

Section 3

Water Demands

3.1 Overview

3.2 Future Water Demands

Projecting future water demands allows the DWP to determine if future water supply investments are needed to match expected demands. Water demand projections are used to schedule any investments to ensure they are online when needed, thus minimizing cost impacts due to idle facilities, or cost impacts due to inadequate supply. Future water demands here are derived from models being prepared for the DWP Water Master Plan.

3.2.1 Consumptive Water Demand Forecast

Projected water demands in the Water Master Plan were estimated based on water billing data, future land uses as designated in the City and County General Plans, and changes in demographics. For purposes of this UWMP, estimated demand projections are provided to 2025.

To determine the water use by customer type, and the number of customers per type, the DWP customer database was used, as well as zoning and land use data from the City of Big Bear Lake and the County of San Bernardino. The DWP customer database contains the number of multi-family accounts, but does not take into account the number of units per account. In order to determine the actual number of multi-family units, rather than accounts, the land use data from the City and County General Plans was used, and an estimate of the number of multi-family units was derived. The table below lists both the number of single family and multi-family accounts, as well as the number of units of each. For the purposes of BMPs in Section 2, the estimated number of units was used.

In order to more effectively manage the water consumption in their service area, the DWP currently limits the number of new connections allowed to the system each year. The number of new connections allowed is determined by the Board of Commissioners of the DWP each year, and that decision is based on recommendations from the technical staff at the DWP. The number of new connections issued yearly generally ranges from 200-400 new connections, with 160-180 new connections being the recent average.

**Table 3-1
Water Use by Customer Type – Past, Present and Future**

| Year | Water Use Sector | | Single Family | Multi-Family | Comm | Indust | Instit / Gov | Land | Agric | Total |
|------|------------------|-----------------|---------------|--------------|------|--------|--------------|------|-------|--------|
| 2000 | Metered | # of accounts | 13,841 | 34 | 450 | 0 | 31 | 0 | 0 | 14,367 |
| | | Deliveries AF/Y | 1,909 | 122 | 128 | 0 | 576 | 0 | 0 | 2,735 |
| | Un-metered** | # of accounts | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| | | Deliveries AF/Y | NA | 0 | 0 | 0 | 0 | 0 | 0 | NA |
| 2005 | Metered | # of accounts | 14,706 | 46 | 525 | 0 | 39 | 0 | 0 | 15,316 |
| | | # of units | 13,435 | 1,317 | 525 | 0 | 39 | 0 | 0 | 15,316 |
| | | Deliveries AF/Y | 1,657 | 110 | 75 | 0 | 608 | 0 | 0 | 2,450 |
| 2010 | Metered | # of accounts | 15,625 | 62 | 613 | 0 | 49 | 0 | 0 | 16,349 |
| | | # of units | 14,111 | 1,576 | 613 | 0 | 49 | 0 | 0 | 16,349 |
| | | Deliveries AF/Y | 1,863 | 123 | 84 | 0 | 686 | 0 | 0 | 2,757 |
| 2015 | Metered | # of accounts | 16,602 | 84 | 715 | 0 | 62 | 0 | 0 | 17,462 |
| | | # of units | 14,851 | 1,834 | 715 | 0 | 62 | 0 | 0 | 17,462 |
| | | Deliveries AF/Y | 2,069 | 137 | 94 | 0 | 765 | 0 | 0 | 3,065 |
| 2020 | Metered | # of accounts | 17,639 | 114 | 834 | 0 | 78 | 0 | 0 | 18,664 |
| | | # of units | 15,560 | 2,092 | 834 | 0 | 78 | 0 | 0 | 18,664 |
| | | Deliveries AF/Y | 2,3275 | 150 | 104 | 0 | 843 | 0 | 0 | 3,372 |
| 2025 | Metered | # of accounts | 18,741 | 154 | 973 | 0 | 98 | 0 | 0 | 19,966 |
| | | # of units | 16,545 | 2,350 | 973 | 0 | 98 | 0 | 0 | 19,966 |
| | | Deliveries AF/Y | 2,479 | 166 | 113 | 0 | 921 | 0 | 0 | 3,679 |

* The # of accounts for 2010-2025 were estimated based on the average growth during the 2000-2005 time period, weighted towards each customer type based on past development.

** Unmetered accounts are not listed after 2000, when the last unmetered account was converted.

Between 2000 and 2005, the DWP issued an average of 189 new connections to their system. The number of new connections issued in 2005 was 160. Projecting the future demand for each of the customer types was performed based on the average new connections issued from 2000-2005.

One of the unique characteristics of the demographics in the Big Bear Valley is the number of vacant homes in the area. According to the State Department of Finance, 74 percent of the dwelling units within the City of Big Bear Lake are classified as vacant, the majority of these units assumed to be used as vacation homes and/or second homes. A similar percentage of vacant homes occur within the entire Big Bear Valley. When projecting future demands, one must consider the possibility that some of these vacation/second homes might become full-time residences.

Future water demands in the Water Master Plan were based on existing demands and incremental demands resulting from new development and occupancy conversion from part-time equivalent (vacation homes and/or second homes) to full-time equivalent. Currently, approximately 25 percent of existing accounts are considered to consume water as full-time equivalents. Water demand from the development of vacant lots and developed lots that could subdivide was estimated using unit flow factors derived for specific lot sizes. In addition, a percentage of the unit flow factors was randomly assigned to individual parcels to account and replicate the current occupancy distribution.

The potential of occupancy conversion from part-time equivalent to full-time equivalent was also considered when assessing future demand projections. Parcels that are currently consuming water as part-time equivalents (approximately 75 percent of existing parcels) were randomly assigned a probability of conversion to full-time equivalent. This was conducted to account for the possibility that people leaving outside of the service area could retire to the Big Bear Lake area and consume more water on a per unit basis as the residences that are used as vacation or second homes. Many conversion factors were considered to estimate future demands, from maintaining the present 25 percent full-time equivalence to a maximum of 50 percent full-time equivalence. This maximum percentage was considered as the maximum probable conversion that could take place in the service area.

Based on the above considerations of full development and 50 percent full-time equivalence, ultimate water demands were estimated at 4,829 ac-ft per year. At the present time, DWP controls the rate of development within the service area by limiting the number of new connections each year. Over the last 10 years, DWP has issued an average of 198 new connections per year. At this rate and based on an estimated 8,310 undeveloped and sub-dividable parcels, full build out will occur in 42 years or approximately by the year 2045. Assuming a linear increase in demand over the 42 years, a future demand for the years 2010, 2015, 2020, and 2025 was determined.

| Table 3-2 Average Annual Consumptive Water Demand – AF/Y | | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
| Customer Class | Year | | | | | |
| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 |
| Residential | 2,032 | 1,767 | 1,986 | 2,206 | 2,425 | 2,644 |
| Commercial / Industrial | 128 | 75 | 84 | 94 | 104 | 113 |
| Public | 576 | 608 | 686 | 765 | 843 | 921 |
| Total | 2,735 | 2,450 | 2,757 | 3,065 | 3,372 | 3,679 |

3.2.2 Additional Water Uses and Losses

As stated in Section 2, DWP does not actively engage in water exchanges or transfers on a regular basis.

Additional water uses must include unaccounted for water. For future projections and in the model for the DWP Water Master Plan it is assumed that system losses, or unaccounted for water, are 5% of the total amount pumped. This value is based on the percent unaccounted for water in 2004. Table 3-3 presents projected unaccounted for water.

| Table 3-3 Water Losses | | | | | | |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 |
| Demand | 2,735 | 2,450 | 2,757 | 3,065 | 3,372 | 3,679 |
| Unaccounted for water (5%) | 137 | 123 | 138 | 153 | 169 | 184 |
| Total | 2,872 | 2,573 | 2,895 | 3,218 | 3,541 | 3,863 |
| % of 2005 | 111% | 100% | 113% | 125% | 137% | 150% |

3.2.3 Total Water Uses

Total water use is the summation of the consumptive water demands presented in Table 3-2, and the additional water uses in Table 3-3. Table 3-4 summarizes the total future water uses under normal weather conditions.

| Table 3-4 Total Water Demands 2000-2025 | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 |
| Total Demand | 2,872 | 2,573 | 2,895 | 3,218 | 3,541 | 3,863 |