

## 5. Conclusions and Recommendations

---

### 5.1 Conclusions

Assessment of hydrogeologic conditions in 2008 showed that groundwater levels and general mineral quality in the shallow and deep aquifer zones remain within historical ranges for the SMVMA. As has historically been the case for several decades, the prevailing gradients for groundwater flow in both zones was reduced (flattened) in the vicinity of local pumping near the Santa Maria Airport, but groundwater flow continued through the area toward the coast where groundwater levels remained above sea level. Concentrations of nitrate in groundwater remained near or below reporting limits in the deep aquifer zone, but continued to increase in the shallow zone near Orcutt, where elevated concentrations have resulted in reduction or cessation of municipal pumping from shallow water supply wells. Nitrate concentrations also continued to increase in shallow portions of the confined zone along the coast.

Water requirements, water supplies to meet those requirements, and disposition of water supplies in the SMVMA in 2008 can be summarized as follows. Total water requirements were 133,300 af, comprised of 108,800 af for agricultural irrigation and 24,500 af for municipal supply. Groundwater was the primary water supply, 125,100 af, to meet most of the water demand; the balance of total water requirements was met by 8,200 af of imported water from the State Water Project.

Disposition of agricultural water supply was notably to evapotranspiration by crops, which consumptively used 88,700 af of the applied water; the balance, 20,100 af, returned to the groundwater basin as deep percolation of applied water not consumptively used by crops. About 11,000 af of municipal supply was consumptively used in the service areas of municipal purveyors. The remainder of total municipal supply, about 13,500 af, was processed at waste water treatment plants, after which about 10,000 af are estimated to have returned to the groundwater basin, primarily by surface spreading in infiltration basins and much less through spray irrigation. About 1,350 af are estimated to have been consumed through waste water treatment processes and about 100 af were disposed through deep well injection of waste brine product from reverse osmosis treatment of some municipal waste water. A tabular delineation of total water requirements, water supplies, and disposition of water supplies for the SMVMA is provided in Table 5.1.

**Table 5.1-1**  
**Summary of 2008 Water Requirements, Water Supplies and Disposition**  
**Santa Maria Valley Management Area**  
**(in acre-feet)**

Water Requirements			Water Supplies			
Agricultural	Municipal	Total	Groundwater	Imported SWP Water	Total	
108,800	24,500	133,300	125,100	8,200	133,300	
Disposition						
Agriculture		Municipal				
Consumption	Return Flows	Consumption	Waste Water			
88,700	20,100	11,000	13,500			
			Tmt. Plant Consump.	Return Flows	Disposal To Irrig.	Injection
			1,350	10,030	2,020	100

The preceding components of total water requirements remained consistent with volumes and patterns of demand last summarized about a decade ago; it is intended that data collection and interpretation in 2009 will permit reporting on the intervening decade in the 2009 Annual SMVMA Report.

Conclusions drawn from reporting on conditions in the SMVMA in response to the preceding water demand, supply and disposition are discussed in the following section, which is in turn followed by recommendations for ongoing data collection and future analysis.

Despite siltation that has now filled the former dead pool storage below the conservation pool in Twitchell Reservoir, operation of the Reservoir continued to provide conservation of runoff for subsequent release for groundwater recharge in the SMVMA. Precipitation and reference evapotranspiration in 2008 were close to long-term average, but the area has been experiencing a period of drier-than-average climatic conditions since 2001. As a result, Twitchell releases in 2008 were roughly one-half of the long-term annual average, while streamflows in the Sisquoc River and Orcutt Creek, which are uncontrolled, were slightly above average. General mineral and nitrate concentrations in the Sisquoc River and Orcutt Creek, the only streams in the SMVMA for which water quality data were available, were within historical ranges. As such, Orcutt Creek quality remained degraded with highly elevated dissolved salts and nitrate.

Reported total irrigated acreage and crop distribution in 2008, about 50,000 acres devoted primarily to truck crops, and the associated applied water requirement, about 108,800 af, are consistent with the generally constant trend in agricultural land use and water requirements in the

SMVMA prior to the last reporting on the area a decade ago. At that time, total irrigated cropland had been generally stable between 48,000 and 53,000 acres, with increased truck crop acreage and a decline in pasture, field, and citrus acreages. The associated applied water requirements had also been generally stable in the range of 90,000 to 125,000 afy. The sole source of water supply for agricultural irrigation continues to be groundwater, so groundwater pumping for agricultural purposes was an estimated 108,800 af in 2008.

Recorded municipal water supplies in 2008 were 16,300 af of groundwater and 8,200 af of imported SWP water, for a total municipal water requirement of 24,500 af, which is consistent with the long-term trend of gradually increasing municipal water demand prior to the last reporting on the basin a decade ago. Groundwater pumping for municipal water supply in 2008 was one-third less than a decade ago, when groundwater pumping met the entire municipal water requirement of approximately 23,000 afy. The decrease in municipal groundwater pumping results from the importation and use of SWP water in 2008; those importations approximately equaled or exceeded the minimum annual amounts specified in the Stipulation for the Santa Maria Valley Groundwater Basin for each of the three municipal purveyors.

Finally, the Stipulation delineates four specific criteria that, when all are met in any given year, define a condition of severe water shortage in the SMVMA; those four criteria are:

- chronic decline in groundwater levels (over period of not less than 5 years);
- groundwater level decline not caused by drought;
- material increase in groundwater use during the five year period; and
- groundwater levels below lowest recorded levels.

While groundwater levels in the SMVMA have gradually declined since about 2000, including between 2007 to 2008, groundwater levels observed in 2008 remained well above lowest recorded levels in the SMVMA. Recognizing that generally drier conditions have prevailed over that time, notably resulting in no releases from Twitchell Reservoir in 2002-2004 and 2007, the recent gradual decline in groundwater levels is most likely attributable to climatological conditions, and not to any material increase in groundwater use. While data on recent groundwater use remain to be collected for future annual reporting, groundwater use in 2008 was comparable to use a decade ago. In summary, conditions in the SMVMA do not satisfy any of the criteria delineated in the Stipulation to define a severe water shortage; as a result, it is concluded that there is no severe water shortage in the SMVMA as of 2008.

## **5.2 Recommendations**

In light of basin conditions related to water requirements and supplies, and related to local water resources, there are no apparent pressing needs to change things related to those conditions. Such as this report provides a summary of current conditions, i.e. in 2008, with some historical context, it is recognized that it is necessarily limited as the first annual report under the Stipulation in that it does not include some details over about the last decade. Thus, an obvious first recommendation is that pertinent data be collected during 2009 to allow completion of the historical record of water requirements and supplies over the last decade, and that the data then be interpreted and included in the next annual report.

Such as other data, not currently being collected, impede some aspect of reporting on conditions in the SMVMA, recommendations regarding collection of those data are included in the monitoring program prepared for the TMA in 2008. While implementation of the entire monitoring program will logically be over a period of time, as recognized in the monitoring program itself, progress toward implementation will allow progressively expanded reporting on conditions in the SMVMA in future annual reports. Examples of continued or expanded monitoring include:

- measurement of groundwater levels on a semi-annual basis in all designated wells;
- groundwater quality sample collection and analysis for general minerals, nitrate, and bromide on a biennial basis in all designated water quality wells;
- installation of shallow and deep monitoring wells north of the City of Santa Maria for inclusion in the monitoring program well networks;
- reactivation of stream gauges, in order of priority: 1) Cuyama River (below Twitchell) and Santa Maria River (near Guadalupe), 2) Sisquoc River tributaries (Foxen, La Brea, and Tepusquet Creeks), and 3) Santa Maria River tributaries (Nipomo and Suey Creeks);
- reporting of stream stage with discharge;
- collection and analysis of surface water quality samples from Twitchell Reservoir and streams on a biennial basis; and
- reestablishment of a CIMIS climate station on the Valley floor for the collection of reference evapotranspiration data.

Beyond components of the overall monitoring program, recommendations for additional investigation that derive from this first annual report most notably include:

- investigation of the fate of municipal water supply, most notably as it produces return flows to the aquifer system that, specifically related to provisions in the Stipulation, support the stipulated rights to capture of those return flows
- investigation of the commitments in the Stipulation to comply with the MOU between the City of Santa Maria and the Nipomo CSD for delivery of water from Santa Maria to Nipomo, notably to support the assumption that there is surplus water in the SMVMA that can be exported to the NMMA, to analyze the impacts related to groundwater that will be part of an export from the SMVMA, and to resolve the apparent conflict between the Stipulation and the MOU with regard to minimum importation of SWP water and its use within the SMVMA.

Finally, four points not otherwise included in the monitoring program but useful in future analysis and reporting on the SMVMA include:

- surveying of wellhead reference point elevations;
- definition of municipal water supply well locations (GSWC, Guadalupe) and well completion information (GSWC), with historical groundwater levels, quality, and pumpage;
- improved conveyance of municipal water supply well groundwater level, quality, and pumpage data, and SWP water delivery data, i.e. regular data transmittal through the year as data is collected; and
- development of more detailed crop water use data for principal crops and crop categories