

SECTION 2 – WATER DEMANDS

Demand for water in the Authority's service area is divided into two basic categories: municipal and industrial (M&I), and agricultural. M&I use constitutes about 80 to 85 percent of regional water consumption. Agricultural water, used mostly for irrigating groves and crops, accounts for the remaining 15 to 20 percent of demand. This section describes these use categories along with the total historic, current and projected water demands. By 2020 water demands are projected to reach 813,000 AF, which is approximately a 30 percent increase above the 1999 demand of 619,400 AF.

2.1 MUNICIPAL AND INDUSTRIAL WATER DEMAND

M&I demand can be subdivided into residential demand (water used for human consumption in the home, domestic purposes, and residential landscaping) and water used for commercial and industrial purposes.

2.1.1 Residential Demand

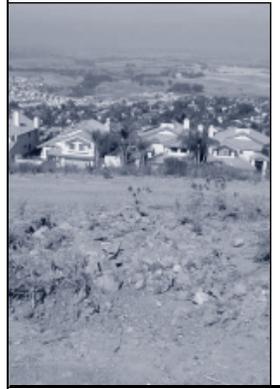
Residential water consumption is composed of both indoor and outdoor uses. Indoor water use includes sanitation, bathing, laundry, cooking, and drinking. Most outdoor water use is to meet landscaping irrigation requirements. Other minor outdoor uses include car washing, surface cleaning, and similar activities. For single-family homes and rural areas, outdoor demands may be as high as 60 percent of total residential use.

Based on SANDAG data, the San Diego regional housing stock composition in 1999 was approximately 59 percent single-family homes, 36 percent multi-family homes, and 5 percent mobile homes. Single-family residences generally contain larger landscaped areas, predominantly planted in turf, and require more water for outdoor application in comparison to other types of housing. The general characteristics of multi-family and mobile homes limit outdoor landscaping and water use, although some condominium and apartment developments do contain green belt areas.

2.1.2 Commercial and Industrial Demand

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

Industrial water consumption consists of a wide range of uses, including product processing and small-scale equipment cooling, sanitation, and air conditioning.





Water-intensive industrial uses in the City of San Diego, such as kelp processing, electronics manufacturing, and aerospace manufacturing, typically require smaller amounts of water when compared to other water-intensive industries found elsewhere in Southern California, such as petroleum refineries, smelters, chemical processors, and canneries.

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

2.2 AGRICULTURAL WATER DEMAND

The coastal and inland valley areas of the county possess a moderate and virtually frost-free climate able to support a variety of sub-tropical crops, making the San Diego area a unique agricultural region. The primary crops grown for the national and international markets are avocados, citrus, cut flowers, and nursery products. To a lesser extent, local fresh market crops and livestock are produced in the Authority's service area. In recent years, agriculture has accounted for 10 to 20 percent of the Authority's total water demand.

The Authority is the largest consumer of agricultural water within Metropolitan's service area, comprising over 60 percent of Metropolitan's total agricultural water demands each year. Agricultural water use within the Authority's service area is concentrated mainly in north county including member agencies such as: Rainbow, Valley Center, Ramona, and Yuima Municipal Water Districts, the Fallbrook Public Utility District, and the city of Escondido.

2.3 TOTAL CURRENT AND HISTORIC WATER USE

Water use in the San Diego area is closely linked to the local economy, population, and weather. Over the last half century a prosperous local economy has stimulated population growth, which in turn produced a relatively steady increase in water demand. However, fluctuating economic and weather conditions in the 1990s and lingering effects from the 1987-1992 drought resulted in deviations from historic demand patterns. By 1999 a new combination of natural population increase and job creation surfaced as the primary drivers of long-term water consumption increases.

Until FY2000, the peak year water demand in the Authority's service area occurred in 1990, when member agency use crested at 646,645 AF. The FY2000 demands did exceed the 1990 historic peak and reached an estimated total water use of 695,000 AF. Following the 1987-1992 drought, the Authority's service area experienced significant reductions in water use. This reduction in water use was attributable to several factors, including the economic recession, water conservation measures implemented by the Authority and its member agencies as a result of the 1987-92 drought, and relatively plentiful rainfall. From 1996 to 1999, yearly water demand remained fairly constant at the low 600,000 AF range, (excluding the 1998 decrease, due to extreme El Niño weather conditions), **Table 2-1** shows the historic water demand within the Authority's service area.

**TABLE 2-1
HISTORIC WATER DEMAND WITHIN
AUTHORITY SERVICE AREA
(1990-2000)**

YEAR	WATER USE (AF)
1990	646,645
1991	585,619
1992	503,210
1993	548,673
1994	536,907
1995	526,053
1996	615,900
1997	621,739
1998	562,225
1999	619,409
2000	695,000

Source: Authority Annual Reports

**FIGURE 2-1
CATEGORIES OF REGIONAL WATER DEMAND-1997**

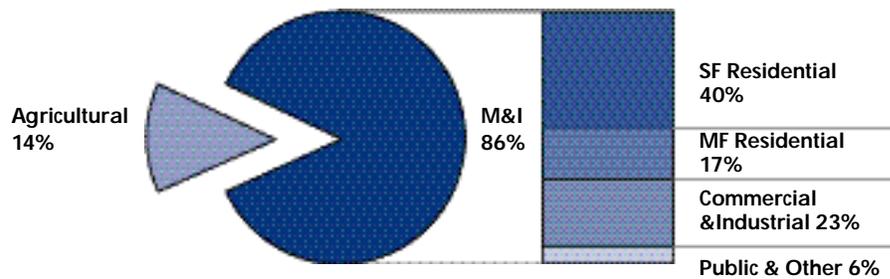


Figure 2-1 shows the relative percentages of various categories of water demand. In this figure, residential demand has been split between single-family residential (SF), and multi-family residential (MF). The "Public & Other" category includes water used for government and institutional purposes, as well as water system losses, including evaporation, meter losses (\pm errors), leaks, and seepage.

2.4 PROJECTED WATER DEMANDS

To forecast future M&I water use, the Authority selected the IWR-MAIN (Institute for Water Resources - Municipal And Industrial Needs) computer model. Versions of this econometric model have evolved over a 20-year period and are being used by many U.S. cities and water agencies. The IWR-MAIN system is designed to translate local demographic, housing, and business statistics into estimates of existing water demand and to utilize projections of local population, housing, and employment to forecast M&I water demand.

The Authority's version of the model, called "CWA-MAIN," utilizes demographic data from SANDAG. In 1992, the Authority and SANDAG entered into a memorandum of agreement (MOA) whereby the Authority agreed to use SANDAG's most recent regional growth forecasts for planning purposes. In addition, the MOA recognizes that water supply reliability must be a component of San Diego County's regional growth management strategy. As required in Proposition C, which was passed by the San Diego County voters in 1988, SANDAG has prepared a growth management strategy that includes a water supply element. The MOA ensures that the water demand projections for the San Diego region are linked with SANDAG's demographic projections and that water supply is a component of the overall regional growth management strategy.

In 1996, the Authority completed the development of a computer model that accounts for local demographic factors. M&I demands forecasted by the model served as the basis for the 1997 Water Resources Plan.

In 1999, the Authority modified the 1996 model to incorporate the latest member agency demographic projections from SANDAG and extend its forecast range from 2015 to 2020. The updated model incorporates SANDAG's 2020 Cities/County demographic forecast for member agencies through 2020.

Projecting future conservation is the last step in the development of the M&I forecast. The Authority developed the estimates of water savings based on implementation of the conservation Best Management Practices and SANDAG demographic information for the period 2000 through 2020. These savings are then used to adjust the baseline forecast.

The future water demands of the Camp Pendleton Military Reservation were forecasted by Camp Pendleton and included in the adjusted M&I forecast and agricultural forecast.

In addition to updating the CWA-MAIN model, a new agricultural water use model has also been developed. The new model estimates agricultural demand met by Authority’s member agencies based on agricultural acreage projections provided by SANDAG, crop distribution data derived from DWR and California Avocado Commission, and average watering requirements.

Table 2-2 shows the total projected water demand for the Authority through 2020. The baseline M&I demand forecast has been adjusted for the estimated water conservation, inclusion of Camp Pendleton demands, and the forecasted agricultural water use added to produce the total projected demand. Water conservation measures are expected to reduce total M&I demands by approximately 12 percent in 2020, with an estimated savings of 93,000 AF/YR. Agricultural demand will decrease about 17 percent over the 20 year period to an estimated demand of 91,500 AF.

**TABLE 2-2
NORMAL YEAR WATER USE FORECASTS
ADJUSTED FOR WATER CONSERVATION
(2005-2020)**

YEAR	M&I BASELINE FORECAST (AF)	ESTIMATED CONSERVATION SAVINGS (AF)	M&I FORECAST REDUCED BY CONSERVATION [†] (AF)	AGRICULTURAL FORECAST ^{‡§} (AF)	TOTAL PROJECTED DEMAND (AF)
2005	643,900	54,900	596,200	109,900	706,100
2010	693,600	74,400	628,100	105,200	733,300
2015	747,100	83,400	672,600	99,400	772,000
2020	805,800	93,200	721,500	91,500	813,000

Source: CWA-MAIN Forecast (July 2000)

[†] Includes M&I demands from Camp Pendleton Marine Corps Base (7,200 AF/YR in year 2005 and 8,900 AF/YR in years 2010, 2015 and 2020).

[‡] Includes non-certified IAWP agricultural water.

[§] Includes agricultural demands from Camp Pendleton Marine Corps Base (1,600 AF/YR in year 2005 and 2,300 AF/YR in years 2010, 2015 and 2020).

**FIGURE 2-2
REGIONAL HISTORIC AND PROJECTED
NORMAL WATER DEMANDS**

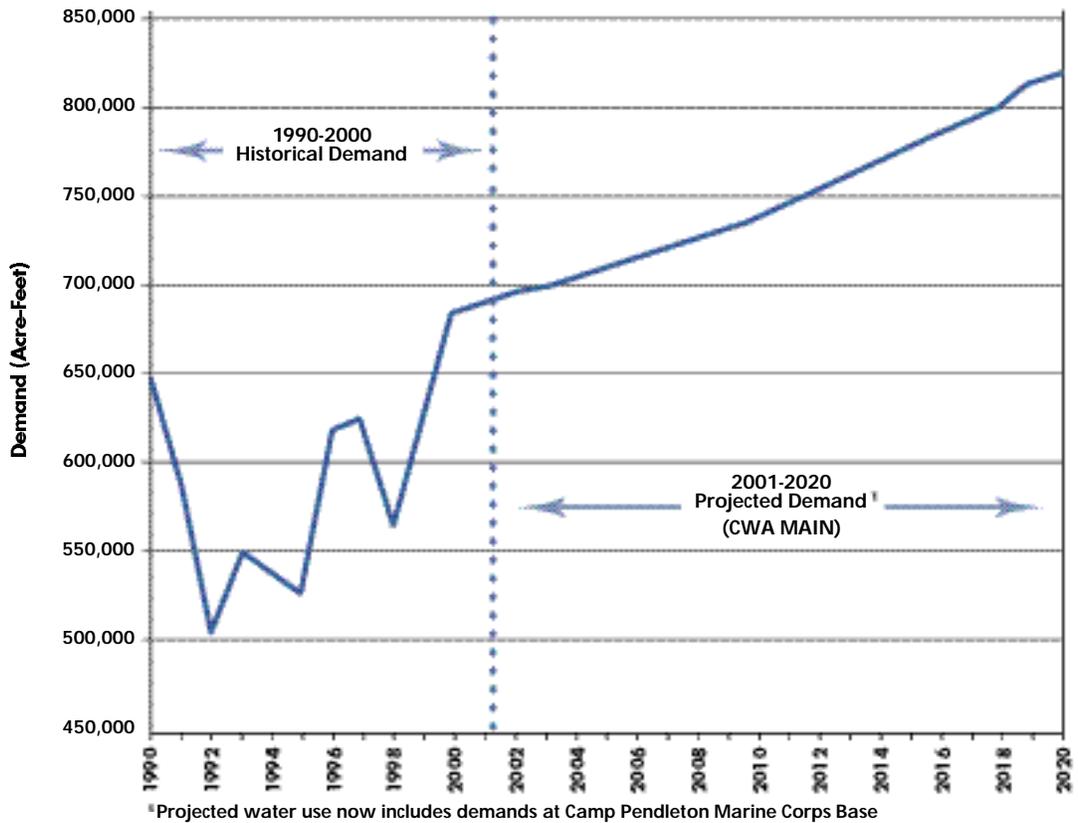


Figure 2-2 shows how water demand is projected to behave over the projected period of 2000 to 2020. This figure combines historical water use and the updated projected demands using the CWA-MAIN model and SANDAG 2020 Cities/County demographic and economic forecast data.