Water Demand

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

2.1 Overview

Today, the total water demand for the 1.61 million people living within Central Basin's service area is approximately 280,400 acre-feet (AF) with replenishment demand making up 27,600 AF. One acre-foot equals 326,000 gallons, and serves the annual water needs of two families. In 1980, Central Basin's population was 1.22 million and the service area's water demand was 260,960 AF. In those twenty-five years, Central Basin's retail water demand has grown 7.4% while population has grown 30%. One of the contributing factors to this low growth in demand has been in large part because of conservation and education efforts by the water community.

In the last five years Central Basin's water demand has increased by only 1%, while population has increased by more than 5%. This gradual increase in water usage is attributed to Central 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, water use will continue to increase. However, projections show that Central Basin's water usage is expected to increase roughly 0.5% per year over the next 25 years, as illustrated in Table 2-5.

This section will explore in greater detail Central 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

Central 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, creating a challenge for water agencies in meeting for increasing water demands with a limited water supply.

[1] According to the National Weather Service.

Areas with low precipitation, such as Southern California, are typically vulnerable to droughts. Historically, Central Basin has experienced some severe dry periods (Droughts of 1977-78 and 1989-92) and until recently the Los Angeles region had the five driest years on record (1999-2004). In fact, anything less than the average yearly rainfall causes concern for water agencies. Central Basin has been actively pursuing and accomplishing these water saving techniques for the last 15 years to ensure adequate future water reliability.

Table 2-1 illustrates the climate characteristics for the Los Angeles region, taken at both the Long Beach Station and the Montebello Station, for the period between 1979 and 2004 (25 years) including, standard monthly average ETo[2] (Long Beach Station), the average rainfall (Montebello Station), and the average temperature (Montebello Station). In comparison to other cities with an abundant supply of precipitation each year, the low rainfall in this region invariably challenges Central Basin to provide sufficient, reliable, quality water to meet the area's increasing water needs. The average precipitation for the last 25 years is approximately 16.02 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 1/1/1979 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]	3.71	4.07	3.19	0.94	0.24	0.07
Average Temperature (Fahrenheit)[2]	69.4	71.1	72.7	77.8	79.4	83.7

	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	0.02	0.20	0.32	1.28	1.96	**16.02**
Average Temperature (Fahrenheit)	88.6	89.7	87.9	82.6	75.4	70.9	**79.1**

[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 Montebello Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?camont.

2.3 Demographics

Central Basin's service area encompasses 227 squares miles in southeast Los Angeles County, including 24 cities, water agencies, publicly-owned mutual water companies and publicly regulated utilities. This service area includes some of the most densely populated areas in the County. According to the 2000 U.S. Census Report and the Metropolitan Water District of Southern California's (MWD) demographics data, Central Basin has grown from 1.4 million people in 1990 to 1.61 million people today.

[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.

Based on MWD's demographic projections, population is expected to increase an average of 3.01% every five years for the next 25 years, or 0.64% annually. By 2030, Central Basin's population is expected to grow by more than 258,000 people. Table 2-2 displays the demographic projections for the next 25 years.

Table 2-2
Demographic Projections for Central Basin's Service Area[1]

Year	2005	2010	2015	2020	2025	2030
Population	**1,614,400**	**1,655,200**	**1,712,300**	**1,768,000**	**1,821,200**	**1,872,500**
Single-family	291,200	300,200	301,800	311,400	320,500	323,800
Multi-family	124,900	132,600	147,000	153,400	160,200	172,900
Total Household	**416,100**	**432,800**	**448,800**	**464,800**	**480,700**	**496,700**
Persons per Household	3.84	3.78	3.78	3.77	3.75	3.74
Employment	591,700	659,700	682,600	702,600	720,500	736,900

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

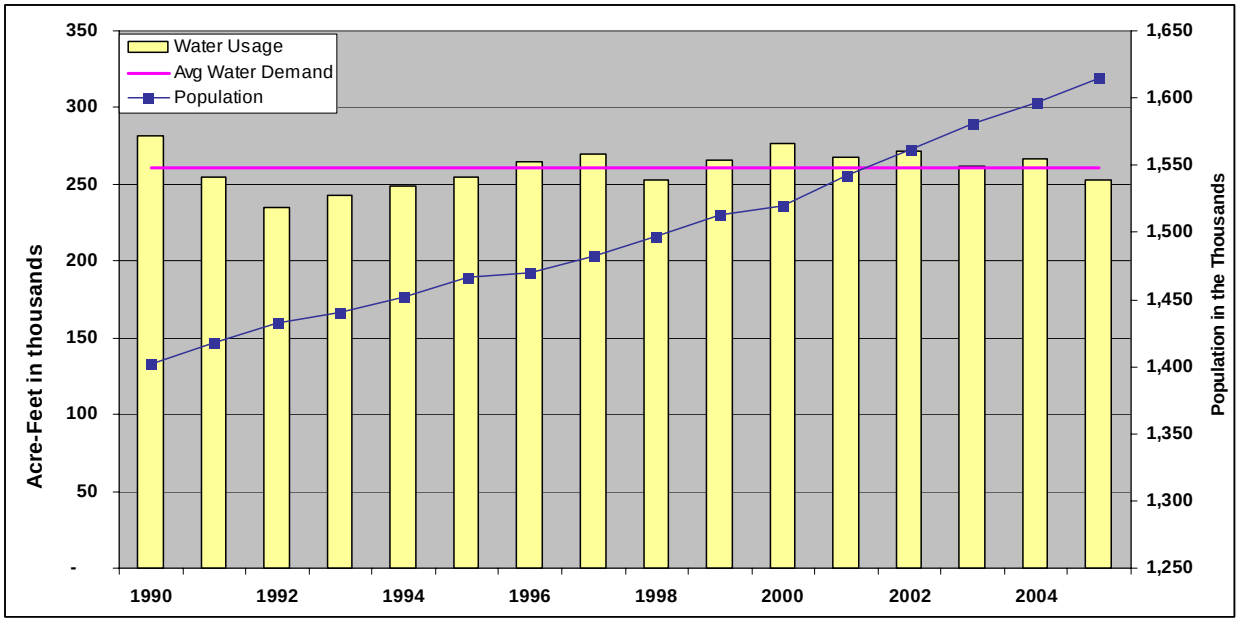
Table 2-2 also displays Central Basin's total households, which are expected to increase 19% by 2030; especially in the Multi-family category where households will increase by 48,000 people. As it relates to water demand, the availability of more households increases the demand on water supplies. As for employment, Central Basin is expected to see a 25% 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 Central Basin's service area have remained fairly consistent. As illustrated in Figure 2-1, the Central Basin region has not seen significant increases in water demands over the past 15 years despite population growth at an average rate of 10,350 persons per year and continued in-fill development in the service area. Central Basin's FY 2004-05 retail water demand was 252,800 AF.

Total water use, or demand, within Central 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 (Alamitos) or to the spreading grounds (Montebello), are not directly delivered to the public but enable continued groundwater production to help satisfy retail demand.

Figure 2-1
Central Basin's
Historical Total Retail Water Demand[1] vs. Population



[1] Includes groundwater production (both from Central Basin and Main San Gabriel Basin) and imported & recycled water purchases within the Central Basin's service area.

Figure 2-1 displays Central Basin's total retail water demand from FY 1990 to 2005. As previously discussed, retail demands have remained fairly consistent since 1995 following several years of increasing demands after the drought. The average retail demand for the past 15 years is 260,468 AF.

The District averaged 264,167 AF for the past five years, which is only 1.4 % above the 15 year average.

Central Basin's service area is using the same amount of water as it did ten years ago, despite the addition of 148,560 people. This indicates that water conservation and education has significantly affected the manner in which Central Basin's residents are using water today. We can further verify this by reviewing Central Basin's water usage per person in "Per Capita Water Usage."

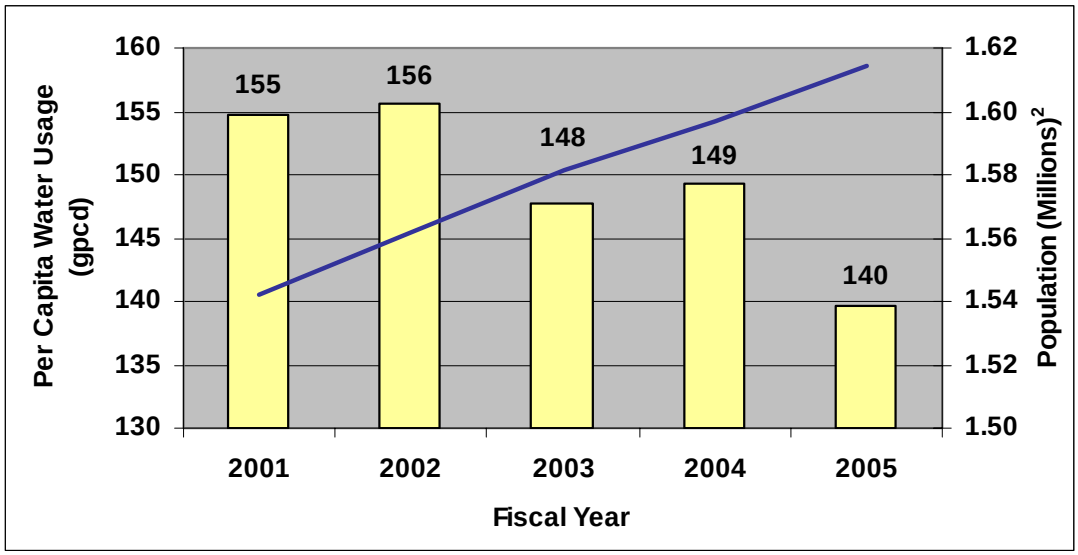
2.4.1 Historical Per Capita Water Usage

According to the Pacific Institute[3], 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.[4] Through conservation measures such as Ultra-low-flush toilets (ULFT), high efficiency clothes washer machines, low-flow showerheads, new technologies in water irrigation and education programs, Central Basin has gradually reduced Per Capita water usage.

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

In 1990, the Per Capita water usage was estimated at 180 gallons per day (gpcd). For the last five years the usage has decreased to an average of 152 gallons per day gpcd. Figure 2-2 illustrates the retail water usage per capita for the last five fiscal years comparative to population in Central Basin's service area.

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



[1] Retail water usage includes groundwater, imported water and recycled water.
[2] Information based on MWD Demographic Data, 2005.

As displayed above, population has been steadily increasing in the last five years while Per Capita water usage decreased to 140 gpcd, verifying the notion that the District's current water resources efforts are meeting the growing water demands of today.

2.4.2 Replenishment Demands

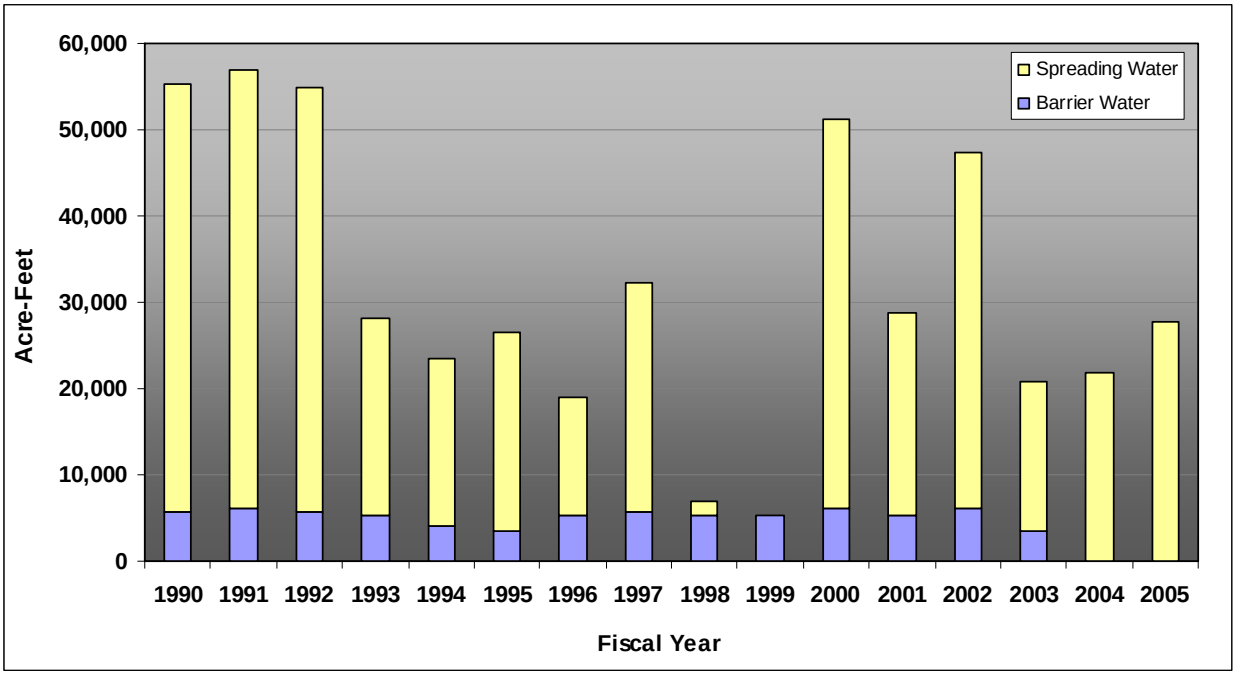
Replenishment water is defined as water that is used to refill or protect the groundwater basin. The Water Replenishment District of Southern California (WRD) is the entity responsible for maintaining and replenishing the West Coast and Central Groundwater Basins. WRD is a special district created by the State and governed by a 5-member elected body to replenish and protect these groundwater basins with imported water and recycled water.

Spreading Demands

As groundwater is extracted annually beyond the natural level of replenishment known as basic yield, WRD purchases supplemental water to refill the basin and replenish the amount that is extracted above the basin yield. This replenishment water is a combination of allowable deliveries of recycled water and the purchases of untreated imported water.

As the imported wholesaler, Central Basin sells untreated imported water to WRD to be conserved at the Rio Hondo and San Gabriel River Spreading Grounds (Spreading Grounds) in the Montebello Forebay. Demands at the Spreading Grounds have varied year to year. As shown in Figure 2-3 below, imported spreading purchases can range from 45,000 AF to 0 AF in any given year. The cause for variation can be the result of available seasonal water from MWD or operations, maintenance, and construction activities at the spreading grounds, or unpredictable replenishment needs of the basin. For example, spreading water deliveries were limited in 1997-98 due to the "El Nino" effect, which brought on heavy rains that met the replenishment needs for the basin. By contrast, the drought conditions in the region in 1990 increased the need for replenishment deliveries to reach over 50,000 AF. Nevertheless, WRD's purchases average 27,000 AFY of imported water per year.

Figure 2-3
Replenishment Demands in Central Basin's Service Area



Source: CBMWD Wateruse Database, 2005

Barrier Demands

Unlike the Spreading Grounds, the demands at the Alamitos Barrier (Barrier) are mostly consistant year to year. This is mainly due to the required regular injection of imported water needed to prevent seawater intrusion from entering into the basin. For the last ten years, the average demand at the Barrier has been about 5,300 AF. However, in 2003 the City of Long Beach took over the connection that serves the Barrier with imported water, and Central Basin no longer supplies water to meet those demands. Looking forward, WRD plans to reduce imported demands at the Barrier by 3,000 AF, replacing it with the

delivery of highly treated recycled water through WRD's new Leo J. Vander Lans Advanced Water Treatment Center located in Long Beach.

2.4.3 Retail Water Demand by Customer Agency

As mentioned above, Central Basin, as a wholesaler, has not seen significant increases in water demands for the past ten years. However, local retail customer agencies have experienced changes in their overall water 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 Central Basin Customer Agency
FY 1990-1995 vs. FY 2000-2005
(In Acre-Feet)

Customer Agency	1990-1995 Average Total Water Use	2000-2005 Average Total Water Use	% Increase/ (Decrease)
Bellflower- Somerset MWC	8,102	6,465	**(20.2%)**
Cal-Water- East LA	20,500	21,098	**2.9%**
Cal-Water- Commerce	2,663	2,689	**1.0%**
City of Bell Gardens	1,204	1,252	**4.0%**
City of Cerritos	12,239	14,644	**19.7%**
City of Downey	16,263	18,297	**12.5%**
City of Huntington Park	5,746	5,826	**1.4%**
City of Lakewood	8,733	9,545	**9.3%**
City of Lynwood	6,710	6,850	**2.1%**
City of Montebello	1,594	1,627	**2.1%**
City of Norwalk	1,358	1,564	**15.2%**
City of Paramount	7,407	7,923	**7.0%**
City of Santa Fe Springs	8,549	8,462	**(1.0%)**
City of Signal Hill	1,908	2,295	**20.3%**
City of South Gate	9,368	11,281	**20.4%**
City of Vernon	8,941	11,729	**31.2%**
LA Co. – Rancho Los Amigos	947	880	**(7.1%)**
La Habra Heights Water District	2,331	2,824	**21.1%**
Maywood MWC No.1	884	941	**6.4%**
Maywood MWC No.2	1,461	1,318	**(9.8%)**
Maywood MWC No.3	1,478	1,518	**2.7%**
Orchard Dale Water District	2,276	2,448	**7.6%**
Park Water Company	10,928	14,043	**28.5%**
San Gabriel Valley WC	5,255	3,555	**(32.4%)**
Southern California WC	30,256	29,998	**(0.9%)**
Suburban Water System	15,743	15,441	**(1.9%)**
Walnut Park Mutual WC	1,491	1,567	**5.1%**
Total	**194,335**	**206,080**	

Source: CBMWD Wateruse Database, 2005

Although some agencies have seen some dramatic shifts in water demand usage over the past 15 years, the overall average per customer agency saw a 5.5% increase in water demand. Some of the significant changes among customer agencies may be attributed to reductions and/or expansions in service area, an increase or decrease 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 Central 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. Central 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 twenty-five 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 Central Basin under normal demand conditions.

Table 2-4
Central Basin's Current and Projected M&I Water Demand[1]
(In Acre-Feet)

District Water Demands	2005[1]	2010	2015	2020	2025	2030
Retail Municipal & Industrial Use						
Groundwater[2]	186,549	202,000	202,000	202,000	202,000	202,000
Imported Water	61,033	59,091	64,691	70,462	76,409	82,535
Recycled Water[3]	5,217	12,900	14,150	15,400	16,650	17,900
Total	**252,799**	**273,991**	**280,841**	**287,862**	**295,059**	**302,435**

[1] The 2005 demands are based on the 2004-05 year, which was considered one of the "wettest" year on record.
[2] Includes groundwater production from the Central and Main San Gabriel Basins (est. 42,000 AF).
[3] Includes Recycled Water sales from Central Basin's service area and Cerritos Water Systems.

As displayed above, the retail demand in Central 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, with imported and recycled water meeting the growth over the next twenty-five years.

2.5.1 Projected Per Capita

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 Central Basin's Service Area

Year	Estimated Population[1] (Millions)	Retail Water Usage[2] (AF)	Per Capita (GPCD)
2005	1.614	252,799	140
2010	1.655	273,991	148
2015	1.712	281,122	147
2020	1.768	287,400	145
2025	1.821	294,650	144
2030	1.873	301,900	144

[1] Information based on MWD Demographic Data, 2005.
[2] Retail Water usage includes recycled water, but does not include replenishment sales.

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 the Barrier with increased deliveries of recycled water. Furthermore, there are projects currently being studied to increase the amount of storm and recycled water at the Spreading Grounds within the Central Basin. Any one of these projects can affect the projections of replenishment water demands.

Below are the estimated replenishment demands over the next 25 years under normal conditions. Although replenishment demands may fluctuate year to year, the overall demand should stay relatively the same because groundwater production within the Central Basin is limited according to the allowable pumping rights each producer is allocated in the Central Basin. 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]	27,600	27,600	27,600	27,600	27,600	27,600
Recycled Water[2]	50,000	50,000	50,000	50,000	50,000	50,000
Total	**77,600**	**77,600**	**77,600**	**77,600**	**77,600**	**77,600**

[1] Imported water demands are based on the Water Replenishment District's projected estimate needs, although they may adjust depending upon groundwater production.
[2] Recycled water is limited to 50,000 AF according to the California Department of Health Service's permit which allows a maximum of 150,000 AF over three years.