West Basin supports the ongoing efforts of all these programs.

ES.7 Water Supply Reliability

During consecutive dry years, southern California has historically seen demands increase by as much as 20% while supplies have decreased. Prior to recent significant improvements in water reliability, most cities and agencies were forced to mandate conservation efforts and restrict water use in some cases to maintain an adequate supply. Enormous strides made by MWD, West Basin, and the entire water supply community in southern California to increase locally-developed supplies and conservation, as well as imported water storage and transfers over the past decade, have increased the overall supply reliability during extended dry periods.

MWD's 2005 Regional UWMP demonstrates reliability of supply in all hydrologic conditions through the year 2030. In fact, their plan shows a surplus of supply in nearly all conditions. MWD planning initiatives to ensure water supply reliability include the IRP, the Water Surplus and Drought Management Plan (WSDM Plan) and their local resource investments. These initiatives provide a framework for MWD and its member agencies to manage their water resources to meet growing demands.

Through its investments into supply diversification, support of the region's IRP and the collaborative efforts with MWD, West Basin's projections show that supplies will adequately meet service area demands in normal, single dry, and multiple dry-year scenarios.

ES.8 Water Quality

Water quality regulations are an important factor in West Basin's water management activities. Imported water quality is the responsibility of MWD to comply with State and Federal drinking water regulations. Purveyors that West Basin sells imported water to are responsible for ensuring compliance in their individual distribution systems and at the customer tap. MWD maintains a rigorous water quality monitoring program, and is also proactive in protecting its water quality interests in the SWP and the Colorado River. Imported water meets or exceeds all drinking water standards set by the California Department of Health Services.

Water quality of the West Coast Groundwater Basin is continually monitored by both West Basin and WRD. Challenges to water quality include potential contamination from

seawater intrusion and the migration of shallow contamination into deeper aquifers. WRD and West Basin have several active programs to monitor, evaluate, and mitigate water quality issues.

West Basin actively assists its retail agencies in meeting drinking water standards through its *Cooperative Basin-Wide Title 22 Groundwater Quality Monitoring Program*. West Basin offers this program to water agencies for wellhead and reservoir sample collection, water quality testing and reporting services.

Although recycled water meets Title 22 standards through tertiary treatment, West Basin's Water Recycling Plant produces five different types of water quality for various end users. The five types of recycled water include: 1) Disinfected Tertiary Water, 2) Nitrified Water, 3) Softened Reverse Osmosis Water, 4) Pure Reverse Osmosis, and 5) Ultra-Pure Reverse Osmosis Water. Approximately 2,000 tests are performed monthly at the West Basin Water Recycling Plant to ensure water quality meets or exceed all State and Federal requirements.

ES.9 Water Conservation

Since the drought of the 1990s, West Basin has been a leader implementing aggressive water conservation programs to help limit water demand in its service area. District programs have included a strong emphasis on education and the distribution of rebate incentives and plumbing retrofit hardware. The active and passive conservation programs have resulted in significant reductions in water use. By current estimates, demand management conservation saves over 4.5 billion gallons of imported water every year. This represents the average water use of almost 30,000 families of four in southern California.

West Basin water conservation programs follow the recommended 14 Best Management Practices (BMPs) according to the California Urban Water Conservation Council. For fiscal year 2005/06, West Basin will complete a Conservation Master Plan that will guide the District to meet or exceed the goals of the BMPs and MWD's Conservation Strategy Plan. The plan will assess the conservation potential and incorporate local stakeholder input into a group of actions and strategies for achieving long-term targets for conservation.

ES.10 Water Rates and Charges

In 2002, MWD adopted a new rate structure to support its strategic planning vision as a regional provider of services, incentivize the development of local supplies like recycled water and conservation, and encourage long-term planning for imported water demand. To achieve these objectives, MWD called for voluntary purchase orders from its member agencies, unbundled its water rates, established a tiered supply rate system, and added a capacity charge. In all, these new rate structure components have provided a better opportunity for MWD and its member agencies to manage their water supplies.

MWD's 2002 rate structure changes were passed through to West Basin's customer agencies in a manner that preserved the water management benefits while minimizing financial impacts. With the purchase order and tiered supply rate elements, West Basin has successfully implemented a conservation-based structure that encourages agencies to stay within their annual water budget, and uses revenue from agencies that exceed their water budget to fund service-area wide conservation studies and programs. West Basin also assesses a capacity charge at the retail level designed to recover the cost of MWD's capacity charge, and a Readiness-to-Serve charge. In addition to the pass-through elements of MWD's rate structure, West Basin's rates include a volumetric administrative surcharge and a fixed water service charge.

Since 1995, West Basin has encouraged the maximum use of recycled water through the economic incentive of its rates and charges. West Basin commodity rates cover the operation, maintenance, labor and power costs associated with the delivery of recycled water. These rates are set up in a declining tiered structure and are wholesaled at a significant reduction to imported water so they may further encourage the use of recycled water.

ES.11 Recycled Water

Recycled water is one of the cornerstones of West Basin's efforts to augment local supplies and reduce dependence on imported water. Since the initial planning and construction of West Basin's recycled water system in the early 1990s, West Basin has become a leader in producing and marketing recycled water. This new supply of water assists in meeting the demand for non-potable applications such as landscape irrigation, commercial and industrial processes, and seawater intrusion barriers. With approximately 210 site connections, West Basin has delivered approximately 210,000 AF of recycled water over the past ten years. Over the past five years, West Basin has delivered an average 25,000 AFY to its irrigation, industrial, and groundwater replenishment customers.

Although not within its service area, West Basin sells recycled water to the City of Torrance and Los Angeles Department and Power. West Basin purchases secondary treated water from the City of Los Angeles' Hyperion Wastewater Treatment Plant. The treated wastewater is further treated at West Basin's Water Recycling Plant, located in El Segundo, California.

West Basin anticipates recycled water use sales to increase in the future as more customers switch from potable water to recycled water due to the reliability of the supply and the economic incentives associated with the conversion. West Basin is also performing a number of expansion projects such as the Harbor/South Bay Water Recycling Project, the West Basin Water Recycling Plant Phase IV Expansion, and the Madrona/Palos Verdes Lateral Extension. These three projects will increase recycled water use significantly in the coming years. Table ES-3 summarizes the current and projected demands for recycled water.

Table ES-3
Projected Recycled Water Deliveries by West Basin MWD
(In Acre-Feet)

	2005[1]	2010	2015	2020	2025	2030
Industrial & Irrigation	13,065	21,848	32,500	36,250	40,000	43,750
West Coast Barrier (Replenishment)	3,800	17,500	17,500	17,500	17,500	17,500
West Basin MWD's Service Area Total	**16,865**	**39,348**	**50,000**	**53,750**	**57,500**	**61,250**
City Torrance	6,921	6,650	6,650	6,650	6,650	6,650
City of Los Angeles	283	1,400	1,400	1,400	1,400	1,400
Outside West Basin MWD's Service Area Total	**7,205**	**8,050**	**8,050**	**8,050**	**8,050**	**8,050**
Total	**24,070**	**47,398**	**58,050**	**61,800**	**65,550**	**69,300**

[1] Based on West Basin MWD's actual sales for FY 2004-05

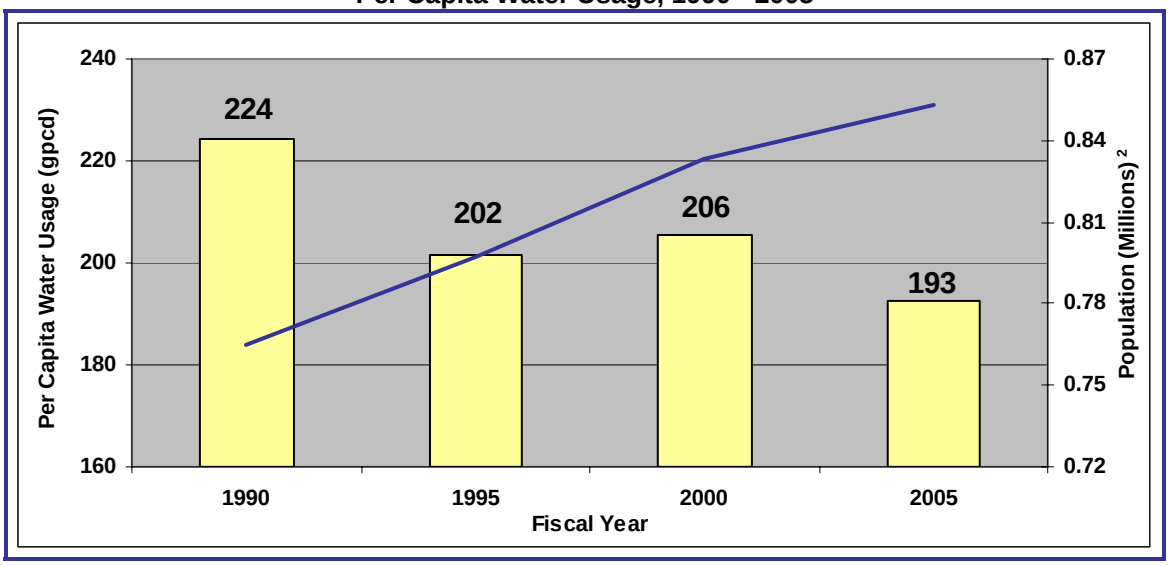
1.12 Ocean Desalination

Another important element of West Basin's supply diversification strategy is the cost-effective development of ocean desalination. Within MWD's Integrated Resources Plan, West Basin has committed to producing 20,000 acre-feet per year of potable water from the ocean beginning in 2011. West Basin is following an incremental approach to that production target, including research, pilot testing, a demonstration facility, and ultimately a full-scale plant.

Since 2001, West Basin has been a leader in creating funding partnerships for research related to the application of technologies it currently uses successfully in the desalination of wastewater to produce high-purity recycled water, namely micro-filtration and reverse osmosis. West Basin has successfully operated a pilot scale test facility in El Segundo using microfiltration and reverse osmosis to produce 40 gallons per minute of drinking water. These processes have demonstrated tremendous water quality and operational performance since the commissioning of the pilot project.

Recently, West Basin was awarded $1,750,000 in state grants to assist in the research and construction of the next step in its desalination program: a 500,000 gallons per day demonstration project.

Figure ES-2
Per Capita Water Usage, 1990 - 2005



It is apparent that the trend of lower per capita water usage over time, with assistance from MWD and its member agencies, has been successful in continuing a water conservation ethic begun 15 years ago during the last major drought.

ES.5 Water Supply

West Basin currently relies on approximately 150,000 AFY of imported water from the State Water Project (SWP) and the Colorado River delivered through MWD to meet the District's retail and replenishment demands. While groundwater supplies remain a significant source of water (20%) for customer agencies in the West Basin service area, imported water supplements this resource (65%) and assists to mitigate the over-pumping of the groundwater basin. Recycled water is added to the supply mix, serving up to 7% of the area's demands, while conservation rounds out the equation at 7%.

Table ES-2 shows current (2005) and projected (2030) supplies within West Basin's service area, with imported and local supplies being provided by West Basin.

Table ES-2
Current and Projected Water Supply
(In Acre-Feet)

District Water Demands	2005[1]	2030
Groundwater[2]	41,535	52,000
Imported Water[3]	129,315	101,747
Recycled Water[4]	13,065	43,750
Ocean Desalination	-	20,000
Total	**183,916**	**217,497**
Conservation[5]	14,500	42,800
Total	**198,416**	**260,297**

Introduction

This section provides an overview of the District

1.1 Purpose and UWMP Summary

An Urban Water Management Plan (UWMP or Plan) prepared by a water purveyor is to ensure the appropriate level of reliability of water service sufficient to meet the needs of its various categories of customers during normal, single dry or multiple dry years. The California Water Management Planning Act of 1983 (Act), as amended, requires urban water suppliers to develop an UWMP every five years in the years ending in zero and five.

The legislature declared that waters of the state are a limited and renewable resource subject to ever increasing demands; that the conservation and efficient use of urban water supplies are of statewide concern; that successful implementation of plans is best accomplished at the local level; that conservation and efficient use of water shall be actively pursued to protect both the people of the state and their water resources; that conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions; and that urban water suppliers shall be required to develop water management plans to achieve conservation and efficient use.

West Basin Municipal Water District's (District) 2005 UWMP has been prepared in compliance with the requirements of the Act, as amended to 2005 [1] (Appendix A), and includes the following:

- Water Wholesale Service Area
- Water Demands
- Water Sources and Supplies
- Water Reliability Planning
- Water Quality Information
- Water Demand Management Measures
- Water Shortage Contingency Plan
- Water Recycling
- Ocean Water Desalination

1.2 Urban Water Management Plan Update Preparation

The District's 2005 UWMP revises the 2000 UWMP prepared by the District and incorporates changes enacted by legislation, including SB 610 (2001), AB 901 (2001), SB 672 (2001), SB 1348 (2002), SB 1384 (2002), SB 1518 (2002), AB 105 (2004), and

[1]California Water Code, Division 6, Part 2.6; §10610, et. seq. Established by Assembly Bill 797 (1983).

SB 318 (2004). The UWMP also incorporates water use efficiency efforts the District has implemented or is considering implementing pursuant to the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU).[2] The District was one of the first agencies to became signatory to the MOU in September 1991.

The sections in this Plan 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 the District. The Department of Water Resources Review for Completeness form has been completed, which identifies the location of Act requirements in this Plan and is included as Appendix B.

1.2.1 Plan Adoption

The 2005 UWMP was adopted by a resolution of the District's Board of Directors in December 2005, following a public hearing. The Plan was submitted to the California Department of Water Resources within 30 days of Board approval. Copies of the Notice of Public Hearing and the Resolution of Plan Adoption are included in Appendix C. Copies of the Plan were made available to the public within 30 days following Board approval.

1.2.2. Agency Coordination

A Notice of Preparation for the 2005 UWMP Update was prepared and sent to Metropolitan Water District of Southern California (MWD), the County of Los Angeles, and all of the District's various cities and customer agencies, as shown in Table 1-1. The Notice of Preparation is included in Appendix D.

Table 1-1
Coordination with Appropriate Agencies

	Participated in UWMP Development	Commented on the Draft	Attended Public Meetings	Contacted for Assistance	Received Copy of Draft	Sent notice of intention to adopt
Retail Water Agencies	Metropolitan Water District of Southern California	✓	✓	✓	✓	✓
Customer Agencies	California American Water Company				✓	✓
	California Water Service Company	✓		✓	✓	✓

[2]The *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) was adopted in September 1991 by a large number of water suppliers, public advocacy organizations and other interested groups. It created the *California Urban Water Conservation Council* and established 16 Best Management Practices (BMPs) for urban water conservation, recently refined to 14 BMPs. The District became signatory to the MOU in September 1991.

	City of El Segundo		✓		✓	✓
	City of Inglewood				✓	✓
	City of Lomita	✓	✓	✓	✓	✓
	City of Manhattan Beach		✓		✓	✓
	Southern California Water Company		✓	✓	✓	✓
	LA County Waterworks District 29	✓	✓	✓	✓	✓
	Water Replenishment District	✓	✓	✓	✓	✓

Development of this Plan was performed by District staff in coordination with its water purveyors and the MWD. District staff has met with many of its customer agencies to discuss the UWMP, answer questions related to the UWMP and/or projects occurring throughout the service area, and provide assistance when requested. Staff provided many of its agencies with conservation data that they were able to use in their conservation section of the UWMP.

The District is a water wholesaler and is fully dependent on MWD for its imported water supplies to its service area. This UWMP details the specifics as they relate to the District and it service area and will refer to MWD throughout the document. The District held two UWMP workshops, one in January 2005 for the public, in coordination with MWD and the California Urban Water Conservation Council, and the other in June 2005 for the District's water purveyors. Further, MWD held multiple UWMP information meetings for stakeholders and the public throughout its service area during the months of June and July 2005. On August 24, 2005, MWD held an additional Public Information Meeting at the Southern California Water Dialogue monthly forum. The Southern California Water Dialogue participants meet voluntarily to explore water-related issues of vital interest to the Southern California region.

The UWMP is intended to serve as a general, flexible, and open-ended document that periodically can be updated to reflect changes in the region's water supply trends, and conservation and water use efficiency policies. This Plan, along with the District's other planning documents, will be used by District staff to guide the service area's water use and management efforts through the year 2010, when the UWMP is required to be updated.

1.3 The District's Service Area

1.3.1 Background

The District was established by a vote of the people in 1947 to help mitigate the overpumping in the West Coast Groundwater Basin (Basin). West Basin's founders realized they would have to curtail the use of pumping by providing the region with

imported water. As a water supplier, MWD provides the Southern California region with a reliable supply of imported water. West Basin remains one of the largest member agencies in MWD's family of wholesalers.

Today, West Basin wholesales potable water to 17 cities, mutual water companies, investor-owned utilities, water districts and private companies in the region. In addition, the District supplies recycled water to the region for municipal, commercial and industrial use. West Basin supplies imported and recycled water to its customer agencies to help reduce their reliance on groundwater supplies.

West Basin is governed by a five member elected board of directors from within the service area of the District. Each director serves a four-year term once elected. The Board of Directors guides the mission and policy of the District. Also, West Basin's Board of Directors appoints two representatives to serve on the 37-member MWD Board of Directors. West Basin's representation on the MWD Board is critical to shaping a regional voice on water issues.

1.3.2 District's Service Area

West Basin's service area covers approximately 185- square miles and includes 17 cities and several unincorporated areas in Los Angeles County. Approximately 852,800 people are served within West Basin's service area. The cities and their associated divisions include:

Division 1:
- Carson, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills and Rolling Hills Estates

Division 2:
- Inglewood and the Los Angeles County unincorporated areas of Athens, Howard, Ross-Sexton and South Ladera Heights

Division 3:
- Hermosa Beach, Lomita, Manhattan Beach, Redondo Beach and unincorporated areas of Torrance

Division 4:
- Culver City, El Segundo, Malibu, West Hollywood and unincorporated areas of Lennox, North Ladera heights, Topanga, View Park and Windsor Hills

Division 5:
- Gardena, Hawthorne and Lawndale

1.3.3 Relationship to Metropolitan Water District

West Basin became a member agency of the MWD in 1947. West Basin joined MWD to purchase, on a wholesale level, potable water imported from the Colorado River and the State Water Project, and then sell it to the local municipalities, investor-owned, and mutual water companies and districts. The imported water is provided to supplement

existing groundwater supplies in all areas of West Basin (there are some utilities within the District service that do not receive MWD water directly but receive their drinking water through groundwater wells).

The District plays an important role in managing the imported supplies for the region. Through varies programs and projects the District ensures that its residents have a safe and reliable supply of water.

Figure 1-1 shows the supply chain which illustrates the relationship the District plays to its customer agencies. The District is the voice and representative of its customers to MWD. As such, the District takes great pride in knowing that its retailers are receiving a safe and reliable supply of drinking water.

Figure 1-1
Imported Water Supply Chain

Water Demand

This section describes current and future water demand trends within West Basin's service area

2.1 Overview

Today, the total retail water demand for the 852,800 people living within West Basin's service area is approximately 183,900 acre-feet (AF) with replenishment demands adding an additional 15,200 AF. One acre-foot equals 326,000 gallons, and serves the annual water needs of two families. In 1980, West Basin's population was 707,500 people and the service area's retail water demand was 162,653 AF with replenishment demands adding an additional 43,131 AF. In those 25 years, West Basin's retail water demand has grown 13.1%, while population has grown 21%. Some of the contributing factors to this growth in demand have been population, new development, land use, economic growth, and persons-per-household ratios.

In the last five years West Basin's water demand has increased by only 0.4%, while population has increased by more than 2%. This gradual increase in water usage is attributed to West Basin's efforts in education and promotion of water conservation, as well as incentives for people to retrofit their homes and businesses with more efficient water use devices.

Despite the flattening demand trend due to conservation, water use will continue to increase. Projections show that West Basin's water usage is expected to increase roughly 0.4% per year over the next 25 years, as illustrated later in Table 2-5.

This section will explore in greater detail West Basin's population trends, its historical and current water demands, and offer some insight into expected future water demands for the next 25 years.

2.2 Climate Characteristics

West Basin's service area lies in the heart of southern California's coastal plain. The climate is Mediterranean, characterized by typically warm, dry summers and wet, cool winters with an average precipitation level of approximately 14.9 inches per year[1]. The combination of mild climate and low rainfall makes the area a popular residential destination, which create challenges for water agencies to provide for increased water demands with a tight water supply.

[1] According to the National Weather Service

Areas with low precipitation, such as southern California, are typically vulnerable to droughts. Historically, West Basin has been plagued with some severe dry years (Droughts of 1977-78 and 1989-92) and recently the Los Angeles region had the driest five years on record (1999-2004). In fact, anything less than the average yearly rainfall causes concern for water agencies.

Table 2-1 illustrates the climate characteristics for the Los Angeles region, taken at both the Long Beach Station and the Los Angeles WSO Airport Station, for the period between 1944 and 2004 (60 years) including, standard monthly average ETo[2] (Long Beach Station), average rainfall (Los Angeles WSO Airport Station), and average temperature (Los Angeles WSO Airport Station). In comparison to other cities with an abundant supply of precipitation each year, the low rainfall in this region invariably challenges West Basin to provide sufficient, reliable, quality water to meet the area's increasing water needs. The average precipitation for the last 60 years is approximately 12.13 inches, indicating the need for water conservation in an area with a water demand that will continue to grow as urban infiltration continues to rise.

Table 2-1
Climate Characteristics- Los Angeles Region
Period 8/1/1944 to 12/31/2004

	Jan	Feb	Mar	Apr	May	June
Standard Monthly Average Eto[1]	1.65	2.15	3.59	4.77	5.12	5.71
Average Rainfall (inches)[2]	2.67	2.69	1.94	0.78	0.17	0.06
Average Temperature (Fahrenheit)[2]	65.0	65.4	65.3	67.5	69.2	72.0

	July	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average Eto	5.93	5.91	4.39	3.22	2.18	1.68	**46.3**
Average Rainfall (inches)	0.02	0.08	0.16	0.35	1.48	1.75	**12.13**
Average Temperature (Fahrenheit)	75.2	76.4	76.2	73.6	70.2	66.1	**70.2**

[1]Data taken from the California Irrigation Management Information System (CIMIS) at the Long Beach Station for the Los Angeles Region for Calendar Year 2004: http://www.cimis.water.ca.gov/cimis/welcome.jsp.
[2] Data taken from the Western Regional Climate Center's website at the Los Angeles WSO Airport Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?calosa.

2.3 Demographics

West Basin's service area encompasses 185 squares miles in southwest Los Angeles County, including 17 cities, water agencies, and several unincorporated areas. With the population in West Basin's service area expected to increase by 83,300 people by the year 2020, the demand on the limited existing water supplies will also increase.

Based on the Metropolitan Water District of Southern California's (MWD) demographic projections, population is expected to increase an average of roughly 3.1% every five years for the next 25 years, or 0.6% annually. Table 2-2 displays the demographic projections for the next 25 years.

[2] Evapotranspiration is the water lost to the atmosphere by two processes-evaporation and transpiration. Evaporation is the loss from open bodies of water, such as lakes and reservoirs, wetlands, bare soil, and snow cover; transpiration is the loss from living-plant surfaces.

Table 2-2
Demographic Projections for West Basin's Service Area

Year	2005	2010	2015	2020	2025	2030
Population	**852,800**	**876,400**	**906,500**	**936,100**	**964,600**	**991,900**
Single-family	168,300	173,900	175,800	181,600	186,900	189,700
Multi-family	123,200	128,900	138,300	143,900	149,900	158,500
Total Household	**291,500**	**302,800**	**314,100**	**325,400**	**336,800**	**348,100**
Persons per Household	2.89	2.86	2.86	2.85	2.84	2.82
Employment	455,800	514,500	530,000	544,000	556,500	586,200

Source: Information based on MWD Demographic Data, 2005.
Note: All units are rounded to the nearest hundred; totals may not sum exact due to rounding.

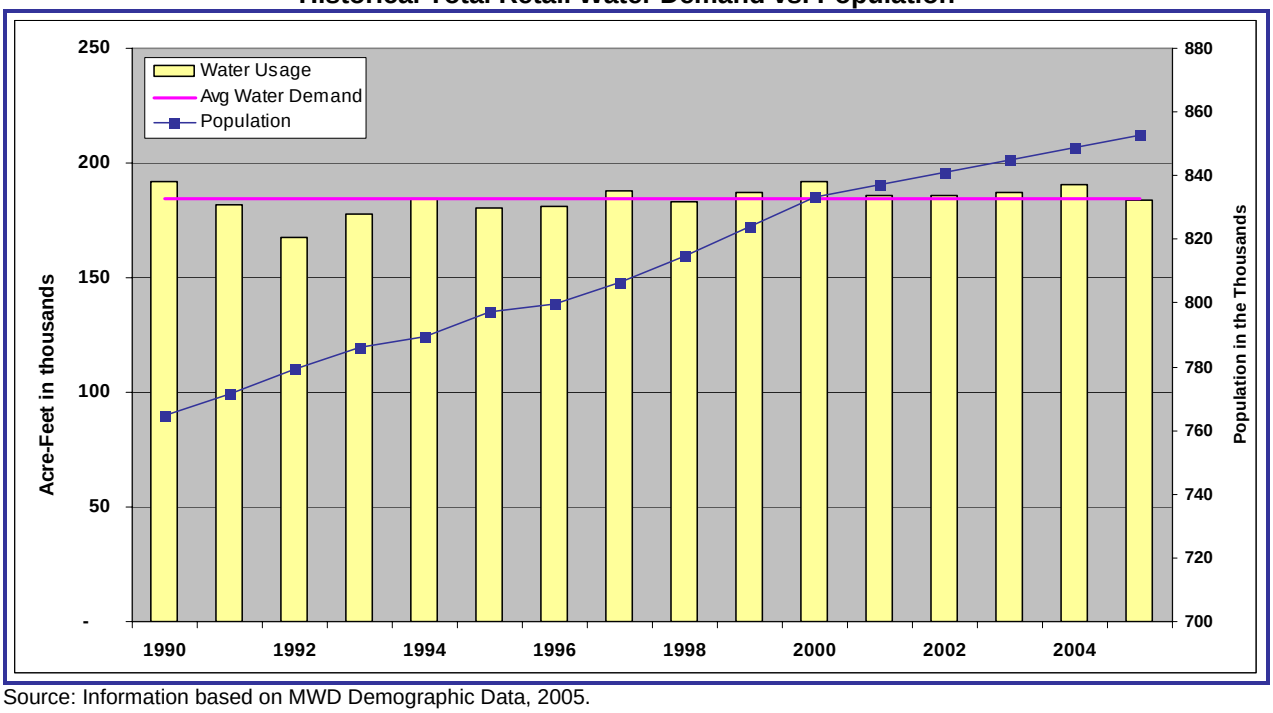
Table 2-2 displays West Basin's total households, which are expected to increase 20% by 2030; especially in the Multi-family category where households will increase by 35,300 people. As it relates to water demand, the availability of more households increases the demand on water supplies. As for employment, West Basin is expected to see a 29% increase by 2030. As urban employment grows, so does the demand on water supplies.

2.4 Historical and Current Water Demands

The key factors that affect water demands are growth in population, increases in land use development, industrial growth and hydrology. However, since the end of the 1989-1992 drought, retail water demands in West Basin's service area have remained fairly consistent. As illustrated in Figure 2-1, the West Basin region has not seen significant increases in water demands over the past 15 years despite population growth at an average rate of 3,875 persons per year and continued in-fill development in the service area. West Basin's FY 2004-05 retail water demand was 183,916 AF.

Total water use, or demand, within West Basin's service area includes retail demand and groundwater replenishment. Retail demand is defined as all municipal (residential, firefighting, parks, etc.) and industrial uses, and represents the population's total direct water consumption. Replenishment uses, including deliveries to the saline barriers (West Coast and Dominguez Gap Barriers), are not directly delivered to the public but enable continued groundwater production and helps to satisfy retail demand.

Figure 2-1
West Basin's
Historical Total Retail Water Demand vs. Population



Source: Information based on MWD Demographic Data, 2005.
Note: The totals do not include Replenishment Sales i.e. Barrier RW & Imported

Figure 2-1 displays West Basin's total retail water demand from FY 1990 to 2005. As previously discussed, retail demands have remained very consistent since 1994 following several years of increasing demands after the drought. The average retail water demand for the past 15 years is 184,295 AF.

The District averaged 187,554 AF for the past five years, which is only 1.8% above the 15 year average.

West Basin's service area is using an average amount of water as it has since 1990. This indicates that water conservation and education has significantly affected the manner in which West Basin's residents are using water today. This can be verified by reviewing West Basin's water usage per person in the "Historical Per Capita Water Usage" Section, which follows.

2.4.1 Historical Per Capita Water Usage

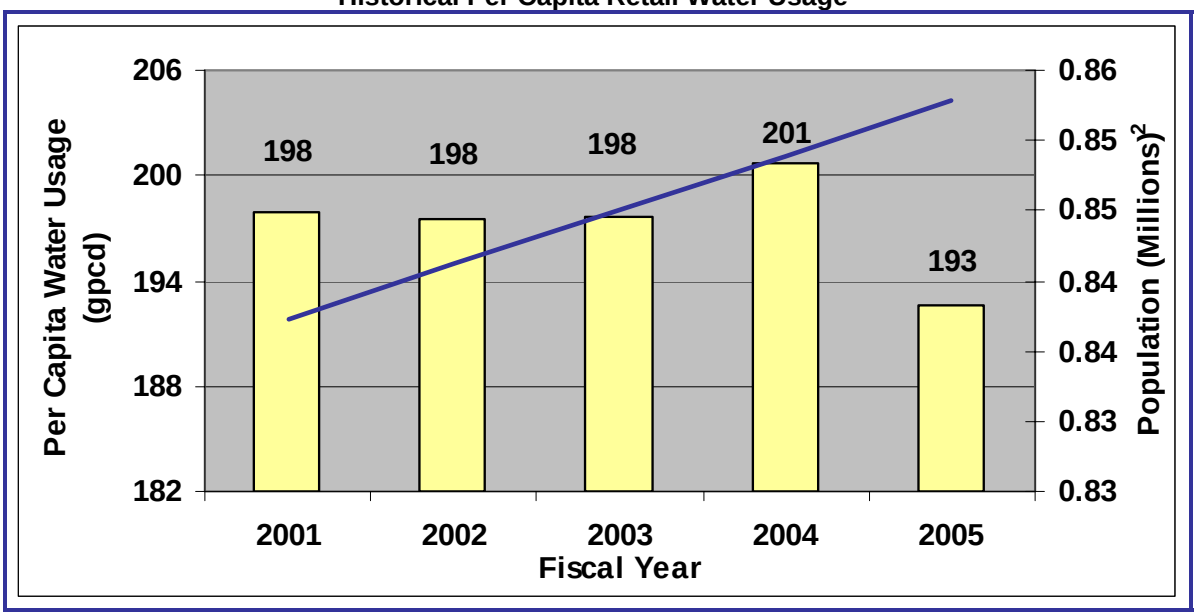
According to the Pacific Institute, the State's total water usage is equivalent to 183 gallons per capita per day (gpcd) for the nearly 34 million people living in California.[3] Through conservation measures such as Ultra-low-flush toilets (ULFT), high efficiency clothes washer machines, low-flow showerheads, and new technologies in water

[3] Pacific Institute, *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, 2003. pg. 4

irrigation and education programs, West Basin has gradually reduced per capita water usage.

In 1990, the per capita water usage was estimated at 224 gallons per day (gpd). For the last five years the usage has decreased to an average of 199 gpd. Figure 2-2 illustrates the retail water usage per capita for the last five fiscal years comparative to population in West Basin's service area.

Figure 2-2
Historical Per Capita Retail Water Usage[1]



[1] M&I Water Usage from West Basin MWD Water Use Data.
[2] Population is based on MWD Population Estimates, MWD-MAIN Model.

As displayed above, population has been steadily increasing from Fiscal Year 2001 to 2005 while per capita water usage remained stable at around 199 gpcd, verifying the positive impact of the District's current water resource conservation efforts.

2.4.2 Replenishment Demands

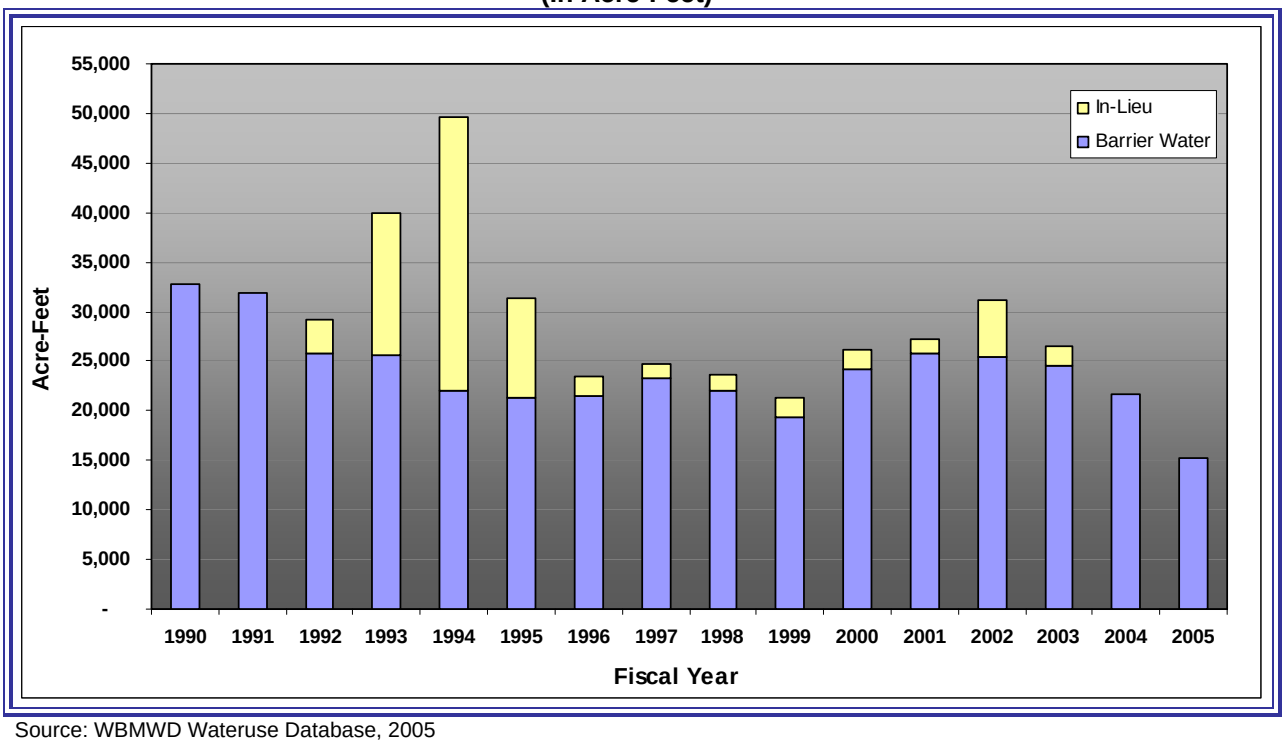
Replenishment water is defined as water that is used to refill or protect the groundwater basin. The Water Replenishment District of Southern California (WRD) is the entity responsible for maintaining and replenishing the West Coast and Central Groundwater Basins. WRD is a special district created by the State and governed by a 5-member elected body to replenish and protect these groundwater basins with imported water, storm water, and recycled water. Within the West Coast Groundwater Basin (WCGB), WRD's responsibility is to protect the basin by injecting treated water at the West Coast and Dominguez Gap Barriers along the western South Bay Region.

Barrier Demands

As groundwater is extracted annually beyond the natural level of replenishment, seawater begins to intrude into the basin along the coast. The current method in preventing seawater from contaminating the groundwater basin is to create a hydrologic barrier. The Los Angeles County Department of Public Works (LACDPW) maintains two barriers where imported and recycled water is injected on a consistent basis to protect the groundwater basins.

As the wholesaler, West Basin sells treated imported and recycled water to WRD to inject into the saltwater barriers. WRD's purchases average a total of 17,000 AFY of imported water and 5,000 AFY of recycled water from West Basin. Water demands at the barriers usually do not shift dramatically due to the limited groundwater production each customer is allowed annually. Figure 2-3 displays the total barrier demands within West Basin's service area.

Figure 2-3
Replenishment Demands[1] in West Basin MWD's Service Area
(In Acre-Feet)



Source: WBMWD Wateruse Database, 2005
[1] Replenishment demands include both In-lieu and barrier deliveries. Barrier deliveries include both imported and recycled water.

2.4.3 Retail Water Demand by Customer Agency

Overall, retail water demands within West Basin's service area have not seen significant increases for the past 15 years. However, individual retail customer agencies have experienced some changes in their retail demand since 1990. Table 2-3 illustrates the changes, either increases or decreases, in each retail customer agencies' average water usage over two different five year periods since 1990.

Table 2-3
Total Water Demand per West Basin Customer Agency
Average (1990-1995) vs. Average (2000-2005)
(In Acre-Feet)

Customer Agency	1990-1995 Average Total Water Use	2000-2005 Average Total Water Use	%Increase/ (Decrease)
California American Water Co.	**3,261**	3,834	17.6%
Cal Water Service Co.- Dominguez	**33,288**	35,134	5.5%
Cal Water Service Co.- Hermosa/Redondo	**13,704**	15,816	15.4%
Cal Water Service Co.- Palos Verde	**18,479**	21,684	17.3%
Cal Water Service Co.- Hawthorne	**4,948**	5,020	1.5%
City of El Segundo	**17,802**	17,296	(2.8%)
City of Inglewood	**12,424**	12,533	0.9%
City of Lomita	**2,491**	2,764	11.0%
City of Manhattan Beach	**6,279**	7,088	12.9%
L.A. County Waterworks District 29	**8,036**	9,822	22.2%
Southern California Water Co.	**36,605**	40,002	9.3%
Water Replenishment District	**25,310**	25,021	(1.1%)
Total	**182,627**	**196,014**	

Source: WBMWD Wateruse Database, 2005

Although some agencies have seen some dramatic shifts in water demand usage over the past 15 years, the average increase for a West Basin customer agency was 9.1%. Some of the significant changes among customer agencies may be attributed to population growth, increases in industrial customers, and/or further land use development.

2.5 Projected Water Demands

One of the objectives of this Plan is to provide some insight into West Basin's expected water demands for the next 25 years. The predictability of water usage is an important element in planning future water supplies. The methodology used to determine demand forecasting is a combination of historical water use analysis, population growth and commercial and residential development. West Basin, with the assistance of MWD's forecasting model known as MWD-MAIN (Municipal and Industrial Needs) Water Use Forecasting System, is able to develop some well formulated water demand projections.

The MWD-MAIN forecasting model determines expected urban water usage for the next 25 years. This model incorporates Census data, industrial growth, employment, and regional development from regional planning agencies, such as SCAG (Southern California Association of Governments), to project water demands. It also features demands in sectors such as single family, multi-family, industrial, commercial and institutional usage for the region. MWD also takes into account current and future water

management efforts, such as water conservation Best Management Practices (BMPs) and education programs.

Table 2-4 illustrates the current and projected retail water demands to the year 2030 for West Basin under normal demand conditions.

Table 2-4
West Basin's Current and Projected M&I Water Demands
(In Acre-Feet)

District Water Demands	2005[1]	2010	2015	2020	2025	2030
Retail Municipal & Industrial Use						
Groundwater[2]	41,535	52,000	52,000	52,000	52,000	52,000
Imported Water	129,316	123,000	97,319	98,665	100,140	101,747
Recycled Water[3]	13,065	21,848	32,500	36,250	40,000	43,750
Desalinated Water	0	0	20,000	20,000	20,000	20,000
Total	**183,916**	**196,848**	**201,819**	**206,915**	**212,140**	**217,497**

[1] The 2005 demands are based on FY 2004-05, which was recorded as one of the "wettest" years on record.
[2] Groundwater demands include the amount of groundwater pumped from the West Coast and Central (avg. 2,000 AFY) groundwater basins to satisfy groundwater demands within West Basin's service area.
[3] Includes M&I recycled water sales from West Basin's service area; it does not include recycled water sales to Los Angeles Department of Water and Power and the City of Torrance or Replenishment sales (Barrier).

As displayed above, the retail demand in West Basin is expected to grow approximately 0.5% each year. Groundwater will remain consistent, due to the limited amount of extractable pumping rights within the basin; but imported water is expected to decrease with the expansion of recycled water and the development of ocean water desalination meeting the growing demand over the next 25 years.

2.5.1 Projected Per Capita Water Usage

As discussed previously, water demand is determined by the water usage per person. The future per capita usage shows how water demand is growing at a modest pace.

Table 2-5
Projected Per Capita Retail Water Usage in West Basin's Service Area

Year	Estimated Population[1] (Thousands)	Retail Water Usage[2] (AF)	Per Capita (GPCD)
2005	**852,800**	**183,916**	**193**
2010	**876,400**	**196,848**	**201**
2015	**906,500**	**201,819**	**199**
2020	**936,100**	**206,915**	**197**
2025	**964,600**	**212,140**	**196**
2030	**991,900**	**217,497**	**196**

[1] Information is based on MWD Demographic Data, 2004.
[2] Retail Water usage includes recycled water, but does not include replenishment sales, i.e. barrier water.

Table 2-5 shows a gradual decrease in per capita usage at a time when water has become a scarce commodity in a region where population is projected to increase. Although the total retail water usage continues to increase, the amount of water used per person will decline over the next 25 years. Essentially, more people are using less water.

2.5.2 Projected Replenishment Demand

Future replenishment demands are difficult to project because of the variation in operational changes and replenishment needs. WRD expects reduced deliveries of imported water at both of the Barriers, Dominguez Gap and West Coast, with increased deliveries of recycled water.

The estimated replenishment demands over the next 25 years under normal conditions are presented in Table 2-6. Although replenishment demands may fluctuate year to year, the overall demand should stay relatively the same because groundwater production is limited according to the allowable pumping rights each groundwater producer is allocated. Furthermore, groundwater production is at or around its maximum amount, therefore, replenishment demands should not significantly increase.

Table 2-6
Projected Replenishment Demands
(In Acre-Feet)

District Water Demands	2005	2010	2015	2020	2025	2030
Replenishment						
Imported Water[1]	15,000	10,000	10,000	10,000	10,000	10,000
Recycled Water[2]	7,500	17,500	17,500	17,500	17,500	17,500
Total	**22,500**	**27,500**	**27,500**	**27,500**	**27,500**	**27,500**

[1] Imported water demands are based on the Water Replenishment District's projected estimate needs, although they may adjust annually depending upon groundwater production. Imported water demands are for both the West Coast and Dominguez Gap Barriers.
[2] Recycled water deliveries are only at the West Coast Barrier; with a 5,000 AF expansion in 2006. Additional recycled water deliveries in 2010 are contingent upon a regulatory permit to expand recycled water to 100% at the West Coast Barrier.

Water Supply

This section discusses the current and future water supply within West Basin's service area

3.1 Overview

It is West Basin's mission to ensure a safe, adequate and reliable supply of water for the region it serves. However, with a limited supply and growing demand for water, the task of meeting this mission is becoming increasingly challenging.

Seventy years ago the average customer agency in West Basin relied completely on groundwater. Today, however, it relies on a more diverse mix of water resources: 21% groundwater, 65% imported, 7% recycled water (only Municipal & Industrial [M&I]), and to date conservation efforts have made up 7%. It is projected that by 2030, the resource mix on average will be 20% groundwater, 39% imported, 17% recycled water, 8% ocean water desalination, with conservation meeting the remaining 16%. Diversification of water supplies has become one of the District's answers to ensuring a reliable supply of water for its service area.

This section provides an overview of the current and future water supplies needed to meet the expected demands of West Basin, including a review of the District's current and projected water supply mix, a description of each water source that West Basin's customer agencies currently rely on, and expected future supplies that West Basin is planning and/or developing to meet the demands by year 2030.

3.2 West Basin's Water Supply Portfolio

Since its formation in 1947, West Basin has fulfilled its responsibility of providing its customer agencies with supplemental supplies to ensure reliability. Today, diversification is the key to an ample future supply of water throughout its service area. As illustrated in Figure 3-1, West Basin's supply portfolio has changed through the years.

Similar to creating a balanced investment portfolio to reduce risk, the District plans to further diversify the water resource mix over the next 25 years, with the expansion of the District's recycled water system, increased conservation efforts, and groundwater storage opportunities. The District's dependence on traditional sources of water (groundwater and imported) will continue to decrease with the expansion of these alternative resources. Figure 3-1 and Table 3-1 show the historical, current and projected water supply portfolio that the District is anticipating meeting by the year 2030.

Figure 3-1
West Basin's Service Area
Projected Water Supplies

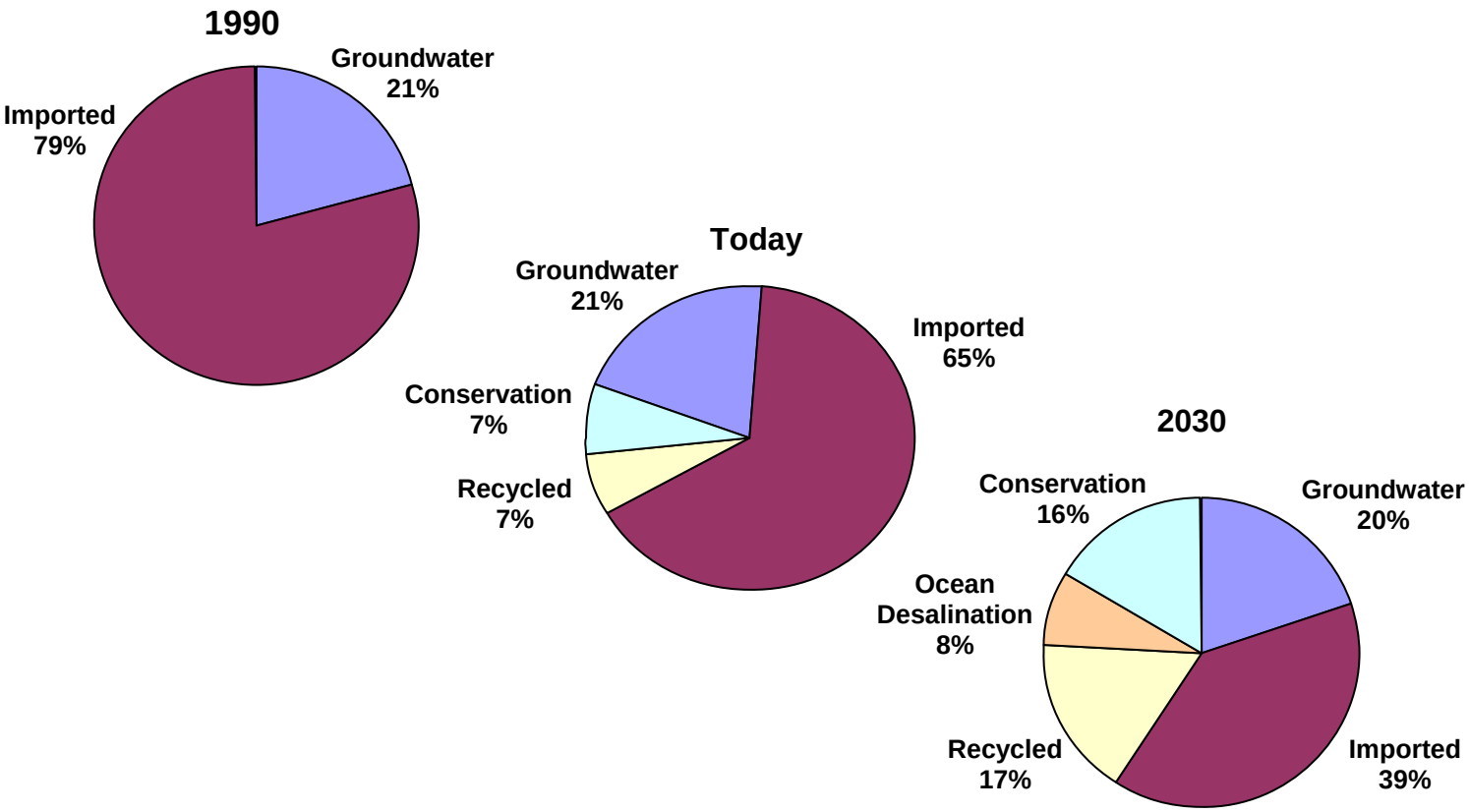


Table 3-1
West Basin MWD
Historical & Projected Retail Water Supplies
(In Acre-feet)

Type of Water	FY 1990	Today[1]	2030
Groundwater[2]	40,148	41,535	52,000
Imported Water[3]	151,829	129,315	101,747
Recycled Water[4]	-	13,065	43,750
Ocean Desalination	-	-	20,000
Total	**191,977**	**183,916**	**217,497**
Conservation[5]	-	14,500	42,800
Total	**191,977**	**198,416**	**260,297**

[1] Based upon actual FY 2004-05 sales.
[2] Groundwater production within West Basin service area only, including imported groundwater production from California American Water Company (FY 1990 1,658 AF, FY 04-05 2,228 AFY, and average of 2,000 AFY for 2030).
[3] Imported retail use only; does not include replenishment deliveries; i.e. Barrier.
[4] Recycled M&I use only; does not include replenishment deliveries; i.e., Barrier.
[5] Conservation consists of Active and Passive savings according to the District's projected estimates.

3.3 West Basin's Water Source

3.3.1 Imported Water Supply

West Basin relies on approximately 150,000 acre-feet per year (AFY) of imported water from the Colorado River and State Water Project to meet the District's retail and replenishment demands. MWD receives this supply from these two major water systems that supplies a majority of the southern California region.[1]

Colorado River

MWD was established to develop a supply from the Colorado River. Its first mission was to construct and operate the Colorado River Aqueduct (CRA), which can deliver roughly 1.2 million acre-feet (MAF) per year. Under its contract with the Federal government, MWD has a basic entitlement of 500 thousand acre-feet per year of Colorado River water. MWD also holds a priority for an additional 0.662 MAF per year. MWD can obtain water under this priority when the U.S. Secretary of the Interior determines that either one or both of the following exists:

- surplus water; and/or
- water is apportioned to, but unused by, Arizona and/or Nevada.

MWD and the State of California have acknowledged that they could obtain less water from the Colorado River in the future than they have in the past, but the lack of clearly quantified water rights hindered efforts to promote water management projects. The U.S. Secretary of Interior asserted that California's users of Colorado River water had to limit their use to a total of 4.4 MAF per year, plus any available surplus water. The resulting plan, known as "California's Colorado River Water Use Plan" or the "California Plan," characterizes how California would develop a combination of programs to allow the State to limit its annual use of Colorado River water to 4.4 MAF per year plus any available surplus water. The Quantification Settlement Agreement (QSA) among the California agencies is the critical component of the California Plan. It establishes the baseline water use for each of the agencies and facilitates the transfer of water from agricultural agencies to urban uses.

[1] The Los Angeles Aqueduct, a third aqueduct to southern California, the Los Angeles Aqueduct, supplies imported water from the eastern Sierra Nevada region to the City of Los Angeles.

In the context of the QSA, MWD has identified a number of storage and transfer programs that could be used to achieve long-term development targets for a full CRA, and it has entered into or is exploring agreements with a number of agencies.

State Water Project

California's State Water Project (SWP), MWD's second main source of imported water, is the nation's largest state-built water and power development and conveyance system. It includes facilities—pumping and power plants; reservoirs, lakes, and storage tanks; and canals, tunnels, and pipelines—that capture, store, and convey water from the Lake Oroville watershed in Northern California to 29 water agencies in Central and southern California. Planned, designed, constructed and now operated and maintained by the California Department of Water Resources, this unique facility provides water supplies for 23 million Californians and for 755,000 acres of irrigated farmland.

The original State Water Contract called for an ultimate delivery capacity of 4.2 MAF, with MWD holding a contract for 2.011 MAF. More than two-thirds of California's drinking water, including all of the water supplied by SWP, passes through the San Francisco-San Joaquin Bay-Delta (Bay-Delta). For decades, the Bay-Delta system has experienced water quality and supply reliability challenges and conflicts due to variable hydrology and environmental standards that limit pumping operations.

In 1999, MWD's Board of Directors set new goals for the SWP with the adoption of its CALFED Policy Principles. These goals committed MWD to water quality objectives, the development of 0.65 MAF minimum dry-year supply from the SWP by 2020, and average annual deliveries of 1.5 MAF (excluding transfers and storage programs along the SWP). To achieve these goals while minimizing impacts to the Bay-Delta ecosystem, MWD would maximize deliveries to storage programs during wetter years, implement a number of source water qualities and supply reliability improvements in the Delta, and remove operational conflicts with the Central Valley Project (CVP), and better coordinate planning and operations between the SWP and CVP.

Types of Imported Supplies

MWD 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 Seasonal Treated Replenishment Water (In-Lieu Replenishment).

Non-Interruptible Water is the treated firm supply that is available all year. West Basin delivers an average of 150,000 AF of non-interruptible water annually. It is

used as the main supplemental supply of cities and water agencies, including the main supply for the Saline Barriers.

Seasonal Treated Replenishment Water, also known as the "In-Lieu" water is delivered to customer agencies that are eligible to offset groundwater production with imported water. This program incentivizes customer agencies to take imported surplus water "when available," which indirectly replenishes the groundwater basin. This surplus water is purchased at a discount rate in exchange for leaving groundwater in the basin for no less than a year so that it can be used subsequently during dry years.

3.3.2 Groundwater Supply

Groundwater has for many years represented a fifth of the District's supplies within West Basin's service area. Today, the average customer agency in West Basin relies on groundwater production for 20% of its retail demand. This is a result of the geographical location where most of West Basin's customer agencies are located. There are a few agencies within the District's service area that rely exclusively on imported water to meet all their current water needs.

The West Coast Groundwater Basin (WCGB) is an adjudicated basin. The extensive overpumping of the WCGB over the years led to critically low groundwater levels, resulting in seawater intrusion along the coast. This overpumping of the WCGB resulted in a legal judgment, or adjudication that limits the allowable extraction that could occur in any given year and assigned water rights to basin pumpers. The adjudicated water rights were greater than the basin yield; therefore, the WCGB was operating with an annual overdraft. To address this overdraft, imported and recycled water sources and a means to purchase these sources was required. The groundwater producers (pumpers), which are members of the West Basin Water Association, led the creation of the Water Replenishment District of Southern California (WRD), which manages the replenishment of the groundwater basin.

In 1959, the State Legislature enacted the Water Replenishment Act, enabling the water association for the basin to secure voter approval for the formation of the "Central and West Basin Water Replenishment District" (now referred to as the Water Replenishment District of Southern California or "WRD") to be the permanent agency responsible for replenishing the basin. The State Legislature has vested in WRD the statutory responsibility to manage, regulate, replenish, and protect the quality of the groundwater supplies within its boundaries for the beneficial use of the approximately 3.5 million residents and water users who rely upon those groundwater resources to satisfy all or a portion of their water needs.

Although the water rights have been bought, sold, exchanged, or transferred over the years, the total amount of allowable extraction rights within the entire groundwater basin has remained virtually the same. The adjudicated pumping rights available within West

Basin's service area total 54,730 AF. However, not all of these water rights holders are water retail agencies. Many of these holders are school districts, businesses, cemeteries, and private entities that make up approximately 42% (23,215 AF) of the total water rights. Shown below in Table 3-2, are all of the water retailers' adjudicated groundwater rights in West Basin's service area for Fiscal Year 2003-04.

Table 3-2
Groundwater Pumping Rights 2003-2004
(AFY)

West Basin MWD Retail Agencies	Adjudicated Pumping Rights in West Basin
Cal Water Service Co. (Hermosa/Redondo)	4,070
Cal Water Service Co. (Dominguez)	10,417
City of El Segundo	953
City of Hawthorne	1,882
City of Inglewood	4,450
City of Lomita	1,352
City of Manhattan Beach	1,131
Southern California Water Co.	7,260
Total	**31,515**

Source: West Basin Watermaster Report, 2004

Although mostly all of the groundwater supply is extracted from the WCGB, there is a small amount of groundwater that is imported from the Central Groundwater Basin. The Central Groundwater Basin underlies the southeastern part of the Los Angeles Coastal Plain. It is bounded on the north by the hills separating it from the San Gabriel Valley, on the east by Orange County, and on the southwest by the West Coast Basin.

The total amount of water extracted and imported within West Basin's service area is approximately 2,000 AFY. Table 3-3 below displays the water retailer and the amount produced from this adjoining basin for the past five fiscal years:

Table 3-3
Amount of Groundwater Pumped from Central Basin
(In-Acre-feet)

Water Retailer	2000	2001	2002	2003	2004
California American Water Co.	1,707	1,935	1,979	2,509	2,228
Total	**1,707**	**1,935**	**1,979**	**2,509**	**2,228**

Source: Central Basin Watermaster Report, 2004

As illustrated in Table 3-4, the total amount of groundwater produced over the past five years in the WCGB and Central Groundwater Basin has remained fairly consistent. The amount of groundwater produced ranges from 73% to 86% of the total groundwater supply available from both Basins (56,797 AF).

Table 3-4
Total Amount of Groundwater Pumped
(In-Acre-Feet)

Basin Name	2000	2001	2002	2003	2004
West Coast Basin[1]	50,295	46,867	45,367	46,555	42,421
Central Basin[2]	1,669	1,707	1,935	1,979	2,509
Total	**51,964**	**48,574**	**47,302**	**48,534**	**44,930**
% of Total Water Supply[3]	**91%**	**86%**	**83%**	**85%**	**79%**

Source: West Basin MWD Wateruse Database, 2005
[1] Includes West Basin MWD service area including Desalter sales
[2] Includes California American Water Co. groundwater imported from Central Basin
[3] Percentage of the available groundwater supply of both basins totaling 56,797 AFY

The total amount of groundwater projected to be extracted over the next 25 years will be fairly consistent due to the adjudication of both basins. The economic costs to pumped groundwater versus the purchase of imported water will pressure water retailers to maximize their groundwater rights. Therefore, the total amount of groundwater produced is projected to range in the 92% percentile of available supply, as illustrated in Table 3-5.

Table 3-5
Total Amount of Groundwater Projected to be Pumped
(In Acre-Feet)

Basin Name	2010	2015	2020	2025	2030
West Coast Basin[1]	50,000	50,000	50,000	50,000	50,000
Central Basin[2]	2,000	2,000	2,000	2,000	2,000
Total	**52,000**	**52,000**	**52,000**	**52,000**	**52,000**
% of Total Water Supply[3]	**92%**	**92%**	**92%**	**92%**	**92%**

[1] Includes West Basin MWD service area including Desalter sales
[2] Includes California American Water Co. groundwater imported from Central Basin
[3] Percentage of the available groundwater supply of both basins totaling 56,797 AFY

Groundwater Recharge

To replenish the WCGB and prevent further seawater intrusion, the Los Angeles County Flood Control District (LACFCD) created the injection barriers along the West Coast and at the Dominguez Gap, located north of the Los Angeles Harbor.

For the past 42 years, WRD has accomplished its statutory replenishment objectives primarily by allowing recycled and imported water to be injected into “seawater intrusion barriers” owned and operated by the County of Los Angeles Department of Public Works (LACDPW) in the WCGB.

WRD assesses a groundwater production fee, known as their “Replenishment Assessment”, to pumpers of the WCGB. This assessment provides funds which WRD uses to purchase and produce water for both spreading and injection to replace groundwater pumped, and create hydrological barriers to seawater intrusion.

WRD also encourages In-Lieu replenishment of the basins. Under the "In-Lieu program", pumpers of the WCGB are encouraged through a financial incentive to purchase surplus imported water from the West Coast Basin "in-lieu" of pumping groundwater.

Table 3-6 summarizes the historical amounts of imported water purchased to replenish the basin.

Table 3-6
Historical Replenishment Deliveries
(In Acre-Feet)

Fiscal Year	In-Lieu Water	Barrier Water[1]	Total
1990	0	32,850	**32,850**
1991	0	31,876	**31,876**
1992	3,434	25,736	**29,170**
1993	14,265	25,705	**39,970**
1994	27,656	21,958	**49,614**
1995	10,094	21,274	**31,368**
1996	1,962	21,585	**23,547**
1997	1,453	23,208	**24,661**
1998	1,593	22,088	**23,680**
1999	1,942	19,353	**21,294**
2000	2,045	24,176	**26,221**
2001	1,455	25,811	**27,265**
2002	5,726	25,414	**31,140**
2003	1,864	24,631	**26,495**
2004	0	21,672	**21,672**

[1] Barrier Water includes imported and recycled water deliveries to both the West Coast and Dominguez Gap Barriers.

3.3.3 Recycled Water Supply

Recycled water is one of the cornerstones of West Basin's efforts to augment local supplies and reduce dependence on imported water. Since the planning and construction of West Basin's recycled water system in the early 1990's, West Basin has become a leader in producing and marketing recycled water. This new supply of water assists in meeting the demand for non-potable applications such as landscape irrigation, commercial and industrial processes, and seawater barriers. Recycled water is a resource that is reliable and environmentally beneficial to the region. It is only limited by the infrastructure needed to deliver this source of water. With approximately 206 site connections, West Basin has delivered an average of 14,000 AF of recycled water within the District's service area.

West Basin projects on delivering 21,850 AF of recycled water by year 2010. Refer to a more detailed description of West Basin's water recycling program in Section 8 of this Plan.

3.4 Alternative Water Supply Projects

3.4.1 Seawater Barrier Water Conservation Project

To prevent seawater intrusion into the WCGB, two injection barriers were created along the West Coast and at the Dominguez Gap. These barriers are a series of wells that act like a freshwater dam between the ocean and the groundwater aquifer. To ensure groundwater protection, the barriers require a reliable source of high quality water for continuous injection.

For over a decade, West Basin has supplied a combination of 50 percent imported water and approximately 50 percent highly purified recycled water into the West Coast Barrier. To further enhance water reliability and water quality, West Basin is currently expanding the use of recycled water in the barrier to 75 percent for the following reasons:

- West Basin is committed to conserving imported water. A 25 percent increase in the amount of recycled water used for injection at the barrier represents an additional 5,000 AFY of imported water that can be used for potable purposes. Furthermore, recycled water is more reliable than imported water, which is subject to drought and changes in weather patterns.

- Since it has been treated to have impurities removed, recycled water is a higher quality water source than Colorado River water. This purified water has one-half the salt concentration of existing groundwater and one-fifth the salt of Colorado River water. This will help improve water quality in the aquifer, which is consistent with West Basin's commitment to ongoing water quality enhancement.

- Using highly purified recycled water is less expensive than imported water and helps to control water rates in West Basin's service area.

3.4.2 Ocean Water Desalination

Desalting ocean water as a source of potable water in the West Basin region is a foreseeable goal. May 2003 marked the first anniversary of West Basin's Desalination Pilot Project and research program in which 40,000 gallons per day undergo microfiltration and reverse osmosis treatment and a battery of water quality tests. It is anticipated that West Basin will be able to provide up to 20,000 AF of ocean desalinated water in 2012. A more detailed description of West Basin's desalination efforts are described in Section 9 of this Plan.

3.4.3 Conjunctive Use Groundwater Storage

Conjunctive Use can be defined as the coordinated management of surface and groundwater supplies to increase the yield of both supplies and enhance water supply reliability in an economic and environmentally responsible manner. West Basin sees the development of Conjunctive Use Storage Programs as part of the District's core responsibility to ensure a reliable supply of water for its service area. If done in a publicly responsible manner, groundwater storage can be viewed as an additional source in diversifying our water resource supply portfolio.

The potential benefits of a Conjunctive Use program include:

- Operational flexibility for groundwater production;
- Increased yield of the basin;
- More efficient use of surplus surface water during wet years;
- Financial benefits to groundwater users;
- Better distribution of water resources; and
- Increased measures of reliability.

At this time there are programs available for water retailers to create groundwater storage both within and outside of the WCGB groundwater judgment. Included is the availability for a District-sponsored storage program with MWD in which retail agencies with imported water connections can partake. The size of such a program would depend on retailers' total demand and the amount of groundwater they could realistically shift to imported water.

3.4.4 Water Transfers & Exchanges

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

MWD, in recent years, has played an active role statewide in securing water transfers and exchanges as part of their IRP goals. Although West Basin is a member of MWD, there has not been a compelling reason or opportunity to pursue transfers directly.

Water Reliability

This section discusses West Basin's plan of maintaining a reliable source of water

4.1 Overview

Among the future challenges of continued urbanization in southern California are the questions of water reliability. In other words, can southern California meet the necessary water demands of the region during times of drought? During consecutive dry years, southern California has historically seen demands increase by as much as 20% while supplies have decreased. Prior to recent significant improvements in water reliability, most cities and agencies were forced to mandate conservation efforts and restrict water use in some cases in order to maintain an adequate supply[1].

This section will discuss how the regional supplier, MWD, in partnership with its member agencies like West Basin, plans on ensuring future reliability through water management measures, long-term planning and investment in local resources; West Basin's projections for meeting its service area's future demands during single and multiple dry-year conditions; and finally, a review of the District's Water Shortage Contingency Plan in the event that MWD limits deliveries.

4.2 MWD Water Supply Reliability

With the experience of the droughts of 1977-78 and 1989-92, MWD has undertaken a number of planning initiatives to ensure water supply reliability. Included among them are the Integrated Resources Plan (IRP), the Water Surplus and Drought Management Plan (WSDM Plan) and their local resource investments. Together these initiatives have provided the policy framework for MWD and its member agencies to manage their water resources to meet a growing population even under recurrences of the worst historical hydrologic conditions locally, and in the key watersheds that supply southern California. Below is a brief description of each water management initiative MWD has undertaken to ensure 100 percent reliability over the next 20 years.

4.2.1 MWD Integrated Resource Plan

To meet the challenges of the supply shortages on the State Water Project (SWP) and the Colorado River Aqueduct under increases in population and growing State and Federal regulatory requirements, MWD's Board of Directors called for the development

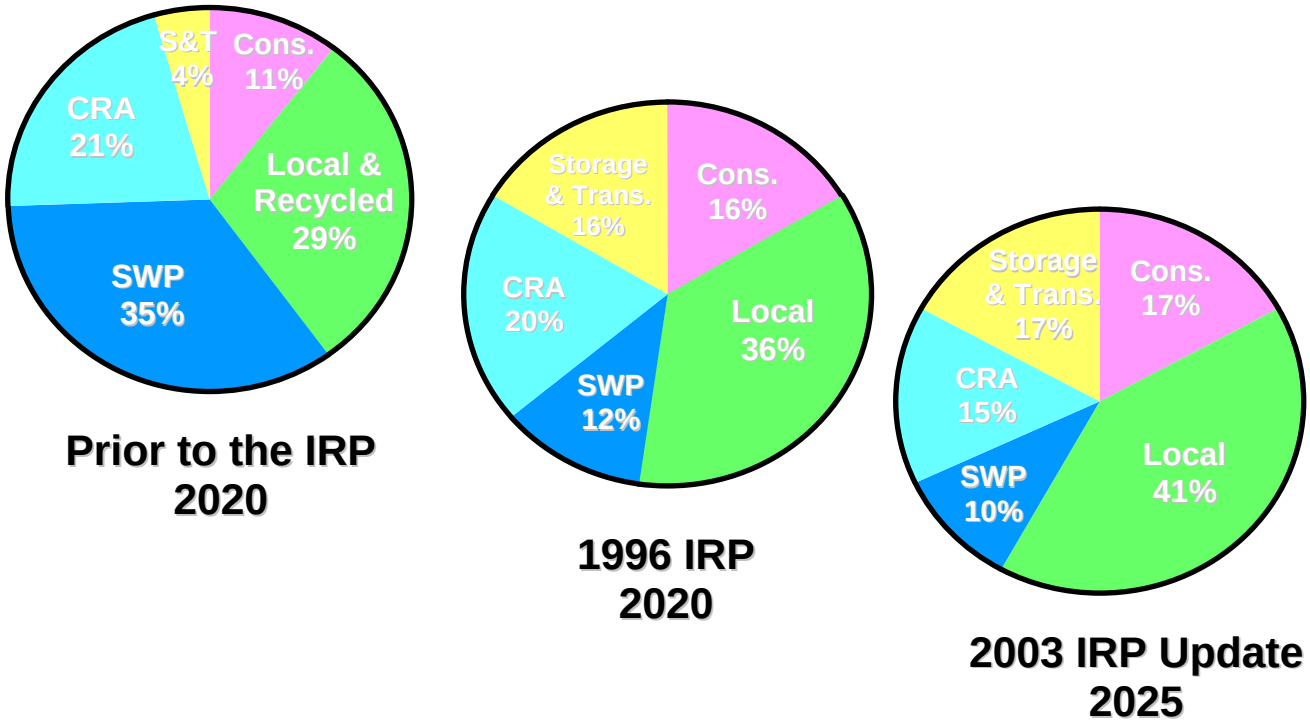
[1] By contrast, the loss of a large portion of our Colorado River supply in 2004 during an extended dry period in southern California did not cause hardship or require any drastic return on the part of the general population. This was a tribute to planning and investments made into water reliability over the past decade.

of an IRP in 1996. The IRP's objective was to determine the appropriate combination of water resources to provide 100 percent reliability for full service demands over the next 20 years. With the support of its member agencies, MWD developed a preferred supply mix that includes conservation, local supplies (recycled, brackish, desalination), SWP supplies, CRA supplies, groundwater banking, and water transfers that could meet projected water demands under severe shortage conditions. The IRP identifies supply targets for each supply option and has become the blueprint for guiding investment and policy decisions for decades to come.

By design, the IRP is subject to revision when conditions and opportunities change over time. In 2003, MWD completed its first update to the IRP, which included revised projected demands and an updated resource supply mix. MWD had three clear objectives for the IRP update: (1) to review the goals and achievements of the 1996 IRP, (2) to identify changed conditions for water resource development and (3) to update the resource targets through 2025.

Among the most significant findings from the updated IRP was the increased participation of local agencies in developing local supplies, such as recycled water and brackish groundwater desalination, as well as promoting savings from conservation. The result of which revealed a greater source of local supply reliability than anticipated among MWD member agencies. However, it also identifies the limitations expected on the Colorado River and the need for local infrastructure improvements to provide the flexibility to manage and overcome supply risks.

Overall, the 2003 IRP Update revealed a decrease in the region's reliance on Colorado River and SWP supplies compared to the 1996 IRP, while continuing to provide 100 percent reliability through the year 2025.



4.2.2 MWD Water Surplus and Drought Management Plan

In order for MWD to be 100 percent reliable in meeting all non-discounted non-interruptible demands in the region, MWD adopted the WSDM Plan in 1999. The WSDM Plan provides the policy guidance to manage the region's water supplies to achieve the reliability goals of the IRP. This is achieved by integrating the operating activities of surplus and shortage supplies through a series of stages and principles.

Those principles include water management actions needed to secure more imported water during times of drought by promoting efficient water usage, increasing public awareness, and seeking additional water transfers and banking programs. Should supplies become limited to the point where imported supplies are truncated, the WSDM Plan would allocate water through a calculation on the basis of need, as opposed to any historical purchases through MWD. MWD and its member agencies have not yet decided on a formula for the allocation calculation.

4.2.3 MWD Local Resource Investments

A key element within MWD's IRP objectives to ensure region reliability is to further enhance local resources. Besides the traditional supplies of imported water and groundwater, MWD has looked to invest in numerous local resource projects including: recycled water, conservation, groundwater and surface water storage, and even ocean water desalination to meet future demands.

Since 1982, MWD has provided financial assistance to over 75 projects in the areas of recycled water and groundwater recovery totaling approximately $124 million and $41 million, respectively.

MWD has already invested over $290 million in water conservation, which has produced significant water savings over the last 15 years.

One of MWD's most significant investments is Diamond Valley Lake. Built in the saddle of two mountains, Diamond Valley Lake, southern California's newest and largest reservoir, is a vital link in the regional system that has brought water to southern California for the past 60 years. The lake nearly doubled the region's surface water storage capacity and provides additional water supplies for drought, peak summer and emergency needs. This newly created reservoir, located in southwestern Riverside County, holds enough water to meet the region's emergency and drought needs for six months and is an important component in MWD's plan to provide a reliable supply of water to the 18 million people in southern California. Water began pouring into the reservoir in November 1999 and the lake was filled by early 2002. Diamond Valley Lake holds 800,000 AF, or 260 billion

gallons of water. By comparison, Lake Havasu on the Colorado River holds just 648,000 AF or 201 billion gallons. The lake has nearly doubled the area's surface water storage capacity and provides additional water supplies for drought, peak summer and emergency needs.

4.3 West Basin's Water Supply Reliability

Along with MWD's reliability initiatives, West Basin has also taken important steps over the past decade to reduce the District's vulnerability to extended drought or other potential threats. The District's investments in recycled water to replace imported water for non-potable uses and the implementation of conservation devices and education have resulted in more self-reliance.

Based on the District's current water supply portfolio, as illustrated in Table 4-1, West Basin provides an adequate supply for the single dry-water year and multiple dry-water year scenarios. The Normal Water Year used in this plan is based on the average rainfall year of 2000-01. According to the National Weather Service, the recorded rainfall in FY 2000-01 was 17.94 inches - one of the closest years to the historical average of over 100 years (16.42 inches). The Single Dry Year is based on the lowest rainfall year of 2001-02. The recorded rainfall in FY 2001-02 was at 4.42 inches - the lowest recorded year in over 100 years. The three Multiple Dry-Water Years used below were based upon the most recent dry period - FY 2001-02, 2002-03, and 2003-04.

Table 4-1
Supply Reliability
(In Acre-Feet)

Supplies	Normal Water Year	Single Dry-Water Year	Multiple Dry-Water Years		
	FY 2000-01	FY 2001-02	FY 2001-02	FY 2002-03	FY 2003-04
Groundwater[1]	56,797	56,797	56,797	56,797	56,797
Imported Water	126,000	129,936	129,936	130,940	135,334
Recycled Water[2]	14,000	14,000	14,000	14,000	14,000
Total Supply	**196,797**	**200,733**	**200,733**	**201,737**	**206,131**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Barrier.
[1] Based upon the total water rights for each customer agency within West Basin's service area, according to the 2004 DWR West Coast Basin Watermaster Report. Also includes groundwater rights (2,000 AFY) from Central Groundwater Basin, which are imported into West Basin.
[2] Includes M&I Recycled Water sales from West Basin's service area; does not include recycled water sales to LADWP and Torrance or replenishment sales (Barrier).

Groundwater is shown constant in all scenarios due to the Basin's adjudication, which limits the total amount that each customer within West Basin's service area is able to extract. Recycled water, which includes only M&I sales, is also constant in all scenarios because the availability of recycled water is not subject to hydrologic variation. This leaves imported water as the only supply currently that can fluctuate under different hydrological scenarios.

The supply reliability scenarios described in this section focus exclusively on municipal and industrial usage within the District's service area, it does not include replenishment water.

Looking forward, West Basin will continue to evaluate opportunities to increase its water supply portfolio within its service area. These opportunities include the expanded use of recycled water, brackish water recovery, ocean water desalination, additional conservation programs, as well as the exploration of investments in groundwater storage through Conjunctive Use programs.

4.3.1 Normal-Year Reliability Comparison

As discussed in the Water Demand Section, West Basin's normal demands are projected to increase modestly over the next 25 years. Increases in recycled water use and ocean water desalination over the 25 year planning period equate to a corresponding reduction in the need for imported water.

Table 4-2
Projected Normal Water Year Supply and Demand
(In Acre-Feet)

Supplies	2005	2010	2015	2020	2025	2030
Groundwater[1]	56,797	56,797	56,797	56,797	56,797	56,797
Imported Water	126,000	123,000	97,319	98,665	100,140	101,747
Recycled Water[2]	14,000	21,848	32,500	36,250	40,000	43,750
Ocean Desalination	0	0	20,000	20,000	20,000	20,000
Total Supply	**196,797**	**201,645**	**206,616**	**211,712**	**216,937**	**222,294**
Total Demand[3]	**183,916**	**196,848**	**201,819**	**206,915**	**212,140**	**217,497**
Surplus/(Shortage)	**12,881**	**4,797**	**4,797**	**4,797**	**4,797**	**4,797**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Barrier
[1] Based upon the total water rights for each customer agency within West Basin's service area, according to the 2004 DWR West Coast Basin Watermaster Report. Also includes groundwater rights (2,000 AFY) from Central Groundwater Basin, which are imported into West Basin.
[2] Includes M&I Recycled Water sales from West Basin's service area; does not include recycled water sales to LADWP and Torrance or replenishment sales (Barrier).
[3] Total Demand includes Projected Groundwater within West Basin's service area, as well as Imported and Recycled M&I Demands.

4.3.2 Single Dry-Year Reliability Comparison

West Basin's projected single dry-year water supply is expected to call for additional imported supplies from MWD. According to historical demands, the total water demands in a single dry-year are projected to be 3.5% greater than normal year projections. Table 4-3 compares the dry-year supply and demand projections for the West Basin MWD service area.

Table 4-3
Projected Single Dry-Year Water Supply and Demand
(In Acre-Feet)

Supplies	2005	2010	2015	2020	2025	2030
Groundwater[1]	56,797	56,797	56,797	56,797	56,797	56,797
Imported Water	129,936	125,460	99,586	101,110	102,768	104,562
Recycled Water[2]	14,000	21,848	32,500	36,250	40,000	43,750
Ocean Desalination	0	0	20,000	20,000	20,000	20,000
Total Supply	**200,733**	**204,105**	**208,883**	**214,157**	**219,565**	**225,109**
Total Demand[3]	**190,353**	**203,738**	**208,883**	**214,157**	**219,565**	**225,109**
Surplus/(Shortage)	**10,380**	**367**	**0**	**0**	**0**	**0**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Barrier
[1] Based upon the total water rights for each customer agency within West Basin's service area, according to the 2004 DWR West Coast Basin Watermaster Report. Also includes groundwater rights (2,000 AFY) from Central Groundwater Basin, which are imported into West Basin.
[2] Includes M&I Recycled Water sales from West Basin's service area; does not include recycled water sales to LADWP and Torrance or Replenishment sales (Barrier).
[3] Total Demand includes Projected Groundwater within West Basin's service area, as well as Imported and Recycled M&I Demands.

4.3.3 Multiple Dry-Year Reliability Comparison

Under the multiple dry-year water scenarios, West Basin is projected to meet demands by continuing to implement conservation, water recycling, and introducing ocean water desalination as a new source of potable water to replace imported water. Tables 4-4 through 4-8 illustrate the projected water supplies and demands within multiple dry-year reliability comparisons for the next 25 years.

Table 4-4
Projected Water Supply and Demand during Multiple Dry-Year 2008-2010
(In Acre-Feet)

Supplies	2008	2009	2010
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	21,000	21,420	21,848
Ocean Desalination	0	0	0
Total Supply	**207,733**	**209,157**	**213,979**
Total Demand[3]	**198,792**	**200,785**	**206,188**
Surplus/(Shortage)	**8,941**	**8,372**	**7,791**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Barrier
[1] Based upon the total water rights for each customer agency within West Basin's service area, according to the 2004 DWR West Coast Basin Watermaster Report. Also includes groundwater rights (2,000 AFY) from Central Groundwater basin, which are imported in West Basin.
[2] Includes M&I Recycled Water sales from West Basin's service area; does not include recycled water sales to LADWP and Torrance or Replenishment sales (Barrier).
[3] Total Demand includes Projected Groundwater within West Basin's service area, as well as Imported and Recycled M&I Demands.

Table 4-5
Projected Water Supply and Demand during Multiple Dry-Year 2013-2015
(In Acre-Feet)

Supplies	2013	2014	2015
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	27,500	31,000	32,500
Ocean Desalination	20,000	20,000	20,000
Total Supply	**234,233**	**238,737**	**244,631**
Total Demand[3]	**203,812**	**205,855**	**211,395**
Surplus/(Shortage)	**30,421**	**32,882**	**33,236**

Table 4-6
Projected Water Supply and Demand during Multiple Dry-Year 2018-2020
(In Acre-Feet)

Supplies	2018	2019	2020
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	34,750	35,500	36,250
Ocean Desalination	20,000	20,000	20,000
Total Supply	**241,483**	**243,237**	**248,381**
Total Demand[3]	**208,959**	**211,053**	**216,733**
Surplus/(Shortage)	**32,524**	**32,184**	**31,648**

Table 4-7
Projected Water Supply and Demand during Multiple Dry-Year 2023-2025
(In Acre-Feet)

Supplies	2023	2024	2025
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	38,500	39,250	40,000
Ocean Desalination	20,000	20,000	20,000
Total Supply	**245,233**	**246,987**	**252,131**
Total Demand[3]	**214,235**	**216,383**	**222,205**
Surplus/(Shortage)	**30,998**	**30,604**	**29,926**

Table 4-8
Projected Water Supply and Demand during Multiple Dry-Year 2028-2030
(In Acre-Feet)

Supplies	2028	2029	2030
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	42,250	43,000	43,750
Ocean Desalination	20,000	20,000	20,000
Total Supply	**248,983**	**250,737**	**255,881**
Total Demand[3]	**219,645**	**221,847**	**227,816**
Surplus/(Shortage)	**29,338**	**28,890**	**28,065**

4.4 Water Shortage Contingency Plan

The State requires that each urban water supplier provide a water shortage contingency analysis within its UWMP. Below is a brief description of the District's plan for water shortage according to the state's water code requirements.

4.4.1 Minimum Supply

Currently, the District's water supplies are groundwater, imported water, and recycled water. As it relates to the estimated minimum supply available during a severe drought, the District's groundwater supply, as stated in Section 3, is not affected by hydrology because the Basin is adjudicated. The available supply for each groundwater producer (Allowable Production Allocation), set by the Judgment, remains the same regardless of the service area's rainfall. The same relates to recycled water, where the supply is not affected by hydrology but rather through the number of service connections and production capacity. The benefit of recycled water is that it is drought-proof and the supply of recycled water remains available regardless of the rainfall. Imported water, on the other hand, is the only supply affected by hydrology. As the wholesaler of imported water to the region, the District's minimum imported water supply is based upon the recent historical demand of imported water during a dry-year sequence of fiscal years 2001-02 to 2003-04; rainfall for these three years range among the lowest on record. The estimated minimum supplies over the next three years for the District is shown in Table 4-9.

Table 4-9
Three-year Estimated Minimum Water Supply
(In Acre-Feet)

Supplies	2006	2007	2008
Groundwater[1]	56,797	56,797	56,797
Imported Water	129,936	130,940	135,334
Recycled Water[2]	14,500	18,000	21,000
Ocean Desalination	0	0	0
Total Supply	**201,233**	**205,737**	**213,131**
Total Demand[3]	**196,819**	**198,792**	**204,142**
Surplus/(Shortage)	**4,414**	**6,945**	**8,989**

Note: Supply Reliability covers only retail water demand; does not include replenishment deliveries such as Barrier
[1] Based upon the total water rights for each customer agency within West Basin's service area, according to the 2004 DWR West Coast Basin Watermaster Report. Also includes groundwater rights (2,000 AFY) from Central Groundwater basin, which are imported into West Basin.
[2] Includes M&I Recycled Water sales from West Basin's service area; does not include recycled water sales to LADWP and Torrance or Replenishment sales (Barrier).
[3] Total Demand includes Projected Groundwater within West Basin's service area, as well as Imported and Recycled M&I Demands.

4.4.2 Stages of Action to Reduce Imported Deliveries

As the area's wholesaler of MWD imported water, the District's stages for reduction are subject to MWD's WSDM Plan, which guide the management of water supplies for the region during shortage conditions.

According to MWD's WSDM Plan, an array of water resource management measures would take place prior to any supply reductions. Through a series of seven shortage stages, MWD will seek the steps to encourage more efficient water usage with its member agencies. Not until the last stage, under an extreme shortage condition, will MWD discontinue imported water deliveries according to an allocation formula. Currently, however, MWD has not determined the shortage allocation methodology to complete the WSDM Plan. Conversely, MWD's 2005 Regional UWMP demonstrates 100 percent reliability in multiple dry-years through 2030. Nevertheless, given the resources described in MWD's IRP, MWD fully expects to be reliable, under the most extreme supply shortage scenarios, over the next ten years.

However, if imported water supplies were discontinued according to MWD's WSDM Plan, the District would consider reducing supplies through a series of action stages, which would include an allocation methodology similar to MWD. Once MWD determined such an allocation, the District would work with each of its customer agencies to set a specific allocation level to cumulatively meet the District's allocation from MWD. Below is a four step stage rationing plan the District would implement to reduce imported deliveries up to 50%.

West Basin Municipal Water District
Stages of Action

Minimum Shortage – The District would request for a voluntary effort among its customers to reduce imported water deliveries. In addition, the District would pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.

Moderate Shortage – In addition to the stage above, the District would work with its customer agencies to promote and adopt water waste prohibitions and ordinances to discourage unnecessary water usage.

Severe Shortage – In addition to the two stages above, the District would seek to adopt a rate structure that penalizes increased water usage among its customer agencies.

Extreme Shortage – In addition to all the stages above, the District would call for the discontinuance of imported water based upon an allocation methodology similar to MWD for each of its customer agencies.

Since these action stages are contingent upon MWD's WSDM Plan's allocation methodology and such a formula has yet to be determined, the District's shortage stages will remain in draft form. Until MWD completes the WSDM formula, the District's implementation of any rationing stage will be subject to a variety of conditions, among them the severity of the drought, the District allocation level, and the current water supply mix available to each customer agency before the Board would apply any action stage listed above.

Once the Board determines what action is necessary, the Board will adopt, by resolution, the appropriate stage of action, which will take effect immediately and the District's customer agencies will be notified. A draft resolution is included in Appendix E.

4.4.3 Prohibitions, Penalties and Consumption Reduction Methods

Through the years the District has developed strong relationships with its customer agencies to promote community awareness of water conservation. Should water reductions become necessary, the District will work with each city, water agency or investor owned water company within its service area to encourage the adoption of water waste prohibition measures that establish mandatory water use restrictions. Moreover, the District will provide the necessary assistance and information to apply the best suited water reducing practice(s) for each customer agency.

Additionally, the District will encourage behavioral change through the adoption of an appropriate water rate structure. As part of MWD's WSDM Plan, the District will pass through additional charges; where MWD will enforce water reductions by setting a minimum amount per AF for any deliveries exceeding a member agency's allotment up

to 102 percent, once an allocation plan is determined. Any deliveries exceeding 102 percent will be assessed a surcharge equal to three times MWD's full-service rate. The District will impose MWD's penalties for excess use to its customer agencies that exceed their allocation.

4.4.4 Impacts to Revenue

The District will seek to recover the shortfall of revenue caused by water reductions from its Rate Stabilization Fund as well as from any surplus revenues collected from excess penalties. Moreover, the District will closely monitor its revenue and expenditure impacts on a monthly basis, and response with any rate adjustments needed at each action stage.

Through the District's imported water invoices per connection, the District will measure each customer agencies' actual performance on a monthly basis.

4.4.5 Catastrophic Supply Interruption

In the event imported water supplies are interrupted from a catastrophic event, the District, through coordination with MWD, 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. affected the entire southern California region, MWD would take the lead and activate its Emergency Operation Center (EOC). The EOC coordinates MWD's and the District's responses to the emergency and concentrate efforts to ensure the system can begin distributing potable water in a timely manner.

If circumstances render the southern California's aqueducts to be out of service, MWD's Diamond Valley Lake can provide emergency storage supplies for its entire service area's firm demand for up to six months. With few exceptions, MWD can deliver this emergency supply throughout its service area via gravity, thereby eliminating dependence on power sources that could also be disrupted. Furthermore, should additional supplies be needed, MWD also has surface reservoirs and groundwater conjunctive use storage accounts that can be drawn upon to meet additional demands. The WSDM plan guides MWD's management of available supplies and resources during an emergency to minimize the impacts of a catastrophic event.

Locally, the District has the Member Agency Response System (MARS) to immediately contact its customer agencies and MWD during an emergency about potential interruption of services and the coordination of critical resources to respond to the emergency, also known as mutual aid. The MARS is a radio communication system developed by MWD and its member agencies to provide an alternative means of communication in extreme circumstances. The District is currently in the process of enhancing its communication system in order to provide a more rapid response.

Water Quality

This section discusses the Water Quality within West Basin's service area

5.1 Overview

Compliance with water quality regulations within West Basin's service area is a critical water management activity. MWD is responsible for complying with State and Federal drinking water regulations on its imported 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.

For groundwater quality, West Basin assists retail agencies in its service area in meeting drinking water standards through its *Cooperative Basin-Wide Title 22 Groundwater Quality Monitoring Program*. Title 22 refers to the California Code of Regulations section pertaining to both domestic drinking water and recycled water standards. West Basin offers this program to water agencies for wellhead and reservoir sample collection, water quality testing and reporting services. Sampling is conducted for compliance with the Federal Safe Drinking Water Act and Title 22 regulations. Three agencies in West Basin's service area participate in the monitoring program. Results are compiled in a published annual report called the Consumer Water Quality Report.

The West Basin Water Recycling Plant (WRP), located in El Segundo, processes and distributes water through three distinct treatment trains: Title 22, Barrier, and Boilerfeed. Tertiary recycled water meeting Title 22 standards is used for a wide variety of industrial and irrigation purposes where high-quality, non-potable water is needed. The WRP also produces recycled water to meet the strict standards required for injection into the West Coast Basin Barrier Project to protect the underground aquifer from seawater intrusion. The Boilerfeed treatment process produces high-quality water treated through microfiltration and reverse osmosis for use in oil refinery boiler systems.

5.2 Quality of Existing Water Supplies

Providing a safe drinking water supply to consumers is a task of paramount importance to MWD and West Basin. All prudent actions are taken to ensure that water delivered throughout the service area meets or surpasses drinking water standards set by the State's primary water quality regulatory agency, the California Department of Health Services (CDHS). MWD is also proactive in its water quality efforts, protecting its water quality interests in the SWP and Colorado River through active participation in the regulatory arena and in treatment processes that provide the highest water quality from both sources.

A number of issues are considered when evaluating alternative water supply options. Of primary consideration is a project's ability to provide a safe, reliable, and cost-effective drinking water supply.

5.2.1 Imported Water

West Basin's imported water comes from the SWP and Colorado River via MWD pipelines and aqueducts. MWD tests its water for microbial, organic, inorganic, and radioactive contaminants as well as pesticides and herbicides. Protection of MWD's water system is a top priority. In coordination with its 26 member agencies, MWD added new security measures in 2001 and continues to upgrade and refine procedures. Changes have included an increase in the number of water quality tests conducted each year (more than 300,000) as well as contingency plans that coordinate with the Homeland Security Office's multicolored tiered risk alert system.[1] MWD also has one of the most advanced laboratories in the country where water quality staff performs tests, collects data, reviews results, prepares reports, and researches other treatment technologies. Although not required, MWD monitors and samples elements that are not regulated but have captured scientific and/or public interest.

MWD has a strong record of identifying those water quality issues that are most concerning and have identified necessary water management strategies to minimize the impact on water supplies. Part of its strategy is to support and be involved in programs that address water quality concerns related to both the SWP and Colorado River supplies. Some of the programs and activities include:

- **CALFED Program** – This program coordinates several SWP water feasibility studies and projects. These include:
  1. A feasibility study on water quality improvement in the California Aqueduct.
  2. The conclusion of feasibility studies and demonstration projects under the Southern California-San Joaquin Regional Water Quality Exchange Project.[2] This exchange project was discussed earlier as a means to convey higher quality water to MWD.
  3. DWR's Municipal Water Quality Investigations Program and the Sacramento River Watershed Program. Both programs address water quality problems in the Bay-Delta and Sacramento River watershed.

- **Delta Improvement Package** – MWD, in conjunction with DWR and the U.S. Geologic Survey, have completed modeling efforts of the Delta to determine if levee modifications at Franks Tract would reduce ocean salinity concentrations in water exported from the Delta. Currently, tidal flows trap high saline water in the track. By constructing levee breach openings and flow control structures, it is believed saline intrusion can be reduced. This would significantly reduce total dissolved solids and bromide concentrations in water from the Delta.

[1] MWD's website, www.mwdh2o.com/mwdh2o/pages/yourwater/2005_report/protect_02.html
[2] The MWD Water District of Southern California, Regional Urban Water Management Plan, 2005

- **Source Water Protection** – In 2001, MWD completed a Watershed Sanitary Survey as required by CDHS to examine possible sources of drinking water contamination and identify mitigation measures that can be taken to protect the water at the source. CDHS requires the survey to be completed every five years. MWD also completed a Source Water Assessment (December 2002) to evaluate the vulnerability of water sources to contamination. Water from the Colorado River is considered to be most vulnerable to contamination by recreation, urban/storm water runoff, increasing urbanization in the watershed, wastewater and past industrial practices. Water supplies from SWP are most vulnerable to urban/storm-water runoff, wildlife, agriculture, recreation, and wastewater.[3]

5.2.2 Groundwater

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*. This voluntary program offers water quality testing to purveyors in the service area, funded through an annual assessment. The District's Water Quality staff coordinates a wellhead and reservoir water quality testing at approximately 7 groundwater wells in the service area to ensure high quality of the local supply of drinking water. Under the program, a contract laboratory provides sampling, analytical and reporting services. Laboratory results are reported to the District, retail agencies, and the CDHS. The program helps retail agencies save time and expense while providing a valuable service for public health.

Other services provided under the program are an annual report summarizing water quality throughout the basin, and production of the annual Customer Water Quality report at the purveyor's request. The Customer Water Quality Report is required by State and Federal law. District water quality staff has prepared Annual Consumer Water Quality Reports for several West Basin purveyors for over ten years.

Water Replenishment District Programs

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

Under its Groundwater Quality Program, WRD continually evaluates current and proposed water quality compliance in agency production wells, monitoring wells, and recharge/injection waters of the groundwater basins. 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 monitors and evaluates the impacts of pending drinking water regulations and proposed legislation.

[3] The MWD Water District of Southern California, Regional Urban Water Management Plan, 2005

WRD's Regional Groundwater Monitoring Program consists of a network of about 200 WRD and USGS-installed monitoring wells at 45 locations throughout the District. Monitoring well data is supplemented with information from production wells to capture the most accurate information 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 the District's GIS database and provides the basis to better understand the characteristics of the Central and West Coast Groundwater Basins.

WRD's Safe Drinking Water Program (SDWP) is intended to promote the cleanup of groundwater resources at specific well locations. Through the installation of wellhead treatment facilities at existing production wells, the District hopes to remove contaminants from the underground supply and deliver the extracted water for potable purposes. Projects implemented through the program are accomplished through direct input and coordination with well owners. The current program focuses on the removal of volatile organic compounds (VOCs) and offers financial assistance for the design and equipment of the selected treatment facility.

More information regarding these and other groundwater management programs can be found in the WRD's current Engineering and Survey Report and Regional Groundwater Monitoring Report.

WRD provides extensive information on groundwater quality in both its current Engineering and Survey Report (March 2005) and the Regional Groundwater Monitoring Report (April 2005). Both reports have a section devoted solely to groundwater quality management. The groundwater quality issues facing West Basin customers are summarized in the following sections.

5.2.3 Groundwater Recovery- Saltwater Plume

Although construction of seawater barriers was effective in halting the intrusion of seawater into the WCGB, exiting plumes of brackish water are still trapped behind the barriers. In the early 1990's, West Basin completed the C. Marvin Brewer Desalting facility in the City of Torrance area as a demonstration project for removing and treating brackish water from 2 existing drinking water wells. Enhancements in the Desalter's water supply and water quality in 2005 included the replacement of 2 wells with a new, more productive well. This well will have a design capacity of approx. 1,000 to 1,500 gallons per minute (gpm). This corresponds to approximately 1,600 to 2,400 AFY of saltwater treatment capability.

Since 2002, WRD has been operating the Robert W. Goldsworthy Desalter, located adjacent to West Basin's Brewer Desalter. Product water from the Goldsworthy Desalter is delivered for potable use to the City of Torrance's water distribution system.

5.2.4 Recycled Water

West Basin's WRP, in continuous operation since 1995, has conserved over 48 billion gallons of imported water by serving reliable supplies of recycled water for a wide variety of non-potable uses. The WRP produces five different types of water quality, from irrigation water to ultra-pure water for groundwater injection and industrial boilerfeed. Tertiary treated recycled water meeting California Title 22 regulations is produced for non-potable irrigation use through a conventional treatment process of flocculation, coagulation, filtration and disinfection. Some Title 22 recycled water is further treated in a process called nitrification for use in refinery cooling towers.

Barrier water is high quality recycled water that undergoes lime or microfiltration pretreatment, reverse osmosis and disinfection. The resulting product is higher quality water than the Colorado River or SWP water from Northern California, with one-half the salt concentration of existing groundwater and one-fifth the salt concentration of Colorado River water. This purified water is blended with imported potable water from MWD before being injected into a series of wells that act as a barrier to protect inland fresh water supplies from sea water intrusion. Upgraded treatment facilities are being constructed that will improve the barrier water product quality, including state-of-the-art microfiltration, and disinfection with ultraviolet (UV) and hydrogen peroxide.

The last two water quality types are treated with microfiltration and reverse osmosis to an ultra-pure quality for use in refinery boiler feed. More information on West Basin's water recycling efforts is included in Section 8 of this Plan.

5.2.5 West Coast Barrier Monitoring Well

The Barrier Monitoring Well will be completed in June 2005. This well will monitor the quality of the groundwater down-gradient of the barrier. West Basin is committed to monitoring and maintaining the high quality of the seawater barrier and surrounding groundwater from migrating contamination sources. The monitoring well will be essential in providing critical water quality data for the surrounding groundwater. The well is located within a three to six-month groundwater travel time from the barrier injection wells. This will serve as a first line of monitoring the blended water quality.

5.2.6 Ocean Water Desalination

West Basin's Desalination Pilot Project (Pilot Project) marked the first use of microfiltration as a pretreatment to reverse osmosis for ocean water desalination. The goal was two-fold: 1) identify optimal performance conditions and 2) evaluate the water quality. The research findings would then be shared with the rest of the industry on the suitability of microfiltration/ reverse osmosis technology for producing potable water from ocean water.

Since it first began operation, West Basin has identified the optimal operating parameters for desalination and will continue with the research, focusing primarily on water quality. Along with 500 analytical tests performed monthly, additional water quality studies will be completed under the auspices of the American Water Works Association Research Foundation (AWWARF). The Pilot Project's analytical test results indicate that the quality of the desalinated ocean water meets current State and Federal drinking water standards set by the CDHS and the EPA. West Basin's plan for the future is a full-scale desalination plant capable of providing 20,000 AFY of potable water, enough to supply 40,000 families (of four) for a year. More information on West Basin's ocean water desalination efforts is included in Section 9 of this Plan.

5.3 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, pressure, and supply are maintained through operational practices that can include wellhead treatment for contaminated groundwater sources, or blending down contaminated groundwater with purchased imported surface water from MWD or high quality groundwater from adjacent purveyors.

5.4 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's confidence, which can be very 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.

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.

Water Conservation

This section discusses the Water Conservation efforts within West Basin's service area

6.1 Overview

Since the drought of the 1990's, West Basin has been a leader implementing aggressive water conservation programs to help limit water demand in its service area. District 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 the plumbing and building codes, have resulted in significant reductions in retail water use within West Basin's service area. By current estimates, demand management conservation saves over 4.5 billion gallons of imported water every year. This represents the average water use of almost 30,000 families (of four) in southern California.

West Basin's conservation programs are made up of a wide array of cost-effective programs that contribute to conserving water, improving water quality, reducing imported water needs and increasing the region's water supply reliability.

West Basin prides itself in the partnerships it has created with Federal, State, and local entities to offer these programs. By developing integrated programs with its partners, West Basin has been able to leverage funding and resources to provide effective programs throughout its region.

Water Conservation is made of two main elements: *Active* and *Passive*. Below is a brief description of these two.

Active Conservation: Water savings produced from incentive based programs: Rebates, Giveaways, Retrofits, etc.

***Passive Conservation*:** Water savings produced from building and plumbing codes, consumer behavioral changes, and price responses.

This section will present the past and current water conservation efforts West Basin has undertaken since 1990. In addition, this section provides a detailed analysis of West Basin's water conservation programs, implemented in accordance with the California Urban Water Conservation Council's (CUWCC) recommended Best Management Practices (BMPs), followed by a brief description of West Basin's upcoming conservation efforts and its Conservation Master Plan to promote additional water savings for the service area by the year 2030.

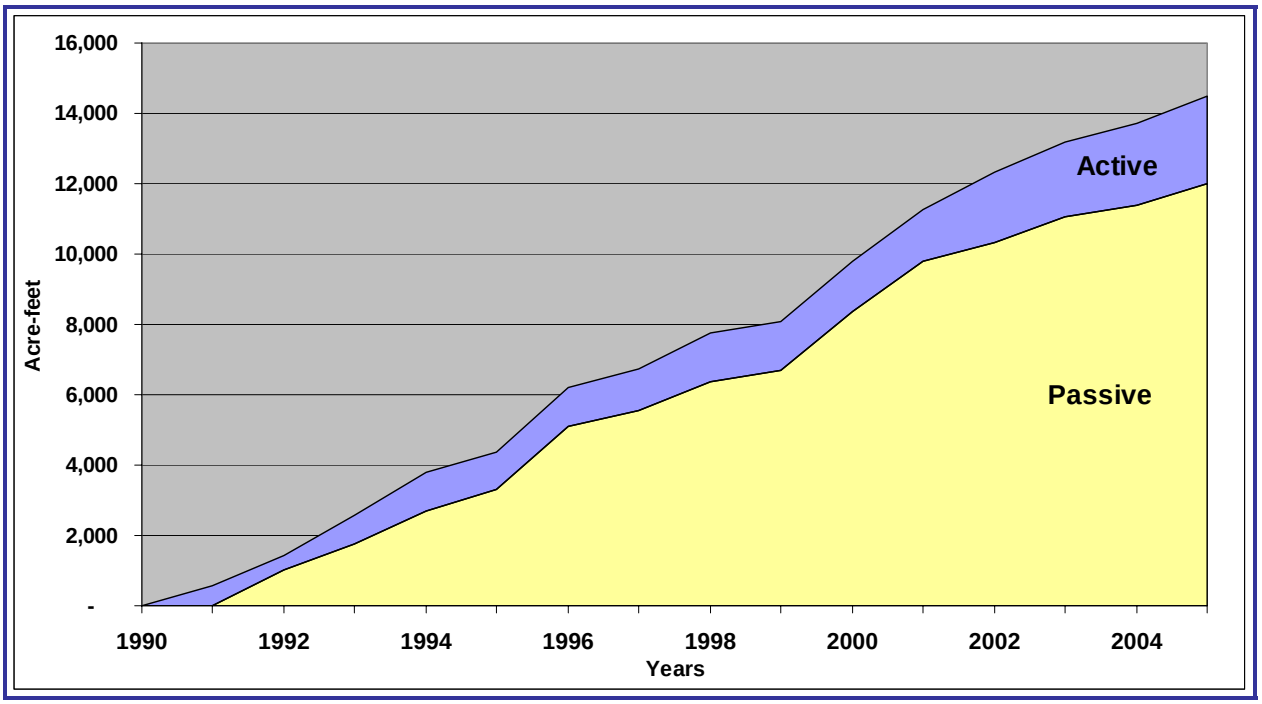
6.2 West Basin's Past and Current Water Conservation Efforts

Today, West Basin's conservation programs are made up of a wide array of cost-effective programs, which include:

- **Zero Water Consumption Urinal Program**
- **Ultra Low Flush Toilets**
- **High Efficiency Clothes Washer Rebate Program**
- **Commercial, Industrial, and Institutional Rebates**
- **Commercial Clothes Washers**
- **Water brooms**
- **Cooling Towers Conductivity controllers**
- **Pre-rinse spray nozzles**
- **X-ray machine Recirculating devices**
- **Landscape Conservation Programs**
- **Weather Based Irrigation Controller**
- **Landscape Classes**
- **School Education Programs**
- **Public Outreach**

It is estimated that West Basin has distributed and installed over 274,000 devices from 1990 to 2003. As a result, it is estimated that West Basin currently saves, from active and passive conservation combined, over 14,500 AF (4.7 billion gallons), or 7 percent annually, of West Basin's total water demand. The total cumulative savings since 1990 is over 116,000 AF.

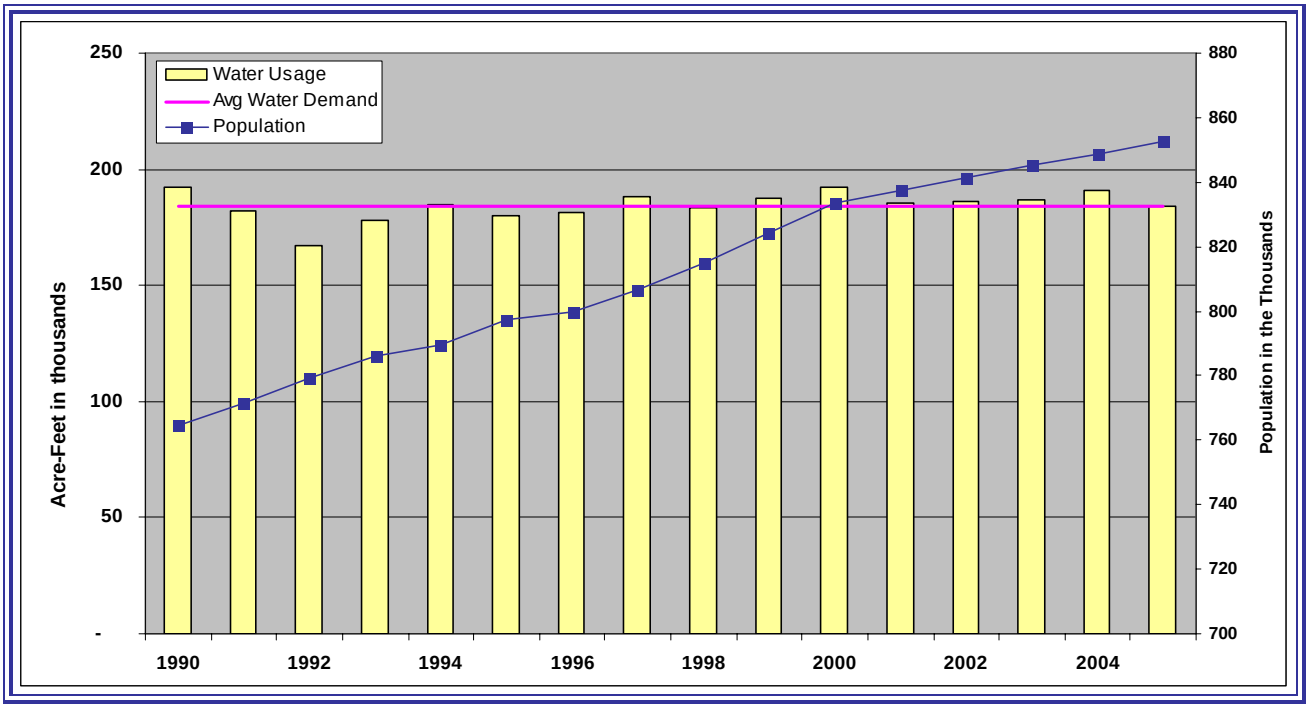
Figure 6-1
West Basin Conservation Water Savings
From 1990 to 2005



Source: Estimated total water savings from conservation from MWD-MAIN Model 2004.

Conservation savings can further be verified by comparing West Basin's water usage versus population. As shown in Figure 6-2, water usage has remained relatively consistent while population has escalated an average of 1% annually.

Figure 6-2
Total Retail Water Demand vs. Population Growth
From 1990 to 2005



Source: Information based on MWD Demographic Data, 2005.
Note: The total retail demand does not include replenishment sale i.e. Barrier Sales - RW & Imported

6.2.1 Metropolitan Water District's Conservation Goal

MWD, in adopting its 2004 IRP Update, is committed to an aggressive water conservation goal. MWD's IRP Update set water supply targets for southern California through 2025, which includes a conservation target of 1.1 MAF over the next 20 years. MWD's strategy and approach for meeting the conservation targets is outlined in a "Conservation Strategy Plan." The Strategy Plan emphasizes three main areas of incentive based conservation: Residential, Landscape, and Commercial, Industrial & Institutional (CII), and provides Board policy guidelines and action plans for the implementation of conservation under MWD's Conservation Credit Program.

6.3 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 14 BMPs.

West Basin was one of the first urban water suppliers to become signatory to the CUWCC's MOU. In addition, West Basin has submitted a *Best Management Practices Wholesaler Water Agency Report* to the CUWCC every other year that details West Basin's progress in implementing the 14 BMPs as currently specified in the MOU. In Appendix F, the District has attached its 2003-04 CUWCC Report.

The BMPs are becoming increasingly important as benchmarks of agency conservation efforts throughout the State. This UWMP, for example, requires agencies that are not members of the CUWCC to describe current and future implementation efforts for all 14 BMPs (referred to as Demand Management Measures, or DMMs). Eligibility for grant funding from State agencies, such as DWR, is now contingent upon satisfactory completion of the urban water management plans, and the conservation reporting within them.

6.3.1 Best Management Practices (BMPs)

The BMP's are a list of recommended conservation measures that have been proven to provide reliable savings to a given urban area. There are currently 14 BMPs that a signatory member is committed to implement. Table 6-1 lists the 14 existing BMPs.

Table 6-1
List of Best Management Practices for
California Urban Water Conservation Council

1. Residential Water Surveys *Indoor and outdoor audits of residential water use and distribution of water-saving devices*
2. Residential Plumbing Retrofits *Distribution or installation of water-saving devices in pre-1992 residences*
3. System Water Audits *Unaccounted for water calculated annually, and distribution system audits as required*
4. Metering with Commodity Rates *Metering of consumption and billing by volume*
5. Large-Landscape Conservation *ET-based water budget for large landscape irrigators*
6. High Efficiency Clothes Washers *Rebates for efficient washing machines*
7. Public Information *Public information to promote water conservation*
8. School Education *Provision of education materials and services to schools*

9. Commercial, Industrial, and Institutional Conservation (CII) *Programs to increase water use efficiency in CII sectors*
10. Wholesale Agency Assistance *Support by wholesalers for conservation programs of retail water suppliers*
11. Conservation Pricing *Uniform or increasing block rate structure, volume related water charges, and service cost recovery*
12. Conservation Coordinator *Designation of staff coordination of agency conservation programs*
13. Water Waste Prohibition *Enforced prohibition of wasteful use of water*
14. Residential Ultra-Low Flush Toilet Replacement *Programs promoting replacement of high-water-using toilets with ultra-low flush toilets*

As a signatory to the MOU, West Basin currently implements the wholesaler BMPs, which are BMPs #3, 7, 8, 10, 11, and 12. Although only certain BMPs apply to a wholesaler, West Basin also provides additional support to its cities and water retailers (customers) through BMP #10. As a water wholesaler representing 17 cities throughout the South Bay, West Basin also supports its customers with BMPs #5, 6, 9, and 14. In order to enhance the programs, West Basin offers partnership opportunities to its customers who can add additional funding and resources in order to increase the size of the programs or rebates, which increases participation and water savings.

6.4 West Basin's Conservation Programs

West Basin's mission is to ensure a safe, reliable supply of water to its service area. Since the drought of the early 1990s, West Basin has strived to expand its role in water use efficiency. Not only is water conservation and education a method for public outreach, but an essential part of West Basin's water resources portfolio to drought-proof the region.

Although West Basin is required to meet only the wholesaler BMPs, West Basin is committed to assisting its customer agencies with their conservation efforts. Described below are West Basin's efforts in each of the 14 BMPs.

6.4.1 BMP #1 - Water Survey Programs for Single-Family Residential and Multi-Family Customers

Residential surveys look to all the water using devices inside the home such as toilets, faucets, and showerheads. A trained surveyor checks for leaks and tests the flow indoors and outdoors. Once the survey is completed, recommendations are provided

for retrofitting certain water use devices, and educational materials are also supplied to the resident.

Because West Basin is a water wholesaler and does not have direct access to single or multi-family customer account data, West Basin can only provide support to the water retailers. MWD currently provides funding for residential survey devices, and if requested, West Basin will act as the liaison to MWD and provide retailers with funding available through MWD. It is anticipated that West Basin will review the market strategy for promoting residential water use surveys within the Conservation Master Plan.

Residential surveys provide cities and water retailers with a great opportunity to provide their customers with a program that offers customer outreach opportunities.

6.4.2 BMP #2 - Residential Plumbing Retrofit

This BMP recommends the distribution and retrofit of low-flow showerheads, ultra-low flush toilets, and faucet aerators, as well as the adoption of enforceable ordinances.

Since 1990, it is estimated that West Basin has distributed the following number of faucet aerators and low-flow showerheads.

Table 6-2
Residential Plumbing Retrofit Devices

Devices	1990-2000		2000-2005		Total	
	# units	AF	# units	AF	# units	AF
Faucet Aerators	954	3	0	0	954	3
Low-flow Showerheads	215,563	1,014	7,500	35	223,063	1,049

6.4.3 BMP #3 - System Water Audits, Leak Detection, and Repair

In 1996, West Basin and its sister agency, Central Basin Municipal Water District, partnered with the United States Bureau of Reclamation (USBR) and hired a consultant to develop and provide a Water Audit and Leak Detection Program (Program). The Program was offered to 40 water purveyors. Of the 40, 10 participated in the audit, and of the 10, only three agencies found their unaccounted for water to be above 10%.

According to BMP #3, water retailers shall complete an annual pre-screening system audit of its potable water system to determine the need for a full-scale system audit. This BMP is geared more towards a water retailer, but West Basin has provided support in the past. As part of its Conservation Master Plan, West Basin will seek input from its water retailers regarding support for this program.

6.4.4 BMP #4 - Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Since West Basin is a water wholesaler, this BMP does not directly apply. However, every water agency within West Basin's service area bills their retail customers according to meter consumption. This BMP requires that agencies identify intra- and inter-agency disincentives and barriers to retrofitting mixed use commercial accounts with dedicated landscape meters and conduct a feasibility study to assess the merits of a program that provides incentives to switch mixed use accounts to dedicated landscape meters.

By encouraging the installation of dedicated landscape meters, agencies will be able to recommend the appropriate irrigation schedules through future landscape programs.

6.4.5 BMP #5 - Large Landscape Conservation Programs and Incentives

Despite the urbanization of southern California, the region is dotted with large turf areas that require year-round irrigation to keep them green. Large turf areas include city and county parks, golf courses, schools, cemeteries, and street medians. West Basin is reducing demand for imported water for irrigation purposes by providing recycled water in its service area. Virtually anywhere potable water is used to irrigate, recycled water can, and should, replace it. However, in areas where recycled water is not available, West Basin provides other programs to conserve water. Below is a list of the programs West Basin is currently implementing.

Irrigation Controller Programs

In 2004, MWD was awarded a Proposition 13 grant for a new Weather-Based Irrigation Controller (WBIC) Program. MWD and its member agencies developed a Project Advisory Committee (PAC) to work on developing the program, which includes marketing, reporting, databasing, and implementing. MWD allocated a limited amount of funding to each member agency for this program. West Basin has been working with the PAC to develop the program. West Basin recognizes the water savings potential and is beginning to test weather-based irrigation controllers in sites that use potable imported water. The plan is to use the new controllers in areas where recycled water is unavailable. The funding incentives provided vary based on the number of stations and acreage at each site. The funding is used to help pay for the hardware and to help motivate cities, parks, and schools to participate in the program.

Protector Del Agua Irrigation Program

West Basin also partners with MWD on the "Protector Del Agua" or "Protector of Water" landscape classes. In partnership with cities, classes are offered to residents as a way to teach them about various topics that help conserve water and reduce urban runoff. Residents learn about gardening with native plants and using weather-based irrigation controllers to conserve water and reduce runoff.

Over 50% of the potable water in southern California is used for maintaining landscaping; therefore, offering these classes is an ideal way to reduce outdoor water use and waste. By educating the public on properly maintaining the irrigation system, trouble-shooting problems, such as over-watering, that are simple yet difficult to address, can be solved without spending additional funding.

Ocean Friendly Gardens

Also in 2005, West Basin formed a partnership with the Surfrider Foundation to develop "Ocean Friendly Garden" workshops and demonstration gardens. West Basin took the lead in applying for a State grant to help finance the classes. The classes focus on planting "ocean friendly plants" and installing weather-based irrigation controllers as a way to reduce urban runoff that finds its way to the local waterways and the ocean. The installation of water efficient plants and efficient sprinkler controllers can conserve between 20%-50% water and reduce runoff by up to 70%.

6.4.6 BMP #6 - High-Efficiency Washing Machine Rebate Programs

Beginning in 1999, West Basin participated with MWD in a pilot program with Southern California Edison (Edison) to offer rebates to residents who replaced their existing clothes washer with a high efficiency model. The rebate from Edison varied according to the model purchased (which was tied into the total energy savings), but the amount offered by West Basin and MWD at the time was capped at $35 per washer. That pilot program ended in September 1999.

In 2003, West Basin again partnered with MWD on a new program. MWD received funding from CALFED and provided a higher rebate incentive. West Basin developed the program and offered residents a $100 rebate.

The CALFED portion of the funding expired, but the program was so successful that, at the request of the MWD member agencies, MWD continued to provide funding at the current level. The High-Efficiency Clothes Washer (HECW) Program has exceeded all expectations and continues to be one of West Basin's more successful programs. When the HECW's first hit the market, they were quite expensive; but market demand has helped to drive the price down. The new HECW's cost twice as much as regular inefficient models, but by providing a $100 rebate (along with other utility/store incentives), consumers are purchasing the new HECW's. In addition to saving 50% water, the HECW's also have other benefits: they save 60% electricity and use less detergent. Consumer acceptance has been very positive.

In 2004, the MWD Board of Directors, along with the support of West Basin, approved additional funding to continue the program through 2005. At the same time, MWD applied for Proposition 50 funding in an effort to maintain the program at the higher incentive level through 2006. MWD was successful in its Prop. 50 application and was awarded roughly $1.6 Million from the California Department of Water Resources for the

High-Efficiency Clothes Washer Rebate Program. This funding will allow MWD and West Basin to continue offering its $100 rebate to residents in an effort to encourage the purchase of high-efficient clothes washers with a Water Factor (WF) of 6.0 or less.

The Water Factor of a clothes washer can range from 13.5 to 3.6, with the lower number being more efficient. A complete list of qualifying washers can be obtained at MWD's web site, www.bewaterwise.com, or by calling the District's program vendor at, 1-800-442-0467.

In 2003, the Governor of California signed Assembly Bill 1561 that would require clothes washer manufacturers to only manufacture and provide residential washers with a WF of 8.5 in 2007 and 6.0 by 2010. The legislation was adopted by the California Energy Commission and was submitted to the Federal Government for approval. The Federal Government must approve this legislation before the new standards can be applied. This process is anticipated to take 1 – 2 years.

As long as funding is available, MWD and West Basin will continue offering its $100 rebate to residential customers for clothes washers with a WF of 6.0 or less. Table 6-3 illustrates the number of rebates West Basin has distributed over the past two years.

Table 6-3
High-Efficiency Washing Machine

	2003	2004	Total
$ per Rebate	$100	$100	$100
# of Rebates	104	602	706
Water Savings (AF)	1.6	9.4	11

In an effort to continue the successful washer rebate program, MWD along with its member agencies, applied for and received Proposition 50 funding from DWR in the amount of $1,660,000. This funding will allow West Basin to continue its program through 2006.

6.4.7 BMP #7 - Public Information Programs

"Public information" is a very broad term with various meanings. Since West Basin operates a strong outreach program, public information about West Basin and its mission, programs and events are constantly disseminated to many interested parties. The method by which the public receives this information is important.

- The first significant method is the Public Information Committee (PIC), formed several years ago. The Committee is made up of Public Information and Public Affairs Officers from cities and water agencies within West Basin's service area. The purpose is to share information on a variety of topics that would be of interest to customers.

- West Basin, in cooperation with MWD, also provides inspection tours of the Colorado River Aqueduct and the State Water Project to legislators, local elected officials, retail agency staff, and the general public on various dates throughout the year. The purpose of the three-day trips is to give local decision-makers a better understanding and appreciation of the water supply throughout the State.

- West Basin, through its Speaker's Bureau, provides speakers to local community groups, service clubs, and schools when requested. In addition, West Basin operates a very successful and aggressive school education program that promotes the importance of conservation and recycled water.

- In October 1999, West Basin began its first annual "Water Harvest Festival" located at the West Basin Water Recycling Plant in El Segundo. West Basin invites children and their parents to participate in a variety of games and to obtain information on water recycling and conservation.

- West Basin is also active in the California Water Awareness Campaign (CWAC), which is an association formed several years ago to coordinate efforts throughout the State during "May is Water Awareness Month." With this effort, water agencies throughout the State, large and small, can tap into a large pool of knowledge and materials to promote a water awareness message not only in May, but throughout the year.

- West Basin maintains a strong link with the local news media through press releases on important subjects and periodic meetings with newspaper editorial boards.

6.4.8 BMP #8 - School Education Programs

Water and environmental education continue to be critical components of West Basin's outreach strategy. Therefore, West Basin offers a variety of elementary through high school programs free of charge to all schools within its service area. The following is a list of West Basin's current and future education programs. Descriptions of each program can be found in Section 6.5.

- Planet Protector Water Explorations
- Think Earth It's Magic
- Conservation Connection
- Think Earth Curriculum Kits
- Water Awareness Month Poster Contest
- Water Wanderings: A Journey Through Water
- SEWER SCIENCE

6.4.9 BMP #9 - Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

West Basin, in partnership with MWD, participates in MWD's region-wide CII rebate program. West Basin helps promote these rebates to the businesses, schools and facilities throughout its service area. Rebates are offered for commercial clothes washers, waterbrooms, cooling tower conductivity controllers, pre-rinse spray nozzles, x-ray machine recirculating devices and commercial toilets and urinals.

In 2002, the CUWCC pursued and received a $2.3 million grant from the California Public Utilities Commission (CPUC) to purchase and install restaurant pre-rinse spray nozzle valves. The new nozzles use 1.6 gpm compared to 2 to 6 gpm valves. These valves conserve water, heating costs, and reduce waste-water discharge. West Basin supported CUWCC's efforts in marketing the program. The nozzles and installations were provided free of charge to the food services sector.

In 2005, West Basin entered into a 10-year agreement with MWD to help support the on-going regional marketing efforts of the CII rebate program. As a way to increase the success of this program, West Basin offers its cities and water purveyors with partnering opportunities to increase the rebate amounts. Over the years, agencies have partnered to provide higher rebate incentives in an effort to increase program participation of their customers.

6.4.10 BMP #10 - Wholesale Agency Programs

The programs provided by West Basin are done in partnership with and benefit the following retail water agencies that are located within the 17 cities serviced by West Basin: 1) California American Water Company 2) California Water Service Company 3) City of El Segundo 4) City of Inglewood 5) City of Lomita 6) Los Angeles County Water Works #29 7) City of Manhattan Beach, and 8) Southern California Water Company.

Among the 14 BMPs West Basin provides assistance for are:

- **BMP #3 - System Audits**
- **BMP #5 - Landscape Programs**
- **BMP #6 - Washing Machines**
- **BMP #7 - Public Information**
- **BMP #8 - School Education**
- **BMP #9 - CII Rebates**
- **BMP #10 - Wholesaler Incentives**
- **BMP #12 - Water Conservation Coordinator**
- **BMP #14 - ULFT Replacement**

Since 2000, West Basin has acquired more than $1 million from State and local grant funding sources for program development and implementation. Furthermore, West Basin markets, designs and implements a majority of the BMPs within its service area. West Basin has also invested over $1 million to provide conservation programs that help increase water supply reliability for the region.

West Basin plans on expanding its conservation programs and the support it provides to cities and water retailers in their conservation program efforts.

6.4.11 BMP #11 - Conservation Pricing

In 2003, West Basin passed-through MWD's two-tiered rate structure to its customer agencies to promote water conservation and regional water supply reliability. This rate structure called for customer agencies, in coordination with West Basin, to develop a reasonable budget for their Tier 1 annual maximum limit for imported water. Through voluntary purchase agreements, these customers will pay a higher price (Tier 2) for purchases that exceed their Tier 1 allotment.

To help assist agencies from exceeding their Tier 1 allocation limits, West Basin works with agencies to enhance conservation, education and expand recycled water use.

6.4.12 BMP #12 - Water Conservation Coordinator

As the regional wholesaler, West Basin has a full time water conservation coordinator who not only promotes West Basin's conservation programs and devices but also works with cities and water agencies to enhance their conservation efforts. This close collaboration between West Basin's conservation coordinator and the customer agencies' staff provides for a successful execution of the BMPs. In addition, West Basin's conservation coordinator represents the service area at regional and statewide workshops and organizations.

West Basin's conservation coordinator also seeks Federal, State, and local funding to develop new programs that cities and water purveyors can partner on and provide additional benefits to the end-users.

6.4.13 BMP #13 - Water Waste Prohibition

West Basin encourages its customer agencies to adopt water waste prohibition ordinances. West Basin can also assist local cities and agencies in the development of ordinances that will reduce water wasting in the area.

6.4.14 BMP #14 - Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs

One of West Basin's more successful programs has been its free ULFT distribution program. Since 1991, West Basin has provided over 80,000 ULFTs to the public "free of charge" in an effort to conserve water. These devices have proven water savings and have contributed to the overall water reduction over the years.

In 2004, West Basin partnered with MWD on a joint-project to identify the existing opportunity within West Basin's service area for this device. Data shows that there are still many inefficient toilets that need to be replaced. Within West Basin, there is a 30% - 40% saturation level in many of its cities. The saturation levels and program performance will continue to be evaluated. For the time being, West Basin plans on continuing to provide ULFTs and rebates as long as funding is available, programs

continue to be cost-effective, and a significant saturation level has not been met. Due to the large areas of high density and numerous multi-family facilities, there are still many older toilets that need replacing. West Basin will continue to partner with cities and water purveyors in order to implement these programs. In addition, West Basin will continue to offer its $50 rebate for the purchase and installation of ULFTs.

West Basin also provides a $70 rebate for the purchase and installation of dual-flush toilets. These new toilets have the capability of flushing at either 0.8 gallons for liquids and 1.6 gallons for solids; they average 1 gallon per flush. Also, new 1 gallon per flush High-Efficiency Toilets (HET) are beginning to enter the market place. Advances in technology continue to create new conservation devices that are more water efficient than today's products.

Tables 6-4 and 6-5 illustrate the ULFT Rebate Program and the ULFT Replacement Program for the last five years.

Table 6-4
ULFT Rebate Program

	2000	2001	2002	2003	2004	Total
$ per Rebate	$50	$50	$50	$50	$50	n/a
# of Rebates	564	564	377	736	581	2,822
Water Savings (AF)	16	16	10	21	16	79

Table 6-5
ULFT Replacement Program (Free ULFT Distribution to the Public)

	2000	2001	2002	2003	2004	Total
# of Devices	4,234	2,946	2,214	2,234	1,544	13,172
Water Savings (AF)	123	85	64	65	44	381

6.4.15 Additional Conservation Programs

West Basin is very active in working with MWD to develop new conservation programs that are included in the CUWCC BMPs. In 2005, MWD implemented several new programs that West Basin supports, including:

Synthetic Turf Program

MWD, in partnership with the USBR, developed and provided funding to test the effectiveness of using synthetic turf. West Basin helped promote the program by issuing press releases and forwarding information to cities, water purveyors, non-profit organizations and others.

City Makeover Program

West Basin continues to support MWD's City Makeover Program. Through a competitive application process, MWD provides funding for development of new water efficient landscapes that promote California native plants and water efficient techniques. More information about this program can be found on MWD's web site; www.mwdh2o.com.

Community Partnering Program

MWD, in cooperation with the Member Agencies, accepts applications from non-profit organizations and public agencies that promote discussions and educational activities for regional water quality, conservation and reliability issues. This program provides support for the following types of programs:

- after-school water education
- community water festivals
- watershed education outreach
- environmental museum exhibits
- library water resources education book drives
- public policy water conferences
- other projects that directly support water conservation or water quality education

6.5 Current and Future Education Programs

6.5.1 CURRENT PROGRAMS

Planet Protector Water Explorations

Now in its tenth year of operation, *Planet Protector Water Explorations* is a collaborative water education field trip program between West Basin and the Roundhouse Marine Research Station and Aquarium in Manhattan Beach. The Roundhouse is operated by Oceanographic Teaching Stations, a non-profit organization, and is affiliated with the Los Angeles County Office of Education.

The objectives of *Planet Protector Water Explorations* are:

1. To increase the awareness of water as a valuable and limited resource.
2. To encourage water conservation efforts.
3. To introduce the concept of water recycling.
4. To introduce the concept of ocean water desalination.
5. To increase the awareness of urban runoff pollution.
6. To teach about local marine life.
7. To promote the concept of stewardship of the environment and its resources.

By the end of the 2004-2005 school year, over 25,000 students will have experienced *Planet Protector Water Explorations*, since the program began in September 1995. Table 6-6 displays the number of students that have been educated through the *Planet Protector Water Exploration* program from fiscal year 2000-01 to fiscal year 2004-05. Beginning in fiscal year 2004-05, additional programs have become available to students, therefore increasing the number of students that become educated.

Table 6-6
School Education Program
(Number of Students)

Grade Level	FY 2000-01	FY 2001-02	FY 2002-03	FY 2003-04	FY 2004-05[1]	Total
Grades K-3rd	240	250	480	690	1,014[2]	2,674
Grades 4th-6th	350	575	450	690	1,632	3,697
Grades 7th-8th	70	36	150	120	876	1,252
High School	0	70	30	30	174	304
Total	**660**	**931**	**1,110**	**1,530**	**3,696**	**7,927**

[1] Program includes *Planet Protector Water Exploration* in addition to *Think Earth It's Magic*, *Conservation Connection*, and Think Earth curriculum kits for Fiscal Year 2004-05 only.
[2] Only third graders participate in this program.

Think Earth It's Magic

Through West Basin's membership as part of the Think Earth Environmental Education Foundation, *Think Earth It's Magic* is a collaborative program between West Basin, Los Angeles County Sanitation Districts, and MWD. *Think Earth It's Magic* combines Think Earth's award winning environmental education curriculum, which is designed to promote conservation behaviors and stewardship of the environment, with an environmental magic show that cleverly ties together what students learn in the classroom. By the end of the 2004-2005 school year over 500 elementary school students will have participated in *Think Earth It's Magic*.

Conservation Connection

We turn on the tap and water flows out. We turn on a lamp and light fills the room. We depend on water and energy. We need water and energy to live in this world. But where do we get the water and energy that we use? And will we always have enough to meet our needs?

Conservation Connection answers those questions, showing the connections between California, our water and energy supply, and us. But providing information is only part of *Conservation Connection*. The goal of the curriculum is to get students actively involved – in their homes and at school – in conserving water and energy. Within the program, students have the opportunity to: survey

their family's water and energy use, and survey water and energy use at their school.

After gathering data, analyzing their findings, and reviewing recommendations, students make, implement, and monitor plans to decrease water and energy use. By participating in this action-based curriculum, students will learn to look critically at important environmental issues and take responsibility for finding solutions. By the end of the 2004-2005 school year over 500 middle school students will have participated in *Conservation Connection*.

Think Earth Curriculum Kits

Through West Basin's membership as part of the Think Earth Environmental Education Foundation, all teachers that participate in *Planet Protector Water Explorations* receive a grade appropriate *Think Earth* curriculum unit. *Think Earth* units are usually distributed each March, so that teachers have them prior to Earth Day in April. Each *Think Earth* unit contains a video, two color posters, a teacher's guide, and student booklets. The entire *Think Earth* curriculum is correlated to the California State Content Standards for the following content areas: Language Arts, Science, Social Science, and Mathematics. Over the past ten years over 25,000 students within West Basin's service area have participated in *Think Earth*.

Water Awareness Month Poster Contest

All teachers who have or will participate in *Planet Protector Water Explorations* are notified each February, which provide enough time to allow students to participate in the 2005 "Water Is Life" Poster Contest, which is sponsored by West Basin and MWD each May. In addition, all teachers at each of West Basin's primary and secondary schools will also be notified in February. As in previous years, one grand-prize winner is selected and receives a fully-loaded laptop computer during an award ceremony in June. Each grand-prize winner will also have his or her artwork featured in MWD's "Water Is Life" annual calendar. Over the past ten years, more than 25,000 students within West Basin's service area have participated in this program.

6.5.2 FUTURE PROGRAMS

Water Wanderings: A Journey Through Water

Water Wonderings is a collaborative classroom visitation program between West Basin and the S.E.A. Lab in Redondo Beach. This collaborative hands-on classroom program will take fourth graders on a 2 ½-hour journey through California's water. The program will be correlated to many of the fourth grade State standards for social science and science. Included in the program will also be a "touring tide pool," a van outfitted with touch tanks that will enable students

to touch live marine creatures and plants. The Program schedule calls for classes to began in October and last through June for this upcoming fiscal year.

SEWER SCIENCE

Staff is currently exploring the possibility of partnering with the Los Angeles County Sanitation Districts on this exciting high school science program. *Sewer Science* is a hands-on laboratory program that teaches students about wastewater treatment. During a week-long lab, students create wastewater; treat it through the use of tanks employing physical, biological, and chemical methods; and apply analytical procedures to test its quality. *Sewer Science* is correlated to the California State Content Standards for the following high school sciences: chemistry, physics, and microbiology. The Program schedule calls for classes to begin in September 2005 and last through June 2006.

6.6 Funding Partnerships

In addition to partnering with MWD on programs, West Basin continually seeks State funding. In 2004 and 2005, the Department of Water Resources and the State Water Resources Control Board provided funding for programs through various chapters of Proposition 50. As a leader in water conservation, West Basin, in partnership with its cities and water retailers, developed several conservation programs and applied to the State's competitive funding process. As funding is awarded, West Basin works with its cities and water purveyors to provide programs to the local communities.

6.6.1 Proposition 50 Programs

In 2005, West Basin, with support from cities, water retailers, and environmental groups, applied for and received Proposition 50 – Chapter 7 – Water Use Efficiency Grant Funding for a complete Restroom Retrofit Program in the amount of $294,834. This program will provide older commercial, industrial, and institutional facilities that have inefficient devices with a complete restroom retrofit that includes: water-efficient toilets, Waterfree urinals, and infrared sink sensor faucets. The program will also provide funding for installation. This new conservation program will be rolled-out in 2006.

In an effort to conserve water outdoors, West Basin also applied for Proposition 50 – Chapter 8 Funding, under the State's Integrated Regional Water Management Grant Program. West Basin partnered with various cities, water purveyors and stakeholders to develop an integrated approach at developing regional programs. Funding is being sought for the purchase and installation of weather-based irrigation controllers and for the development of "Ocean Friendly Garden" workshops. If successful, West Basin will provide education and devices that will conserve water, reduce urban runoff, reduce imported water, and increase local water supply reliability.

6.7 West Basin's Conservation Master Plan

Water Conservation, along with water recycling, will be used to meet a substantial portion of West Basin's gradually increasing water demands. The goal is to minimize West Basin's need for new imported water sources, and enhance this drought-proof resource that has no environmental impacts and is not subject to weather conditions.

Measures such as tiered water pricing, financial incentives for the installation of ultra-low flush toilets, water efficient washer machines and large landscape irrigation efficiency programs are just some of the ways West Basin provides leadership and results in the conservation arena. Conservation is a key component of West Basin's water resource planning activities and will be implemented to the fullest extent practicable over the long-term.

6.7.1 Water Conservation Master Plan

West Basin is in the process of developing its own specific Conservation Master Plan (Plan) to meet and exceed the goals of the BMPs and MWD's Conservation Strategy Plan. The goal of the Plan is to assess the conservation potential within West Basin's service area and incorporate local stakeholder input into a group of actions and strategies for achieving long-term targets for conservation. The Plan will be launched and completed by the end of the 2005-06 fiscal year.

Water Rates & Charges

This section discusses West Basin's Water Rates & Charges

7.1 Overview

The residential water bill in southern California is most likely the least expensive of a typical household's major utility bills. In fact, tap water can be purchased for much less than a penny per gallon; remarkable, considering investments made by water utilities into regulatory compliance, water use efficiency, infrastructure, and other reliability programs. This paradox applies to West Basin's service area as well, although residential water bills vary from one retail agency to another, agency depending primarily on the mix of source water purchased and/or produced.

Retail agencies that serve exclusively groundwater, for example, tend to have water rates that are lower than those that serve all imported water or a mix of groundwater and imported water. Imported water purchased from West Basin and provided by MWD, carries not only the cost of acquiring importing, purifying (treating) and distributing the commodity throughout the region, but also a long-term action plan for ensuring adequate supplies to meet growing demands through conservation, education, and new locally produced supplies.

7.2 MWD Rate Structure

In 2002, the MWD Board adopted a new rate structure to support its strategic planning vision as a regional provider of services, encourage the development of local supplies like recycled water and conservation, and ensure a reliable supply of imported water. To achieve these objectives, MWD called for voluntary purchase orders from its member agencies, unbundled its water rates, established a tiered supply rate system, and added a capacity charge. In all, these new rate structure components provide a better opportunity for MWD and its member agencies to manage their water supplies and proactively plan for future demands.

7.2.1 Purchase Orders

One of the important changes in the new rate structure was the call for voluntary purchase orders among MWD's member agencies. The Purchase Order is an agreement between MWD and a member agency, whereby the member agency agrees to purchase a minimum amount (60% of their highest year's delivery of non-interruptible water times ten) of non-interruptible water over a ten-year period - "Purchase Commitment." The economic incentive for a Purchase Commitment is that it entitles the member agency to purchase annually a set amount of non-interruptible water (Tier 1

Annual Maximum) at the lower Tier 1 rate, which is 90% of it's highest year's delivery of non-interruptible water.

In the case of West Basin, the highest delivery of non-interruptible water was 174,304 AF in 1990. As shown below in Table 7-1, West Basin's Tier 1 Annual Maximum is 156,874 AF with a Purchase Commitment of 1,045,824 AF by the end of 2013.

Table 7-1
West Basin
Purchase Order Terms

Initial Base Allocation	Tier 1 Annual Maximum (90% of Base)	Purchase Commitment (60% of Base x 10)
174,304 AF	**156,874 AF**	**1,045,824 AF**

Since signing a Purchase Order with MWD, West Basin has remained below its Tier 1 Annual Maximum and has been on track to meet its Purchase Commitment by the year 2013.

7.2.2 Unbundled Rates and Tier 1& 2

To clearly justify the different components of the costs of water on a per acre foot basis, MWD unbundled its full service water rate. Among the components MWD established are:

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 MWD costs associated with developing new supplies, which is 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 MWD's cost of providing incentives to member agencies for conservation, water recycling, groundwater recovery, and other water management programs approved by the MWD Board.

System Power Rate – Recovers MWD's electricity-related costs, such as the pumping of 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 unbundled MWD water rates for calendar year (CY) 2006 are displayed in Table 7-2.

Table 7-2
Metropolitan Water District
Unbundled Water Rate Components
Adopted for 2006

Category of Water	$/AF
Supply Rate Tier 1	$73
Supply Rate Tier 2	$169
System Access Rate	$152
Water Stewardship Rate	$25
System Power Rate	$81
Treatment Surcharge	$122
Total Tier 1 Treated Rate	**$453**
Total Tier 2 Treated Rate	**$549**

7.2.3 Replenishment Service

Although a majority of the MWD water sold is full service at the Tier 1 rate, there is imported water sold at a discounted rate, better known as Replenishment Service Water. This type of water is used for groundwater replenishment. There are two main types of replenishment water – treated and untreated. Because the replenishment water can be interrupted at anytime, MWD has provided a discount to the rates. However, these rates are not tied to the unbundled rate structure illustrated above. These rates are established by MWD to provide the best incentive to replenish the groundwater basins. Replenishment Service rates for 2006 are shown in Table 7-3.

Table 7-3
Metropolitan Water District
Replenishment Service Rate
Adopted for 2006

Category of Water	$/AF
Replenishment Water Rate Untreated	**$238**
Treated Replenishment Water Rate	**$335**

Within West Basin, the only replenishment water sold is the treated replenishment water for customers participating in the West Basin and WRD In-Lieu program.

7.2.4 MWD Capacity Charge

MWD's new rate structure also established a new charge labeled "Capacity Charge." This charge was developed to recover the costs of providing distribution capacity use

during peak summer demands. The aim of this new 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 will result in more efficient utilization of MWD's existing infrastructure and defers capacity expansion costs. Currently, MWD's Capacity Charge for 2006 is set at $6,800/cubic feet per second (cfs).

The Capacity Charge is assessed by multiplying West Basin's maximum usage by the rate. The maximum usage is determined by a member agency's highest daily average usage (per cfs) for the past three summer periods, as shown below for West Basin's maximum usage for 2006 – 260.5 cfs.

Table 7-4
Metropolitan Water District
Capacity Charge for 2006

	Peak Flow 2002	Peak Flow 2003	Peak Flow 2004	3-Year Max
West Basin	256.0 cfs	260.5 cfs	258.5 cfs	260.5 cfs

Note: These peak flows are based upon West Basin's coincident peak of all its MWD connections.

7.2.5 Readiness-to-Serve Charge

The Readiness-to-Serve Charge (RTS) recovers a portion of MWD's debt service costs associated with regional infrastructure improvements. The RTS charge is a fixed charge assessed to each member agency regardless of the amount of imported water delivered in the current year. Rather, it is determined by the member agencies' firm imported deliveries for the past ten years. West Basin meets this obligation through its commodity rates.

7.3 West Basin's Imported Water Rates

As MWD adopted a new rate structure so did West Basin. In 2003, West Basin passed through MWD's Purchase Order by offering customer agencies voluntary purchase agreements and assessing MWD's new Capacity Charge. West Basin also revised the administrative surcharge to be applied uniformly to all classes of imported water sold. Described below are elements of the rate structure that West Basin applies to the delivery of imported water.

7.3.1 Purchase Agreements

In order to meet the Purchase Order commitment with MWD, West Basin established its own purchase contract policy with its customer agencies. West Basin's Imported Water Purchase Agreements mimic the MWD version in terms of an Annual Tier 1 Maximum and Total Purchase Commitment, but offer more flexibility to the customer. West Basin MWD requires only a five-year commitment, as opposed to a ten-year term. Furthermore, customer agencies have the option to adjust their Tier 1 and Purchase

Commitment amounts annually if certain conditions are favorable, and can also reduce their commitment amounts by offsetting imported water demand with recycled water purchased from West Basin. For purchases above the Tier 1 limit, or in the absence of a Purchase Agreement, the customer agency pays the Tier 2 rate (currently $81/AF above the Tier 1 rate).

Every customer agency of West Basin signed an imported water Purchase Agreement.

7.3.2 Administrative Surcharge

One of the main revenue sources for West Basin is the Administrative Surcharge applied to all imported water sold. In 2003, West Basin revised the Administrative Surcharge to be uniformly applied to all imported water regardless of the type delivered. Revenue from the surcharge recovers West Basin's administrative costs including planning, outreach and education, and conservation efforts. As of July 1, 2005, West Basin's Administrative Surcharge is at $32/AF.

7.3.3 Readiness-to-Service Surcharge

As described above, MWD levies to West Basin a RTS charge to recover a portion of its debt service costs. Thus, a RTS surcharge is added to West Basin's commodity rates for Non-interruptible and Barrier water to cover this charge. As of January 1, 2006, West Basin's RTS surcharge will be $60/AF.

7.3.4 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, 2005, the Water Service Charge is $20/cfs of a customer agency's meter capacity for imported water meters.

7.3.5 West Basin's Capacity Charge

This charge, as described in Section 7.2.4, is intended to encourage customers to reduce peak day demands during the summer months, which will result in more efficient utilization of MWD's existing infrastructure. West Basin has passed through this MWD charge to its customer agencies by mimicking MWD's methodology. Each customer's Capacity Charge is determined from their highest daily average usage (per cfs) for the past three summer periods. However, because MWD assesses West Basin on the coincident daily peak of all the connections and aggregate of all its customers' daily peak is the non-coincident peak, West Basin is able to lower the Capacity Charge to its customers from $6,800/cfs to $5,700/cfs.

7.3.6 Desalter Water Charges

West Basin also sells the water produced by the Brewer Desalter at the effective MWD rate. This includes the MWD Non-interruptible base rate and an acre-foot equivalent for the Capacity Charge. Currently, the rate for desalter water is $465/AF.

7.4 Recycled Water Rates

West Basin's recycled water program is one of the largest in southern California, delivering over 28,000 acre-feet of highly treated recycled water to over 180 sites annually. The West Basin Water Recycling Plant in El Segundo provides five different qualities of "designer" water to meet the needs of landscape irrigation, cooling towers, refineries, and industries within the Los Angeles County South Bay region. The WRP also has the potential to expand its delivery up to 100,000 AF of recycled water.

Since 1995, West Basin has encouraged the maximum use of recycled water to industries, cities, and landscape irrigation sites through its water quality and economic incentive of its rates and charges. Below is a description of West Basin's recycled water rates and charges.

7.4.1 Recycled Water Rates

West Basin contains seven different rates for recycled water. Each rate differs because of the treatment quality, power, and location. All rates, however, are assessed to cover the operation and maintenance costs, and labor and power costs associated with the delivery of recycled water. A majority of these rates are set up in a declining tiered structure, so they may further encourage the use of the recycled water, while the others are set up to service one or more customers at a uniform rate.

Most of these rates are set lower than West Basin's imported rates to encourage the usage of recycled water. Only highly treated recycled water deliver to the refineries are set above imported rates. West Basin's recycled water rates for FY 2005-06 are shown in Table 7-5.

Table 7-5
Recycled Water Rates
Fiscal Year 2005-06

Volume (AF/Month)	WBMWD Service Area	West Coast Barrier	Industrial R/O (WB Svc Area)	Nitrified (Ind R/O usage)	Industrial R/O Ultra (WB Svc Area)	Torrance / LADWP Service Areas	Palos Verdes Zone Rate
0-25	$312/AF	$430/AF	$568/AF	$292/AF	$750/AF	$354/AF	$548/AF
25-50	$292/AF	$430/AF	$568/AF	$292/AF	$750/AF	$334/AF	$528/AF
50-100	$272/AF	$430/AF	$568/AF	$292/AF	$750/AF	$314/AF	$508/AF
100-200	$252/AF	$430/AF	$568/AF	$292/AF	$750/AF	$294/AF	$488/AF
200+	$232/AF	$430/AF	$568/AF	$292/AF	$750/AF	$274/AF	$468/AF

The "out of service area" rate is assessed to customers outside of West Basin's service area boundaries, which pay an additional $40/AF per tier. This additional charge is applied to make up for the recycled water standby charge they are not levied on their parcels.

7.4.2 Recycled Water Standby Charge

There is a recycled water standby charge that is levied by West Basin to each parcel within the service area. An average rate of $24 per parcel 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 the Board holds a public hearing where they adopt West Basin's Engineer's Report and Resolution to assess this charge.

7.5 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. Below are discussions of imported and recycled water rate trends over the next ten years.

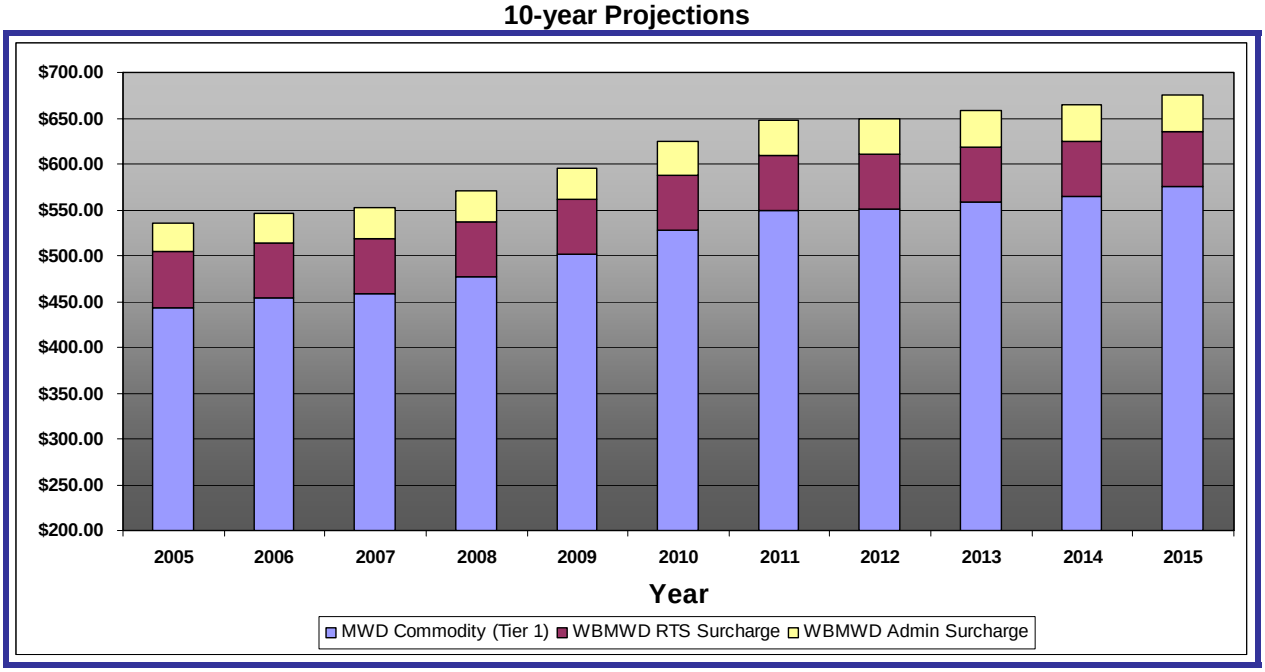
7.5.1 Imported Water Rate Projections

In 2004, the MWD 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 MWD will pursue over the next ten years. According to projected MWD sales, with investments into local resources, MWD estimates imported water rates will increase 4-6% annually.

West Basin's Administrative Surcharge is projected to increase at an annual average rate of 3%-4%. This increase is determined by West Basin's Long Range Financial analysis and the budget's revenue requirements.

Figure 7-1 displays West Basin's imported water rate projections for the next ten years.

Figure 7-1
West Basin Imported Water Rates
10-year Projections



Source: MWD 2004 Long Range Financial Plan & West Basin's Financial Plan.

7.5.2 Recycled Water Rate Projections

Similar to imported water rates, recycled water rates are expected to increase because of 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 by West Basin to increase at a slightly lower level than imported water. The recommended rates are projected to increase for all types of recycled water, by an average of 3% annually. However, these rates may vary depending upon energy and chemical costs.

Water Recycling

This section discusses Water Recycling Efforts within West Basin's service area

8.1 Overview

Recycled water is a cornerstone of West Basin's efforts to augment local supplies and reduce dependence on imported water. Since planning and constructing its recycled water system in the early 1990s, West Basin has become an industry leader in water re-use. Recycled water is used for non-potable applications such as landscape irrigation, commercial and industrial processes, and indirect potable uses such as groundwater replenishment. An additional benefit of West Basin's recycled water is less ocean discharge of treated wastewater into the Santa Monica Bay.

In 2005, West Basin delivered 24,069 AF of recycled water to customer agencies inside and outside its service area. Within West Basin's service area, M&I recycled water totaled 13,065 AF; representing approximately 7% of the District's current total water supplies. According to projections, recycled water sales will represent 17% of the District's total water supplies by the year 2030.

This section will provide an overview of the District's recycled water system, its treatment process at its El Segundo Plant, and a description of its distribution systems. In addition, a description of the District's past, current, and projected sales inside and outside of their service area will be discussed, concluding with a discussion of West Basin's system expansion projects and plans to encourage future recycled water use.

8.2 Recycled Water Sources and Treatment

8.2.1 Source Water

The source of West Basin's recycled water is from the City of Los Angeles's Hyperion Wastewater Treatment Plant (Hyperion). The City of Los Angeles has operated Hyperion, located adjacent to West Basin's service area, since 1894. Initially built as a raw sewage discharge plant into the Santa Monica Bay, it has been upgraded over the years to partial secondary treatment (1950), and most recently to full secondary treatment (1998). Hyperion has a dry weather capacity of 450 mgd for full secondary treatment and an 850 mgd wet weather capacity. Hyperion has a daily influent of 362 mgd, or 405,000 AFY, and secondary treatment capacity of 450 mgd. West Basin recycles approximately 24 mgd, or roughly 7.7 percent of the effluent from Hyperion. Ocean disposal accounts for the balance of the secondary effluent from Hyperion.

West Basin purchases secondary effluent from Hyperion prior to ocean disposal and provides at a minimum tertiary treatment and disinfection to meet applicable Title 22 standards. More advanced treatment is provided according to customer specifications. West Basin treats and distributes recycled water at its Water Recycling Treatment Plant (WRP), located in the city of El Segundo, to customer sites in its service area, as well as to sites in the City of Torrance and to the City of Los Angeles. Figure 8-1 shows the West Basin WRP, located in the City of El Segundo in Los Angeles County.

Figure 8-1
West Basin's Water Recycling Treatment Plant

8.2.2 Treatment Process

The effluent received from Hyperion is limited by the City of Los Angeles' (City) National Pollutant Discharge Elimination System permit. Although the City strives to provide West Basin with a consistent quality of secondary treated wastewater, the WRP has to accommodate inevitable fluctuations in influent quality. Table 8-1 illustrates the amount of historical, current and projected wastewater collected and treated at Hyperion and the amount of recycled water that West Basin treats to Title 22 standards, the minimum treatment standard at the facility. There are other qualities of water that are treated, named "Designer Water," explained in further detail below.

Table 8-1
Wastewater Collected and Treated
AF/Calendar Year

	2000	2005	2010	2015	2020	2025	2030
Wastewater collected & treated in service area[1]	355,000	390,000	425,000	465,000	500,000	535,000	570,000
Quantity that meets recycled water standard[2]	21,900	32,500	48,000	58,100	62,000	66,000	70,000

[1] Data supplied by the Hyperion Wastewater Treatment Plant.
[2] Data supplied by West Basin's Water Recycling Treatment Facility.

Most of West Basin's recycled water undergoes a treatment process to clarify it to quality standards to meet California Code of Regulations Title 22 (Title 22). The level of treatment necessary is approved by the California Department of Health Services (CDHS). Title 22 addresses specific treatment requirements for recycled water and lists approved uses. Approximately 2,000 tests are performed monthly at the West Basin WRP to ensure water quality meets or exceed all State and Federal requirements. West Basin's recycled water program is unique in that it provides a variety of products that are developed at one or more facilities to meet specific customer specifications (hence the nickname "designer water"). In all, West Basin produces five different qualities of recycled water:

- *Disinfected Tertiary Water* - Tertiary recycled water is treated secondary water from Hyperion that undergoes coagulation, flocculation, filtration and disinfection to meet Title 22 standards. Tertiary water can be used for a wide variety of industrial and irrigative purposes where high-quality, non-potable water is needed.

- *Nitrified Water* - Nitrified recycled water is tertiary treated water that has been nitrified to remove ammonia, which can be corrosive to pipe material. This water is used in industrial cooling towers.

- *Softened Reverse Osmosis Water* - Softened reverse osmosis water is secondary treated water from Hyperion that has been pretreated with microfiltration and lime softeners and then treated with reverse osmosis. The water is softened because it can be corrosive to pipe material. This water is used in the seawater barrier to protect the South Bay's coastal groundwater reservoirs against saltwater intrusion from the Pacific Ocean and to replenish the groundwater supplies. Softened reverse osmosis water is superior to State and Federal drinking water standards. West Basin is currently undergoing a major capital project to add both ultraviolet light as well as advanced oxidation to the barrier system, further ensuring the quality of this water and making it the most advanced water treatment facility in the world for recycled water.

- *Pure Reverse Osmosis* - Pure reverse osmosis water is secondary treated water from Hyperion that has been pretreated with microfiltration and further treated with reverse osmosis. This water is used for low pressure boilerfeed water for large scale industrial sites such as refineries.

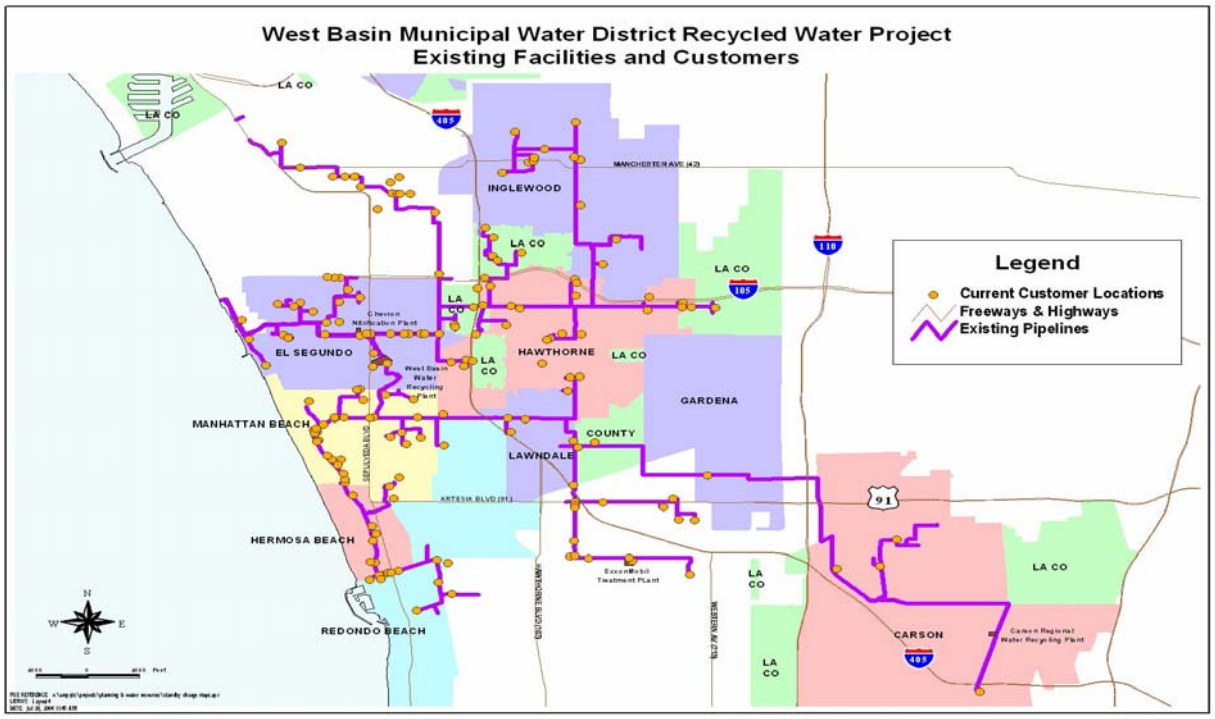
- *Ultra-Pure Reverse Osmosis Water* - Ultra-pure reverse osmosis water is secondary treated water that has been pretreated once with microfiltration and then treated twice with reverse osmosis. Since this water is used for high pressure boilers, it is important that no mineral buildup occurs on the equipment. This water can be used multiple times (cycles) as boilerfeed water before being discharged.

8.3 West Basin's Recycled Water System

8.3.1 Existing System

In 1995, West Basin opened its state-of-the-art water recycling facility in El Segundo, which is still one of the largest recycled water plants of its kind in the nation. West Basin's plant has a current capacity of 35 mgd with a 15 mgd expansion expecting to come on-line in early 2006. In 2002, West Basin was recognized by the National Water Research Institute as one of the six National Centers for Water Treatment Technologies in the country, and this past year the District celebrated the plant's ten-year anniversary of its continuous operation. To date, West Basin has saved over 48 billion gallons of potable water which would have otherwise been imported from Northern California and the Colorado River.

Figure 8-2
West Basin Recycled Water System



As Figure 8-2 shows, West Basin's recycled water system serves the cities of Carson, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Manhattan Beach, Lawndale, Redondo Beach, and unincorporated areas of Los Angeles County. The District also serves the Cities of Torrance and Los Angeles, which are both outside of the District's service area.

All recycled water is produced initially at the WRP where it is distributed to either end-use sites or one of several satellite facilities. In all, more than 210 sites currently use more than 8 billion gallons annually.

The recycled water distribution infrastructure is separate from the 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.

8.3.2 Recycled Water Use by Type

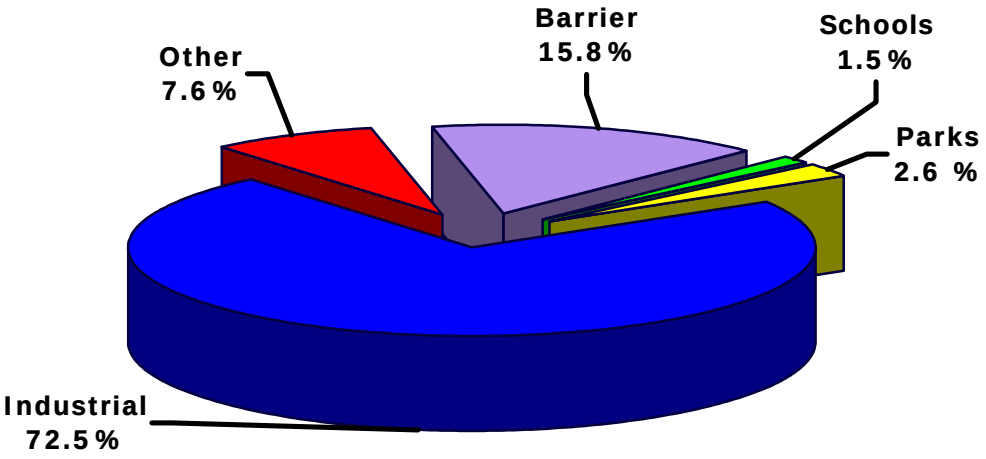
The type of customers West Basin currently delivers recycled water, as shown in Table 8-2, varies from parks and landscape medians to refineries and industries.

Table 8-2
Types of Recycled Water Customers

• Cemetery	• Multi-use
• Industries	• Parks/ Sports Fields
• Golf Course	• School (irrigation)
• Replenishment (Barrier)	• Street Sweeping/ Sewer Flushing
• Landscape & Median	• Refineries
• Cal-Trans (irrigation)	• Others

Figure 8-3 shows the distribution of West Basin's total FY 2004-05 sales by type of use. The predominate area of recycled water deliveries are to the refineries; making up roughly 72% of the total use. In the upcoming years with expanding the system, the District plans to increase deliveries in both the landscape irrigation and Barrier sector.

Figure 8-3
West Basin Recycled Water Use
By Type of Site FY 2004-05

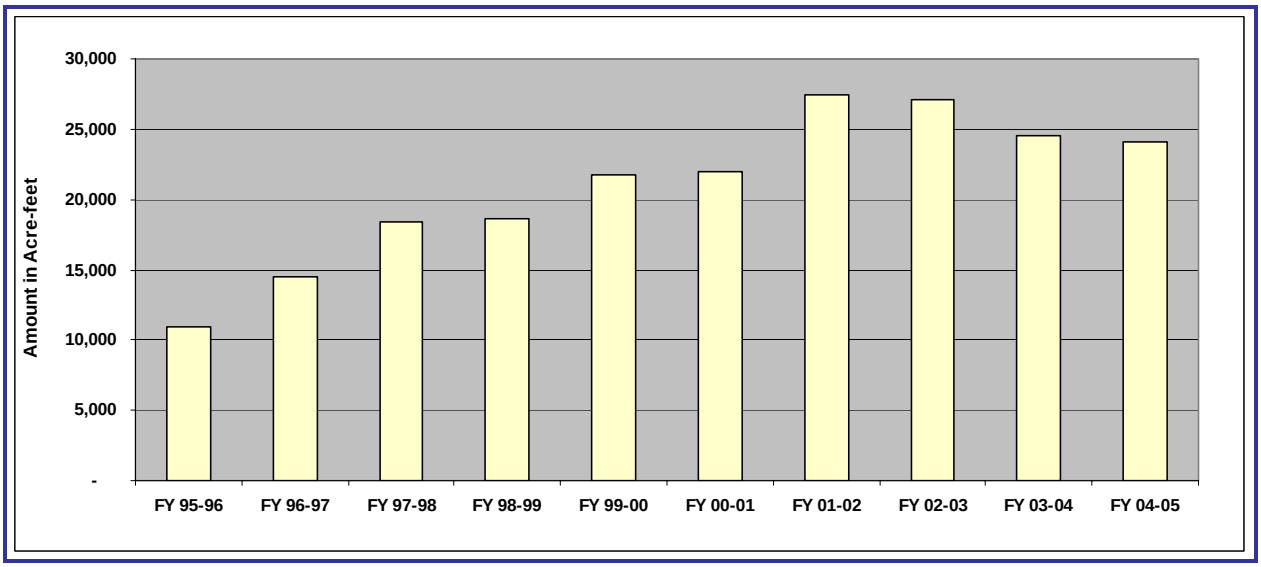


8.3.3 Historical and Current Sales

Historical Water Sales

West Basin's historical recycled water sales for the past ten years are illustrated in Figure 8-4. Sales increased until 2002-03 and declined in subsequent years due to a change in the source water from Hyperion, which reduced the acceptability of recycled water for the West Coast Barrier Project. After identifying the source of the quality variance, West Basin designed and built a high rate clarifier treatment facility to restore the barrier water to even higher quality standards. The high rate clarifier will go online in early 2006 enabling West Basin to increase barrier use by 5,000 AFY beyond the original level.

Figure 8-4
Historical Recycled Water Sales
From FY 1996-2005



The amount of recycled water the District has been able to delivery inside and outside of its service area over the last ten years have total over 209,000 AF, replacing enough potable water to supply the needs of approximately 418,000 families of four for an entire year. West Basin anticipates recycled water sales to increase in the future due to system expansions, new applications, increasing public acceptance and economic incentives.

Table 8-3, provides a more detailed breakdown of historical sales by showing each retail customer agency's annual purchases for the past ten years.

Table 8-3
West Basin Historical Recycled Water Sales
FY 1996-2005
(In Acre-Feet)

West Basin	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	TOTAL
CWS - Dominguez	-	-	-	4	1,317	3,297	3,165	3,101	3,639	3,616	**18,139**
CWS - Hawthorne	26	78	75	92	94	90	116	101	112	111	**894**
CWS - Hermosa Redondo	26	67	88	128	141	133	130	130	144	107	**1,095**
City of El Segundo	1,709	3,610	3,943	3,756	4,050	3,542	7,632	8,102	8,310	7,868	**52,523**
City of Inglewood	243	708	516	533	706	622	707	577	638	595	**5,845**
City of Manhattan Beach	181	197	177	197	230	272	307	254	301	274	**2,389**
Inglewood Unified School District	-	-	-	12	22	24	31	30	67	60	**246**
Southern California Water Co.	121	442	279	240	273	237	282	315	432	435	**3,055**
West Basin Inland Use	502	631	515	330	-	-	-	-	-	-	**1,978**
Industrial & Irrigation Subtotal	**2,808**	**5,732**	**5,593**	**5,293**	**6,833**	**8,216**	**12,371**	**12,610**	**13,643**	**13,065**	**86,162**

WRD (Replenishment-Barrier)	4,609	5,062	8,355	7,081	7,539	6,753	7,290	6,754	3,935	3,799	**61,177**
WBMWD's Service Area Total	**7,417**	**10,794**	**13,948**	**12,374**	**14,372**	**14,969**	**19,660**	**19,364**	**17,578**	**16,863**	**147,339**
City of Torrance	-	-	-	-	22	91	117	144	196	186	**757**
City of Torrance - Mobil	3,466	3,653	4,334	6,157	7,030	6,558	7,212	7,328	6,385	6,735	**58,858**
LA Dept. of Water and Power	-	-	84	138	268	357	398	277	394	283	**2,200**
Outside WBMWD's Service Area Total	**3,466**	**3,653**	**4,418**	**6,295**	**7,321**	**7,006**	**7,727**	**7,750**	**6,975**	**7,205**	**61,815**
TOTAL	**10,883**	**14,447**	**18,366**	**18,669**	**21,693**	**21,975**	**27,387**	**27,114**	**24,553**	**24,068**	**209,154**

As discussed above, West Basin's recycled water system services the Cities of Torrance and Los Angeles, which are located outside of the District's boundaries. Therefore, although the total usage within West Basin was 16,863 AF this past year, the total amount of recycled water delivered by West Basin was 24,068 AF.

Table 8-4
Recycled Water Uses
2000 Projections compared with 2005 Actuals
AF/Fiscal Year

Type of Use	2000 Projection for 2005	2005 Actual Use
Irrigation/Industrial	33,000	20,268
West Coast/Dominguez Barrier	15,000	3,800
Total	**48,000**	**24,068**

In West Basin's 2000 UWMP, the District projected deliveries of recycled water within its service area to reach 33,000 by 2005. As shown in Table 8-4, actual sales in 2005 fell significant below this target. This was mainly due to setbacks in expanding the recycled water program in the southern area of the District which resulted in many large industrial customers not being able to connect. In addition, water quality problems at Hyperion impacted deliveries to the West Coast Barrier. However, with the recent plant expansion projected to be on-line, next year deliveries should place the District back on target.

8.3.4 System Expansions and Projected Sales

Harbor/South Bay Water Recycling Project

Currently, the Harbor/South Bay Water Recycling Project (Harbor/South Bay), a federally funded partnership project between West Basin and the U.S. Army Corps of Engineers, is under construction and consists of sixteen component projects with 68 miles of combined pipelines. The first two laterals of the overall project, the Victoria Lateral and the California State University at Dominguez Hills (CSUDH) Mainline Extension, were successfully completed in April 2003.

Harbor/South Bay is scheduled for completion in 2010 and is expected to conserve more than 490 million gallons of potable water annually.

The $3 million Victoria Lateral Project added nearly 1.4 miles of pipeline throughout the City of Carson. The project delivers approximately 4 million gallons of recycled water daily for landscape irrigation and industrial application at local sites which include medians along Avalon Boulevard, the Links at Victoria Golf Course, and the Victoria Regional Park.

The $1.8 million California State University at Dominguez Hills (CSUDH) Mainline Extension consists of a recycled water transmission pipeline connecting to the end point of the Victoria Lateral and serving irrigation sites and cooling towers on the CSUDH campus. The pipeline also serves the newly-built Home Depot National Training Center, including the soccer stadium field.

In addition to the completion of the Victoria Lateral Project and CSUDH Mainline Extension, on-going 2005 activities of the Harbor/South Bay Project include: design and construction of a lateral to serve Los Angeles Southwest College, the design of the Madrona Lateral, the Palos Verdes Extension and the pre-design of Lateral V. The customers served by the Palos Verdes Extension will include parks and schools in the City of Torrance along with several golf courses, parks, schools and a cemetery in the Palos Verdes Peninsula area. This project is detailed below.

West Basin Water Recycling Plant Phase IV Expansion

Undergoing its fourth expansion in 10 years, West Basin's WRP will add an additional 5 mgd of barrier water treatment capacity by the end of 2005 and 10 mgd of Title 22 treatment capacity in 2006 to supply the Harbor/South Bay System expansion. The barrier water expansion will enable the blend of seawater barrier injection to increase to 75% recycled water (and 25% potable water), by upgrading the existing 7.5 mgd train with microfiltration pre-treatment, adding a new 5 mgd train of microfiltration and reverse osmosis, and introducing ultraviolet disinfection to the entire 12.5 mgd process. The higher blend of ultra-pure recycled water in the source water for barrier injection will not only improve the quality of the groundwater basin, and conserve potable water, but also lower water costs to WRD (the purchaser of the recycled water) and enhance ecosystem benefits.

Additional upgrades to the WRP will also be implemented, including removal of the lime clarification system, modifications to the solids de-watering system, and the addition of clarifiers upstream of the Title 22 Filters.

Madrona/ Palos Verdes Lateral Extension

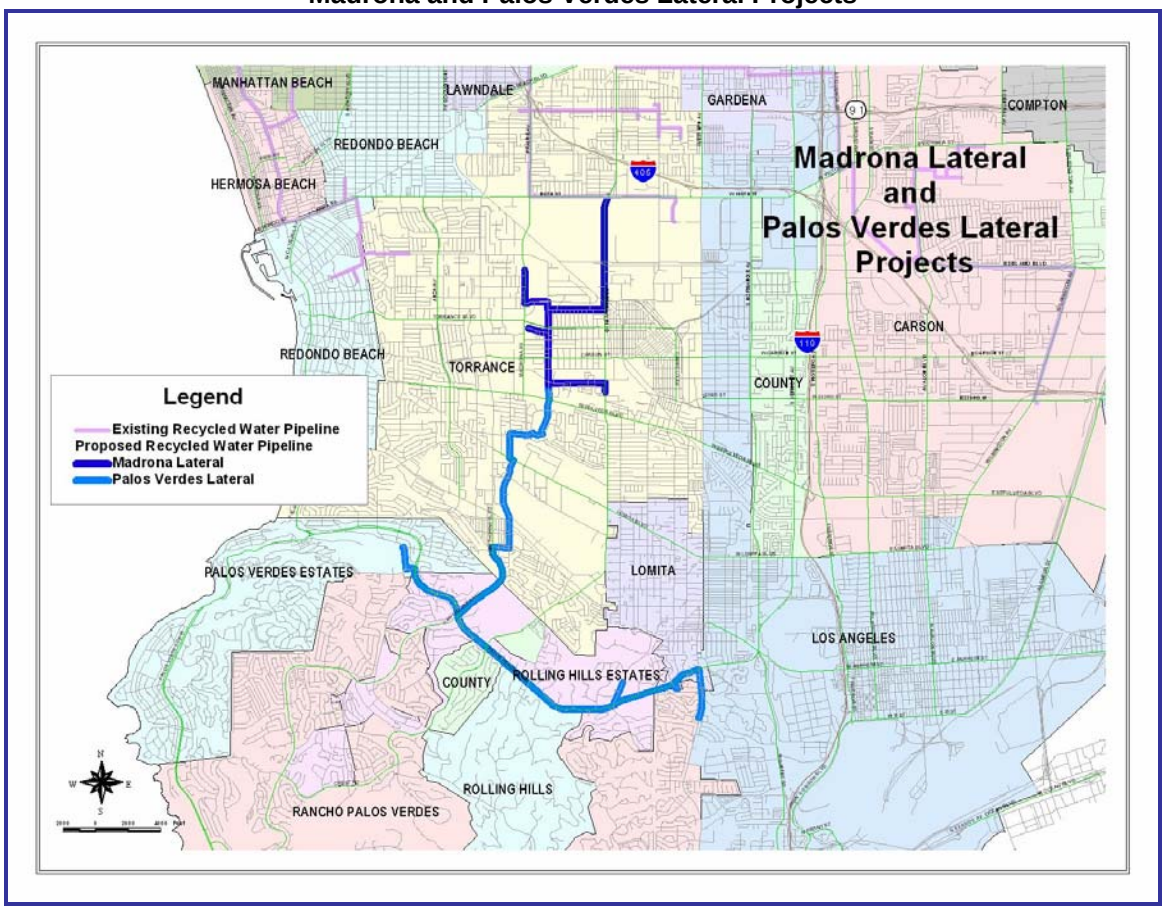
The Madrona Lateral will consist of 30,000 linear feet of pipeline, which will provide recycled water for non-potable use to several sites in the City of Torrance, including the City Hall and Recreation Center, Madrona Marsh, Delthorne Park, and various area schools. This $9 million project is expected to be completed by late 2005. This lateral represents a stepping stone to the Palos Verdes Peninsula.

The Palos Verdes Lateral will serve several large irrigation customers along the north side of the Palos Verdes Peninsula such as Palos Verdes Golf Club, Rolling Hills Country Club, Los Angeles County Sanitation District landfill and Green Hills Memorial Park (cemetery). This 34,000 linear-foot pipeline is currently in its pre-design phase and is targeted to be completed in early 2007 at a cost of $17 million.

West Basin recently applied for State funding through Proposition 50 for the Madrona/ Palos Verde Lateral project. This construction project is an extension of West Basin's existing recycled water distribution system that will serve the City of Torrance and various cities throughout the Palos Verdes Peninsula. This project includes approximately 64,000 linear feet of pipeline that will ultimately serve up to 17 sites with over 800 AFY of recycled water to public and private entities. Recycled water for this project will be provided by West Basin's WRP. Construction on the Madrona Lateral began in January 2005 while design for the Palos Verdes Lateral was underway. The Madrona Lateral is expected to be completed in January 2006 and operational soon thereafter. Construction of the Palos Verdes Lateral is expected to be complete by December 2006 and operational by June 2007.

West Basin will provide recycled water via the Palos Verde Lateral to the Palos Verdes Peninsula to reduce demand on imported water. The ability for West Basin to produce and distribute this water locally means less impact on fragile ecosystems, less energy to pump water long distances, and a drought-proof supply of water. As an added benefit, the cost to produce this water will be less than the cost of imported supplies. An extra 800 AFY of recycled water saves potable water for approximately 1,600 families of four every year and reduces the amount of wastewater that is discharged into the ocean. Figure 8-5 illustrates the Madrona and Palos Verdes Lateral projects in West Basin's service area.

Figure 8-5
Madrona and Palos Verdes Lateral Projects



Projected Sales

As discussed in Section 8.3.3., recycled water sales in fiscal year 2004-05 totaled 24,068 AF. The Phase IV Expansion of the WRP and the Harbor/South Bay System Expansion are expected to enable West Basin to add a minimum of 40,000 AF of sales by 2030. One key to further expanding the system, and increasing sales, is West Basin's partnership with the City of Los Angeles. Additional oil refineries within the harbor area of Los Angeles, but proximal to West Basin's existing system, represent a large untapped potential for high-quality recycled water sales. A proven track record with West Basin's existing refinery customers is expected to convince others that recycled water can increase reliability and reduce costs in water management. Roughly 37,500 AFY of projected recycled water sales through 2030 are attributable to the refinery/industrial sector. Table 8-5 illustrates the projected increase of recycled water over the next 25 years.

Table 8-5
Projected Recycled Water Use
AF/Fiscal Year

	2010	2015	2020	2025	2030
Industrial & Irrigation	21,848	32,500	36,250	40,000	43,750
West Coast Barrier (Replenishment)	17,500	17,500	17,500	17,500	17,500
West Basin MWD's Service Area Total	**39,348**	**50,000**	**53,750**	**57,500**	**61,250**
City Torrance	6,650	6,650	6,650	6,650	6,650
City of Los Angeles	1,400	1,400	1,400	1,400	1,400
Outside West Basin MWD's Service Area Total	**8,050**	**8,050**	**8,050**	**8,050**	**8,050**
Total	**47,398**	**58,050**	**61,800**	**65,550**	**69,300**

8.3.5. Potential Recycled Water Use

West Basin is currently acting to fulfill the potential identified in its 2000 Master Plan, as well as other opportunities that have emerged since that Plan was completed. Although limited to an extent by economic feasibility of reaching end users that are not near existing infrastructure, the potential for increased use of recycled water continues to grow with greater acceptance of its use in different applications. Fabric and carpet dying, for example, are areas that represent a significant opportunity for increased sales for West Basin.

West Basin will continue to pursue new cost-effective projects both within and outside its service area. Although there are challenges and limitations in connecting customers, such as in the Palos Verde peninsula, there is great potential. The limitations in connecting customers due to their challenges dictate when and how much recycled water will be sold in the future.

The 2000 Master Plan identified and prioritized areas where recycled water has the potential to expand. In this Plan, a database was established to locate and identify future customers. The approach considered pipeline routing, hydraulic analysis and economic interests to project the growth of the system. Much of these findings evolved in the system expansion projects discussed in section 8.3.4.

8.3.6 Encouraging Recycled Water Use

West Basin's marketing efforts have been successful in changing the perception of recycled water from merely a conservation tool with minimal application to a business enhancement tool that lowers operating costs while increasing the reliability of the water supply. West Basin markets recycled water as a resource that:

- Is less expensive than potable water;
- Is more reliable than imported water in a drought; and

- Is consistent with statewide goals for water supply and ecosystem improvement on both the SWP and Colorado River systems.

The target customer is expanding from traditional irrigation users such as golf courses and parks to unconventional commercial and industrial users. 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-generating plants, and commercial laundries.

In addition to West Basin wholesaling recycled water at a rate lower than potable water, West Basin provides other financial incentives as well to encourage recycled water use. Some potential recycled water customers do not have the financial capability to pay for onsite plumbing retrofits necessary to accept recycled water. Therefore, West Basin advances funds for retrofit expenses, which can be reimbursed through the water bills. The on-site plumbing retrofit costs are amortized over a period of time, up to ten years at West Basin's cost of funds. Repayment is made using the differential between potable and recycled water rates so that the customer never pays more than the potable rate. Once the loan is repaid, the rate reverts to the current recycled rate.

Optimizing Recycled Water Use

West Basin's plan for optimizing the use of recycled water is carried out through its Recycled Water Master Plan (Master Plan) and its Recycled Water Marketing Plan (Marketing Plan). The Master Plan is West Basin's guiding document for identifying and prioritizing potential customers in all existing and emerging types of recycled water use.

The Marketing Plan is the companion effort to the Master Plan and revisits the strategies and tools employed by West Basin's staff and consultants in generating interest in recycled water with potential customers and the cities in which they do business. The thrust of the Marketing Plan is to emphasize the benefit of recycled water as a "tool for profitability" for businesses and not just the right thing to do in terms of water conservation and the environment. The Marketing Plan will be updated in FY 2005-2006.

Coordination Efforts

Table 8-6 illustrates the District's coordinated effort among key stakeholders as well as their role in the development of West Basin's 2000 Recycled Water Master Plan.

Table 8-6
Recycled Water Master Plan Coordination

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

1. Water Purveyors: See Table 8-3 within this section
2. Wastewater Agencies: Hyperion Wastewater Treatment Facility and West Basin Water Recycling Treatment Plant
3. Groundwater Agencies: Water Replenishment District of Southern California
4. Planning Agencies: Purveyors and Cities within West Basin's service area

8.3.7 Funding

Capital costs for projects planned for the future have been budgeted to average per fiscal year approximately $8.1 million. These costs will be covered by the sources identified here and other sources as they become available:

- ***MWD Local Resources Program Incentive.*** To qualify, proposed recycled water projects by member agencies must cost more than projected MWD treated non-interruptible water rates and reduce potable water needs. Since founding MWD with other municipal water utilities in 1928, West Basin has remained affiliated as a member agency and is therefore considered for the rebates for up to $250/AF of produced water offered under the program.

- **Grant Funding**. West Basin continuously applies for Federal and State grant funding for recycled water projects, as it becomes available. For example, in 2005, West Basin applied for a Water Recycling Construction grant for the Madrona/Palos Verdes Lateral project through Proposition 50. West Basin submitted an application to the State to fund 25 percent of the $27.5 million cost of the pipeline. An additional source of funding for water recycled projects is through the U.S Army Corps of Engineers Program, which affords qualified conservation programs 75 percent project funding.

Desalination

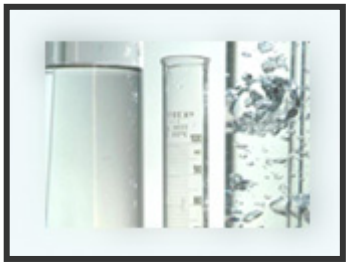
This section discusses the Desalination Efforts within West Basin's service area

9.1 Overview

West Basin's expertise in recycled water treatment includes substantial experience in the removal of salt from recycled water supplies. West Basin currently performs extensive research and development, affording them the opportunity to refine their water production and treatment methods, as well as educating the public. Desalination of ocean water is the next natural step in the development of a new water source for West Basin's service area.

Ocean water desalination is typically thought to be too expensive for large-scale use. However, due to recent advances in technology, desalination now costs less than half of what it did 10 years ago, making it an attractive and financially viable option. The cost has dropped because newer membranes last longer and are more energy efficient, thus lowering capital and operational costs.

9.2 Desalting Process and Quality of Ocean Water Desalination



A number of issues are considered when evaluating alternative water supply options. Of primary consideration is a project's ability to provide a safe, reliable, and cost-effective drinking water supply. Providing a safe drinking water supply to West Basin customers is a task of paramount importance to West Basin. All prudent actions are taken to ensure that water delivered throughout the service area meets or exceeds drinking water standards set by the State's primary water quality regulatory agency, the CDHS. West Basin has performed extensive water quality research at its ocean desalination pilot facility. Test results indicate that the District's treatment approach of utilizing microfiltration pretreatment and reverse osmosis treatment provides a reliable water quality that meets all State and Federal drinking water standards.

The desalting process involves removing salt, minerals and impurities from the ocean water with the latest technologies -- microfiltration and reverse osmosis. The ocean water first passes through microfiltration which consists of thousands of strands with pores that are 5,000 times smaller than a pinhole. The water then continues on to undergo high pressure reverse osmosis. Reverse osmosis, a common method used to produce bottled water, is a pressure driven process whereby water passes through a

thin film membrane that filters out impurities. The water produced at the pilot project consists of approximately 350 parts per million (ppm) of salt, lower than typical tap water in southern California. West Basin will use the data acquired from the pilot project in the planning and development of a 0.5 MGD demonstration plant.

9.3 West Basin's Ocean Water Desalination Pilot Project

West Basin's ocean water desalination pilot project is located at the El Segundo Power Plant and marks the first use of microfiltration pretreatment and reverse osmosis for ocean water desalination. The pilot project desalts approximately 40 gallons per minute (gpm) of raw ocean water. The goal of the project is two-fold: 1) identify optimal performance conditions and 2) evaluate the water quality. The research findings are being shared among industry partners to determine the viability and suitability of producing potable desalinated ocean water.

West Basin's ocean water desalination pilot project was designed to be a regional and national asset, and it is an open, collaborative effort that will benefit the entire water industry. To fund the $1.2 million combined cost of the pilot project, West Basin has partnered with major agencies in the water industry, including the American Water Works Association Research Foundation, California Avocado Commission, City of Tampa Bay, Department of Water Resources, East Bay Municipal Utility District, Long Beach Water Department, Los Angeles Department of Water and Power, Metropolitan Water District, National Water Research Institute, San Diego County Water Authority, South Florida Water Management District, and United States Bureau of Reclamation.

Since it first began operation, West Basin has strived to identify the optimal operational and water quality parameters utilizing a power plant's pre-condenser cooling water as the pilot plant's feed water source to allow reliable and cost efficient ocean desalination treatment. The District recognizes the environmental benefits and capital cost savings of utilizing an existing open ocean water intake substructure and outfall by co-locating the pilot project at an existing power plant site. Following in the footsteps of West Basin's vast desalting experience using advanced membrane treatment, the ocean water desalination pilot project utilizes microfiltration pretreatment and reverse osmosis treatment as the primary treatment processes. These processes have demonstrated tremendous water quality and operational performance since the commissioning of the project. Figure 9-1 illustrates the microfiltration and reverse osmosis membranes used in the pilot demonstration project.

Figure 9-1

Microfiltration **Reverse Osmosis**

West Basin will continue to conduct piloting research to focus on meeting current and future regulatory and water quality standards utilizing post condenser water at the hosting power plant site. This research information will be used to formulate a comparative index to the cold water research to determine the most efficient and environmentally safe approach in the development of a demonstration and full scale ocean desalination treatment facility.

9.4 Future Ocean Water Desalination Projects

West Basin's next logical step in moving forward with a full scale ocean desalination treatment facility is to develop and construct a 500,000 gpd demonstration project. This demonstration project is necessary to evaluate the water quality performance and treatment stability, assess efficient energy recovery devices, optimize operational performance utilizing full scale process equipment, and to acquire the necessary data to achieve regulatory compliance and approval. West Basin's ocean water desalination demonstration project will be located within West Basin's service area and in close proximity to the Pacific Ocean. West Basin and its partners will perform the full battery of water quality analyses to ensure that the demonstration project meets all Federal and State Drinking Water Standards.

Additionally, West Basin will construct a research and education center to educate the public on how ocean water desalination is performed and the safe environmental benefits of developing such a precious and reliable water supply resource. In 2005, West Basin was awarded $1,750,000 in State grants administered under the Proposition 50 funds, to assist in the research and construction of the District's ocean water desalination demonstration project. Table 9-1 lays out the opportunities for West Basin to desalinate ocean water.

Table 9-1
Opportunities for Desalinated Water

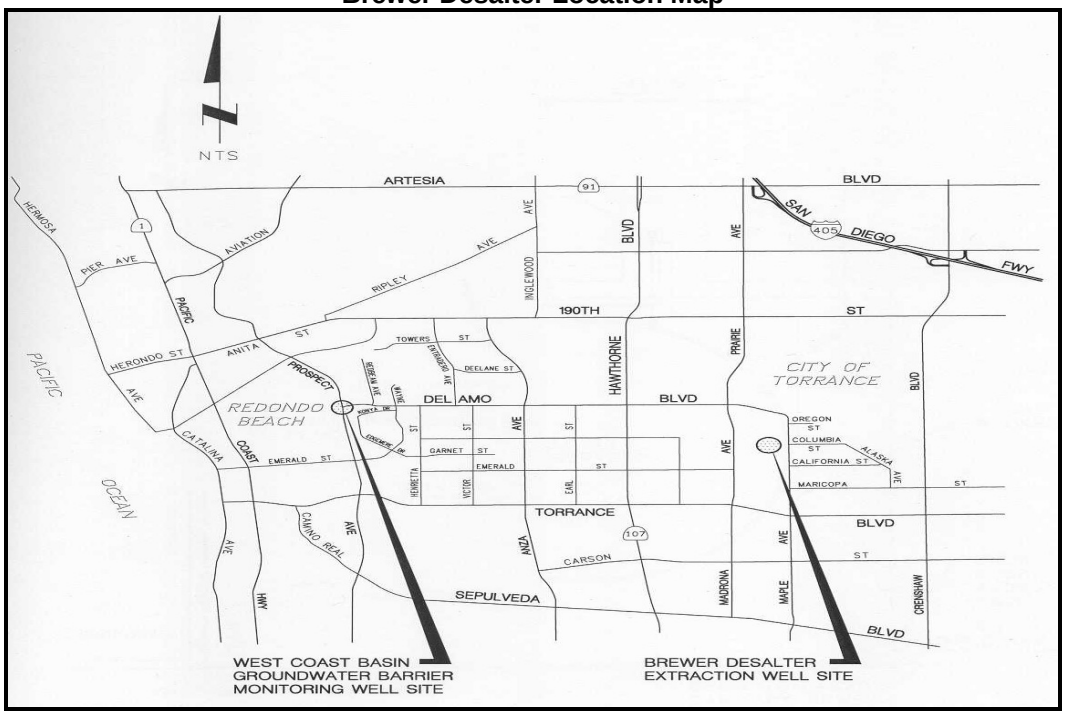
Sources of Water	Yield AFY	Start Date	Type of Use
Ocean Water	20,000	June 2011	Potable

With the knowledge gained by operating the Demonstration Project, West Basin expects to eventually move forward with the planning, design, and construction of a full scale 20,000 AFY ocean water desalination and education facility. West Basin is currently addressing the development of the demonstration project with the Regional Water Quality Control Board and the California Coastal Commission. West Basin anticipates operating the demonstration plant for at least two years while plans are being completed and finalized for the development of a 20,000 AFY full-scale desalination treatment plant. The ultimate goal is to construct a full-scale plant that will diversify the regional water supply and ensure a safe, reliable water source for today and the future.

9.5 Brewer-Desalter Treatment Facility

The Brewer Desalter Treatment Facility, located adjacent to the City of Torrance bus maintenance and storage yard, removes chloride from groundwater impacted by seawater intrusion in the WCGB. The brackish groundwater resulted from seawater intrusion prior to construction of the West Coast Basin Groundwater Barrier. The vicinity map provided in Figure 9-2 shows the location of the Brewer Desalter site.

Figure 9-2
Brewer Desalter Location Map



The Brewer Desalter facility treats brackish groundwater produced by an on-site well. The brackish groundwater passes through cartridge filters and finally reverse osmosis. California Water Service Company's (CalWater) stores the treated water on-site in a 5-million gallon storage reservoir, and ultimately delivers it to consumers for CalWater's distribution system. The Brewer Desalter facility is currently out of service until a new extraction well can be constructed. A new extraction well, located north of the reverse osmosis facility, is expected to be on-line in early 2006.

Figure 9-3
Brewer Desalter Facility Equipment

Brewer Extraction Well Site, looking west from a top the 5 MG reservoir

Chemical addition tanks located inside the RO building

Brewer Desalter RO treatment on-site

Appendix A

Appendix B

Appendix C

Appendix D

West Basin Municipal Water District

17140 S. Avalon Blvd • Suite 210 • Carson, CA 90746-1296

telephone 310-217-2411 • fax 310-217-2414

July 8, 2005

To Whom It May Concern:

This letter serves as notification that the West Basin Municipal Water District is currently preparing a 2005 update of its Urban Water Management Plan, pursuant to the Urban Water Management Planning Act (Act) of the California Water Code. The Act requires urban water suppliers to update their Urban Water Management Plans and submit a complete plan to the California Department of Water Resources every five years.

A draft of West Basin's Plan is currently available for review and comment. A Final Draft will be available for review prior to the scheduled public hearing in October 2005.

Please contact us if you would like to receive a draft Plan. If you would like more information or have any questions, please contact Harvey De La Torre at (310) 660-6233 or via email at harveyd@wcbwater.org.

Thank you,

Art Aguilar
Co-General Manager

Rich Nagel
Co-General Manager

CHRONO FILE

Art Aguilar
Co-General Manager

Richard Nagel
Co-General Manager

Printed

Central Basin
Municipal Water District
310-217-2222

West Basin
Municipal Water District
310-217-2411

June 29, 2005

Dear Central/West Basin Customer Agencies:

2005 Urban Water Management Plan

As you are aware, all California agencies providing water to more than 3,000 customers or supplying more than 3,000 acre-feet of water a year are required to update their Urban Water Management Plans (UWMP) every five years, according to California Water Code Section 10621(a). Central Basin MWD (CBMWD) and West Basin MWD (WBMWD) hosted its 2005 Urban Water Management Plan workshop with the Metropolitan Water District of Southern California and the California Urban Water Conservation Council on June 28, 2005.

Enclosed you will find the District's DRAFT 2005 UWMP, which will assist you in updating your agency's UWMP. We will be meeting with each agency to discuss our Plan and answer any questions you may have throughout the months of July and August. Staff will be contacting you soon to schedule a date and time. The District anticipates completing its FINAL UWMP by September and taking it to the Board for adoption in October. All UWMP's are due to the Department of Water Resources by December 31, 2005.

If you have any questions, please feel free to contact Harvey De La Torre at (310) 660-6233 or Leighanne Reeser at (310) 660-6225.

Sincerely,

Art Aguilar
Co-General Manager

Rich Nagel
Co-General Manager

Enclosures

17140 S. Avalon Blvd • Suite 210 • Carson, CA 90746-1296
fax 310-217-2414

Appendix E

----DRAFT----

Resolution No. _____

A RESOLUTION OF THE BOARD OF DIRECTORS OF
THE WEST BASIN MUNCIPAL WATER DISTRICT FINDING THE
EXISTENCE OF A WATER SHORTAGE,
ORDERING THE IMPLEMENTATION OF STAGE __ OF
THE WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the West Basin Municipal Water District (District), a member agency to Metropolitan Water District of Southern California (MWD), has implemented a mandatory reduction program; and

WHEREAS, the Board of Directors has established Stages of Action contingent upon the MWD Water Surplus and Drought Management (WSDM) Plan, which provides for stages of action and an allocation methodology; and

WHEREAS, the WSDM Plan allocation methodology has yet to be determined and the District has established and will follow the following stages of action:

a) Minimum Shortage Stage: Request a voluntary effort among the District customers to reduce imported water deliveries. Pursue an aggressive Public Awareness Campaign to encourage residents and industries to reduce their usage of water.

b) Moderate Shortage Stage: In addition to the Minimum Shortage Stage actions, the District will work with its customer agencies to promote and adopt waste water prohibition and ordinances to discourage unnecessary water usage.

c) Severe Shortage Stage: In addition to the Minimum and Moderate Shortage Stage actions, the District will seek to adopt a rate structure that penalized increased water usage among its customer agencies.

d) Extreme Water Shortage Stage: In addition to the Minimum, Moderate, and Severe Shortage Stage actions, the District will call for the discontinuance of imported water based upon an allocation methodology similar to MWD for each of its customer agencies; and

WHEREAS, the Board of Directors may, upon finding that a water shortage exists, order implementation of a plan which it deems appropriate to address such water shortage and shall establish the Stage if action that it is implementing.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE WEST BASIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

----DRAFT----

1. That, for the reasons hereinabove set forth, the Board of Directors hereby finds and determines that a Water Shortage exists in the West Basin Water District service area.
2. That the Board of Directors hereby orders implementation of the Water Shortage Contingency Plan, _____Stage, as set forth above.
3. That reasonable action shall be taken to ensure compliance by the District's customer agencies.

THE FOREGOING RESOLUTION is approved and adopted by the Board of Directors of the West Basin Municipal Water District this __ day of _____, 20__

_____
PRESIDENT, WEST BASIN MWD

ATTEST:

_____
BOARD SECRETARY, WEST BASIN MWD

Appendix F