

# **OVERVIEW OF THE ATASCADERO SUBBASIN OF THE PASO ROBLES GROUNDWATER BASIN**

This overview of the Paso Robles Groundwater Basin (Basin) and the Atascadero Subbasin are provided to establish the groundwater setting and identify groundwater issues that may be used to develop groundwater management goals, objectives, and actions as part of the Paso Robles Groundwater Basin Management Plan. The following information was summarized from existing reports and available information for the Basin and the Atascadero Subbasin.

## **Paso Robles Groundwater Basin**

The basin-wide information includes the recent hydrologic conditions and the general groundwater setting of the Paso Robles Groundwater Basin.

### **Groundwater Setting of the Paso Robles Groundwater Basin**

The Paso Robles Groundwater Basin covers about 505,000 acres in southern Monterey County and northern San Luis Obispo County. The Paso Robles Groundwater Basin is subdivided into eight subareas. The groundwater system in the Paso Robles Groundwater Basin consists of the Paso Robles Formation and the shallow alluvial aquifers associated with creeks and rivers.

The shallow alluvial aquifers are present along the Salinas River, Estrella River, Huerhuero Creek, and other tributary creeks. Groundwater stored in the alluvial aquifer system accounts for about two percent of the total groundwater storage in the entire Basin. While the amount of total storage may be small, the alluvial aquifers are a significant source of recharge to the Paso Robles Formation, particularly along the western end of the Basin where the Salinas River is located. The coarse-grained deposits of the shallow alluvium act as an unconfined aquifer.

In areas where the alluvial aquifers are not present, the Paso Robles Formation is exposed at the ground surface. The Paso Robles Formation consists of less permeable, interbedded deposits with highly variable thicknesses and permeability, but is the primary aquifer for most agricultural and municipal users. Groundwater stored in the Paso Robles Formation generally occurs under semi-confined to confined conditions. The two primary sources of recharge to the Paso Robles Formation include the infiltration of precipitation and the percolation of stream flow into the shallow alluvial aquifers that infiltrates the Paso Robles Formation.

The alluvium and Paso Robles Formation rest on older consolidated sediments. Faults have created a conduit to allow water trapped in these older sediments to come to the surface as geothermal water.

There are currently about 150 wells located within the limits of the Paso Robles Groundwater Basin that are monitored by the San Luis Obispo County Department of Public Works and the Monterey County Water Resources Agency (Figure 1). These wells are used to track the changes in groundwater level trends through time at a specific location (presented in well hydrographs), or across an area for a specific date (presented as water level maps).

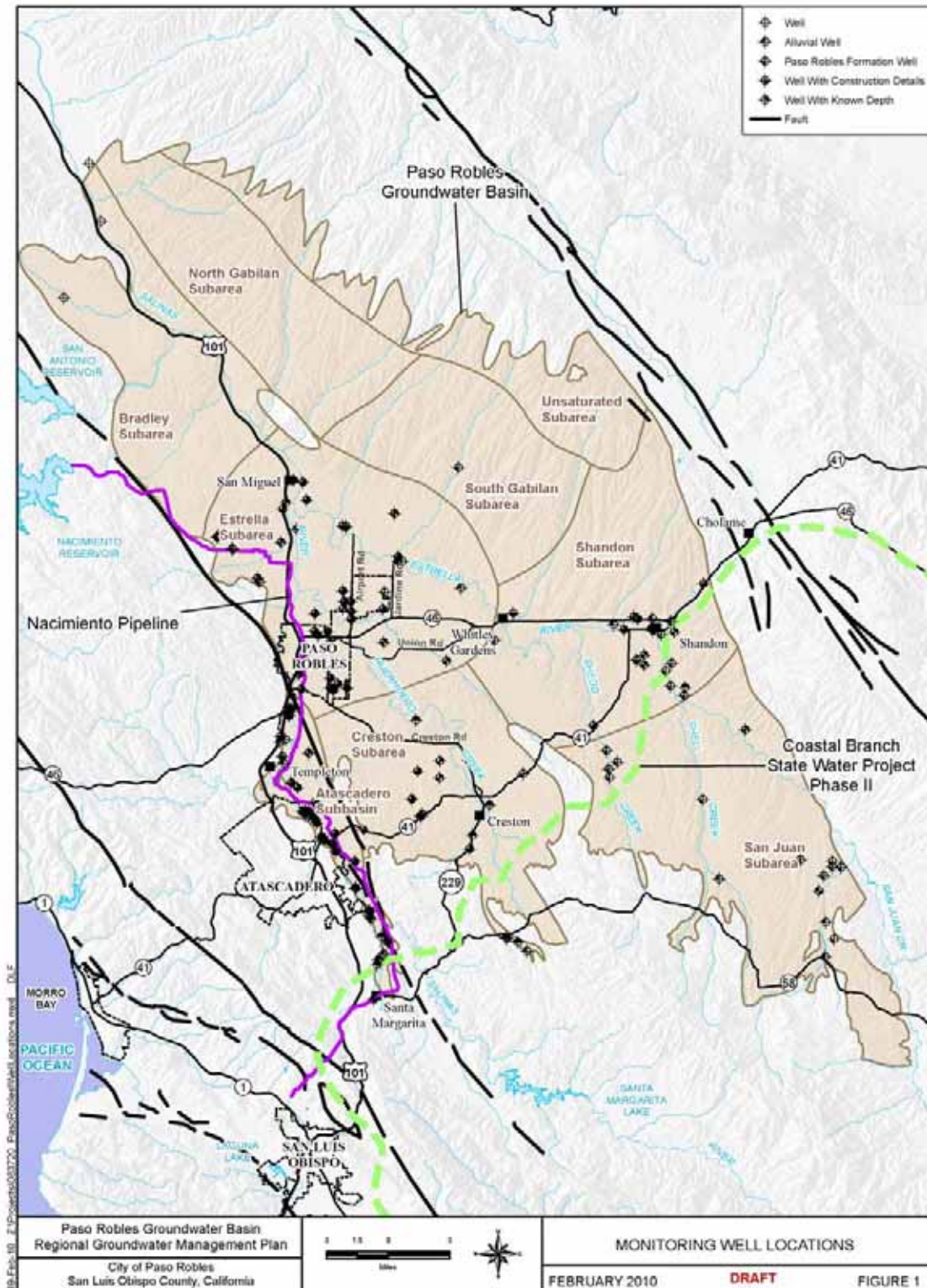


Figure 1. Location of Groundwater Monitoring Wells in the Paso Robles Groundwater Basin

## Recent Hydrologic Conditions

This section summarizes the recent hydrologic conditions for the areas tributary to the Paso Robles Groundwater Basin. The annual precipitation is measured at seven rainfall gauge stations located throughout the Basin to record the geographic variation in rainfall. The Atascadero MWC Station No. 34 is one of the gauges with a long, continuous period of record. The long-term average annual precipitation at this gauge is 17.6 inches per year for the 1916 to 2009 period.

During the 1998 to 2009 period, the Atascadero MWC Station No. 34 averaged 16.7 inches per year. Based on this comparison, the average annual precipitation for the 1998 to 2009 period is somewhat drier than the long-term average.

While the 12-year average for the 1998 to 2009 period may not differ greatly from the long-term average, there is considerable annual variation in precipitation. During the 1998 to 2009 period, the annual precipitation at the Atascadero MWC Station No. 34 ranged from a minimum of 7.6 inches in 2007 to a maximum of 34.6 inches in 2005. Additionally, the last three years (2007 to 2009) received below average rainfall.

## Atascadero Subbasin

The following information for the Atascadero Subbasin includes the recent land and water conditions and local groundwater conditions.

### Land and Water Use

The Atascadero Subbasin is located in the western portion of the Paso Robles Groundwater Basin and has an area of approximately 14,577 acres, which makes up about three percent of the area of the Basin. The Rinconada fault separates the Atascadero Subbasin from the Paso Robles Basin. The Salinas River flows north roughly paralleling Highway 101 through the subbasin, entering the Estrella Subarea of the Basin near the City of Paso Robles.

This subarea includes the City of Paso Robles and the City of Atascadero, community of Templeton. The Atascadero Mutual Water Company (MWC) is the water purveyor to the City of Atascadero, but wastewater treatment is provided by the City of Atascadero. The Templeton Community Services District (CSD) provides potable water and wastewater treatment services to the community of Templeton.

The water use in 2006 totaled about 15,450 acre-feet representing about 17 percent of the water use in the Basin. The water users in the Atascadero Subbasin and their uses are shown in Table 1. In 2006, the entire demand was met with groundwater.

Beginning in 2010, Nacimiento Pipeline will begin delivering surface water to the Atascadero Mutual Water Company (up to 2,000 acre-feet per year) and the Templeton Community Services District (up to 250 acre-feet per year) to offset the municipal groundwater pumping.

**Table 1. Total Estimated Pumping in the Atascadero Subbasin in 2006 (AF)**

Agriculture	Municipal	Small Community	Small Commercial	Rural	Total
1,348	11,735	213	430	1,819	<b>15,454</b>
(9%)	(76%)	<1%	(3%)	(12%)	<b>(100%)</b>

(Todd, 2009)

**Local Groundwater Conditions**

The eastern boundary of the Atascadero Subbasin is the Rinconada fault. Because the fault displaces the Paso Robles Formation, the hydraulic connection between the aquifer across the Rinconada fault is sufficiently restricted to warrant the classification of the distinct Atascadero Subbasin. Outflow (primarily surface flow and Salinas River underflow) from this subbasin enters the Estrella Subarea.

In the Atascadero Subbasin, most production wells extract water from the Salinas River alluvium and the Paso Robles Formation. The alluvial aquifer associated with the Salinas River acts as a primary source of recharge to the Paso Robles Formation. Wells tapping the Salinas River alluvial aquifer tend to be less than 100 feet thick.

**Wells in the Salinas River Alluvium** - Wells perforated in the Salinas River Alluvium typically less than 100 feet total depth with 10 to 30 feet of well screens. Groundwater wells production ranges from < 100 to 700 gallons per minute.

**Wells in Alluvium and Paso Robles Formation** - Wells perforated in the Salinas River Alluvium and the Paso Robles Formation typically less than 100 feet total depth with 10 to 30 feet of well screens. Groundwater wells production ranges from 300 to 500 gallons per minute.

**Wells in Paso Robles Formation** – Wells perforated in the Salinas River Alluvium and the Paso Robles Formation typically less than 200 to 600 feet total depth with well screens ranging from 100 to 300 feet in length. Groundwater wells production ranges from 100 to 800 gallons per.

**Groundwater Flow**

Groundwater flows from areas with higher elevations to lower elevations. Figure 2 shows the groundwater elevations and general flow directions for Spring 2009. Groundwater generally flows to the west, towards the Estrella Subarea, and then north paralleling the Salinas River to the Basin outlet into the Salinas Valley Groundwater Basin. There is a groundwater low (pumping depression) in the Estrella Subarea beneath the City of Paso Robles. There are currently about 33 wells located within Atascadero Subbasin that are included in the groundwater monitoring network.

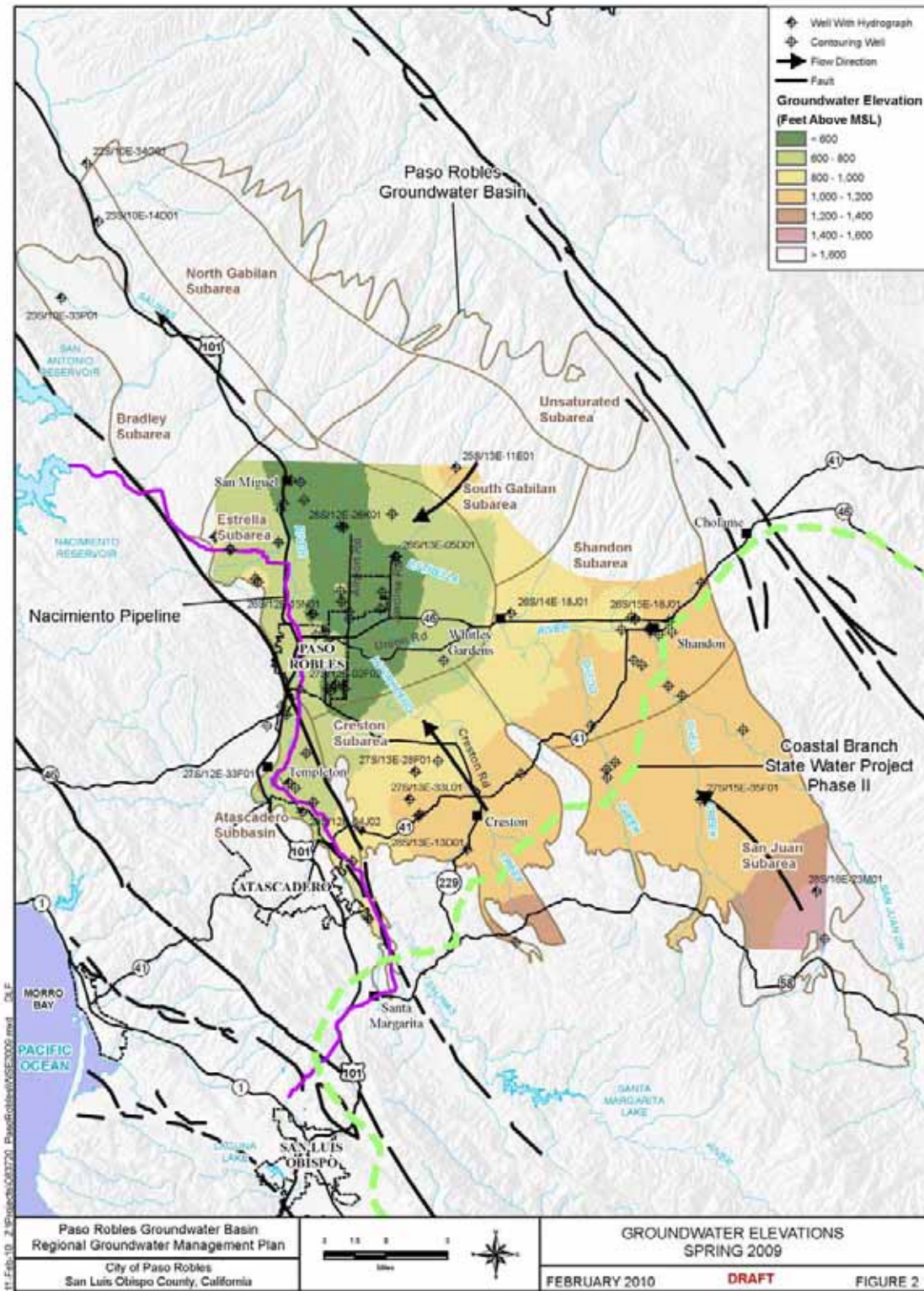


Figure 2. Spring 2009 Groundwater Levels in Paso Robles Groundwater Basin

### Groundwater Levels

Two wells have been identified in the Atascadero Subbasin to demonstrate how groundwater levels have changed through time (well hydrographs) in the alluvial aquifer and the Paso Robles Formation. These wells were selected to represent a range of the conditions in the subarea through an extended period of record. Figures 3 and 4 show the groundwater level trends in key wells in the Atascadero Subbasin. The locations of these wells are shown on Figure 5. A brief discussion is provided for each well.

**Well 28S/12E-4J02** – This well is identified as an alluvial well. It is located adjacent to the Salinas River in the City of Atascadero as shown on Figure 5. Over the 45-year period of record, spring groundwater levels in this well have remained relatively constant at about 780 feet above mean sea level. Fall groundwater levels in this well can be 20 to 40 feet below the spring levels. During the 1998 and 2009 period, spring groundwater levels have declined more than 20 feet. This corresponds to an average annual decline of about 1.5 feet per year. Groundwater levels in the alluvial aquifer are sustained by the percolation from the Salinas River.

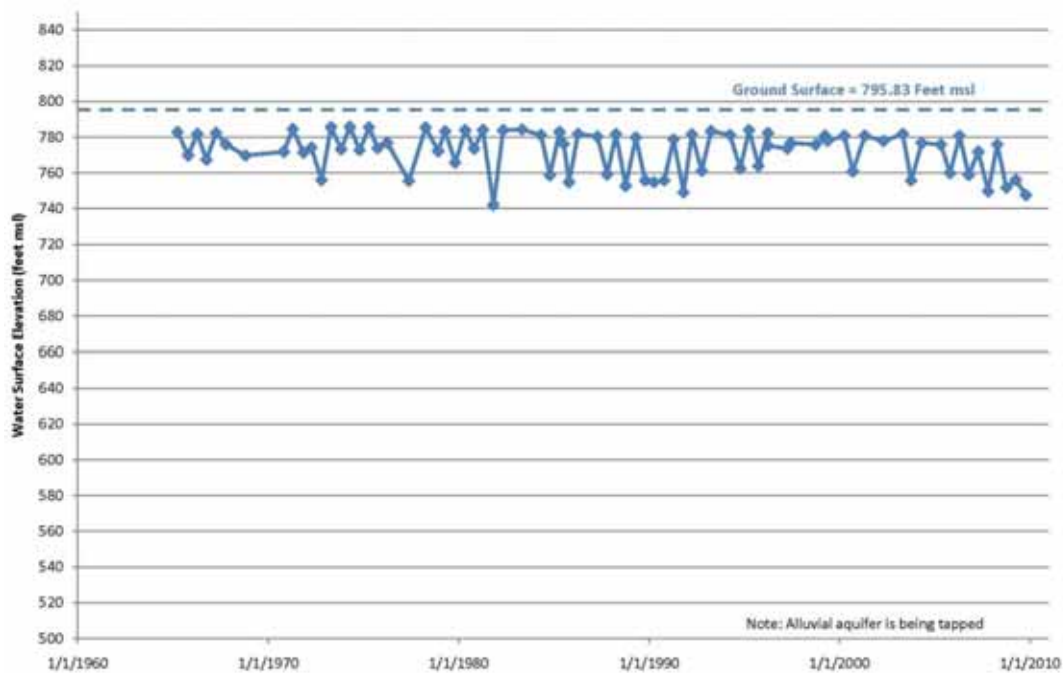
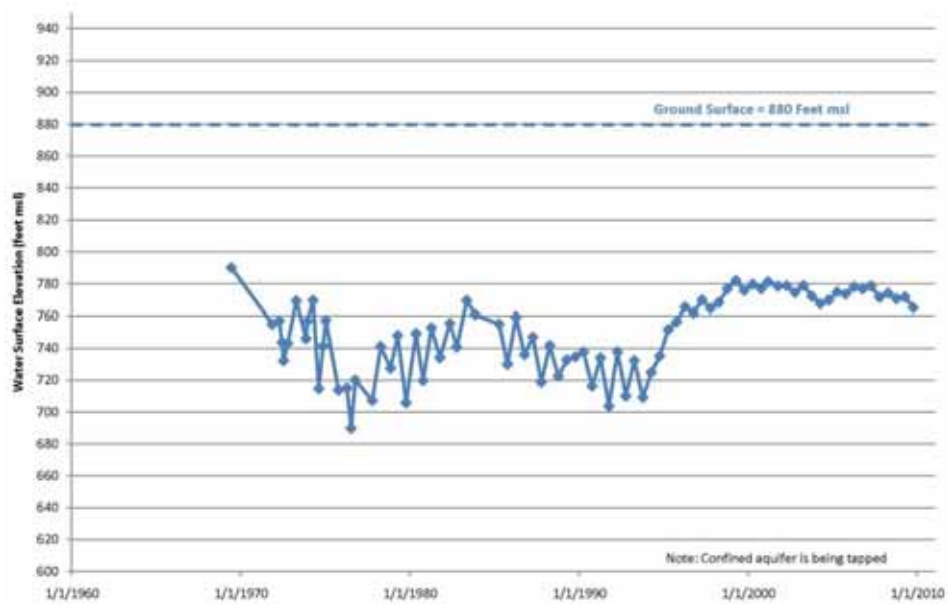


Figure 3. Hydrograph for Well 28S/12E-4J02

**Paso Robles Formation Wells**

**Well 27S/12E-33F01** – This well is identified as extracting water from the Paso Robles Formation. It is located east to the Salinas River between the City of Atascadero and Templeton as shown on Figure 5. This well experienced considerable drawdown from about 1970 to 1995. Spring groundwater levels increase for several years, and have been fairly stable since about 1997. During the 12-year period from 1997 to 2009, spring groundwater levels have been very stable and only show a decline of less than 20 feet. This corresponds to an average annual decline rate of about 1.5 feet during this period. This well shows very little seasonal variation (difference between spring and fall observations) when groundwater levels are above 760 feet msl. When groundwater levels drop below this point, the seasonal variation increases to 20 to 40 feet.



**Figure 4. Hydrograph for Well 27S/12E-33F01**

**Change in Groundwater Storage**

Groundwater levels in the alluvial aquifer system of the Salinas River (as represented by well 28S/12E-04J2 in this discussion) have maintained fairly constant groundwater levels with seasonal fluctuations of less than 20 feet. This occurs because groundwater is pumping from the alluvial aquifer system. It is replaced by infiltration from the Salinas River.

Groundwater levels in the Paso Robles Formation (as represented by well 27S/12E-33F01 in this discussion) shows a larger response to changes in groundwater pumping patterns with declines in groundwater levels during the early to mid-1970s, and again from the mid-1980s to mid-1990s with a period of increasing groundwater levels during the mid-1970s to the mid-1980s. Since the mid-1990s, groundwater levels have increased and remained relatively stable compared to the earlier trends.

Between 1997 and 2009 groundwater levels throughout much of the Atascadero Subbasin have decreased, with some wells near the north part of Atascadero declining by up to 40 feet as shown in Figure 5. A few wells in the northern part of the subbasin showing an increase in groundwater levels during this period.

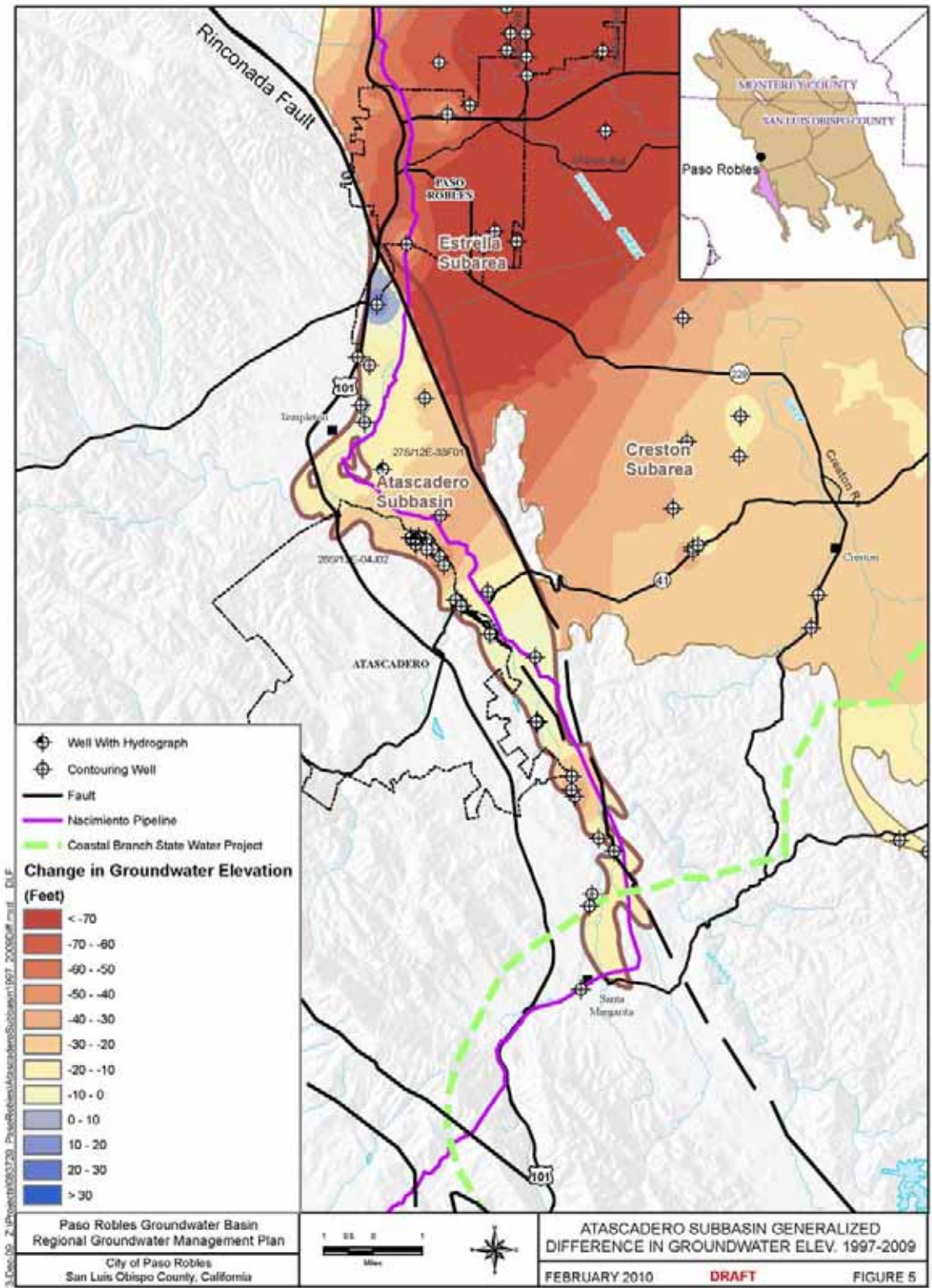


Figure 5. Change in Groundwater Levels in the Atascadero Subbasin for the 1997 to 2009 Period

### **Groundwater Quality Information**

Groundwater quality in the subarea is generally good to moderate for municipal use. Total dissolved solids (TDS), a measurement of the salts in the water, is typically used to assess water quality. For municipal purposes, the TDS should be less than 500 mg/l, but can be usable up to 1,000 mg/l. TDS concentrations in local municipal supply wells, as reported in the 2008 Consumer Confidence Reports, ranged from 420 to 930 mg/l (averaging 665 mg/l) for Atascadero MWC, and ranged from 560 to 1,000 mg/l (averaging 755 mg/l) for Templeton CSD.

Groundwater quality in the subbasin is generally suitable for irrigation without restriction (Fugro and Cleath, 2002).

There is a possible influence of geothermal water on groundwater quality in the hills east of Templeton.

### **References**

Fugro and Cleath, 2002. *Paso Robles Groundwater Basin Study*, August 2002

Fugro, 2010. *Paso Robles Groundwater Basin Balance Review and Update*. February 2010

Todd, 2009. *Evaluation of Paso Robles Groundwater Basin Pumping, Water Year 2006*. May 2009