

Memorandum



DATE: November 9, 2020

TO: Sierra Valley Groundwater
Management District

COPY TO: _____

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SUBJECT: **Sierra Valley GSP Development Progress Update**

The Larry Walker Associates consultant team (LWA team) began work to develop a Groundwater Sustainability Plan for the Sierra Valley Basin at the end of August 2020. Progress to date is summarized below.

GSP DEVELOPMENT: DATA COLLECTION

Initial tasks have focused on reviewing existing information, compiling and evaluating existing data, building the data management system (DMS) and hydrologic model, and developing sustainable management criteria for water quality and subsidence.

Progress includes:

- Water level data from public sources (e.g., DWR, GAMA, etc.) for 146 wells for September 1957-September 2020 incorporated into DMS
- Water quality data also compiled for 206 wells from GAMA with a focus on 150 wells that have been sampled since 1980
- Online data portal has been set up to make data available to stakeholders and includes available well data, crop maps, geology and surface water features
- Data collected by Bachand & Associates is in the process of being incorporated into the DMS
- Began development of Soil-Water Budget Model
- Began setting up PRMS model for basin headwaters
- Initial collection and evaluation of subsidence data
- Evaluation of available water level and water quality data. Identified boron, iron, manganese and TDS as constituents for which exceedances of regulatory thresholds have been measured
- Compilation and validation of climate data for surface water model
- Initial outreach to CDFW to obtain vegetation mapping data to support evaluation of GDEs

- Requested operations and flow data for Frenchman Lake and Lake Davis and annual pumping data in Sierra Valley
- Began review of Satellite InSAR data and ground surveys conducted by DWR (1983), Plumas County (1983) and Caltrans (2016) for evaluation of subsidence

Next steps include:

- Importing water quality and soils data and model domain boundaries into the DMS
- Begin conducting initial surface water and soil/water budget model runs by early December

GSP DEVELOPMENT: SUSTAINABLE MANAGEMENT CRITERIA (SMC)

Groundwater quality SMC

Groundwater quality data available from the state GAMA (Groundwater Ambient Monitoring and Assessment Program) program has been collected and analyzed. Data are available for 206 wells with the following details:

- 31 Deep (greater than 200 feet)
- 29 Shallow (less than 200 feet)
- 146 Unknown depth
- Well Type
- Monitoring (51), Municipal (17), Unknown (138)
- Reviewed 189 unique analytes
- Time period (earliest to latest)
- 5/11/1955 – 7/6/2020

Based on these data, a list of potential constituents of concern is being developed to assist in the development of SMC for groundwater quality.

During the TAC meeting on November 2nd, preliminary analysis was presented and some information was provided regarding the role of the GSA with respect to groundwater quality.

- Existing regulatory agencies (and programs): SWRCB/RWBs, DTSC, DPR
- GSAs are the main steward of groundwater basin sustainability (closer to the “pulse” than the State)
- GSAs have monitoring duties
- In case of man-made pollution: the GSAs may act as a proactive “facilitator” to move forward on processes that protect groundwater quality
- For recharge / pumping projects:
 - Consider effects on existing man-made pollution
 - Consider effects on existing naturally occurring contaminants

Subsidence SMC

Information used to develop subsidence SMC will be presented at the December 7th TAC meeting. A preliminary summary regarding subsidence is presented below:

The various data available for Sierra Valley show that inelastic subsidence has occurred in the recent past and likely continues to the present. While the subsidence has occurred in varying areas in Sierra Valley, it has overlapped with areas known to have significant groundwater pumping in all cases. The geology present in Sierra Valley, which is typical of mountain valleys in California, are dominantly eroded alluvial sediment deposits consisting of clay, silt, sand, and gravel. These deposits, particularly

the clay deposits, are susceptible to inelastic subsidence when heavy groundwater pumping is present.

The first account of recorded subsidence in Sierra Valley was by the California Department of Water Resources (DWR; 1983). DWR (1983), along with Plumas County Road Department surveys, reported that inelastic subsidence occurred in the Sierra Valley and was consistent within the expected range considering the amount of groundwater decline observed (about 1-2+ feet of subsidence during the period of approximately 1960-1983). The subsidence during the period of 1983-2012 is unaccounted for as we have not found any reports accounting for subsidence during this period. The California Department of Transportation (CalTrans) conducted a survey where they collected data suggesting subsidence of about 0.3 to 1.9 feet occurring during the period of 2012 to 2016, which also coincided in areas of heavy groundwater pumping. Satellite-based InSAR data from a NASA JPL study shows widespread subsidence in the northeast part of Sierra Valley with up to 0.5 feet of vertical displacement during the period of 2015-2016 alone and up to 1.2 feet of vertical displacement (at least) during the period of March 2015 to November 2019 in large areas, but is likely to be more in smaller areas. A similar InSAR study from DWR/TRE Altamira (2020) shows subsidence of up to 0.6 +/- 0.1 feet over widespread areas, potentially higher in smaller areas, during the period of June 2015 to September 2019. They estimated an annual subsidence rates of up to 0.15 +/-0.1 feet/year in this same study.

Methodologies currently exist to monitor subsidence in Sierra Valley and manage this issue for SGMA GSP compliance. The main methods currently available are ground-based surveying and satellite-based InSAR. However, it is unclear how much longer InSAR data will be available for Sierra Valley (JPL is no longer funded by DWR to provide this data and the DWR/TRE Altamira studies may not continue to be published annually after 2021/2). There are no known GPS stations or extensometers installed in Sierra Valley. It is possible for the GSA to obtain funding to install continuous GPS stations for monitoring subsidence to augment periodic ground-based elevation surveys.

OUTREACH AND PROJECT ADMINISTRATION

In addition to the work done developing elements of the GSP, the LWA team has worked with the Planning Committee to

- Plan for and convene the first TAC meeting on November 2nd
- Review and update the Communication and Engagement Plan
- Provide updates at the September and October Board meetings.
- Develop an approach to implementing tasks under Category (d) of the Grant Agreement