

# 1. Introduction

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This first annual report of conditions in the Santa Maria Valley Management Area, for calendar year 2008, has been prepared to meet the reporting conditions of the June 30, 2005, Stipulation entered by the Superior Court of the State of California, County of Santa Clara in the Santa Maria Valley Groundwater Basin litigation. The Stipulation divided the overall Santa Maria Valley Groundwater Basin into three management areas, the largest of which overlies the main Santa Maria Valley (the Santa Maria Valley Management Area, or SMVMA) and is the subject of this report. The other two management areas, the Nipomo Mesa Management Area and the Northern Cities Management Area, are addressed in separate annual reports.

This report on the SMVMA provides a description of the physical setting and briefly describes previous studies conducted in the groundwater basin, including the recent development of a long-term monitoring program specific to the SMVMA. The report describes hydrogeologic conditions in the management area historically and through 2008, including groundwater conditions, Twitchell Reservoir operations, and hydrologic and climatic conditions. The water requirements and supplies for agricultural and municipal uses are accounted, as are the components of water disposition in the SMVMA. Discussion is included with regard to any finding of severe water shortage, which is concluded to not be the case. Finally, findings and recommendations are drawn with regard to further implementation of monitoring and other considerations that will serve as input to future annual reporting.

This report was commissioned to be prepared in late January, 2009. That timing, combined with the specification in the Stipulation that the annual reports be prepared in the first 120 days of each year, has resulted in this first annual report being slightly limited. The report documents the key items specified in the Stipulation for 2008, i.e. water requirements, water supplies to meet those requirements, disposition of water supplies, and condition of water resources in the SMVMA. However, due to limited available time, data could not be acquired and analyzed to fully summarize water requirements, supplies, and disposition over much of the prior decade, i.e. since the end of the analyses used during the Phase III trial. As reported herein, the Twitchell Management Authority (TMA) commissioned the preparation of a monitoring program for the SMVMA in 2008; the implementation of that monitoring program, beginning in 2009, is expected to result in the acquisition of data such that, in addition to addressing future conditions, the next annual report will include details about water requirements, supplies, and disposition from the late 1990's to present.

## 1.1 Physical Setting

The Santa Maria Valley Management Area (SMVMA) includes approximately 175 square miles of the Santa Maria Valley Groundwater Basin in northern Santa Barbara and southern San Luis Obispo Counties, as shown by the location map of the area (Figure 1.1-1). The SMVMA encompasses the contiguous area of the Santa Maria Valley, Sisquoc plain, and Orcutt upland, and is primarily comprised of agricultural land and areas of native vegetation, as well as the urban areas of Santa Maria, Guadalupe, Orcutt, Sisquoc, and several small developments. Surrounding the SMVMA are the Casmalia and Solomon Hills to the south, the San Rafael

Mountains to the southeast, the Sierra Madre Mountains to the east and northeast, the Nipomo Mesa to the north, and the Pacific Ocean to the west. The main stream is the Santa Maria River, which generally flanks the northern part of the Santa Maria Valley; other streams include portions of the Cuyama River, Sisquoc River and tributaries, and Orcutt Creek.

## **1.2 Previous Studies**

The first overall study of hydrogeologic conditions in the Santa Maria Valley described the general geology, as well as groundwater levels and quality, agricultural water requirements, and groundwater and surface water supplies as of 1930 (Lippincott, J.B., 1931). A subsequent comprehensive study of the geology and hydrology of the Valley also provided estimates of annual groundwater pumpage and return flows for 1929 through 1944 (USGS, Worts, G.F., 1951). A followup study provided estimates of the change in groundwater storage during periods prior to 1959 (USGS, Miller, G.A., and Evenson, R.E., 1966).

Several additional studies have been conducted to describe the hydrogeology and groundwater quality of the Valley (USGS, Hughes, J.L., 1977; California CCRWQCB, 1995) and coastal portion of the basin (California DWR, 1970), as well as overall water resources of the Valley (Toups Corp., 1976; SBCWA, 1994 and 1996). Of note are numerous land use surveys (California DWR, 1959, 1968, 1977, 1985, and 1995) and investigations of crop water use (California DWR, 1933, and 1975; Univ. of California Cooperative Extension, 1994; Hanson, B., and Bendixen, W., 2004) that have been used in the estimation of agricultural water requirements in the Valley. Recent investigation of the Santa Maria groundwater basin provided an assessment of hydrogeologic conditions, water requirements, and water supplies through 1997 and an evaluation of basin yield, possible conditions of overdraft, and associated provisions for such evaluation (LSCE, 2000).

## **1.3 SMVMA Monitoring Program**

Under the terms and conditions of the Stipulation, a monitoring program was prepared in 2008 to provide the fundamental data for ongoing annual assessments of groundwater conditions, water requirements, water supplies, and water disposition in the SMVMA (LSCE, 2008). As a basis for designing the monitoring program, all available historical data on the geology and water resources of the SMVMA were first compiled into a Geographic Information System (GIS). The GIS was utilized to define aquifer depth zones, specifically a shallow unconfined zone and a deep semi-confined to confined zone, into which a majority of monitored wells were then classified based on well depth and completion information. Those wells with inconclusive depth and completion information were designated as unclassified wells. Assessment of the spatial distribution of monitored wells throughout the SMVMA, as well as their vertical distribution within the aquifer system, provided the basis for designation of two monitoring program well networks, one each for the shallow and deep aquifer zones. While the networks are primarily comprised of wells that are actively monitored, they include additional wells that are currently inactive (monitoring to be restarted) and some new wells (installation and monitoring to be implemented). All network wells are to be monitored for groundwater levels, with a subset of those wells to be monitored for groundwater quality, as shown in the maps and tables of the

monitoring program well networks (Figures 1.3-1a and 1.3-1b; Tables 1.3-1a through 1.3-1c). The SMVMA monitoring program is included in Appendix A.

Another use of the GIS was for evaluation of actively and historically monitored surface water and climatic gauges by location and period of record, specifically for Twitchell Reservoir releases, stream discharge, precipitation, and reference evapotranspiration data. Assessment of the adequacy of coverage of the gauges throughout the SMVMA provided the basis for designation of the network of surface water and climate gauges in the monitoring program. The network includes gauges currently monitored as well as those that are inactive (gauges and monitoring potentially reestablished). For Twitchell Reservoir, stage, storage, releases, and water quality are to be monitored; for surface streams, all current gauges are to be monitored for stage, discharge, and quality (potential gauges monitored for stage and discharge); and for climate, the current and potential gauges are to be monitored for precipitation and reference evapotranspiration data, as shown in the map of the surface water and climate monitoring network (Figure 1.3-2).

In addition to the hydrologic data described above, the monitoring program for the SMVMA specifies those data to be compiled to describe agricultural and municipal water requirements and water supplies. These include land use surveys to serve as a basis for the estimation of agricultural irrigation requirements, and municipal groundwater pumping and imported water records, including any transfers between purveyors. Lastly, the monitoring program for the SMVMA specifies water disposition data be compiled, including treated water discharged at waste water treatment plants (WWTPs) and any water exported from the SMVMA. As part of this accounting, estimation will be made of agricultural drainage from the SMVMA and return flows to the aquifer system.

In order to complete this annual assessment of groundwater conditions, water requirements, water supplies, and water disposition in the SMVMA, the following data for 2008 were acquired from the following sources and compiled in the GIS; as noted above, it is intended that subsequent annual reports will incorporate data from several years prior to 2008 in order to complete the historical record which, in this first annual report, has a number of data gaps from the late 1990's through 2007.

- groundwater level and quality data: the US Geological Survey (USGS), the Technical Group for the adjacent NMMA (NMMA TG), the City of Santa Maria, and Golden State Water Company;
- Twitchell Reservoir stage, storage, and release data: the Santa Maria Valley Water Conservation District (SMVWCD);
- surface water discharge and quality data: the USGS;
- precipitation data: the National Oceanic and Atmospheric Administration (NOAA), California Department of Water Resources (DWR), and SMVWCD;

- evapotranspiration data: the California DWR, including California Irrigation Management Information System (CIMIS), and SMVWCD;
- agricultural land use data: Santa Barbara and San Luis Obispo County Agricultural Commissioner's Offices;
- municipal groundwater pumping and imported water data: the City of Santa Maria, the City of Guadalupe, and the Golden State Water Company; and
- treated municipal waste water data: the City of Santa Maria, the City of Guadalupe, and the Laguna Sanitation District.

## 1.4 Report Organization

To comply with items to be reported as delineated in the Stipulation, this first annual report is organized into five chapters:

- this *Introduction*;
- discussion of *Hydrogeologic Conditions*, including groundwater, Twitchell Reservoir, surface streams, and climate;
- description and quantification of *Water Requirements and Water Supplies* for the two overall categories of agricultural and municipal land and water use in the SMVMA;
- description and quantification of *Water Disposition* in the SMVMA; and
- summary *Conclusions and Recommendations* related to water resources, water supplies, and water disposition in 2008, and related to ongoing monitoring, data collection, and interpretation for future annual reporting.