

2 Past and Projected Water Demand

This section evaluates SLVWD's past and current water demand, and presents District water-demand projections that serve as the basis for the conjunctive-use analysis in Section 7.

Given SLVWD's lack of substantial above-ground water storage, its record of raw-water production is closely related to its customers' historical demand for water. Surface water is diverted and treated, and groundwater is pumped, only in response to fairly immediate water demands. Differences between water produced and water delivered represent various system losses.

2.1 Available Information

Table 2-1 gives the number of service connections and monthly water deliveries for SLVWD's entire service area since 1978. Table 2-2 provides a partial record of Mañana Woods monthly groundwater production since 1988; because the former mutual water company was unmetered, there is no record of past water deliveries. Table 2-3 provides a record of SLVWD's monthly water sales to Mount Hermon Association since 2002.

Table 2-4 summarizes the above information on an annual basis and includes values of annual water production, production that is not accounted for (i.e., losses), and average use per service connection. Table 2-4 also provides a detailed breakdown between SLVWD's Northern and Southern Service Areas for 1993-2002, distinguishing between residential and commercial service connections.

Table 2-5 provides a further breakdown of water use by service-connection type for both service areas combined during 2000, 2004, and 2005. The average distributions of water use by service area and connection type are summarized in Table 2-6.

Tables 2-4, 2-5, and 2-7 provide projections of District water-use and population for every fifth year from 2010 to 2030.

Figure 2-1 compares bar charts of water-year rainfall at Ben Lomond and calendar-year water production and deliveries for the Northern and Southern Service Areas individually and combined.

Figure 2-2 presents bar charts of average bi-monthly water deliveries for the entire District and monthly water production for the Northern and Southern Service Areas and Mañana Woods (expressed as a percent of mean annual).

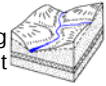
Figure 2-3 contains the following plots of the historical record and future projections:

- a. District-wide population served and number of service connections
- b. District total water production and deliveries
- c. Water use per connection for each service area and connection type
- d. Unaccounted production

2.2 Analysis of Historical Record

SLVWD total water deliveries increased from about 1,000 AF/yr (325 MG/yr) in the late 1970s to an average of about 1,800 AF/yr (580 MG/yr) from 2001 through 2006, increasing at an average rate of about 28 AF/yr (9 MG/yr) (Figures 2-1 and 2-3b). Maximum annual water deliveries of nearly 1,850 AF/yr (600 MG/yr) occurred in 1997.

During 1993-2002, water deliveries in the Northern Service Area increased at an average rate of about 16 AF/yr, reaching nearly 1,450 AF/yr (470 MG/yr). Water deliveries also increased in the Southern Service Area, reaching a peak of nearly 450 AF/yr (145 MG/yr).



Annual water production by SLVWD is on average about 14 percent greater than total water deliveries due to various system losses. Since 2001, annual production has averaged slightly more than 1,700 and 400 AF/yr (560 and 135 MG/yr) in the Northern and Southern Service Areas, respectively. System-wide losses are currently more than 300 AF/yr.

On average, water production and deliveries are greatest in July (about 12 percent of annual) and least in February (5 percent or less of annual) (Figure 2-2). In the Northern Service Area, about 60 percent of annual water use occurs during May to October. Water use during these same months in the Southern Service Area and Mañana Woods is about 65 percent of annual use, reflecting greater demands for landscape irrigation.

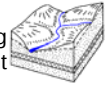
Residential water use comprises roughly 95 and 77 percent of all connections and deliveries, respectively (Table 2-6). As of 2002, residential water use averaged about 225 gallons per day (gpd) in the Northern Service Area and 600 gpd in the Southern Service Area (Table 2-4b). Water use among commercial connections has averaged nearly 1,000 gpd.

Factors influencing SLVWD water production include the following:

1. Population – The population of SLVWD's served area has been increasing and is expected to continue to increase by about 0.3 percent per year (Figure 2-3a). The population served is currently about 20,000.
2. Number of service connections – SLVWD's total number of service connections increased by about 26 per year between 1980 and 1994. Connections jumped by 200 in 1995 when SLVWD began serving communities north of Boulder Creek as a result of the North Boulder Creek Project. Since then, connections have increased by about 17 per year (Figure 2-3a). SLVWD serves approximately 6,000 connections since annexing the Mañana Woods subdivision with about 120 connections.
3. Water use per connection – Among all users, water use per connection increased from an average of about 200 gpd in the early 1980s to about 280 gpd by 2000 (Figure 2-3c). This represents an annual increase of about 3 gpd per connection and 20 AF/yr system-wide. This same trend has been recognized elsewhere and may reflect increased residential occupancy as well as increased water consumption per capita (e.g., due to appliances, landscaping, lifestyle).
4. Water losses – System-wide water losses have varied widely, from about 130 to 450 AF/yr during the available period of record, or about 8 to 24 percent of total production (Figure 2-3d). High losses during 1984-85 may have resulted from 1982-83 storm damage. Apparent high losses in 2005 are unexplained. Excluding these years, losses increased at an average rate of about 8 AF/yr since the 1980s, remaining within about 10 to 15 percent of production.
5. Annual rainfall – Water use tends to be below average during years of above average rainfall, most likely due to reduced landscape irrigation. Conversely, water use tends to be above average during years of below-average rainfall, at least until drought conditions are recognized and SLVWD implements conservation measures. Voluntary conservation appears to continue for a year or more after the end of a drought.

Figure 2-4 compares water-year rainfall to adjusted SLVWD water deliveries for 1977-2005 (both expressed as percent of average). Annual water deliveries were adjusted by removing the approximate +28 AF/yr (9 MG/yr) trend observed since the late 1970s (Figure 2-3b). Given this adjustment:

- Water use declined 5 to 12 percent of average during wet WYs 1982-83, 1998, and 2005 compared to use during the immediately preceding one or two years.



- Water use declined a total of about 10 percent of average during the three years after the start of the WY 1987-92 drought as a result of SLVWD's request for voluntary conservation.
- Beginning two years after each of the last two droughts (1976-77 and 1987-92), water use increased a total of at least 10 percent of average per year for the following several years.

Groundwater production by the Mañana Woods Mutual Water Company ranged between about 63 and 76 AF/yr (20 to 25 MG/yr) based on the partial record available since 1988 (Table 2-2). Assuming 120 service connections, use per connection ranged between 500 and 600 gpd. Since SLVWD began maintaining records for Mañana Woods in July 2006, monthly production has declined and is on track to being 15 to 20 percent below average. This is likely the result of one or both of the following two factors: (1) above average rainfall during WYs 2005 and 2006 and/or (2) installation of water meters.

2.3 SLVWD Projections for 2005-2030

The Urban Water Management Plan guidelines (CDWR, 2005) indicate that potential changes in water-supply conditions should be evaluated for 20 to 25 years into the future. SLVWD has projected its number of service connections and annual water production and deliveries through 2030 based on population projections provided by the Association of Monterey Bay Area Governments (AMBAG) (SLVWD, December 2006). The projections are as follows for 2005 to 2030, assuming average rainfall conditions:

- A 7.8 percent increase in service area population between 2005 and 2030 (Table 2-7).
- An average increase of 18 service connections per year, reaching more than 6,400 by 2030 (including Mañana Woods) (Figure 2-3a).
- Average annual increases in water production and deliveries of 4 to 5 AF/yr (1 to 2 MG/yr). Excluding Mañana Woods, deliveries and production are projected to reach about 1,970 AF/yr (640 MG/yr) and 2,200 AF/yr (720 MG/yr), respectively, by 2030 (Table 2-4).
- Assuming that Mañana Woods production decreases by about 15 percent as a result of metering, total SLVWD production would reach about 2,260 AF/yr (735 MG/yr) by 2030.

These projections indicate the following underlying assumptions:

- Average water use per connection will no longer trend upward but instead stabilize at about 280 gpd (Figure 2-3c). Average water use per connection in the Mañana Woods subdivision will decline to about 450 gpd as a result of metering.
- System-wide water losses will decline from the current annual average of about 14 percent to about 10 percent by 2030 (Figure 2-3d).

These assumptions suggest that SLVWD expects to implement various conservation and leak-repair measures during coming years.