6. Water Budgets

This chapter summarizes the estimated water budgets for the Atascadero Area Groundwater Sub-basin of the Salinas Valley Basin (Basin), including information required by the SGMA Regulations and information that is important for developing an effective GSP to achieve sustainability. In accordance with the SGMA Regulations §354.18, the GSP should include a water budget for the basin that provides an accounting and assessment of the total annual volume of surface water and groundwater entering and leaving the basin, including historical, current, and projected water budget conditions, and the change in the volume of water stored. The regulations require that the water budgets be reported in graphical and tabular formats, where applicable.

6.1 Overview of Water Budget Development

This section is subdivided into three sections: historical, current, future water budgets. Within each section, a surface water budget and groundwater budget are presented. Water budgets were developed using computer models of the Basin hydrogeologic conditions. Before presenting the water budgets, a brief overview of the models is presented. Appendix 6A provides additional information about the models and compares previously reported water budgets to the water budgets developed for this GSP.

The water budgets reported herein are for the Basin defined in Section 1.2 – Description of Atascadero Basin and depicted on Figure 1-1.

The safe yield of a groundwater basin is the volume of pumping that can be extracted from the basin on a long-term basis without creating a chronic and continued lowering of groundwater levels and groundwater in storage volumes. The safe yield is not a fixed constant value, but is a dynamic value that fluctuates over time as the balance of the groundwater inputs and outputs change; thus, the calculated safe yield of the Basin will be estimated and likely modified with each future update of the GSP.

Safe yield is not the same as sustainable yield. Sustainable yield is defined in SGMA as “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus that can be withdrawn annually from a groundwater supply without causing an undesirable result.” An undesirable result is one or more of the following effects on the six sustainability indicators:

1. Chronic lowering of groundwater levels in the aquifer(s)
2. Significant and unreasonable reduction of groundwater in storage
3. Significant and unreasonable degradation of water quality
4. Sea water intrusion

5. Significant and unreasonable land subsidence that interferes with surface land uses
6. Depletion of interconnected surface water that has significant and unreasonable adverse impacts on beneficial uses of surface water

Defining the safe yield of a groundwater basin provides a starting point for later establishing sustainable yield by considering each of the six sustainability indicators listed above.

Section 354.18 of the SGMA Regulations requires development of water budgets for both groundwater and surface water that provide an accounting of the total volume of water entering and leaving the basin. To satisfy the requirements of the regulations, a surface water budget was prepared for the Atascadero Basin and an integrated groundwater budget was developed for each water budget period for the combined inflows and outflows for the two principal aquifers – Alluvial Aquifer (including the Salinas River alluvial aquifer and associated tributaries; Section 4 – Basin Setting) and Paso Robles Formation Aquifer. Groundwater is pumped from both aquifers for beneficial use.

Figure 6-1 presents a general schematic diagram of the hydrologic cycle. The water budgets include the components of the hydrologic cycle.

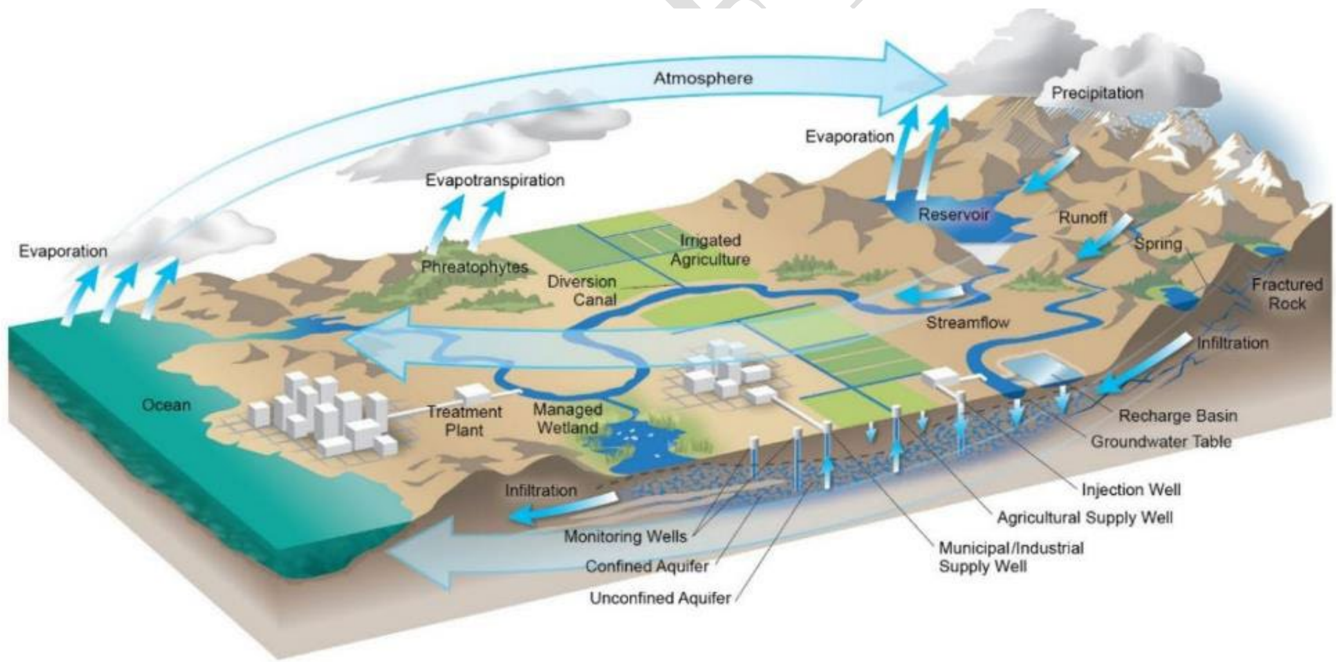

Figure 6-1. Hydrologic Cycle (Source: DWR 2016a)

A few components of the water budget can be measured, like streamflow at a gaging station or groundwater pumping from a metered well. Other components of the water budget are estimated, like recharge from precipitation or unmetered groundwater pumping. The water budget is an inventory and accounting of total surface water and groundwater inflows (recharge) and outflows (discharge) from the Basin, including:

Surface Water Inflows:

- Runoff of precipitation and reservoir releases into streams and rivers that enter the Basin from the surrounding watershed
- Imported surface water (e.g., NWP)

Surface Water Outflows:

- Streamflow exiting the Basin
- Percolation of streamflow to the groundwater system
- Evaporation

Groundwater Inflows:

- Recharge from precipitation
- Subsurface groundwater inflow
- Irrigation return flow (water not consumed by crops/landscaping)
- Percolation of surface water from streams
- Percolation of treated wastewater from disposal ponds
- Percolation of imported surface water (e.g., NWP)

Groundwater Outflows:

- Evapotranspiration
- Groundwater pumping
- Subsurface outflows to the adjoining, downgradient groundwater basins
- Groundwater discharge to surface water

The difference between inflows and outflows is equal to the change in storage.

6.2 Water Budget Data Sources and Basin Model

Water budgets for the Basin were estimated using an integrated system of three hydrologic models (collectively designated herein as the "basin model"), including:

1. A watershed model
2. A soil water balance model
3. A groundwater flow model

The groundwater model was originally developed by Fugro et. al. (2005). The watershed and soil water balance models were developed and integrated with an updated version of the groundwater model by Geoscience Support Services, Inc. (GSSI 2014; 2016). These models were developed for SLOFCWCD. The domain of these models encompasses an area that includes both the Paso Robles Subbasin and the Basin as well as a portion of the Salinas Valley – Upper Valley Aquifer Subbasin north of the Monterey County line[28]. The original models are documented in the following reports:

- Final Report, Paso Robles Groundwater Basin Study Phase II, Numerical Model Development, Calibration, and Application: (Fugro et. al. 2005)
- Paso Robles Groundwater Basin Model Update (GSSI 2014)
- Refinement of the Paso Robles Groundwater Basin Model and Results of Supplemental Water Supply Options Predictive Analysis (GSSI 2016)

The GSSI 2016 version of the basin model was updated by Montgomery & Associates (M&A; 2020) for the Paso Robles Subbasin GSP. Because the model domain of the basin model encompasses the entirety of the original Paso Robles Basin (Fugro and Cleath;2002), the basin model simulates groundwater flow conditions and water budgets for both the Paso Robles and the Atascadero subbasins.

The M&A (2020) basin model update included updating the GSSI 2016 basin model by incorporating hydrologic data for the period 2012 through 2016 into the models. Appendix 6A includes a brief summary of the model update process, including:

- A summary of data sources used for the update (Table 6A-1 in Appendix 6A)
- A summary of modifications made to the basin model to address computational refinements, data processing issues, and conceptual application of the model codes

The updated versions of the basin models are referred to herein collectively as the "GSP model". The GSP model has been utilized for both the Atascadero Basin GSP and the Paso Robles Subbasin GSP as the model domain covers large portions of both basins.

Numerous sources of raw data were used to update the basin models for the GSP. Examples of raw data include metered pumping and deliveries from the Atascadero MWC, Templeton CSD, and the city of Paso Robles, precipitation data obtained from weather stations in the Basin, and crop acreage from the office of the San Luis Obispo County Agricultural Commissioner, among many others. Data sources are listed in Appendix 6A, Table 6A-1. Raw data were compiled, processed, and used to develop model input files. Model results were used to develop estimates of the individual inflow and outflow components of the surface water and groundwater budgets. Thus, all the estimated flow components herein were extracted from the GSP model.

[28] The domain of the Fugro 2005 model and subsequent model updates completed by GSSI (2014 and 2016) were designed to encompass the area defined as the Paso Robles Groundwater Basin by Fugro in 2002. The 2002 Fugro study defined the lateral and vertical extent of the Paso Robles Groundwater Basin, which included a portion north of the Monterey County line and identification of the Atascadero Subbasin (Basin) as a hydrogeologically distinct portion of the basin. The basin extents defined by Fugro (2002) varies slightly from the basin extents defined in the current DWR Bulletin 118 (DWR 2016b).

6.2.1 *Model Assumptions and Uncertainty*

The GSP model is based on available hydrogeologic and land use data from the past several decades, previous studies of Basin hydrogeologic conditions, and earlier versions of the basin models. The GSP model gives insight into how the complex hydrologic processes are operating in the Basin. During previous studies, available data and a peer-review process were used to calibrate the basin model to Basin hydrogeologic conditions. Results of the previous calibration process demonstrated that the model-simulated groundwater and surface water flow conditions were similar to observed conditions. The GSP model was not recalibrated. However, after updating it for this GSP, calibration of the model was reviewed and found to be similar to the previous model. The groundwater flow model module of the GSP model does not cover the northwestern upland portion of the Atascadero Basin (as defined by DWR Bulletin 118, DWR 2016) so groundwater processes have not been modeled in this area, yet, the watershed model does include this area so contributing surface and subsurface flows from this upland area have been incorporated into the GSP model; therefore, use of the GSP model was considered appropriate for development of the Atascadero Basin GSP.

Projections made with the GSP model have uncertainty due to limitations in available data and assumptions made to develop the models. Model uncertainty has been considered when developing and using the reported GSP water budgets for developing sustainability management actions and projects (Section 9 – Project Management Actions).

New data will be collected and/or refined throughout the early implementation of this GSP (after adoption by the GSA). The information will be used to recalibrate and potentially expand the domain of the GSP model, and perhaps develop a stand-alone, Atascadero Basin-specific groundwater flow model rather than continued utilization of the coupled Paso Robles Subbasin/Atascadero Basin model. New hydrologic data and a calibrated model will be used to simulate impacts from proposed sustainability management actions, and possible water resource improvement projects, to monitor that progress toward the sustainability goal is being achieved.

6.3 Historical Water Budget

The SGMA Regulations require that the historical surface water and groundwater budget be based on at least the most recent 10 years of data. The period 1981 to 2011 was selected as the time period for the historical water budget (referred to as the historical base period) because it is long enough to capture typical climate variations, it corresponds to the period simulated in the basin model, and it ends at about the time the latest drought period began. Estimates and assumptions of the surface water and groundwater inflows and outflows, and changes in storage for the historical base period are provided below.

6.3.1 *Historical Surface Water Budget*

The SGMA Regulations (§354.18) require development of a surface water budget for the GSP. The surface water budget quantifies important sources of surface water and evaluates their historical and future reliability. The water budget Best Management Practice (BMP) document states that surface water sources should be identified as one of the following (DWR 2016a):

- Central Valley Project
- State Water Project
- Colorado River Project
- Local imported supplies
- Local supplies

The Basin relies on two of these surface water source types: local imported supplies and local supplies.

6.3.1.1 Historical Local Imported Supplies

As described in Section 4.7.1 – Groundwater Recharge Areas, the NWP regional raw water transmission facility delivers water from Lake Nacimiento to communities in San Luis Obispo County, including Atascadero MWC, Templeton CSD, and the city of Paso Robles. Templeton CSD has an allocation of 406 AFY of NWP water and began taking deliveries in 2011. A total of 74 acre-feet was taken by Templeton CSD in 2011 and constitutes the only NWP deliveries in the historical period. Atascadero MWC and the city of Paso Robles began taking deliveries in 2012 and 2013, respectively (these deliveries will be discussed further in Section 6.4 – Current Water Budget). Within the Basin, all three municipal purveyors utilize their imported NWP water to recharge the Basin via percolation ponds or direct discharge located in the Alluvium adjacent to the Salinas River[29]. Table 6-1 summarizes the annual average, minimum, and maximum values for the imported NWP water during the historical base period.

6.3.1.2 Historical Local Supplies

Local surface water supplies include surface water flows that enter the Basin from precipitation runoff within the watershed and Salinas River inflow to the Basin (including releases from the Salinas Reservoir). Table 6-1 summarizes the annual average, minimum, and maximum values for these inflows.

Table 6-1. Estimated Historical (1981-2011) Annual Surface Water Inflows to Basin

Surface Water Inflow Component	Average	Minimum[2]	Maximum[2]
Inflow to Basin including the Salinas River and Tributaries[1]	90,600	1,400	407,800
Imported (NWP)	2	0	74

[29] The city of Paso Robles utilizes their NWP allocation in two ways: treatment in a package water treatment plant and applying directly to the ground surface on the alluvial gravels of the Salinas River floodplain in the north end of the Basin. The treated portion of NWP water is used outside of the Basin and is therefore not considered.

Total	90,600		

Notes:
All values in acre-feet
[1] Tributaries include Santa Margarita, Paloma, Atascadero, Graves, and Paso Robles creeks.
[2] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

The estimated average annual total inflow from these sources over the historical base period is about 90,600 AF. The largest component of this average inflow is releases and flow in the Salinas River. The large difference between the minimum and maximum inflows reflects the difference between dry and wet years in the Basin.

6.3.1.3 Historical Surface Water Outflows

The estimated annual average total surface water outflow leaving the Basin as flow in the Salinas River, and percolation into the groundwater system over the historical base period is summarized in Table 6-2.

Table 6-2. Estimated Historical (1981-2011) Annual Surface Water Outflows from Basin

Surface Water Outflow Component	Average	Minimum[1]	Maximum[1]
Salinas River Outflow from Basin	83,500	300	380,600
Streamflow Percolation	7,100	1,100	27,200
NWP Percolation	2	0	74
Total	90,600		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

The estimated average annual total outflow from these sources over the historical base period is about 90,600 AF. The largest component of this average outflow is the Salinas River. The large difference between the minimum and maximum outflows reflects the difference between dry and wet years in the Basin.

6.3.1.4 Historical Surface Water Budget

Figure 6-2 summarizes the historical surface water budget for the Basin.

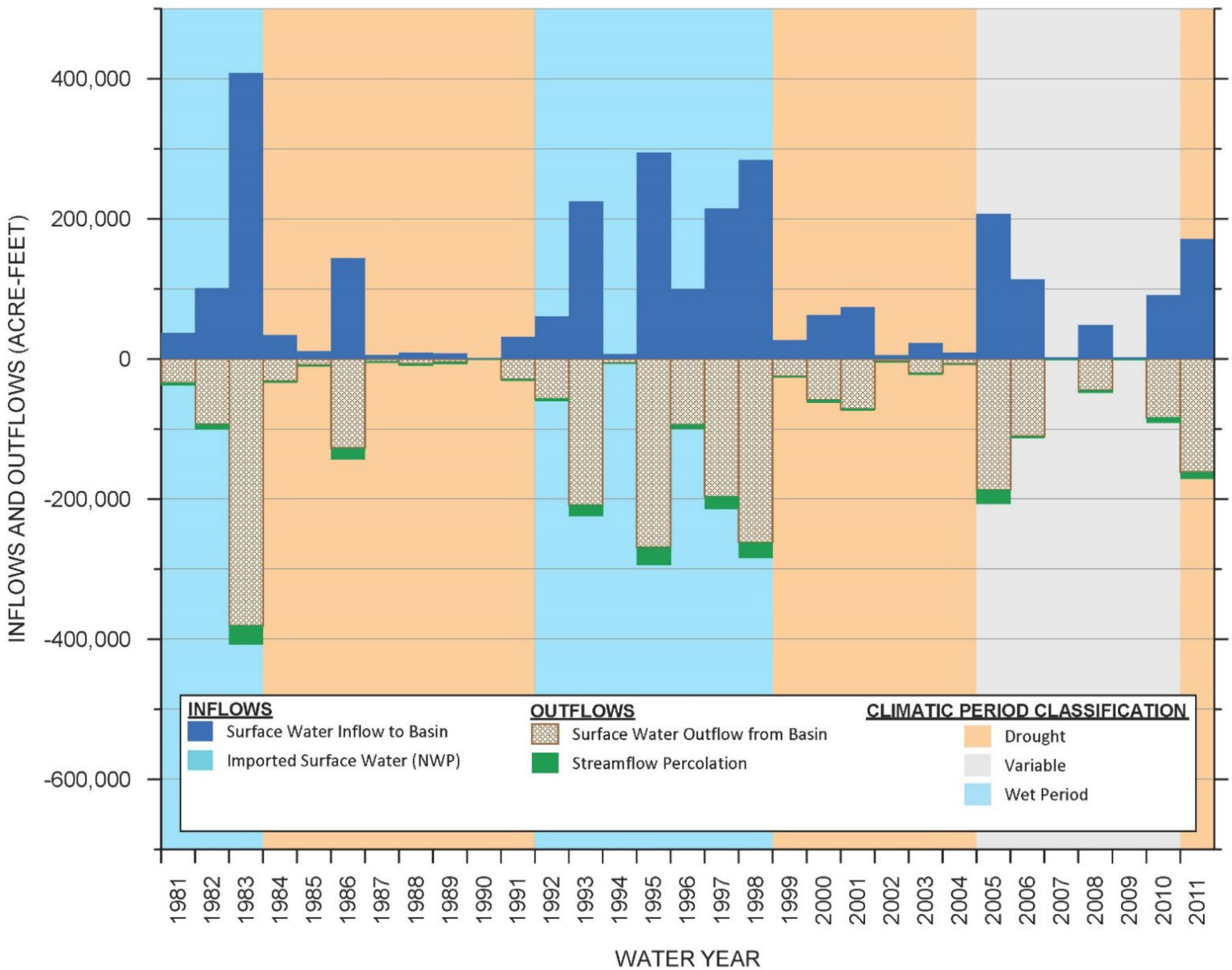

Figure 6-2. Historical (1981-2011) Surface Water Inflows and Outflows

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Figure 6-2 shows the strong correlation between precipitation and streamflow in the Basin. In wet periods, shown with a blue background, surface water inflows and outflows are large. In contrast, in dry periods, shown with an orange background, surface water inflows and outflows are small.

6.3.2 *Historical Groundwater Budget*

Groundwater, including production from both the Alluvial Aquifer (Salinas River underflow) and the Paso Robles Formation Aquifer, supplied virtually all of the water used in the Basin over the historical base period. The historical groundwater budget includes a summary of the estimated groundwater inflows, groundwater outflows, and change in groundwater in storage.

6.3.2.1 Historical Groundwater Inflows

Groundwater inflow components include streamflow percolation, agricultural irrigation return flow, deep percolation of direct precipitation, subsurface inflow into the Basin, imported surface water percolation, wastewater treatment plant pond percolation, and urban irrigation return flow. Estimated annual groundwater inflows for the historical base period are summarized in Table 6-3. Values reported in the table were estimated or derived from the GSP model using data sources reported in Table 6A-1 in Appendix 6A.

Table 6-3. Estimated Historical (1981-2011) Annual Groundwater Inflows to Basin

Groundwater Inflow Component[1]	Average	Minimum[2]	Maximum[2]
Streamflow Percolation	7,100	1,100	27,200
Agricultural Irrigation Return Flow	1,200	500	2,700
Deep Percolation of Direct Precipitation	3,700	100	13,000
Subsurface Inflow into Basin	2,300	0	5,400
Wastewater Pond Percolation	2,000	1,570	2,540
NWP Percolation	2	0	74
Urban Irrigation Return Flow	1,200	100	2,800
Total	17,500		

Notes:
All values in acre-feet
[1] Percolation from septic systems is not directly accounted for because it is subtracted from the total estimated rural-domestic pumping to simulate a net rural-domestic pumping amount
[2] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

For the historical base period, estimated total average groundwater inflow ranged from 5,700 to 49,800 AFY, with an average annual inflow of 17,500 AF. The largest groundwater inflow component is streamflow percolation, which accounts for approximately 41 percent of the total annual average inflow. The large difference between the minimum and maximum inflows from streamflow percolation and direct precipitation reflect the variations in precipitation over the historical base period.

6.3.2.2 Historical Groundwater Outflows

Groundwater outflow components include total groundwater pumping from all water use sectors, subsurface flow out of the Basin, and riparian evapotranspiration. On occasion, the minimum subsurface outflows were negative during the historical base period. Estimated annual groundwater outflows for the historical base period are summarized in Table 6-4.

Table 6-4 Estimated Historical (1981-2011) Annual Groundwater Outflow from Basin

Groundwater Outflow Component	Average	Minimum[1]	Maximum[1]
Total Groundwater Pumping	15,300	11,900	20,400
Subsurface Flow Out of Basin	300	-500	1,400
Riparian Evapotranspiration	500	500	500
Total	16,100		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

The largest groundwater outflow component from the Basin is groundwater pumping. Estimated annual groundwater pumping by water use sector for the historical base period is summarized in Table 6-5.

Table 6-5 Estimated Historical (1981-2011) Annual Groundwater Pumping by Water Use Sector from Basin

Water Use Sector	Average	Minimum[1]	Maximum[1]
Agricultural	5,500	2,100	12,900
Municipal	8,900	4,900	12,000
Rural Domestic	300	200	500
Small Public Water Systems	600	600	700
Total	15,300		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

Municipal and agricultural pumping were the largest components of total groundwater pumping, accounting for about 58 and 36 percent of total pumping over the historical base period, respectively. In general, agricultural pumping decreased and municipal pumping increased over the historical base period. Rural-domestic, and small commercial pumping account for 2 and 4 percent, respectively, of total average annual pumping over the historical base period.

6.3.2.3 Historical Groundwater Budget and Changes in Groundwater Storage

Groundwater inflows and outflows for the historical base period are summarized on Figure 6-3 and tabulated in Appendix 6B. Figure 6-3 shows groundwater inflow and outflow components for every year of the historical period. Inflow components are graphed above the zero line and outflow components are graphed below the zero line. Groundwater outflow by pumping (green bars) includes pumping from all water use sectors (Table 6-5).

Figure 6-4 shows annual and cumulative change in groundwater storage during the historical base period. Annual increases in groundwater storage are graphed above the zero line and annual decreases in groundwater storage are graphed below the zero line. The red line shows the cumulative change in groundwater storage over the historical base period.

The historical groundwater budget is strongly influenced by the amount of precipitation. During the historical base period, dry conditions prevailed from 1984 through 1991 and 1999 through 2004, as depicted by the orange areas on Figure 6-3 and Figure 6-4. During these dry periods, the amount of recharge and streamflow percolation was relatively low. The net result was a loss of groundwater from storage. In contrast, wet conditions prevailed in the early 1980s and 1992 through 1998, as shown by blue areas on Figure 6-3 and Figure 6-4, and one wet year in 2005. During these wet periods, the amount of recharge and streamflow percolation was relatively high. The net result was a gain of groundwater in storage. The period from 2006 through 2010 had generally alternating years of average precipitation. During this period, the amount of recharge and streamflow percolation was average, and the amount of groundwater pumping was relatively high, compared to the prior 15 years. The net result was a loss of groundwater from storage.

The historical groundwater budget is also influenced by the amount of groundwater pumping. Over the historical base period, the total amount of groundwater pumping decreased in the early 1990s, corresponding with a period when irrigation of alfalfa and pasture acreage declined and irrigated vineyard acreage increased (Fugro and Cleath 2002). The transition from alfalfa and pasture to vineyard resulted in a net decrease in groundwater pumping because the irrigation demand per acre of vineyards is significantly less than the per-acre demand for alfalfa and pasture. This decrease in pumping contributed to the increase in groundwater in storage during the 1990s.

Over the 31-year historical base period, a net gain of groundwater storage of about 42,300 AF occurred. The average annual groundwater storage gain was approximately 1,400 AFY.

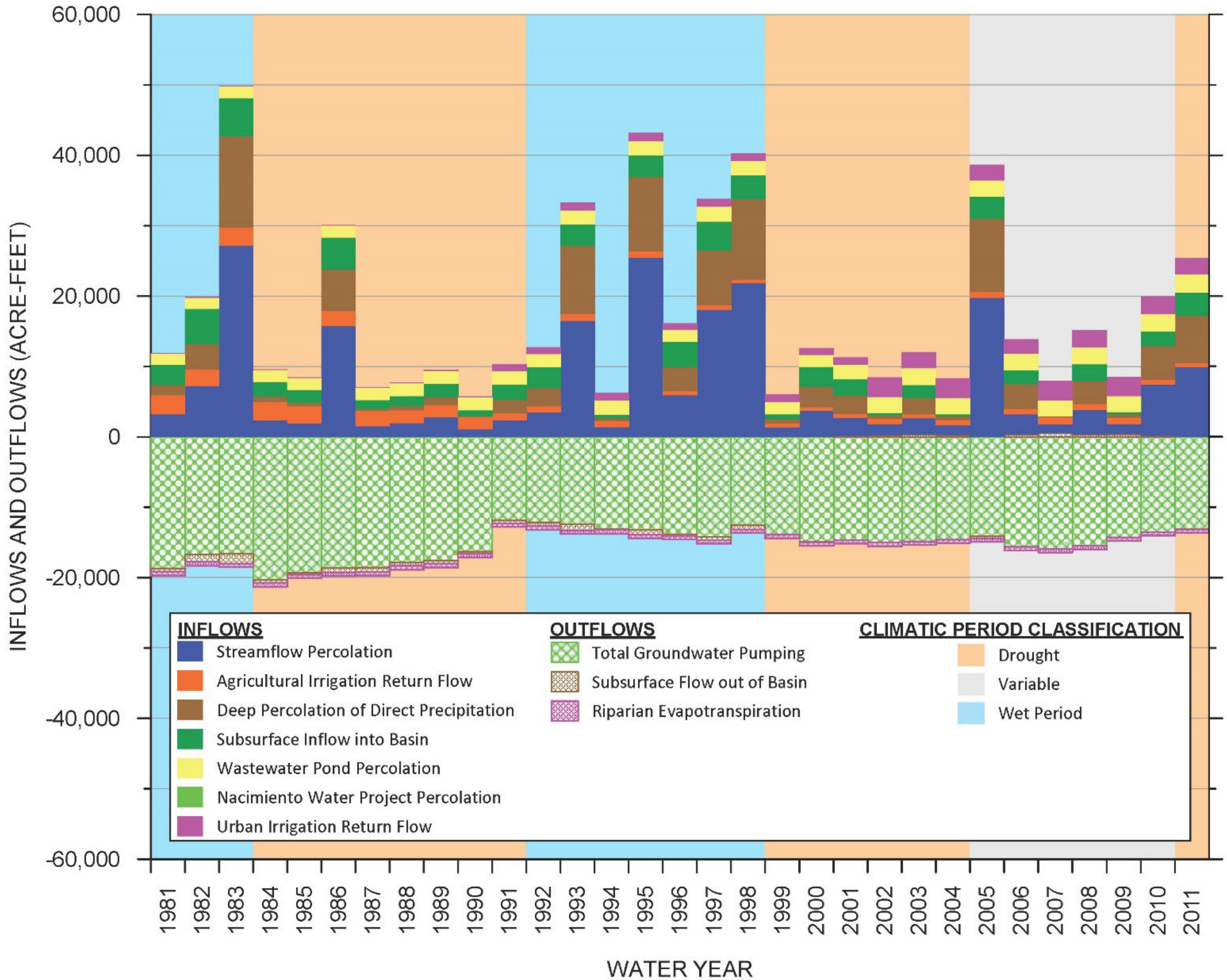


Figure 6-3. Historical (1981-2011) Groundwater Inflows and Outflows

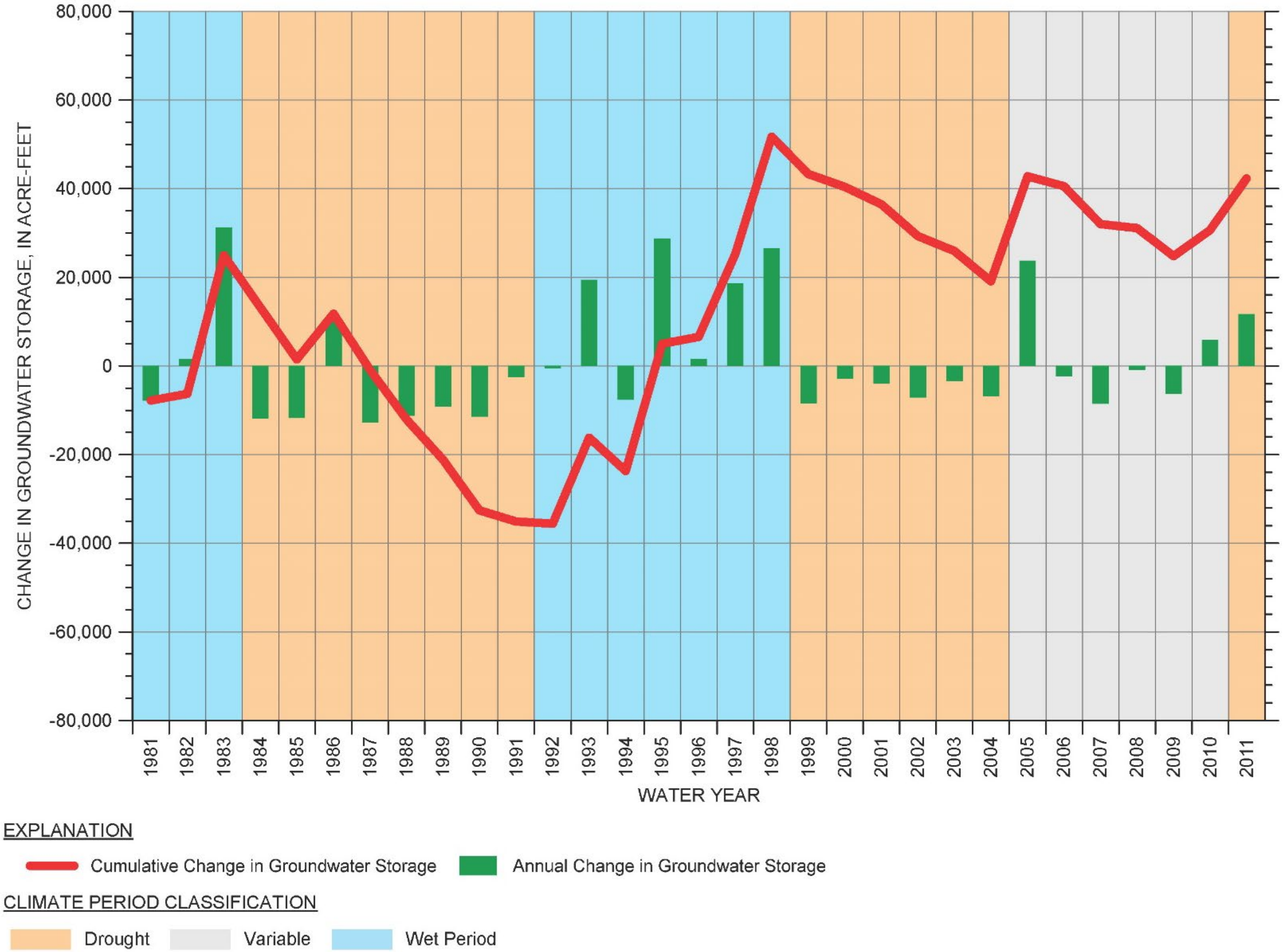


Figure 6-4. Historical (1981-2011) Annual and Cumulative Change in Groundwater Storage

6.3.2.4 Historical Water Balance of the Basin

The computed long-term increase of groundwater in storage indicates that total groundwater inflow exceeded the total outflow in the Basin from 1981 through 2011. As summarized in Table 6-5, total groundwater pumping averaged approximately 15,300 AFY during the historical base period.

Section 354.18(b)(7) of the SGMA Regulations requires a quantification of sustainable yield for the Basin for the historical base period. Sustainable yield is the maximum quantity of groundwater, calculated over a base period representative of long-term conditions in the Basin and including any temporary surplus that can be withdrawn annually from a groundwater supply without causing an undesirable result. The historical safe yield was estimated by summing the estimated average groundwater storage increase of 1,400 AFY with the estimated total average amount of groundwater pumping of 15,300 AFY for the historical base period. This results in a historical safe yield of about 16,700 AFY. This estimated value reflects historical climate, hydrologic and water resource conditions and provides insight into the amount of groundwater pumping that could be sustained in the Basin to maintain a balance between groundwater inflows and outflows.

6.4 Current Water Budget

The SGMA Regulations require that the current surface water and groundwater budget be based on the most recent hydrology, water supply, water demand, and land use information. For the GSP, the period 2012 to 2016 was selected as the time period for the current water budget. In part, the 2012 to 2016 time period was selected because it corresponds with the current water budget period utilized in the Paso Robles Subbasin GSP and it is believed that not only is this time period representative of basin conditions, but the use of the Paso Robles Subbasin GSP model is the best available information and tool for groundwater sustainability planning purposes in the Atascadero Basin.

The current water budget period corresponds to a drought period when annual precipitation averaged about 60 percent of the historical average and streamflow percolation averaged about 19 percent of the historical average. As a result, the current water budget period represents an extreme drought condition in the Basin and is not representative of long-term Basin conditions needed for sustainability planning purposes. Estimates of the surface water and groundwater inflow and outflow, and changes in storage for the current water budget period are provided below.

6.4.1 *Current Surface Water Budget*

The current surface water budget quantifies important sources of surface water. Similar to the historical surface water budget, the current surface water budget includes two surface water source types: local imported supplies and local supplies.

6.4.1.1 Current Local Imported Supplies

Imported surface water from the NWP was utilized by Atascadero MWC, Templeton CSD, and the city of Paso Robles to recharge the Basin via percolation in the Alluvium adjacent to the Salinas River during the current water budget period. In addition to Templeton CSD, which began taking NWP water during the historical based period (Section 6.3.1.1 – Historical Local Imported Supplies), Atascadero MWC and the city of Paso Robles began taking deliveries of NWP water in 2012 and 2013, respectively. Utilization of NWP water peaked in 2015 at 4,792 AF during the height of the latest drought, providing recharge to the Basin. Table 6-6 summarizes the annual average, minimum, and maximum values for the imported NWP water during the current water budget period.

6.4.1.2 Current Local Supplies

Local surface water supplies include surface water flows that enter the Basin from precipitation runoff within the watershed and Salinas River inflow to the Basin (including releases from the Salinas Reservoir), Table 6-6 summarizes the annual average, minimum, and maximum values for these inflows.

Table 6-6. Estimated Current (2012-2016) Annual Surface Water Inflows to Basin

Surface Water Inflow Component	Average	Minimum[2]	Maximum[2]
Inflow to Basin including the Salinas River and Tributaries[1]	5,600	1,300	9,000
Imported (NWP)	2,158	731	4,792
Total	7,800		

Notes:
All values in acre-feet
[1] Tributaries include Santa Margarita, Paloma, Atascadero, Graves, and Paso Robles creeks
[2] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

The estimated average total inflow from both precipitation runoff and reservoir releases over the current water budget period was approximately 7,800 AFY, or about 9 percent of the average annual 90,600 AFY inflow during the historical base period. The substantial reduction in surface water inflows reflects the drought conditions that prevailed during the current water budget period.

6.4.1.3 Current Surface Water Outflows

The estimated annual average, minimum, and maximum surface water outflow leaving the Basin as flow in the Salinas River and percolation into the groundwater system over the current base period is summarized in Table 6-7. Reductions in surface water outflow for the current water budget period were similar to those reported above for the surface water inflows.

Table 6-7. Estimated Current (2012-2016) Annual Surface Water Outflows from Basin

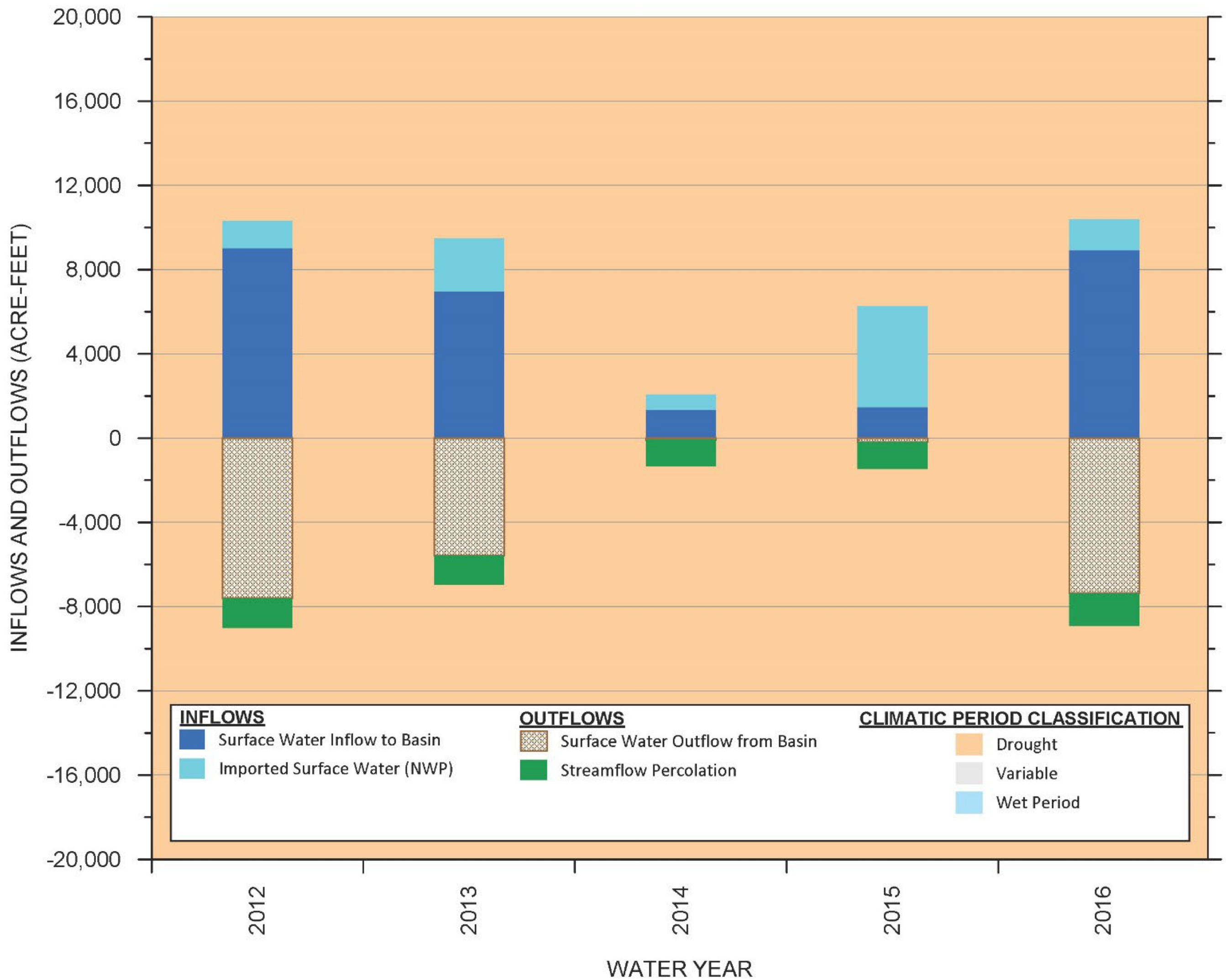
Surface Water Outflow Component	Average	Minimum[1]	Maximum[1]
Salinas River Outflow from Basin	4,200	100	7,600
Streamflow Percolation	1,400	1,200	1,500
NWP Percolation	2,158	731	4,792
Total	7,800		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

6.4.1.4 Current Surface Water Budget

Figure 6-5 summarizes the current surface water budget for the Basin. Figure 6-5 shows the effects of the drought conditions that prevailed during the period 2012 through 2016. During this period, precipitation was well below average, which resulted in very little surface water flow.

Figure 6-5. Current (2012 – 2016) Surface Water Inflows and Outflows



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6.4.2 *Current Groundwater Budget*

Groundwater supplied most of the water used in the basin during the current water budget period. The current water budget includes a summary of the estimated groundwater inflows, groundwater outflows, and change in groundwater in storage.

6.4.2.1 Current Groundwater Inflows

Groundwater inflow components include streamflow percolation, agricultural irrigation return flows, deep percolation of direct precipitation, subsurface inflow into the Basin, imported surface water percolation, wastewater pond percolation, and urban irrigation return flow. Estimated annual groundwater inflows for the current water budget period are summarized in Table 6-8.

Table 6-8. Estimated Current (2012-2016) Annual Groundwater Inflows to Basin

Groundwater Inflow Component[1]	Average	Minimum[2]	Maximum[2]
Streamflow Percolation	1,400	1,200	1,500
Agricultural Irrigation Return Flow	1,000	700	1,200
Deep Percolation of Direct Precipitation	600	300	1,400
Subsurface Inflow into Basin	400	0	1,200
Wastewater Pond Percolation	2,520	2,460	2,570
NWP Percolation	2,158	731	4,792
Urban Irrigation Return Flow	2,700	2,400	2,900
Total	10,800		

Notes:
All values in acre-feet
[1] Percolation from septic systems is not directly accounted for because it is subtracted from the total estimated rural-domestic pumping to simulate a net rural-domestic pumping amount
[2] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

For the current water budget period, estimated total average groundwater inflow ranged from 8,900 AFY to 13,000 AFY, with an average inflow of 10,800 AFY. Notable observations from the summary of groundwater inflows for the current water budget period included:

- Average total inflow during the current water budget period was about 62% of the historical base period.
- Unlike the historical base period, when the largest inflow component was streamflow percolation, the largest groundwater inflow component for the current water budget is agricultural and urban irrigation return flows, which together account for approximately 34% of the total average inflow.
- The relatively small difference between the minimum and maximum inflows reflects the drought condition that prevailed during the current water budget period, when precipitation and runoff were continuously low.

- Total annual average streamflow percolation in the current water budget period was approximately 20% of the streamflow percolation in the historical base period. This reflects the very low streamflows during the drought. The low streamflows had a significant impact on the groundwater basin because streamflow percolation was the most significant source of groundwater recharge during the historical period.
- Total annual average recharge from direct precipitation for the current water budget period was about 16% of the recharge from direct precipitation for the historical base period.

6.4.2.2 Current Groundwater Outflows

Groundwater outflow components include total groundwater pumping from all water use sectors and riparian evapotranspiration. Estimated annual groundwater outflows for the current water budget period are summarized in Table 6-9.

Table 6-9. Estimated Current (2012-2016) Annual Groundwater Outflow from Basin

Groundwater Outflow Component	Average	Minimum[1]	Maximum[1]
Total Groundwater Pumping	12,900	11,400	14,500
Subsurface Flow Out of Basin	-200	-300	-100
Riparian Evapotranspiration	500	500	500
Total	13,200		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

For the current water budget period, estimated total average groundwater outflows ranged from 11,800 to 14,700 AFY, with an average annual outflow of 13,200 AF. A notable observation from a comparison of the historical (Table 6-4) and current groundwater outflows is:

- Total annual average groundwater pumping was about 16% lower during the current water budget period.

The largest groundwater outflow component from the Basin in the current water budget period is pumping. Estimated annual groundwater pumping by water use sector for the current water budget period is summarized in Table 6-10.

Table 6-10. Estimated Current (2012-2016) Annual Groundwater Pumping by Water Use Sector from Basin

Water Use Sector	Average	Minimum[1]	Maximum[1]
Agricultural	2,600	2,200	3,100
Municipal	9,200	7,800	10,800
Rural Domestic	500	500	500
Small Public Water Systems	600	600	600
Total	12,900		

Notes:
All values in acre-feet
[1] Minimum and maximum values are not totaled because the values for each component may have occurred in different years.

For the current water budget period, estimated total average groundwater pumping ranged from 11,400 to 14,500 AFY, with an average pumping of 12,900 AFY. Municipal pumping was the largest component of total groundwater pumping and accounts for about 72 percent of total pumping during the current water budget period. Agricultural, rural-domestic, and small commercial pumping account for 20, 4, and 5 percent, respectively, of total average pumping during the current water budget period.

Notable observations from a comparison of the historical (Table 6-5) and current total annual average groundwater pumping include:

- Total annual average agricultural groundwater pumping was about 53% less during the current water budget period when compared to the historical period (decrease of 2,900 AFY).
- Total annual average municipal groundwater pumping was about 4% higher during the current water budget period when compared to the historical period (increase of 340 AFY).

6.4.2.3 Current Groundwater Budget and Change in Groundwater Storage

Groundwater inflows and outflows for the current base period are summarized on Figure 6-6. This graph shows inflow and outflow components for every year of the current water budget period. Inflow components are graphed above the zero line and outflow components are graphed below the zero line. Groundwater outflow by pumping (green crosshatched bars) includes pumping from all water use sectors (Table 6-10).

Figure 6-7 shows annual and cumulative change in groundwater storage during the current water budget period. Annual decreases in groundwater storage are graphed below the zero line. The red line shows the cumulative change in groundwater storage over the historical base period.

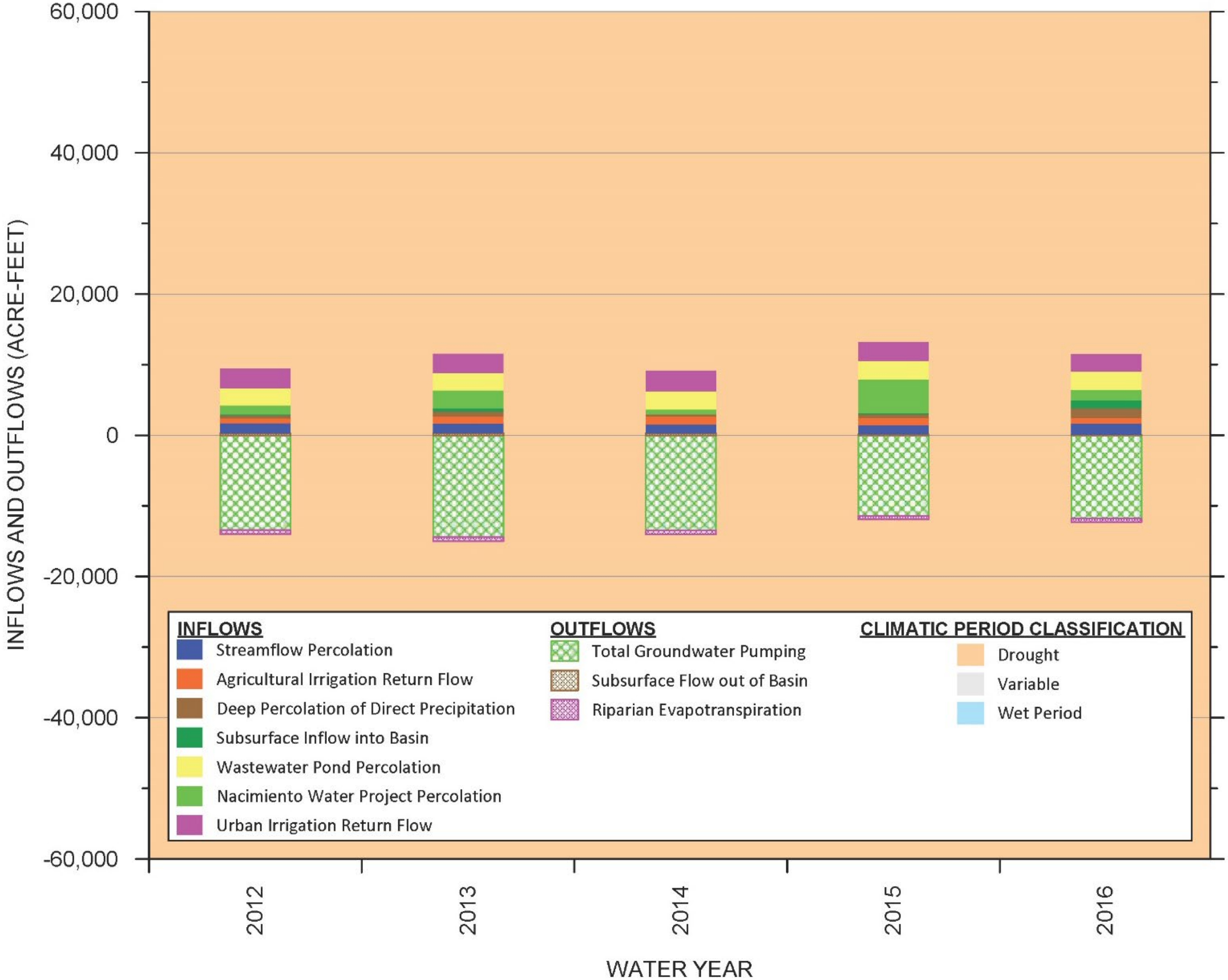

Figure 6-6. Current (2012-2016) Groundwater Inflows and Outflows

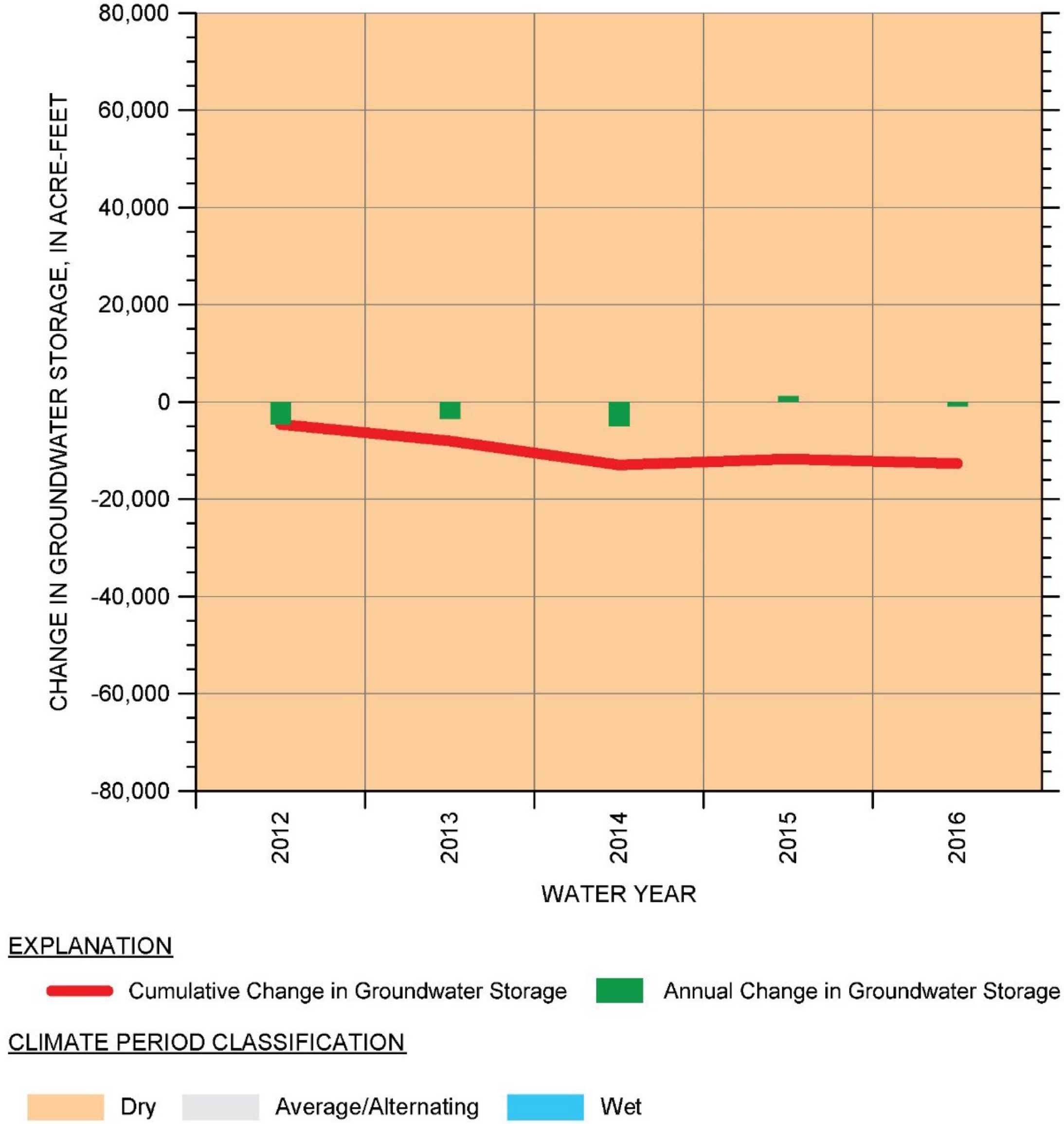

Figure 6-7. Current (2012-2016) Annual and Cumulative Change in Groundwater Storage

The current groundwater budget is strongly influenced by the drought. During the current water budget period, the amounts of streamflow percolation and percolation of direct precipitation were very low, and the average amount of total pumping was only slightly less than the historical water budget period. Percolation of imported surface water from the NWP, which had barely come online in the final year of the historical water budget period, played a significant role in mitigating the effects of the recent drought. Over the 5-year current water budget period, an estimated net loss of groundwater in storage of about 12,600 AF occurred (Figure 6-7). The annual average groundwater storage loss, or the difference between outflow and inflow to the Basin, was approximately 2,500 AFY.

6.4.2.4 Current Water Balance

The short-term depletion of groundwater in storage indicates that total groundwater outflows exceeded the total inflows over the current water budget period. As summarized in Table 6-9, total groundwater pumping averaged approximately 12,900 AFY during the current period. A quantification of the safe yield for the Basin during the current time period is be estimated by subtracting the average groundwater storage deficit (2,500 AFY) from the total average amount of groundwater pumping (12,900 AFY) to yield about 10,400 AFY. Due to the drought conditions, the current water budget period is not appropriate for long-term sustainability planning.

6.5 Future Water Budget

SGMA Regulations require the development of a future surface water and groundwater budget to estimate future baseline conditions of supply, demand, and aquifer response to GSP implementation. The future water budget provides a baseline against which management actions will be evaluated over the GSP implementation period from 2022 to 2042. Future water budgets were developed using the GSP model.

In accordance with Section 354.18 (c)(3)(A) of the SGMA Regulations, the future water budget should be based on 50 years of historical precipitation, evapotranspiration, and streamflow information. The GSP model includes only 36 years of historical precipitation, evapotranspiration, and streamflow data. Therefore, the future water budget is based on 36 years of historical data rather than 50 years of historical data. It is believed that this time period is representative and is the best available information for groundwater sustainability planning purposes.

6.5.1 *Assumptions Used in Future Water Budget Development*

Assumptions about future groundwater supplies and demands are described in the following subsections.

Future water budgets were developed using the GSP model. During the update process for the GSP model, all model components (e.g., groundwater pumping) of the entire original 2016 GSSI model area were updated, including components within Monterey County and the Paso Robles Subbasin.

However, information provided for the future water budget only pertains to the Atascadero Basin (Figure 1-1), thus do not include areas within Monterey County or the Paso Robles Subbasin.

6.5.1.1 Future Municipal Water Demand and Wastewater Discharge Assumptions

Future municipal water demands, and wastewater discharge were estimated for Atascadero MWC, Templeton CSD, and the city of Paso Robles based on the following available planning documents:

- Atascadero MWC 2015 UWMP (MKN & Associates 2016)
- Templeton CSD Water Supply Buffer Model 2019 Update (Templeton CSD 2019)
- Paso Robles 2015 Urban Water Management Plan (Todd Groundwater 2016)

Portions of Atascadero MWC's, Templeton CSD's, and the city of Paso Robles' future groundwater demand[30] will be offset by imported NWP water. Total municipal demand in the Basin is projected to increase from about 10,500 AFY in 2020 to about 12,900 AFY in 2042.

Discharge of treated wastewater to the Salinas River provides a source of recharge to the Alluvial Aquifer. Rates of future wastewater discharge were estimated as a percentage of total water demand based on the planning documents listed above for Atascadero MWC and Templeton CSD[31]. Wastewater discharge as a percentage of water demand was calculated separately for each water provider. Total wastewater discharge in the Basin is projected to increase from about 2,300 AFY in 2020 to about 3,100 AFY in 2042.

Future municipal water demands and/or wastewater discharge volumes will be adjusted during the implementation of the GSP should they be found to differ from the volumes used in the GSP model.

6.5.1.2 Future Agricultural and other Non-Municipal Water Demand Assumptions

In accordance with Section 354.18 (c)(3)(B) of the SGMA Regulations, the most recently available land use (in this case, crop acreage) and crop coefficient information should be used as the baseline condition for estimating future agricultural irrigation water demand. For the GSP, the most recent crop acreage data was obtained from the office of the San Luis Obispo County Agricultural Commissioner. To account for irrigation efficiency in the future water budget, the reported crop coefficient information from GSSI (GSSI, 2016) was used.

Projections for agricultural irrigation water demand are not available. Agricultural water demand was assumed to increase at a 1 percent annual growth rate. This assumed growth rate is considered

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[30] Note that the city of Paso Robles operates production wells in both the Basin and the Paso Robles Subbasin. Only the portion produced from the Basin is included here.

[31] The city of Paso Robles wastewater discharge occurs outside the Basin (within the Paso Robles Subbasin) and is therefore not included.

a conservative estimate. Total agricultural groundwater demand in the Basin is projected to increase from about 2,800 AFY in 2020 to about 3,400 AFY in 2042.

Projections for rural domestic wells and smaller commercial groundwater users, were also not available. Water demand for these users was assumed to increase at a 1 percent annual growth rate. Total rural domestic and smaller commercial user's groundwater demand in the Basin is projected to increase from about 1,300 AFY in 2020 to about 1,600 AFY in 2042.

Future agricultural and/or other non-municipal water demands will be adjusted during the implementation of the GSP should they be found to differ from the volumes used in the GSP model.

6.5.1.3 Future Climate Assumptions

The SGMA Regulations require incorporating future climate estimates into the future water budget. To meet this requirement, DWR developed an approach for incorporating reasonably expected, spatially gridded changes to monthly precipitation and reference ETo (DWR 2018). The approach for addressing future climate change developed by DWR was used in the future water budget modeling for the Basin. The changes are presented as separate monthly change factors for both precipitation and ETo and are intended to be applied to historical time series within the climatological base period through 2011. Specifically, precipitation and ETo change factors were applied to historical climate data for the period 1981 to 2011 for modeling the future water budget.

DWR provides several sets of change factors representing potential climate conditions in 2030 and 2070. DWR recommends using the 2030 change factors to evaluate conditions over the GSP implementation period (DWR 2018). Consistent with DWR recommendations, datasets of monthly 2030 change factors for the Atascadero area were applied to precipitation and ETo data from the historical base period to develop monthly time series of precipitation and ETo, which were then used to simulate future hydrology conditions.

6.5.2 *Modifications to Modeling Platform to Simulate Future Conditions*

The existing modeling platform was modified to simulate future conditions, and the results of these simulations are used to develop the future water budget.

6.5.2.1 Modification to Soil Water Balance Model

The soil water balance model operates on a daily time scale and tracks daily variations in soil water storage for different agricultural areas in the model domain. For consistency with the monthly climate change factors provided by DWR, the daily model was used to develop monthly soil water balance calculations. These calculations compute irrigation demand as the residual crop evapotranspiration demand unsatisfied by effective precipitation.

These calculations use monthly precipitation and evapotranspiration, rescaled by the monthly climate change factors provided by DWR, and the same monthly crop coefficients used in the historical water budget analysis. Empirical relationships were developed to account for soil moisture carryover from the winter into the spring based on results from the daily soil water balance model.

Monthly applied irrigation water was determined over the future base period from computed monthly crop demand and the crop-specific irrigation efficiencies. The future agricultural irrigation water demand assumptions (Section 6.5.1.2 – Future Agricultural and other Non-Municipal Water Demand Assumptions) were incorporated into this analysis. Agricultural irrigation return flow is then computed as the difference between the applied irrigation water and the crop demand. Results were then averaged to provide average monthly rates of applied irrigation water and irrigation return flow that would be expected under future climate conditions.

6.5.2.2 Modifications to the Watershed Model

The watershed model operates on a daily time scale and simulates streamflow and infiltration of direct precipitation. The watershed model was modified to account for climate change by rescaling daily precipitation and ETo with the monthly climate change factors provided by DWR. The watershed model was then re-run using the modified precipitation and ETo values.

Results from the modified historical base period simulation were then averaged to provide average monthly rates of infiltration of direct precipitation and streamflow under future climate conditions.

6.5.2.3 Modifications to the Groundwater Model

The groundwater model operates at a semi-annual time scale, with stress periods representing 6-month periods. The groundwater model was extended and modified to simulate the period 2020 to 2042. Starting groundwater levels for the future simulation were set to groundwater levels at the end of Water Year 2016, extracted from the updated groundwater model.

Future groundwater recharge components were computed using the modified soil water balance model and watershed model, as described above. Future streamflow generated both inside and outside the Basin was computed using the modified watershed model.

Future groundwater recharge and streamflow are specified in the groundwater model as repeating average time-series, based on average monthly calculation of excess irrigation water, recharge of direct precipitation, and streamflow. This approach was adopted to simplify the future water budget and allow reporting of average future conditions accounting for climate change. Future pumping and wastewater return flows are the only inputs to the groundwater model that exhibit a long-term trend over the implementation period.

6.5.3 *Projected Future Water Budget*

Future surface water and groundwater budgets were projected.

6.5.3.1 Future Surface Water Budget

The future surface water budget includes average inflows from local imported supplies, average inflows from local supplies, average stream outflows, and average stream percolation to groundwater. Table 6-11 and Table 6-12 summarize the average components of the projected surface water budget.

Table 6-11. Projected Future Annual Surface Water Inflows to Basin

Surface Water Inflow Component	Average
Inflow to Basin including the Salinas River and Tributaries[1]	96,400
Imported (NWP)	2,600
Total	99,000

Notes:
All values in acre-feet
[1] Tributaries include Santa Margarita, Paloma, Atascadero, Graves, and Paso Robles creeks

Table 6-12. Projected Future Annual Surface Water Outflows from Basin

Surface Water Outflow Component	Average
Salinas River Outflow from Basin	92,000
Streamflow Percolation	4,400
NWP Percolation	2,600
Total	99,000

Notes:
All values in acre-feet

6.5.3.2 Future Groundwater Budget

Projected groundwater budget components are computed using the modified groundwater flow model to simulate average conditions over the implementation period. Table 6-13 summarizes projected annual groundwater inflows. In contrast to the historical groundwater budget, which accounted for month-to-month variability, the projected groundwater budget is based on average monthly inflows. Therefore, variability in simulated groundwater budget components is minor, and minimum and maximum values are not included in Table 6-13.

Table 6-13. Projected Future Annual Groundwater Inflows to Basin

Groundwater Inflow Component1	Average
Streamflow Percolation	4,400
Agricultural Irrigation Return Flow	900
Deep Percolation of Direct Precipitation	3,700
Subsurface Inflow into Basin	1,600
Wastewater Pond Percolation	2,800
NWP Percolation	2,600

Groundwater Inflow Component1	Average
Urban Irrigation Return Flow	1,900
Total	18,000

Notes:
All values in acre-feet
[1] Percolation from septic systems is not directly accounted for because it is subtracted from the total estimated rural-domestic pumping to simulate a net rural-domestic pumping amount

The total average annual groundwater inflow is 500 AF greater during the future period than during the historical base period. Although, annual stream percolation is projected to be 2,700 AF less during the future period than during the historical base period, the increased imported surface water percolation nearly makes up for it. Lesser increases in urban irrigation return flow and wastewater percolation offset minor reductions in agricultural irrigation return flow and subsurface inflow between the historical base period and the projected future period. Reduction in agricultural irrigation return flow is due partly to changes in historical cropping patterns and partly to improvements in vineyard irrigation efficiency. Table 6-14 summarizes projected annual groundwater outflows.

Table 6-14. Projected Future Annual Groundwater Outflow from Basin

Groundwater Outflow Component	Average
Total Groundwater Pumping	16,400
Subsurface Flow Out of Basin	200
Riparian Evapotranspiration	600
Total	17,200

Note:
All values in acre-feet

The total average annual groundwater outflow is estimated to be 1,100 AF greater during the future period than during the historical base period. Future total annual groundwater pumping is projected to increase by about 1,100 AF compared to the historical base period.

6.5.3.3 Future Safe Yield

The projected future groundwater budget shows the Basin to be generally in balance, with projected groundwater inflows of about 18,000 AFY and projected groundwater outflows of about 17,200 AFY. The projected future surplus indicates an average annual increase in groundwater in storage of 800 AFY. A calculated annual volume for the projected future safe yield of the Basin was estimated by adding the average groundwater storage surplus of 800 AFY to the total projected future average amount of groundwater pumping of 16,400 AFY, therefore the future safe yield for the Basin is estimated to be approximately 17,200 AFY.

The estimated future safe yield of 17,200 AFY is 500 AFY greater than the estimated safe yield for the historic base period. This close comparison of safe yield values between the two periods indicates that projected future climate change is not expected to have a substantial impact on the safe yield.

The primary reason that the average safe yield increases in the future compared to the historical period, even coupled with the assumed climate change modifiers and increased projected pumping from all users, is the added beneficial component of increased future use of the NWP water. However, as demonstrated by the projected cumulative change in storage curve presented on Figure 6-8, the benefits of increased NWP utilization is expected to be overtaken by the assumed 1 percent annually increasing pumping demands by the year 2034.

The cumulative change of groundwater in storage is projected to remain well above zero by the year 2042, however its downward trend in later years suggests the possibility of a groundwater storage deficit in the distant future (well beyond 2042) without further mitigation measures.

It is likely that the 1 percent annual growth rate assumption for non-municipal pumping is overly conservative. Adjusting this to a lower or a flat growth rate at some future date would be one such potential mitigation measure. Regardless, the imported NWP supply augments the natural basin recharge components and provides the municipal purveyors a water resource management tool that allows for effective management of the Basin for the foreseeable future.

The calculated safe yield of the Basin is a reasonable estimate of the long-term pumping that can be maintained without a long-term lowering of groundwater levels. The sustainable yield of the Basin, which will be estimated after an assessment of the sustainable management criteria and identification of potential undesirable results, will be estimated later. Sustainable yield looks to the presence or absence of undesirable results, not strictly inflows and outflows. The definitive sustainable yield can only be determined once undesirable results have been shown to have not occurred. The sustainable yield estimate may be revised in the future as new data become available during GSP implementation.

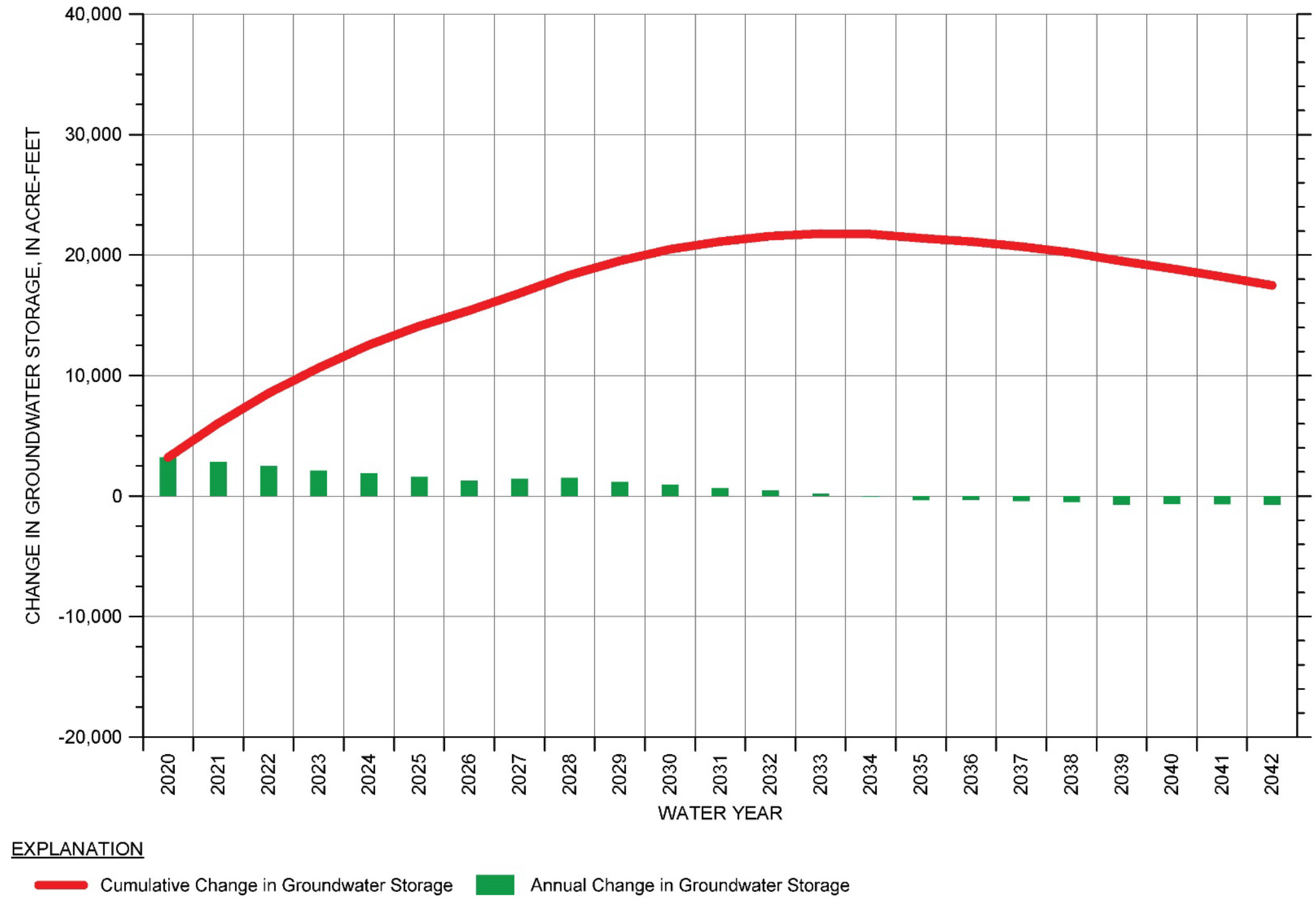

Figure 6-8. Projected Future Cumulative Change in Groundwater Storage

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7. Monitoring Networks

This section describes the monitoring networks that exist and improvements to the monitoring networks that will be developed for the basin identified by the DWR in its Bulletin 118 (DWR 2016) as Basin No. 3-004.11, Atascadero Area Groundwater Sub-basin of the Salinas Valley Basin (Basin) as part of GSP implementation. This section is prepared in accordance with the SGMA regulations §354.32 and §354.34 and includes monitoring objectives, monitoring protocols, and data reporting requirements.

The monitoring networks presented in this section are based on existing monitoring sites. It will be necessary to expand the existing monitoring networks and identify or install more monitoring sites to fully demonstrate sustainability and improve the GSP model. Monitoring networks are described for each of the five applicable sustainability indicators, and data gaps are identified for every monitoring network. These data gaps will be addressed during GSP implementation. Addressing these data gaps and developing more extensive and complete monitoring networks will improve the Atascadero Basin GSA's ability to track progress and demonstrate sustainability.

7.1 Monitoring Objectives

The SGMA regulations require monitoring networks be developed to promote the collection of data of sufficient quality, frequency, and spatial distribution to characterize groundwater and related surface water conditions in the Basin and to evaluate changing conditions that occur through implementation of the GSP. The monitoring network should accomplish the following:

- Demonstrate progress toward achieving measurable objectives described in the GSP
- Monitor impacts to the beneficial uses and users of groundwater
- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds
- Quantify annual changes in water budget components

The minimum thresholds and measurable objectives monitored by the networks are described in Section 8 – Sustainable Management Criteria.

7.1.1 *Monitoring Networks*

Monitoring networks are developed for each of the five sustainability indicators that are relevant to the Basin:

- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Degraded water quality

- Land subsidence
- Depletion of interconnected surface water

The Basin is isolated from the Pacific Ocean and is not threatened by seawater intrusion; therefore, this GSP does not provide monitoring for the seawater intrusion sustainability indicator.

The SGMA regulations allow the GSP to use existing monitoring sites for the monitoring network. Wells used for monitoring, however, are limited by restrictions in §352.4(c) of the SGMA regulations which requires the GSAs to provide various data for any wells used as monitoring wells, including but not limited to CASGEM well identification number, well location, ground surface elevation, well depth, and perforated intervals. Wells for which these data were not available, were not publicly accessible because of confidentiality agreements, or could not be easily inferred, could not be used in the current groundwater monitoring network.

The approach for establishing the monitoring network for the Basin is to leverage existing monitoring programs and incorporate additional monitoring locations that have been made available by cooperating entities. The monitoring networks are limited to locations with data that are publicly available and not collected under confidentiality agreements. This section identifies data gaps in each monitoring network and proposes locations for filling those data gaps.

7.1.2 *Management Areas*

The SGMA regulations require that if management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the Basin setting and sustainable management criteria specific to that area. At this time, management areas have not been defined for the Basin. If management areas are developed in the future, the monitoring networks will be reevaluated to ensure that there is sufficient monitoring to evaluate conditions in each management area.

7.2 Groundwater Level Monitoring Network

The minimum thresholds and measurable objectives for the chronic lowering of groundwater levels sustainability indicator are evaluated by monitoring groundwater levels. The SGMA regulations require a network of monitoring wells sufficient to demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features.

Existing well records and existing groundwater monitoring programs in the Basin are described in Sections 3 and 5, respectively. Groundwater well construction data and water level data were obtained from the following public sources:

- San Luis Obispo County Flood Control and Water Conservation District
- USGS NWIS

- DWR Online System for Well Completion Reports (OSWCR)
- DWR SGMA Data Viewer
- DWR CASGEM
- City of Paso Robles, Atascadero MWC, and Templeton CSD for public drinking water supply wells and associated monitoring wells
- Environmental consulting reports for the Santa Margarita to Tassajara Creek Pipeline cleanup (Geotracker site ID: SL0607989492)

These data sources resulted in a dataset of nearly 200 wells, each analyzed using the following steps to assess whether they would be included in the GSP groundwater level monitoring network:

1. Include Only Currently Measured Wells: To reduce the possibility of selecting a well that has not been monitored in many years or that may no longer be accessible, wells were excluded that did not have at least one groundwater level measurement from 2017 or later. All the groundwater level monitoring data available for the Basin that met this criterion were provided by SLOFCWCD (a subset of which is included in CASGEM) or the environmental consulting reports for the Santa Margarita to Tassajara Creek Pipeline cleanup, for a total of 114 wells.
2. Prioritize Wells with Known Well Completion Information: Wells without enough information to determine principal aquifer of completion were removed. This excluded nine wells.
3. Remove Confidential Wells: Many of the wells in the SLOFCWCD groundwater level monitoring network are subject to confidentiality agreements. An effort has been made to reach out to confidential well owners and offer them the opportunity to opt in to the GSP groundwater level monitoring network. Several wells have been added to the GSP monitoring network as a result of this effort. Because monitoring data collected as part of this GSP will be publicly available, data from the wells subject to confidentiality agreements cannot be published and therefore these wells are currently excluded from the GSP monitoring network. The groundwater level data that met this criterion resulted in a total of 85 wells.
4. Additional Wells: Include Additional Wells and/or Water Level Data Provided by Atascadero MWC and Templeton CSD. This resulted in the addition of the Templeton CSD Selby monitoring well, for a total of 86 wells.
5. Remaining Wells: The remaining 86 wells were scored in terms of their total number of historical water elevation records, data quality[32], and in terms of their spatial distribution within the Basin and their spatial distribution relative to other candidate wells completed in the same principal aquifer. Wells with a greater number of high-quality historical water

[32] Historical water elevation data were inspected for obvious pumping effects or otherwise suspect data. These suspect data were flagged for removal.

elevation records were prioritized over those with fewer records or wells with lower quality data. In cases where multiple high-scoring wells completed in the same principal aquifer are located in close proximity, only the highest-scoring well, based on number of high-quality water elevation records, was retained. In addition to these considerations, wells that are included in the CASGEM network were prioritized over other wells and three sets of paired vertical-gradient monitoring wells were included, despite a couple of them being in close proximity to other high-scoring wells. This selection process resulted in a GSP groundwater level monitoring network consisting of 26 wells (12 completed in the Alluvial Aquifer; 14 completed in the Paso Robles Formation Aquifer).

The wells in the GSP groundwater level monitoring network are listed in Table 7-1 and shown on Figure 7-1.

A subset of wells from the GSP groundwater level monitoring network has been selected as Representative Monitoring Sites (RMS). RMS are defined in the SGMA regulations as a subset of monitoring sites that are representative of conditions in the Basin. These RMS wells are evaluated in terms of sustainable management criteria in Section 8 – Sustainable Management Criteria. The groundwater level RMS network is indicated in Table 7-1 and shown on Figure 7-2.

All but two wells in the GSP groundwater level monitoring network are part of the SLOFCWCD monitoring network. None of these wells are subject to confidentiality agreements and therefore the data are publicly available. The monitoring frequency indicates that water levels are presumably measured twice a year, in accordance with the SLOFCWCD protocol of measuring depths to water in April and October of each year. The most recent available measurement was 2017, 2018, or 2019 in all wells.

Table 7-1. Groundwater Level Monitoring Network

Well ID	Well Depth (feet)	Screen Interval(s) (feet bgs)	Reference Point Elevation (feet AMSL)	First Date Measured	Last Date Measured	Years Measured (years)	Number of Measure -ments	Aquifer	RMS Well (y/n)	Int. SW Well (y/n)
27S/12E-09N02*	85	44-85	721	4/16/1996	4/5/2019	23	32	Qa	Y	Y
27S/12E-21XX6	61	31-51	754.2	4/30/2017	4/5/2019	2	5	Qa		Y
27S/12E-29H03	65	35-55	753.0	4/16/1996	4/5/2019	23	33	Qa	Y	Y
28S/12E-04J02	86	21-86	795.8	3/29/1965	4/10/2019	54	96	Qa	Y	Y
28S/12E-04J04	70	30-70	802.4	4/1/1996	4/8/2019	23	37	Qa		
28S/12E-05AX2	60	25-55	796.2	10/24/2016	4/1/2019	3	6	Qa	Y	Y
28S/12E-10R04	75	46-75	820	4/27/1984	4/11/2019	35	56	Qa	Y	Y
28S/12E-14K04	105	50-100	835	4/21/1989	4/18/2019	30	41	Qa	Y	Y
28S/12E-25B03	120	100-120	867.8	5/25/1971	10/19/2018	47	95	Qa	Y	Y
29S/13E-19H04*	57	29-49	1005	4/6/1998	3/29/2019	21	43	Qa	Y	
E11W-26B	35	10-35	1,003.0	6/30/1999	11/29/2017	18	18	Qa	Y	
Templeton CSD Selby Well	50	25-50	764.5	2/21/1997	4/6/2020	23	2	Qa	Y	Y
27S/12E-17B02	400	200-360, 380-400	828.3	9/29/1989	4/5/2019	30	46	QTp	Y	
27S/12E-17E01*	310	190-300	842.4	10/4/1988	4/5/2019	31	60	QTp	Y	
27S/12E-20A02	205	105-195	776	10/4/1988	4/5/2019	31	51	QTp	Y	
27S/12E-20R01*	230	110-230	771	4/6/1998	4/5/2019	21	36	QTp	Y	
27S/12E-21XX5	360	110-140, 180-250, 300-360	752.5	4/30/2017	4/5/2019	2	5	QTp		Y
27S/12E-22M01	550	pump @ 300[1]	850.5	3/30/1965	3/29/2019	54	99	QTp	Y	
27S/12E-33F01	340	140-340	880	6/15/1969	3/29/2019	50	99	QTp		
27S/12E-33G01	460	200-460	892	11/14/1973	3/29/2019	46	79	QTp	Y	
27S/12E-XXXX1	650	260-420, 440-640	723.2	4/30/2017	4/5/2019	2	4	QTp		Y
28S/12E-04J05	360	145-190, 210-360	803.1	4/3/1995	4/1/2019	24	41	QTp		Y
28S/12E-04J06*	153	93-153	800.5	4/1/1996	4/1/2019	23	37	QTp	Y	
28S/12E-10A03	500	157-500	808.3	6/30/1972	4/8/2019	47	75	QTp	Y	Y
28S/12E-11K02*	603	300-600	882	4/5/1993	4/9/2019	26	46	QTp	Y	
28S/13E-31F02	310	55-300	884.3	11/26/1974	10/8/2018	44	67	QTp	Y	Y

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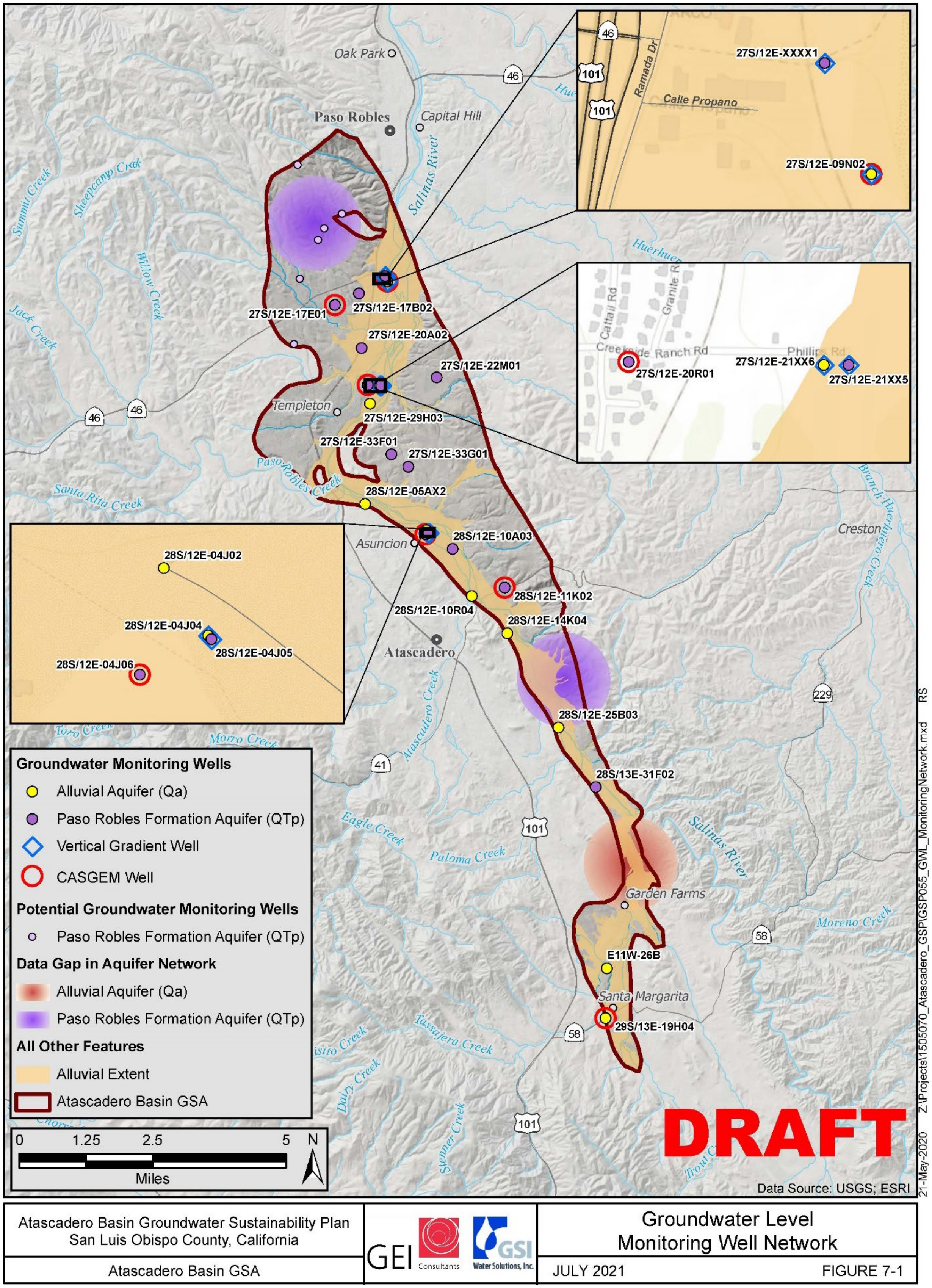

Figure 7-1. Groundwater Level Monitoring Network

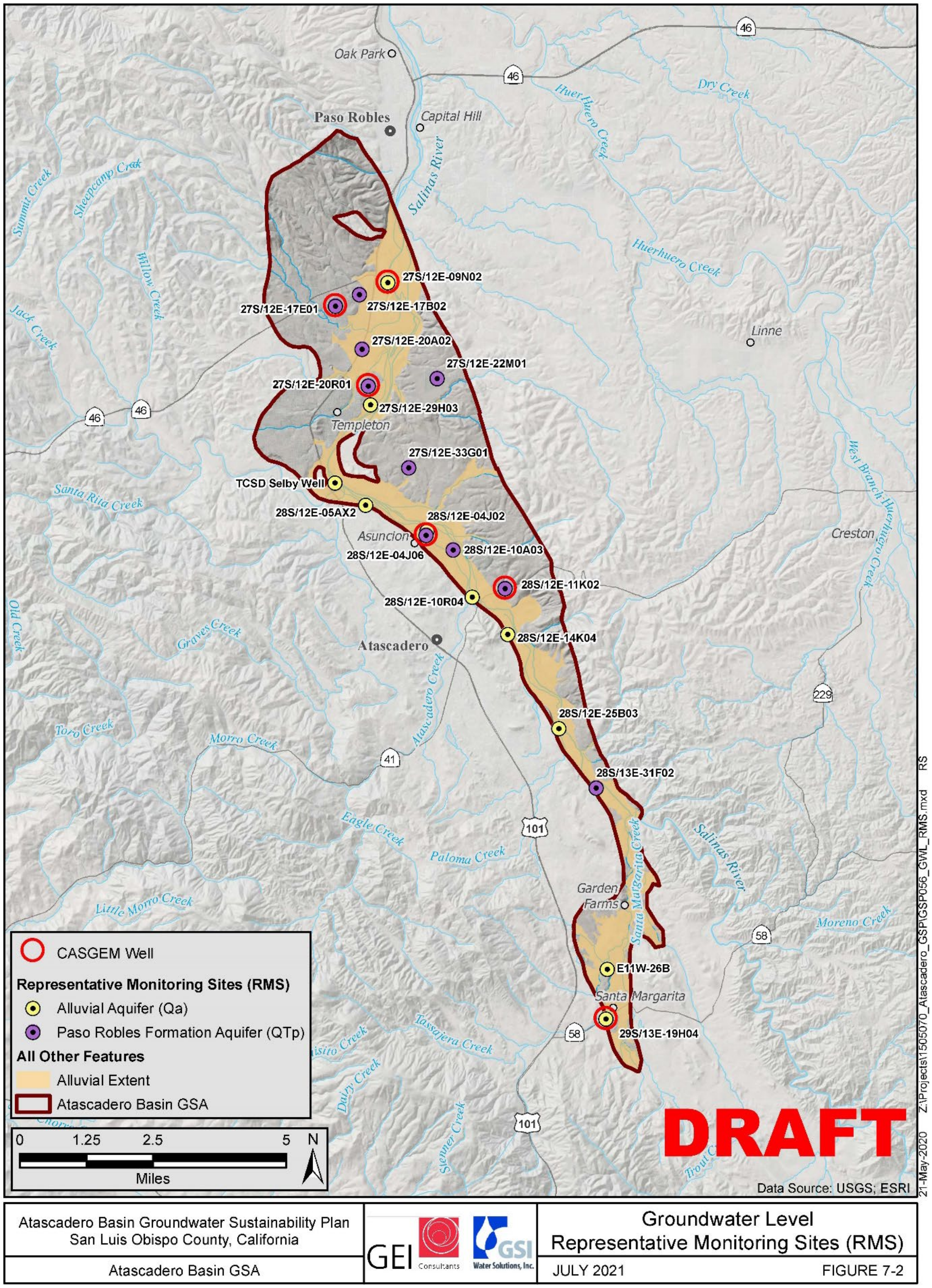

Figure 7-2. Groundwater Level Representative Monitoring Sites

7.2.1 *Groundwater Level Monitoring Network Data Gaps*

The GSA identified data gaps using guidelines in the SGMA regulations and BMPs published by DWR on monitoring networks (DWR 2016). Table 7-2 summarizes the suggested attributes of a groundwater level monitoring network from the BMPs in comparison to the current network and identifies data gaps.

The SGMA regulations require a sufficient density of monitoring wells to characterize the groundwater table or potentiometric surface for each principal aquifer. Professional judgement is also used to determine an adequate level of monitoring density.

While there is no definitive rule on well density, the BMP cites a range of 0.2 to 10 wells per 100 square miles, with a median of five wells per 100 square miles from various cited studies. The Basin is 31 square miles, which equates to 1.6 wells at a median density of five wells per 100 square miles. The monitoring network of 11 wells in the Alluvial Aquifer and 14 wells in the Paso Robles Formation Aquifer is many times greater than the recommended range cited in the BMP (0.1 – 3.1 wells).

Although the existing GSP groundwater level monitoring network satisfies the requirements cited in the BMP, there are two data gap areas identified, based on professional judgement, in the Paso Robles Formation Aquifer and one data gap area identified in the Alluvial Aquifer, as shown on Figure 7-1. The Paso Robles Formation Aquifer data gap in the northwest area of the Basin occurs in an area with many existing private agricultural supply and domestic supply wells. Several of these wells are currently enrolled in the Irrigated Lands Regulatory Program (ILRP, *see* Section 7.4 – Water Quality Monitoring Network) and may be good candidates to bring into the GSP groundwater level monitoring program through an outreach program that will be initiated during GSP implementation. The five most recently sampled ILRP wells (all sampled since 2018) and one USGS well are shown as potential Paso Robles Formation Aquifer monitoring wells on Figure 7-1.

The other Paso Robles Formation Aquifer data gap area located to the south and the single Alluvial Aquifer data gap area located near Garden Farms both occur in areas where existing confidential SLOFCWCD monitoring network wells are located. These confidential wells cannot be shown on the map. However, the GSA will reach out to these confidential well owners and offer them the opportunity to opt in to the GSP groundwater level monitoring network during GSP implementation.

A program to increase monitoring frequency may be considered during GSP implementation to better determine seasonal high and low groundwater elevations and monitor groundwater response to recharge and other activities[33]. One method to increase monitoring frequency is to install continuous dataloggers in existing and new monitoring wells.

The reference point elevations (RPE's) for each GSP groundwater level monitoring well listed in Table 7-1 were taken from the SLOFCWCD monitoring program database, where available, or were estimated using the 10-meter USGS National Elevation Dataset (also known as, NED 10) in a Geographic Information System (also known as, GIS). The accuracies of these RPE's are unknown. The elevations of

33 Atascadero MWC and Templeton CSD both measure groundwater levels in their wells on a weekly basis, but only the April and October data are reported to the SLOFCWCD groundwater monitoring program.

these RPE's should be determined to within 0.1-foot NAVD88[34] accuracy by a professional land surveyor during GSP implementation.

Although well completion reports are available online via DWR's OSWCR, the well completion report (WCR) identification numbers are unknown for many of the wells in the GSP groundwater level monitoring network and therefore it is not possible to always identify the associated WCRs. The known WCRs, with redacted ownership information, are provided in Appendix 7A.

Groundwater level data must be sufficient to identify changes in groundwater flow directions and gradients. Groundwater contour maps are presented in Section 5 – Groundwater Conditions, for both the Alluvial Aquifer and the Paso Robles Formation Aquifer. These maps were prepared using available monitoring data, including data collected from wells subject to confidentiality agreements. To comply with the confidentiality agreements, the data and well locations are not included on the maps. Continued use of confidential wells/groundwater level data is expected to be sufficient for preparation of future groundwater contour maps.

[34] NAVD88 – North American Vertical Datum of 1988.

Table 7-2. Summary of Best Management Practices, Groundwater Level Monitoring Well Network, and Data Gaps

Best Management Practice (DWR 2016a)	Current Monitoring Network	Data Gap
Groundwater level data will be collected from each principal aquifer in the basin.	14 wells in the Paso Robles Formation Aquifer; and 12 wells in the Alluvial Aquifer.	Minor data gaps: two data gap areas identified based on professional judgement in the Paso Robles Formation Aquifer and one data gap area identified in the Alluvial Aquifer
Groundwater level data must be sufficient to produce seasonal maps of groundwater elevations throughout the basin that clearly identify changes in groundwater flow direction and gradient (Spatial Density).	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	Some data used to prepare groundwater elevation maps in the GSP are confidential. Continued use of confidential wells/groundwater level data is expected to be sufficient for preparation of future groundwater contour maps.
Groundwater levels will be collected during the middle of October and March for comparative reporting purposes, although more frequent monitoring may be required (Frequency).	All 26 wells in the existing monitoring network have been monitored twice a year, in spring (April[35]) and fall (October).	Seasonal monitoring is the protocol for SLOFCWCD (Appendix 7B); more frequent monitoring may be needed to identify actual seasonal high and low groundwater elevations and further characterize groundwater level fluctuations; instrumentation like transducers or other technology may be used in future to monitor groundwater elevations.
Data must be sufficient for mapping groundwater depressions, recharge areas, and along margins of basins where groundwater flow is known to enter or leave a basin.	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	Some data used to prepare groundwater elevation maps in the GSP are confidential. Continued use of confidential wells/groundwater level data is expected to be sufficient for preparation of future groundwater contour maps.
Well density must be adequate to determine changes in storage.	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	None.
Data must be able to demonstrate the interconnectivity between shallow groundwater and surface water bodies, where appropriate.	Current Interconnected Surface Water network of 14 wells plus 3 confidential wells in the SLOFCWCD monitoring network is sufficient for mapping these areas.	There are no surface water gaging stations in the Basin. The potential need for installation of surface water gaging station(s) along the Salinas River within the Basin to aid in determining gaining/losing reaches may be evaluated during GSP implementation.

[35] Although the Monitoring Networks and Identification of Data Gaps BMP calls for collection of groundwater levels in the middle of March, the only available spring data for many of the GSP groundwater level monitoring wells were from the month of April (as available from the SLOFCWCD monitoring program database). The April data is considered representative of spring conditions in the Basin.

Best Management Practice (DWR 2016a)	Current Monitoring Network	Data Gap
Data must be able to map the effects of management actions, i.e., managed aquifer recharge.	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	Additional monitoring wells may be required to map the effectiveness of management actions. This monitoring will be addressed as projects are implemented.
Data must be able to demonstrate conditions near basin boundaries; agencies may consider coordinating monitoring efforts with adjacent basins to provide consistent data across basin boundaries. Agencies may consider characterization and continued impacts of internal hydraulic boundary conditions, such as faults, disconformities, or other internal boundary types.	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	Additional wells may be necessary to map the structure and effect of internal faults.
Data must be able to characterize conditions and monitor adverse impacts to beneficial uses and users identified within the basin.	Current GSP network of 26 wells plus additional wells in the SLOFCWCD monitoring network is sufficient for mapping all of these areas.	Network may be expanded in accordance with the data gaps identified above.

7.2.2 *Groundwater Level Monitoring Protocols*

The groundwater level monitoring protocols established by SLOFCWCD are adopted by this GSP for manual groundwater level monitoring. The monitoring protocols are included in Appendix 7B.

Atascadero MWC and Templeton CSD measure groundwater levels in their wells on a weekly basis. It is likely that these more frequently measured data will be incorporated during GSP implementation. The GSA may consider use of automated groundwater level data loggers in the GSP groundwater level monitoring network wells. These data may be used to supplement the current water level monitoring network in the future. As automated groundwater level monitoring systems are added to the monitoring network, appropriate protocols for each automated system will be incorporated into this GSP.

Automated groundwater level monitoring systems have the advantage of supplying more frequent groundwater levels. The groundwater level monitoring BMP recommends more frequent monitoring in certain areas, including shallow, unconfined aquifers, in areas of rapid recharge, and in areas of greater withdrawal rates. More frequent monitoring may also be required in specific places where sustainability indicators are a concern or to track impacts of specific management actions and projects. The need for more frequent monitoring will be evaluated, and a program to increase monitoring frequency may be developed during the GSP implementation phase.

7.3 Groundwater Storage Monitoring Network

This GSP adopts groundwater levels as a proxy for assessing change in groundwater storage, as described in Section 8 – Sustainable Management Criteria. The GSP groundwater level monitoring network identified in Section 7.2 – Groundwater Level Monitoring Network, is central to the monitoring network used to create historical groundwater elevation contour maps and change in groundwater elevation maps for each principal aquifer (Section 5 – Groundwater Conditions). However, there are several additional wells used for these analyses that are subject to confidentiality agreements or otherwise do not meet the criteria for inclusion in the GSP groundwater level monitoring network as specified in Section 7.2. As described in Section 5, a total of approximately 128 wells (depending on year) were used for these groundwater elevation analyses. Of these wells, 95 are not subject to confidentiality agreements. The locations of these non-confidential wells are shown on Figure 5-1 and are listed in Appendix 7C.

7.3.1 *Groundwater Storage Monitoring Data Gaps*

Data gaps in the groundwater storage monitoring network are the same as the data gaps identified for the groundwater level monitoring network discussed in Section 7.2.1 – Groundwater Level Monitoring Network Data Gaps.

7.3.2 *Groundwater Storage Monitoring Protocols*

The groundwater storage monitoring network is identical to the groundwater level monitoring network. Therefore, the protocols used for gathering water level data to assess changes in groundwater storage are identical to the protocols used for the chronic lowering of groundwater levels sustainability indicator. Protocols for the manual collection of groundwater levels are included in Appendix 7B. As automated groundwater level collection devices are added to the monitoring network, protocols will be developed for each of these automated systems and incorporated into the GSP.

7.4 Water Quality Monitoring Network

The sustainability indicator for degraded water quality is evaluated by monitoring groundwater quality at a network of existing supply wells. The SGMA regulations require sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators to address known water quality issues.

As described in Section 5 – Groundwater Conditions, there are no known contaminant plumes in the Basin, therefore the monitoring network is monitoring only non-point source constituents of concern and naturally occurring water quality impacts.

Existing groundwater quality monitoring programs in the Basin are described in Section 3 – Description of GSP Area, and groundwater quality distribution and trends are described in Section 5 – Groundwater Conditions. Constituents of concern were identified in Section 5 based on comparison to drinking water standards and levels that could impact crop production. As described in Section 8 – Sustainable Management Criteria, separate minimum thresholds are set for agricultural constituents of concern and drinking water constituents of concern. Therefore, different wells in the network will be assessed for different constituents. Constituents of concern for drinking water will be assessed at public water supply wells, domestic wells associated with the ILRP, and monitoring wells associated with open/active State Water Board Geotracker contamination sites (Section 5). Constituents of concern for crop health will be assessed at agricultural supply wells.

The GSP groundwater quality monitoring network includes 54 public water supply wells that were identified by reviewing data from the State Water Board DDW. Wells were selected that were sampled for at least one of the constituents of concern during 2015 or more recently. These 54 wells are listed in Table 7-3 and shown on Figure 7-3. There are 28 public water supply wells that are completed in the Paso Robles Formation Aquifer and 26 public water supply wells completed in the Alluvial Aquifer[36].

The agricultural supply wells and associated domestic supply wells included in the GSP groundwater monitoring network were identified by reviewing data from the ILRP that are stored in the State Water Board's Geotracker/GAMA database. Wells were selected that were sampled in 2012 or more recently. There are 54 ILRP properties in the groundwater quality monitoring network with a total of 73 wells. Of these 73 wells, 24 are assumed to be domestic supply wells based on their Geotracker/GAMA ID and the other 49 are assumed to be agricultural supply wells. Although well completion information is unknown for the ILRP wells, 68 are assumed to be completed in the Paso Robles Formation Aquifer, based on the surficial geology at the well locations. The remaining five wells are assumed to be completed in the Alluvial Aquifer based on their proximity to the Salinas River. These well completions will be confirmed

[36] Three of these 26 public water supply wells do not have available well completion information but based on location are assumed to be completed in the Alluvial Aquifer. These well completions will be confirmed during GSP implementation.

during GSP implementation. The agricultural supply wells and associated domestic supply wells are listed in Table 7-3 and shown on Figure 7-3.

The GSP groundwater quality monitoring network also includes 55 monitoring wells associated with open/active State Water Board Geotracker contamination sites. All of these wells are completed in the Alluvial Aquifer. These wells are sampled for various water quality constituents as determined by each site's monitoring plan including constituents of concern for drinking water. These monitoring wells will be included in the GSP groundwater quality monitoring network at least until the parent State Water Board Geotracker contamination site(s) are closed[37]. The State Water Board Geotracker monitoring wells are listed in Table 7-3 and shown on Figure 7-3.

[37] In the event of State Water Board Geotracker site closure(s) the GSA may endeavor to retain certain monitoring wells in the GSP groundwater quality monitoring network if agreement(s) with the well owner(s) can be coordinated.

Table 7-3. Groundwater Quality Monitoring Network

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
Atascadero MWC-1B	PWS	65	50-65	5/22/2007	5/14/2019	83	Qa
Atascadero MWC-2A	PWS	105	50-100	1/31/2000	7/19/2018	77	Qa
Atascadero MWC-3A	PWS	75	46-75	2/7/1984	5/5/2014	44	Qa
Atascadero MWC-4	PWS	86	21-85	5/10/1984	5/9/2019	109	Qa
Atascadero MWC-5	PWS	90	20-90	3/12/1985	4/11/2019	125	Qa
Atascadero MWC-5A	PWS	100	50-100	2/3/1994	5/14/2019	149	Qa
Atascadero MWC-13A	PWS	330	210-310	9/12/2000	6/7/2018	28	Qa
Atascadero MWC-16	PWS	72	37-72	3/9/1995	11/27/2018	90	Qa
Atascadero MWC-19	PWS	115	35-105	3/7/1995	11/27/2018	86	Qa
Atascadero State Hosp - WELL 01 (1953)	PWS	--	--	10/31/1988	6/6/2019	717	Qa
Atascadero State Hosp - WELL 02 (1968) - STANDBY	PWS	120	40-120	7/12/1989	6/6/2019	810	Qa
Atascadero State Hosp - WELL 03 (1969)	PWS	--	20-77	7/12/1989	3/14/2019	867	Qa
Atascadero State Hosp - WELL 04	PWS	--	--	4/15/2003	3/14/2019	609	Qa
CSA23 Well-3	PWS	49.5	30-49.5	1/24/1992	6/17/2019	734	Qa
CSA23 Well-4	PWS	57	29-49	7/29/1997	6/17/2019	136	Qa
Garden Farms 1	PWS	80	40-80	4/9/1987	2/25/2019	28	Qa
Garden Farms 2	PWS	127	--	1/15/2002	2/28/2018	26	Qa
Garden Farms 3	PWS	80	55-80	8/19/2002	2/25/2019	12	Qa
Paso Robles-Thunderbird 10	PWS	210	60-210	10/8/1984	11/1/2018	114	Qa
Paso Robles-Thunderbird 13	PWS	130	70-130	9/11/1985	11/1/2018	101	Qa
Paso Robles-Thunderbird 17	PWS	130	70-130	6/22/1993	2/12/2019	65	Qa
Paso Robles-Thunderbird 23	PWS	140	90-140	10/7/1998	11/1/2018	53	Qa
SANTA LUCIA SCHOOL - WELL 01	PWS	--	--	9/18/2002	11/7/2019	136	Qa
Templeton CSD-Creekside River Well	PWS	61	31-51	6/10/2008	5/14/2019	335	Qa
Templeton CSD-Platz Well 02	PWS	85	44-85	4/17/1985	10/29/2018	69	Qa
Templeton CSD-Smith River Well	PWS	65	35-55	1/12/1994	10/29/2018	95	Qa
ALMIRA WATER ASSOCIATION - WELL 02	PWS	--	--	12/10/1987	12/23/2019	397	QTp
Atascadero MWC-6A	PWS	480	240-470	4/2/2002	11/19/2018	31	QTp
Atascadero MWC-7	PWS	500	157-500	4/24/1989	11/6/2018	85	QTp

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
Atascadero MWC-8A	PWS	425	140-415	9/14/2004	2/14/2019	39	QTp
Atascadero MWC-9A	PWS	400	155-420	6/4/2001	11/6/2018	48	QTp
Atascadero MWC-10	PWS	550	192-550	4/18/1989	11/27/2018	77	QTp
Atascadero MWC-12	PWS	603	300-600	7/6/1988	4/16/2019	101	QTp
Atascadero MWC-25	PWS	400	155-355	4/5/2011	5/9/2019	26	QTp
Atascadero MWC-26	PWS	500	160-490	4/5/2011	2/26/2019	28	QTp
LOS ROBLES MOBILE HOME ESTATES - WELL 01	PWS	--	102-184	1/2/2002	7/1/2019	407	QTp
LOS ROBLES MOBILE HOME ESTATES - WELL 02	PWS	--	125-240	1/2/2002	7/1/2019	447	QTp
LOS ROBLES MOBILE HOME ESTATES - WELL 03	PWS	--	115-185	1/2/2002	7/1/2019	397	QTp
PASO ROBLES CHEVROLET CADILLAC - WELL 01	PWS	--	--	10/27/2003	8/13/2019	131	QTp
SANTA YSABEL RANCH MWC - WELL 01, RESERVIOR WELL	PWS	--	145-315	6/30/2004	7/3/2019	402	QTp
SANTA YSABEL RANCH MWC - WELL 02, RANCH HOUSE WELL	PWS	--	140-410	6/30/2004	7/3/2019	433	QTp
Templeton CSD-Bonita Well 01	PWS	245	140-240	4/11/1989	7/11/2017	56	QTp
Templeton CSD-Claussen Well 01	PWS	310	190-300	10/13/1987	10/29/2018	61	QTp
Templeton CSD-Cow Meadows	PWS	290	120-290	6/16/1998	10/29/2018	229	QTp
Templeton CSD-Creekside Deep Well	PWS	360	110-360	5/20/2008	5/14/2019	311	QTp
Templeton CSD-Davis Well	PWS	230	110-230	3/9/1990	5/7/2019	57	QTp
Templeton CSD-Fortini Well	PWS	400	200-400	2/27/1989	10/29/2018	66	QTp
Templeton CSD-Platz Well 04	PWS	650	260-640	5/19/2009	10/29/2018	35	QTp
Templeton CSD-Saunders Well	PWS	280	160-280	3/11/2003	10/29/2018	28	QTp
Templeton CSD-Silva Well 01	PWS	205	105-195	3/14/2003	10/29/2018	128	QTp
WALNUT HILLS MUTUAL WATER CO - WELL 01	PWS	--	120-240	10/27/2003	8/13/2019	131	QTp
WALNUT HILLS MUTUAL WATER CO - WELL 04	PWS	--	--	6/4/2009	4/16/2019	232	QTp
WALNUT HILLS MUTUAL WATER CO - WELL 05	PWS	--	--	5/19/2010	5/19/2010	1	QTp
WALNUT HILLS MUTUAL WATER CO - WELL 07	PWS	--	--	7/31/2018	12/12/2019	267	QTp
SL0607989492-B10-2	MW	--	--	9/30/2005	10/4/2011	25	Qa
SL0607989492-B10-3	MW	--	--	9/30/2005	10/4/2011	25	Qa
SL0607989492-B1-1A	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-B1-2	MW	--	--	12/15/2006	10/11/2011	12	Qa

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
SL0607989492-B1-3	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-B5-2	MW	--	--	10/5/2005	10/24/2012	30	Qa
SL0607989492-E10W-40A	MW	--	--	9/30/2005	10/25/2012	31	Qa
SL0607989492-E10W-41A	MW	--	--	9/30/2005	10/25/2012	31	Qa
SL0607989492-E11W-26B	MW	--	--	10/4/2005	12/4/2015	35	Qa
SL0607989492-E1W-1	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-E1W-2	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-E1W-4A	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-E3W-22	MW	--	--	10/5/2005	12/4/2015	29	Qa
SL0607989492-E3W-24	MW	--	--	10/5/2005	10/24/2012	30	Qa
SL0607989492-E5W-8	MW	--	--	10/5/2005	10/24/2012	24	Qa
SL0607989492-E5W-9	MW	--	--	10/5/2005	10/24/2012	30	Qa
SL0607989492-E9W-33C	MW	--	--	10/3/2005	10/25/2012	30	Qa
SL0607989492-P-1A	MW	--	--	10/21/2009	10/31/2011	57	Qa
SL0607989492-P-1B	MW	--	--	10/21/2009	10/31/2011	57	Qa
SL0607989492-P-2A	MW	--	--	10/21/2009	10/31/2011	57	Qa
SL0607989492-P-2B	MW	--	--	10/21/2009	10/31/2011	55	Qa
SL0607989492-S11-B12	MW	--	--	10/4/2005	10/24/2012	30	Qa
SL0607989492-S11-B13	MW	--	--	10/4/2005	10/24/2012	30	Qa
SL0607989492-S11-B14	MW	--	--	12/13/2006	12/13/2006	6	Qa
SL0607989492-S11-B17	MW	--	--	10/4/2005	10/25/2012	30	Qa
SL0607989492-S11-B18	MW	--	--	10/5/2005	12/4/2015	35	Qa
SL0607989492-S11-B20	MW	--	--	10/4/2005	10/25/2012	24	Qa
SL0607989492-S11-B6	MW	--	--	10/3/2005	10/25/2012	36	Qa
SL0607989492-S11-B9	MW	--	--	10/4/2005	12/4/2015	35	Qa
SL0607989492-S1-B3	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-S1-B4	MW	--	--	12/14/2006	10/24/2012	24	Qa
SL0607989492-S3-B1	MW	--	--	10/4/2005	10/24/2012	24	Qa
SL0607989492-S3-B2	MW	--	--	10/5/2005	10/24/2012	24	Qa
SL0607989492-S9-B1	MW	--	--	10/3/2005	10/25/2012	30	Qa
SL0607989492-S9-B2	MW	--	--	10/3/2005	10/25/2012	30	Qa

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
SL0607989492-S9-B3	MW	--	--	10/3/2005	10/25/2012	30	Qa
T0607900001-MW-10	MW	--	27-47	11/28/2001	4/20/2018	313	Qa
T0607900001-MW-11	MW	--	25-45	11/28/2001	1/13/2011	48	Qa
T0607900001-MW-12	MW	--	20-40	11/28/2001	2/13/2017	192	Qa
T0607900001-MW-13	MW	--	25-45	11/28/2001	1/12/2011	48	Qa
T0607900001-MW-14	MW	--	19-35	9/20/2002	2/13/2017	194	Qa
T0607900001-MW-15	MW	--	19-35	9/20/2002	12/15/2009	137	Qa
T0607900001-MW-16	MW	--	20-35	5/16/2003	1/12/2011	98	Qa
T0607900001-MW-17	MW	--	19-26	5/16/2003	1/12/2011	136	Qa
T0607900001-MW-18	MW	--	20-35	5/16/2003	1/12/2011	145	Qa
T0607900001-MW-2	MW	--	25-40	11/28/2001	2/13/2017	250	Qa
T0607900001-MW-3	MW	--	16.5-46.5	11/28/2001	1/13/2011	39	Qa
T0607900001-MW-4	MW	--	30-40	11/28/2001	1/13/2011	39	Qa
T0607900001-MW-5	MW	--	27-47	11/28/2001	2/13/2017	229	Qa
T0607900001-MW-6	MW	--	29-39	11/28/2001	1/13/2011	211	Qa
T0607900001-MW-7	MW	--	25-45	8/30/2002	1/13/2011	59	Qa
T0607900001-MW-8	MW	--	29-44	11/28/2001	1/12/2011	38	Qa
T10000009038-MW1	MW	--	45-60	4/7/2016	12/7/2018	146	Qa
T10000009038-MW2	MW	--	45-60	4/7/2016	7/26/2016	98	Qa
T10000009038-MW3	MW	--	45-60	4/7/2016	7/26/2016	98	Qa
MSPR-01	MW	--	--	7/19/2005	8/11/2014	2	QTp
S-MS-H04	MW	235	--	11/27/2012	11/27/2012	1	QTp
S-MS-SV01	MW	--	--	11/8/2012	11/8/2012	1	QTp
AGL020000598-FLETCHER DOM	Dom	--	--	3/26/2013	6/14/2013	2	Qa
AGL020027483-VAQUERO DW	Dom	--	--	12/27/2012	12/12/2017	4	Qa
AGL020000508-DW	Dom	--	--	10/16/2012	6/14/2017	3	QTp
AGL020000648-MAIN_D/I	Dom	--	--	1/7/2014	6/2/2014	2	QTp
AGL020001003-HOME DOMESTIC	Dom	--	--	12/12/2012	10/26/2017	4	QTp
AGL020001035-DW	Dom	--	--	12/11/2012	6/24/2013	2	QTp
AGL020001087-PRIMARY AW DW	Dom	--	--	12/12/2012	10/26/2017	4	QTp
AGL020001433-COBBLE C HOME #	Dom	--	--	12/17/2012	12/17/2012	1	QTp

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
AGL020002826-DOM/AG WELL	Dom	--	--	12/10/2012	6/4/2013	2	QTp
AGL020003068-DW	Dom	--	--	1/22/2013	6/4/2013	2	QTp
AGL020003461-WINERY DOM	Dom	--	--	7/28/2014	7/28/2014	1	QTp
AGL020005112-DW	Dom	--	--	10/16/2012	4/6/2016	2	QTp
AGL020005225-DW AW	Dom	--	--	9/24/2013	12/7/2017	5	QTp
AGL020007294-DW	Dom	--	--	12/4/2012	12/12/2017	4	QTp
AGL020012109-HOME WELL #1	Dom	--	--	12/11/2012	5/27/2013	2	QTp
AGL020015262-AVR DW	Dom	--	--	9/25/2012	11/27/2017	3	QTp
AGL020019682-DW AW	Dom	--	--	10/15/2013	6/17/2014	2	QTp
AGL020027467-BLACKSETH DW	Dom	--	--	12/27/2012	11/29/2017	4	QTp
AGL020027660-DOM WELL	Dom	--	--	12/16/2016	9/24/2017	4	QTp
AGL020028468-AOK DOM	Dom	--	--	6/21/2017	10/30/2017	3	QTp
AGL020028474-KCV DOM 1	Dom	--	--	6/21/2017	10/30/2017	2	QTp
AGL020028474-KCV DOM 2	Dom	--	--	6/21/2017	10/30/2017	2	QTp
AGL020028474-KCV DOM 3	Dom	--	--	6/21/2017	10/30/2017	2	QTp
AGL020035786-MAINCOPIA_DOM	Dom	--	--	1/11/2019	1/11/2019	1	QTp
AGL020000598-FLETCHER IRR	Ag	--	--	3/26/2013	6/14/2013	2	Qa
AGL020003146-RIVER	Ag	--	--	6/8/2015	12/12/2017	3	Qa
AGL020027481-RIVER WELL	Ag	--	--	4/18/2016	9/21/2017	4	Qa
AGL020000484-ROOS-HOMESTEAD	Ag	--	--	11/27/2012	12/12/2017	4	QTp
AGL020000508-AW	Ag	--	--	10/16/2012	6/14/2017	3	QTp
AGL020001000-LAGO FOSSIL	Ag	--	--	12/12/2012	10/26/2017	4	QTp
AGL020001035-AW	Ag	--	--	12/11/2012	6/24/2013	2	QTp
AGL020001138-PRIMARY AW	Ag	--	--	5/14/2013	12/19/2017	4	QTp
AGL020001433-JACK CREEK WELL	Ag	--	--	12/17/2012	12/17/2012	1	QTp
AGL020001433-WHALE ROCK #1	Ag	--	--	12/17/2012	1/17/2018	4	QTp
AGL020001744-BARN WELL	Ag	--	--	10/31/2013	12/8/2017	3	QTp
AGL020001744-POND WELL	Ag	--	--	10/31/2013	12/8/2017	3	QTp
AGL020002320-PRIMARY WELL	Ag	--	--	11/12/2012	6/17/2013	3	QTp
AGL020002364-AG WELL	Ag	--	--	11/28/2012	9/25/2017	4	QTp
AGL020002753-OLEA WELL	Ag	--	--	1/31/2013	12/28/2017	3	QTp

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
AGL020002801-PROPERTY WELL	Ag	--	--	1/15/2013	9/29/2017	4	QTp
AGL020002926-AW DW	Ag	--	--	2/26/2013	12/12/2017	4	QTp
AGL020003068-AW	Ag	--	--	1/15/2013	11/28/2017	5	QTp
AGL020003146-BARN	Ag	--	--	6/8/2015	12/12/2017	3	QTp
AGL020003461-AG WELL	Ag	--	--	12/11/2012	12/19/2017	3	QTp
AGL020004031-POMAR RIDGE	Ag	--	--	12/3/2012	5/24/2017	3	QTp
AGL020004709-IRR1	Ag	--	--	6/8/2015	12/5/2017	4	QTp
AGL020004789-IRRIGATION	Ag	--	--	3/8/2018	6/8/2018	2	QTp
AGL020005112-AW 1	Ag	--	--	10/16/2012	10/16/2012	1	QTp
AGL020007196-DWS NEW	Ag	--	--	11/16/2012	4/20/2018	3	QTp
AGL020007294-AW	Ag	--	--	12/4/2012	12/12/2017	4	QTp
AGL020007507-ONLY WELL	Ag	--	--	12/17/2013	9/29/2017	3	QTp
AGL020007659-YRLY WTR SAMPLE	Ag	--	--	9/24/2012	4/26/2017	3	QTp
AGL020007709-AG WELL	Ag	--	--	12/5/2012	12/12/2017	4	QTp
AGL020012109-WELL #1	Ag	--	--	12/11/2012	6/21/2017	3	QTp
AGL020012322-WELL 1	Ag	--	--	11/13/2012	10/16/2017	4	QTp
AGL020012322-WELL 2	Ag	--	--	11/13/2012	10/16/2017	4	QTp
AGL020012842-AG WELL	Ag	--	--	11/28/2012	9/25/2017	4	QTp
AGL020013302-WELL 1	Ag	--	--	12/5/2012	10/3/2017	3	QTp
AGL020015262-AVR IRR	Ag	--	--	9/25/2012	11/27/2017	3	QTp
AGL020017182-AG WELL	Ag	--	--	2/28/2013	9/25/2017	4	QTp
AGL020017862-ANDERSON	Ag	--	--	1/3/2013	12/8/2017	3	QTp
AGL020018782-BELLETTO	Ag	--	--	5/28/2015	10/11/2017	3	QTp
AGL020022602-WELL	Ag	--	--	4/28/2014	9/25/2017	3	QTp
AGL020023442-WELL	Ag	--	--	4/28/2014	10/13/2014	2	QTp
AGL020025242-PRIMARY AG	Ag	--	--	12/16/2014	8/25/2015	2	QTp
AGL020027472-JAVADI - CAT 1	Ag	--	--	6/20/2016	11/29/2017	4	QTp
AGL020027483-VAQUERO IW	Ag	--	--	12/27/2012	12/12/2017	4	QTp
AGL020027660-AG WELL	Ag	--	--	12/16/2016	9/24/2017	4	QTp
AGL020027743-PRIMARY AG	Ag	--	--	8/25/2015	10/30/2017	4	QTp
AGL020027968-J DUSI WELL 1	Ag	--	--	4/14/2016	4/14/2016	1	QTp

Well ID	Type of Well	Well Depth (feet)	Screen Interval(s)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Assumed Aquifer
AGL020028424-WELL	Ag	--	--	9/25/2017	9/25/2017	1	QTp
AGL020028474-KCV PRIMARY AG	Ag	--	--	6/21/2017	10/31/2017	2	QTp
AGL020035655-ARBORMAIN_IRR	Ag	--	--	11/16/2018	11/16/2018	1	QTp

Notes: PWS – public water supply well, MW – monitoring well, Dom – domestic well, Ag – agricultural supply well, Qa – Alluvial Aquifer, QTp – Paso Robles Formation Aquifer; LOS – Level of Severity

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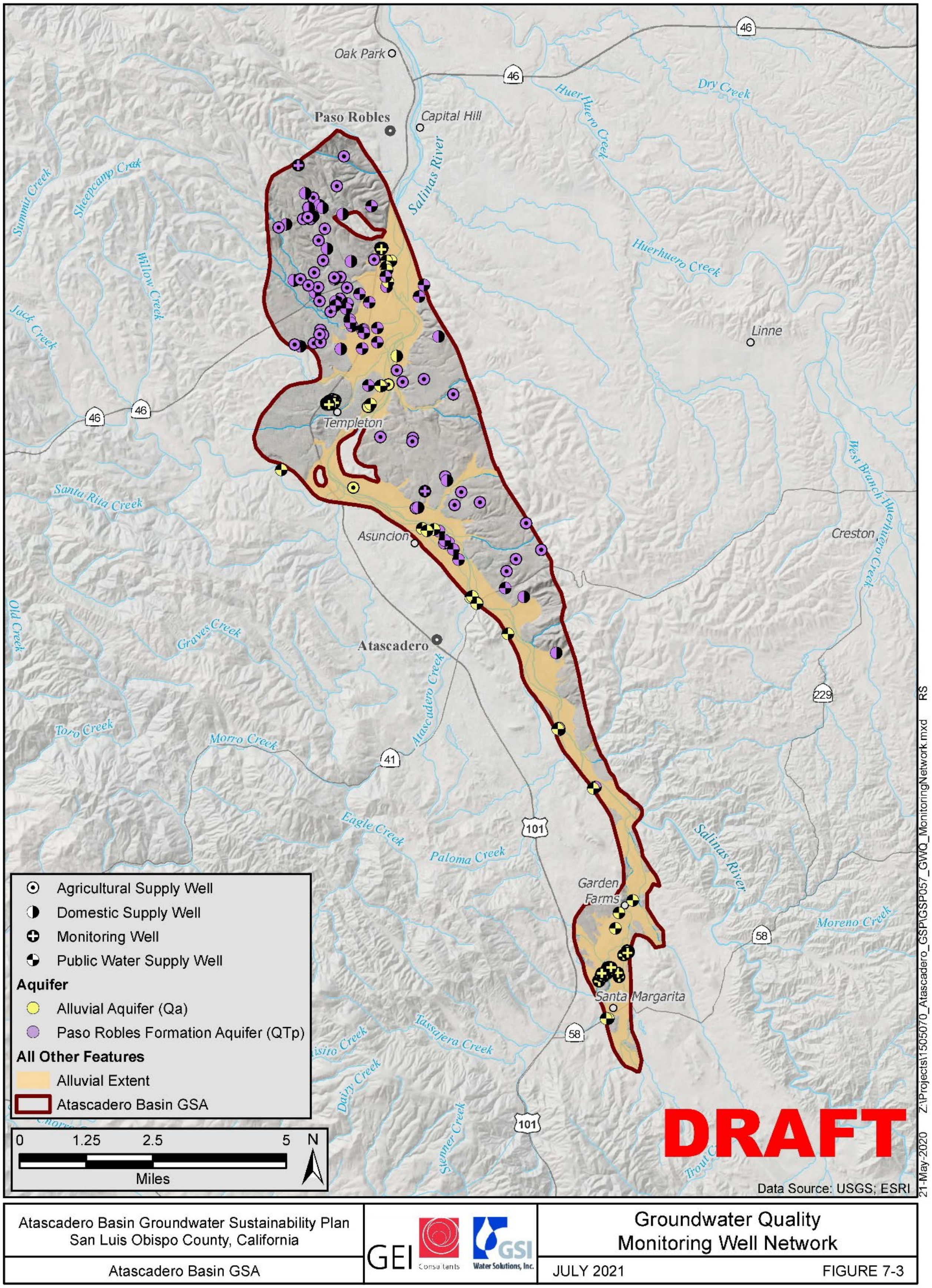

Figure 7-3. Groundwater Quality Monitoring Well Network

7.4.1 *Groundwater Quality Monitoring Data Gaps*

Because the GSP groundwater quality monitoring network is based on existing supply wells, there are no spatial data gaps in the network. Table 7-4 summarizes the recommendations for groundwater quality monitoring from the BMPs, the current network, and data gaps. There is adequate spatial coverage in the network to assess impacts to beneficial uses and users. The primary data gap is that well construction info for many wells in the monitoring network is unknown. This is a data gap that will be addressed during GSP implementation.

Table 7-4. Summary of Groundwater Quality Monitoring, Best Management Practices, and Data Gaps

Best Management Practices (DWR 2016a)	Current Network	Data Gap
Monitor groundwater quality data from each principal aquifer in the basin that is currently, or may be in the future, impacted by degraded water quality. The spatial distribution must be adequate to map or supplement mapping of known contaminants. Monitoring should occur based upon professional opinion, but generally correlate to the seasonal high and low groundwater level, or more frequent as appropriate.	There are 54 municipal wells, 73 IRLP wells, and 55 monitoring wells associated with open/active State Water Board Geotracker contamination sites within the GSP area that have been regularly sampled since at least 2015 for groundwater quality.	None; the current monitoring network contains adequate spatial distribution to map water quality in the basin.
Collect groundwater quality data from each principal aquifer in the basin that is currently, or may be in the future, impacted by degraded water quality. Agencies should use existing water quality monitoring data to the greatest degree possible. For example, these could include ILRP, GAMA, existing RWQCB monitoring and remediation programs, and drinking water source assessment programs.	Public databases provide adequate water quality information for degraded water quality.	Well depth and construction info for some wells in the monitoring network is unknown; however, there is adequate coverage in both principal aquifers.
Define the three-dimensional extent of any existing degraded water quality impact.	There are a large number of wells that are actively sampled.	Depth or construction information will need to be obtained for some wells to determine the vertical extent of contaminants.
Data should be sufficient for mapping movement of degraded water quality.	There are a large number of wells that are actively sampled.	None.
Data should be sufficient to assess groundwater quality impacts to beneficial uses and users.	Water quality monitoring program assesses impacts to agricultural, domestic, and municipal users.	None.
Data should be adequate to evaluate whether management activities are contributing to water quality degradation.	There are a large number of wells that are actively sampled.	Projects and actions may be developed. Water quality network will be evaluated and augmented if necessary.

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7.4.2 *Groundwater Quality Monitoring Protocols*

Water quality samples are currently being collected according to State Water Board and ILRP requirements and according to the monitoring plans associated with open/active State Water Board Geotracker contamination sites. ILRP data are currently collected under Central Coast RWQCB Ag Order 3.0. ILRP samples are collected under the Tier 1, Tier 2, or Tier 3 monitoring and reporting programs. Copies of these monitoring and reporting programs are included in Appendix 7B and incorporated herein as monitoring protocols. These protocols will continue to be followed during GSP implementation for the groundwater quality monitoring.

7.5 Land Subsidence Monitoring Network

The sustainability indicator for land subsidence is evaluated by monitoring land subsidence using interferometric synthetic-aperture radar (InSAR) data. As described in Section 5 – Groundwater Conditions, land subsidence is monitored in the Basin by measuring ground elevation using microwave satellite imagery. This data is currently provided by DWR, covers the most recent 3 years of subsidence data (2015-2018), and is adequate to identify areas of recent subsidence. The GSA will continue to annually assess subsidence using the DWR provided InSAR data.

7.5.1 *Land Subsidence Monitoring Data Gaps*

Available data indicate that there is currently no long-term subsidence occurring in the Basin that affects infrastructure. There are no data gaps identified with the subsidence network at this time.

7.5.2 *Land Subsidence Monitoring Protocols*

The BMP notes that no standard procedures exist for collecting subsidence data. The GSA will continue to monitor data annually as part of GSP implementation. If additional relevant datasets become available, they will be evaluated and incorporated into the monitoring program. If monitoring indicates subsidence is occurring at a rate greater than the minimum thresholds, then additional investigation and monitoring may be warranted. In this case, the GSA would implement a study to assess if the observed subsidence can be correlated to groundwater elevations, and whether a reasonable causality can be established. The GSA will also consider subsidence surveys published by the USGS in assessing land subsidence across the Basin if they become available.

7.6 Interconnected Surface Water Monitoring Network

As discussed in Section 5 – Groundwater Conditions, the spatial extent of interconnected surface water in the Basin was evaluated using water level data from confidential and non-confidential Alluvial Aquifer and Paso Robles Formation Aquifer wells adjacent to the Salinas River. The GSP groundwater level monitoring network (Table 7-1 and Figure 7-2) contains all of the non-confidential wells used to evaluate interconnected surface water. As discussed in Section 7.2 – Groundwater Level Monitoring Network, an effort has been made to reach out to confidential well owners and offer them the opportunity to opt in to the GSP groundwater level monitoring network. Several wells have been added to the GSP monitoring network as a result of this effort and the

GSA will continue to make this effort during implementation. Regardless, as was done for the analysis in Section 5 – Groundwater Conditions, water level data from the confidential wells will continue to be utilized for evaluations of interconnected surface water in the Basin. In accordance with the assessment of wells discussed in Section 7.2, nine Alluvial Aquifer wells and five Paso Robles Aquifer wells were identified that meet the criteria for inclusion in the GSP groundwater level monitoring network for monitoring shallow groundwater levels adjacent to the Salinas River. These monitoring wells are indicated in Table 7-1 and shown on Figure 7-4.

7.6.1 *Interconnected Surface Water Monitoring Data Gaps*

The existing GSP groundwater level monitoring network provides good coverage to evaluate interconnected surface water in both principal aquifers within the Basin. The network is of sufficient density and spatial distribution especially when coupled with three additional existing confidential wells in the SLOFCWCD groundwater level monitoring network. The potential need for an increased frequency of water level measurements, especially in spring months, to capture annual maximum groundwater levels will be evaluated during GSP implementation.

Although the county of San Luis Obispo (county) records releases from the Salinas Reservoir (upstream of the Basin) and completes "Live Stream" surveys (as described in Section 5 – Groundwater Conditions) and there is an active USGS stream gaging station in the city of Paso Robles (USGS Station 11147500), there are no surface water gaging stations in the Basin. The potential need for installation of surface water gaging station(s) along the Salinas River within the Basin to aid in determining gaining/losing reaches will be evaluated during GSP implementation.

7.6.2 *Interconnected Surface Water Monitoring Protocols*

Water level monitoring will be conducted in accordance the protocols described in the water level monitoring network section of this section.

7.7 Data Management System and Data Reporting

The SGMA regulations provide broad requirements on data management, stating that a GSP must adhere to the following guidelines for a data management system (DMS):

- Article 3, Section 352.6: Each Agency shall develop and maintain a DMS that is capable of storing and reporting information relevant to the development or implementation of the GSP and monitoring of the Basin.
- Article 5, Section 354.40: Monitoring data shall be stored in the DMS developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.

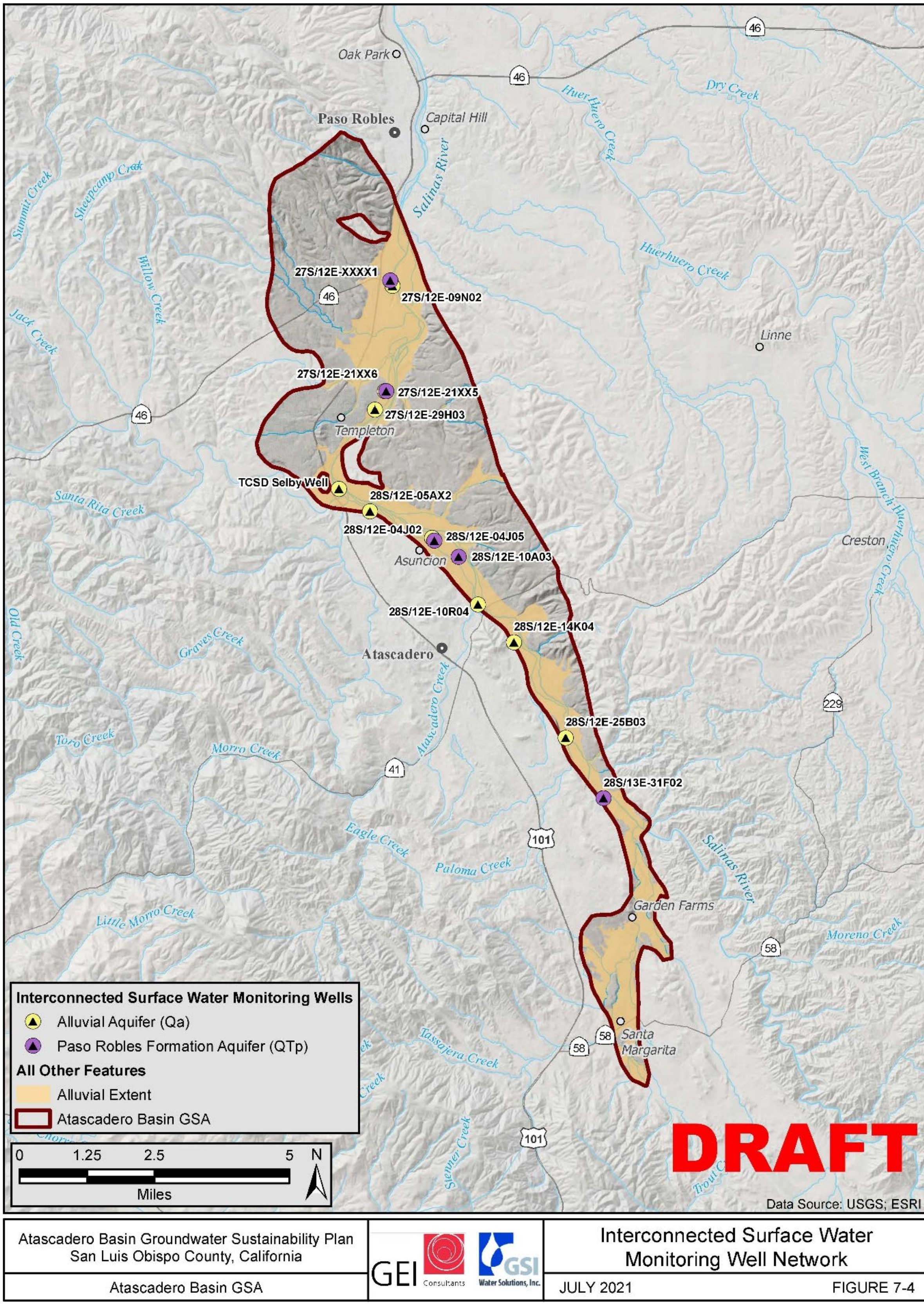

Figure 7-4. Interconnected Surface Water Monitoring Well Network

SGMA-related data for the Atascadero Basin will be incorporated into the county-wide DMS currently under development for the county as part of another project. The Atascadero Basin GSA and entities that collect and report data within the Basin will have access and authorization to enter their data into the San Luis Obispo County DMS.

The data and information stored in the DMS will be presented on a web-based map viewer that displays data relevant to SGMA implementation, GSP development, and annual reporting to the DWR. The map viewer accommodates data within and outside of GSA monitoring networks. The types of data visualized on the map and available via the map's navigation menu are listed in Table 7-5.

Table 7-5. Map Viewer Navigation

Menu Navigation	Description
Groundwater Levels	Water level data and associated wells with well completion reports.
Groundwater Storage	GSA groundwater storage monitoring network sites.
Water Quality	Water quality well and station data for greater than 100 constituents (e.g., Magnesium).
Land Subsidence	Subsidence data from extensometers and other stations plus InSAR data.
Interconnected Surface Water	Data related to the interconnected surface water sustainability indicator such as proximity wells, river and stream gages, precipitation stations, and more.
Seawater Intrusion	Sites (primarily wells) tracking the SGMA seawater intrusion sustainability indicator. This data set is not applicable to the Atascadero Basin, but will be present in the San Luis Obispo County DMS.
Hydrogeologic Conceptual Model (HCM)	Data useful for development of a hydrogeoglogic conceptual model of the basin including suitability of soil for recharge, geologic maps, and fault maps.
Boundaries	GSA and other relevant boundaries.

Data sources used to populate the DMS are listed on Table 7-6. Categories marked with an 'X' indicate datasets that are publicly accessible. Data are compiled and reviewed to comply with data quality objectives. The review included the following checks:

- Identifying outliers that may have been introduced during the original data entry process by others.
- Removing or flagging questionable data being uploaded in the DMS. This applies to historic water level data, water quality data, and water level over time.

The data will be loaded into the database and checked for errors and missing data. Error tables will be developed to identify water level and/or well construction data that were missing. For water level data, another data quality check was completed by plotting well hydrographs to identify and remove anomalous data points.

In the future, well log information will be entered for selected wells and other information will be added as needed to satisfy the requirements of the SGMA regulations.

Table 7-6. Data Sources Used to Populate DMS

Data Sets	Data Category						
	Well and site info	Well construction	Aquifer properties and lithology (data to be added)	Water level	Pumping (data to be added)	Recharge (data to be added)	Water quality
DWR (CASGEM)	X	X		X			
San Luis Obispo County	X	X		X			
SRWCB Geotracker	X	X		X			
Geotracker GAMA	X						X

8. Sustainable Management Criteria (§ 354.22-30)

This section defines the conditions that constitute sustainable groundwater management, discusses the process by which the Atascadero Basin (Basin) will characterize undesirable results, and establishes minimum thresholds and measurable objectives for each sustainability indicator.

This is the fundamental section that defines sustainability in the Basin, and it addresses significant regulatory requirements. The measurable objectives, minimum thresholds, and undesirable results presented in this section define the future sustainable conditions in the Basin and guide the GSAs to actions that will achieve these future conditions.

This section presents the data and methods used to develop Sustainable Management Criteria (SMC) and demonstrate how they influence beneficial uses and users. The SMC presented in this section are based on currently available data and application of the best available science. As noted in this GSP, data gaps exist in the hydrogeologic conceptual model. Uncertainty caused by these data gaps was considered when developing the SMC. Due to uncertainty in the hydrogeologic conceptual model, these SMC are considered initial criteria and will be reevaluated and potentially modified in the future as new data become available.

The SMC are grouped by sustainability indicators. The following five sustainability indicators are applicable in the Basin:

1. Chronic lowering of groundwater elevations levels
2. Reduction in groundwater storage
3. Degraded water quality
4. Land subsidence
5. Depletion of interconnected surface water

The sixth SMC, sea water intrusion, is not applicable in the Basin.

To retain an organized approach, this section follows the same structure for each sustainability indicator. The description of each Sustainable Management Criterion contains all the information required by Section 354.22 *et. seq* of the SGMA regulations and outlined in the SMC BMP (DWR 2017), including:

- How locally defined significant and unreasonable conditions were developed
- How minimum thresholds were developed, including:
    - The information and methodology used to develop minimum thresholds (§354.28(b)(1))

- The relationship between minimum thresholds and the relationship of these minimum thresholds to other sustainability indicators (§354.28 (b)(2))
  - The effect of minimum thresholds on neighboring basins (§354.28 (b)(3))
  - The effect of minimum thresholds on beneficial uses and users (§354.28 (b)(4))
  - How minimum thresholds relate to relevant federal, state, or local standards (§354.28 (b)(5))
  - The method for quantitatively measuring minimum thresholds (§354.28 (b)(6))
- How measurable objectives were developed, including:
  - The methodology for setting measurable objectives (§354.30)
  - Interim milestones (354.30 (a), §354.30 €, §354.34 (g)(3))
- How undesirable results were developed, including:
  - The criteria defining when and where the effects of the groundwater conditions because undesirable results based on a quantitative description of the combination of minimum threshold exceedances (§354.26 (b)(2))
  - The potential causes of undesirable results (§354.26 (b)(1))
  - The effects of these undesirable results on the beneficial users and uses (§354.26 (b)(3))

8.1 Definitions

SGMA regulations and legislation contain several new terms relevant to the SMC. These terms are defined below using the definitions included in SGMA regulations (§351, Article 2). Where appropriate, additional explanatory text is added in italics. This explanatory text is not part of the official definitions of these terms. To the extent possible, plain language, including limited use of overly technical terms and acronyms, was used so that a broad audience will understand the development process and implications of the SMC.

- **Interconnected surface water** refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water.
  - Interconnected surface waters are parts of streams, lakes, or wetlands where the groundwater table is at or near the ground surface and there is water in the lakes, streams, or wetlands.
- **Interim milestone** refers to a target value representing measurable groundwater conditions, in increments of 5 years, set by an Agency as part of a GSP
  - Interim milestones are targets such as groundwater elevations that will be achieved every 5 years to demonstrate progress towards sustainability.

- **Management area** refers to an area within a basin for which the GSP may identify different minimum thresholds, measurable objectives, monitoring, or projects/management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.
- **Measurable objectives** refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the Basin.
  - Measurable objectives are goals that the GSP is designed to achieve.
- **Minimum thresholds** refer to numeric values for each sustainability indicator used to define undesirable results.
  - Minimum thresholds are established at RMS. Minimum thresholds are indicators of where an unreasonable condition might occur. For example, a groundwater elevation might be a minimum threshold if lower groundwater elevations would result in a significant and unreasonable reduction in groundwater storage.
- **Representative monitoring** refers to a monitoring site within a broader network of sites that typifies one or more conditions within the Basin or an area of the Basin.
- **Sustainability indicator** refers to any of the effects caused by groundwater conditions occurring throughout the Basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x).
- The five sustainability indicators relevant to the Basin are listed on page 1.
- **Uncertainty** refers to a lack of understanding of the Basin setting that significantly affects an Agency's ability to develop SMC and appropriate projects/management actions in a Plan, or to evaluate the efficacy of Plan implementation, and therefore may limit the ability to assess whether a basin is being sustainably managed.
- **Undesirable Result** Section 10721 of SGMA states that undesirable result means one or more of the following effects caused by groundwater conditions occurring throughout the Basin:
  1. *Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.*
  2. *Significant and unreasonable reduction of groundwater storage.*
  3. *Significant and unreasonable seawater intrusion.*

4. *Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.*
5. *Significant and unreasonable land subsidence that substantially interferes with surface land uses.*
6. *Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.*

Section § 354.26 of the SGMA regulations states, "The criteria used to define when and where the effects of the groundwater conditions cause undesirable results …shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin."

8.2 Current Atascadero Basin SGMA Prioritization

Prior to the 2016 Basin Boundary Modification Process, the Atascadero Basin was considered part of the Paso Robles Basin, and had a high priority designation and subject to a condition of critical overdraft. As a result of being part of the Paso Robles Basin, the Atascadero subarea was subject to SGMA. Through the Basin Boundary Modification (BBM) process, DWR formally identified the Atascadero Basin as a separate basin from the Paso Robles Basin.

The Atascadero Basin currently has a very low priority based on the 2019 DWR Basin Prioritization. The SGMA 2019 Basin Prioritization process was conducted to reassess the priority of the groundwater basins following the 2016 Basin boundary modification, as required by the Water Code. For the SGMA 2019 Basin Prioritization, DWR followed the process and methodology developed for the CASGEM 2014 Basin Prioritization, adjusted as required by SGMA and related legislation. The following components are used to determine the basin prioritization:

1. The population overlying the basin or subbasin
2. The rate of current and projected growth of the population overlying the basin or subbasin
3. The number of public supply wells that draw from the basin or subbasin
4. The total number of wells that draw from the basin or subbasin
5. The irrigated acreage overlying the basin or subbasin
6. The degree to which persons overlying the basin or subbasin rely on groundwater as their primary source of water
7. Any documented impacts on the groundwater within the basin or subbasin, including overdraft, subsidence, saline intrusion, and other water quality degradation
8. Any other information determined to be relevant by the department, including adverse impacts on local habitat and local streamflows

The 2019 Basin Prioritization identifies the Atascadero Basin as very low priority and that it is being managed in a sustainable manner. The Sustainability Goal for the Basin is to continue managing the Basin in a sustainable manner using historic management strategies and actions to develop minimum thresholds for each sustainability indicator applicable in the Basin.

8.3 Sustainability Goal

> **§ 354.24 Sustainability Goal**
>
> Each Agency shall establish in its Plan a sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline. The Plan shall include a description of the sustainability goal, including information from the basin setting used to establish the sustainability goal, a discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon.

As described in Section 8.2 – Current Atascadero Basin SGMA Prioritization, the Atascadero Basin is a low-priority basin because groundwater has been and continues to be sustainably managed. Although not required by SGMA regulations, the Basin's water managers determined that this was a good time to continue their proactive management of the Atascadero Basin and to prepare a GSP. Consistent with DWR's determination that the Basin is in a sustainable condition, the water managers' goal is to continue to manage the Basin sustainably. The sustainability goal is provided below:

> The goal of the Atascadero Basin GSP is to sustainably manage groundwater resources over the long term for the benefit of Basin stakeholders. This GSP outlines the approach using information developed for this GSP to achieve a sustainable groundwater resource and continue to avoid undesirable results throughout the 20-year SGMA implementation horizon and beyond, while meeting the water supply needs of Basin stakeholders. In adopting this GSP, it is the express goal of the GSA to balance the needs of all groundwater uses and users in the Basin. We have been and will continue to integrate projects and management actions with the natural system in the Basin to operate the Basin sustainably.

A number of management actions and conceptual projects are included in this GSP. Some combination of these management actions and conceptual projects will be implemented, when appropriate, to ensure the Basin is operated to maintain its sustainable yield and sustainability. These management actions and conceptual projects may include (note – projects/management actions will be developed in future chapters):

- Monitoring, reporting, and outreach
- Promoting Best Water Use Practices
- Promoting stormwater capture
- Promoting voluntary fallowing of agricultural land
- Mandatory pumping limitations in specific areas
- Conceptual projects
- NWP Delivery to northern portion of the Basin
- Expansion of Salinas Dam

The management actions and conceptual projects are designed to maintain sustainability for 20 years by one or more of the following means:

- Educating stakeholders and prompting changes in behavior to improve chances of maintaining sustainability
- Increasing awareness of groundwater pumping impacts to promote voluntary reductions in groundwater use through improved water use practices or fallowing crop land
- Increasing Basin recharge by capturing excess stormwater under approved permits
- Developing new renewable water supplies for use in the Basin to offset groundwater pumping

8.4 Process for Establishing Sustainable Management Criteria and Undesirable Results

8.4.1 *Sustainable Management Criteria*

SMC for the Basin were developed using information from public input, received in public surveys, public meetings, comment forms; hydrogeologic analysis of Basin conditions; and meetings with GSA staff and Executive Committee members. The process built on the Atascadero Basin GSA participants long history of involving interested parties – including rural residents, farmers, local cities, and the county – in public meetings focused on groundwater resource planning.

The general process for establishing SMC and conditions constituting undesirable results in the Basin included:

- Holding a series of public outreach meetings that outlined the GSP development process and introduced stakeholders to SMC.

- Surveying the public and gathering input on minimum thresholds and measurable objectives. The survey questions were designed to get public input on all five sustainability indicators applicable to the Basin. A summary of the survey results is included in Appendix 8A.
- Analyzing survey results to assess preferences and trends relevant to SMC. Survey results and public comments from outreach meetings were analyzed to assess if different areas in the Basin had different preferences for what constitutes and undesirable result in the Basin and how minimum thresholds and measurable objectives are established.
- Combining survey results, outreach efforts, and hydrogeologic data to describe undesirable results and set initial conceptual minimum thresholds and measurable objectives.
- Conducting public meetings to present initial conceptual minimum thresholds and measurable objectives and receive additional public input. Three meetings on SMC were held in the Basin.
- Reviewing public input on preliminary SMC with GSAs.

8.5 Chronic Lowering of Groundwater Levels Sustainability Indicator

This section presents and describes the SMC for chronic lowering of groundwater levels by first describing the significant and unreasonable conditions in the Basin that would constitutes an undesirable result. Then minimum thresholds and measurable objectives are summarized for each well in the groundwater level representative monitoring network that will protect the Basin against the undesirable result condition. These criteria are described for each element required by SGMA regulations included as subsections below.

8.5.1 *Undesirable Results*

8.5.1.1 Criteria for Defining Undesirable Results

The chronic lowering of groundwater elevation undesirable result is a quantitative combination of groundwater elevation minimum threshold exceedances. For chronic lowering of groundwater elevations, an exceedance is defined by the annual average (e.g., spring and fall) water level below the well's defined minimum threshold. For the Atascadero Basin, the groundwater elevation undesirable result is:

> Over the course of 2 years, no more than two exceedances for the groundwater elevation minimum thresholds within a defined area of the Basin for any single principal aquifer. A single monitoring well in exceedance for two consecutive years also represents an undesirable result for the area of the Basin represented by the monitoring well. Geographically isolated exceedances will require

investigation to determine if local or Basin wide actions are required in response.

Undesirable results provide flexibility in defining sustainability. Increasing the number of allowed minimum threshold exceedances provides more flexibility but may lead to significant and unreasonable conditions for a number of beneficial users. Reducing the number of allowed minimum threshold exceedances ensures strict adherence to minimum thresholds but reduces flexibility due to unanticipated hydrogeologic conditions.

8.5.1.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include the following:

- Localized pumping clusters. Even if regional pumping is maintained within the sustainable yield, clusters of high-capacity wells may cause excessive localized drawdowns that lead to undesirable results in specific areas.
- Expansion of de minimis pumping. Individual de minimis pumpers do not have a significant impact on Basin-wide groundwater elevations. However, many de minimis pumpers are often clustered in specific residential areas. Pumping by these de minimis users is not currently regulated under this GSP. Adding additional domestic de minimis pumpers in specific areas of the Basin may result in excessive localized drawdowns and undesirable results. Additionally, increased pumping outside and west of the Basin may reduce subsurface inflow to the Basin which could lead to undesirable results in the Basin.
- Extensive drought. Minimum thresholds were established based on historical groundwater elevations and reasonable estimates of future groundwater elevations. Extensive droughts may lead to excessively low groundwater elevations and undesirable results.

8.5.1.3 Effects on Beneficial Users and Land Uses

The primary detrimental effect on beneficial users from allowing multiple exceedances occurs if more than one exceedance occurs in a small geographic area. Allowing 15 percent exceedances is reasonable if the exceedances are spread out across the Basin. If the exceedances are clustered in a small area, it will indicate that significant and unreasonable effects are being born by a localized group of landowners.

8.5.2 *Locally Defined Undesirable Results*

Significant and unreasonable groundwater levels in the Basin are those that:

1. Impact ability of existing domestic wells of average depth to produce adequate water for domestic purposes
2. Causes significant financial burden to those who rely on the groundwater Basin
3. Interfere with other SGMA sustainability indicators

8.5.3 *Information and Methodology Used to Establish Measurable Objectives and Minimum Thresholds*

Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:

(A) The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin.

(B) Potential effects on other sustainability indicators.

– *§ 354.28 Minimum Thresholds (c)(1)*

The information used for establishing the chronic lowering of groundwater levels measurable objective and minimum thresholds includes:

- Information on the public definition of significant and unreasonable conditions and preferred current and future groundwater elevations, gathered from the SMC survey and public outreach meetings
- Historical groundwater elevation data from wells monitored by the county of San Luis Obispo
- Depths and locations of existing wells
- Maps of current and historical groundwater elevation data

The specific methodology used in establishing minimum thresholds recognizes that the Basin is currently being sustainably managed and provides a quantitative measure at each groundwater level representative monitoring well to ensure that groundwater levels continue to be sustainably managed throughout the plan implementation period. For each well, the following procedure was applied:

1. Identify historic high and historic low groundwater levels.
2. The minimum thresholds represent historic low groundwater measured in each well.
3. This mid-point between historic high and historic low was established as the measurable objective for each well.
4. Using data for the past 20 years (2000-2019) a trend line was established and projected to 2042.
5. If the 2042 projection for each well falls below measurable objective, this is an indicator that projects/management actions may be required in this area of the Basin to reverse the

trend and achieve the measurable objective by 2042. If this is the case, interim milestones were set at 5-year targets between 2022 and 2042.

6. If the trend line projection instead falls above the measurable objective, then interim milestones were not established, and area specific projects/management actions will likely not be required in these areas of the Basin.

This methodology for setting Minimum Thresholds and Measurable Objectives is illustrated in Figure 8-1. The methodology for setting interim milestones is shown on Figure 8-2.

8.5.4 *Measurable Objective*

8.5.4.1 Methodology for setting Measurable Objectives

Methodology for setting measurable objectives is described in Section 8.5.3 – Information and Methodology Used to Establish Measurable Objectives and Minimum Thresholds.

8.5.4.2 Alluvial Aquifer Measurable Objectives

Measurable Objectives for Alluvial Aquifer wells are listed in Table 8-1. Maps showing the location of each of the RMS representing the Alluvial Aquifer are included in Appendix 8B. Appendix 8B also includes the well hydrograph for each will with the draft minimum threshold, measurable objective, and if needed, interim milestones.

8.5.4.3 Paso Robles Formation Aquifer Measurable Objective

Measurable Objectives for Paso Robles Formation wells are listed in Table 8-1. Maps showing the location of each of the RMS representing the Paso Robles Formation Aquifer are included in Appendix 8C. Appendix 8C also includes the well hydrograph for each well with the draft minimum threshold, measurable objective, and if needed, interim milestones.

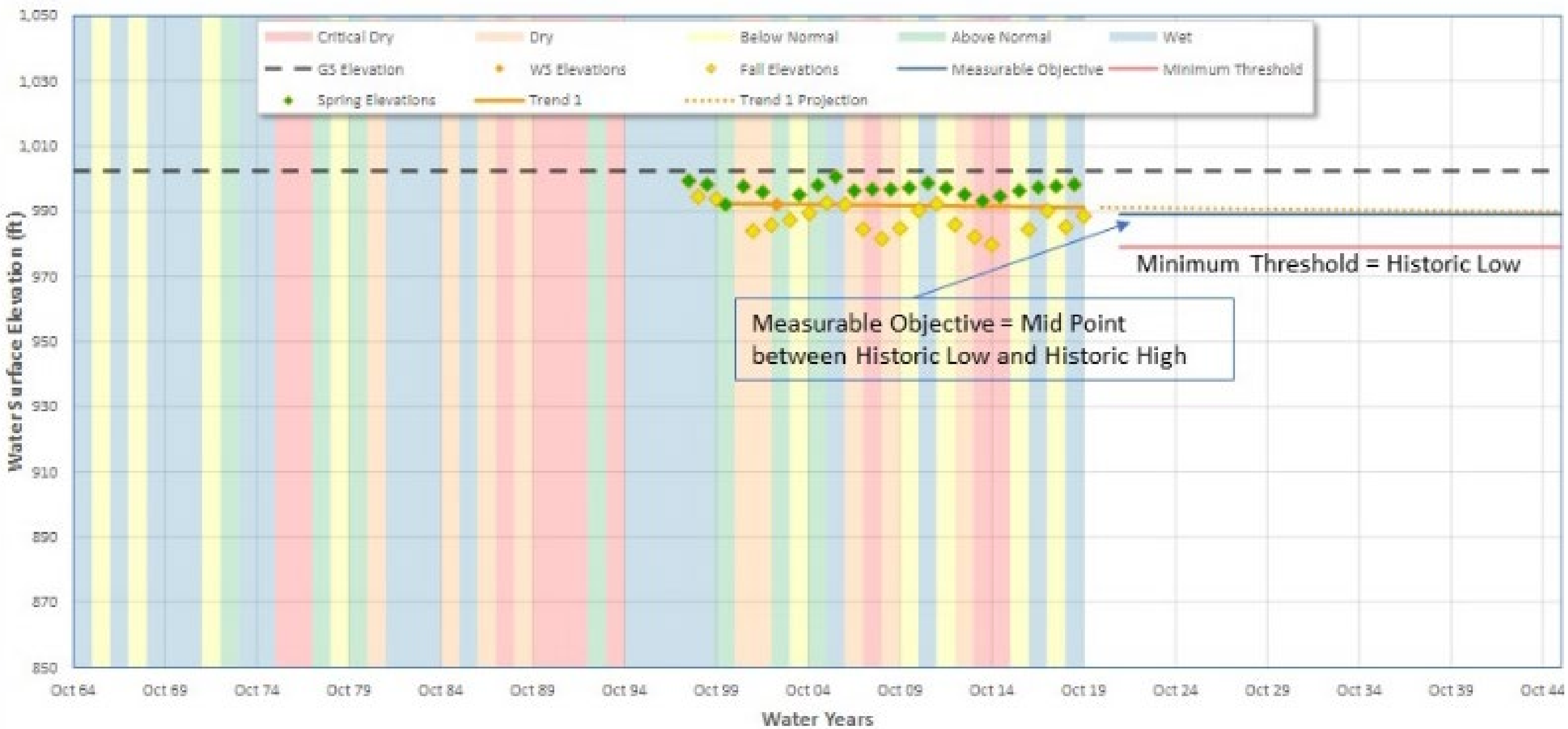

Figure 8-1. Groundwater Level Minimum Thresholds and Measurable Objectives

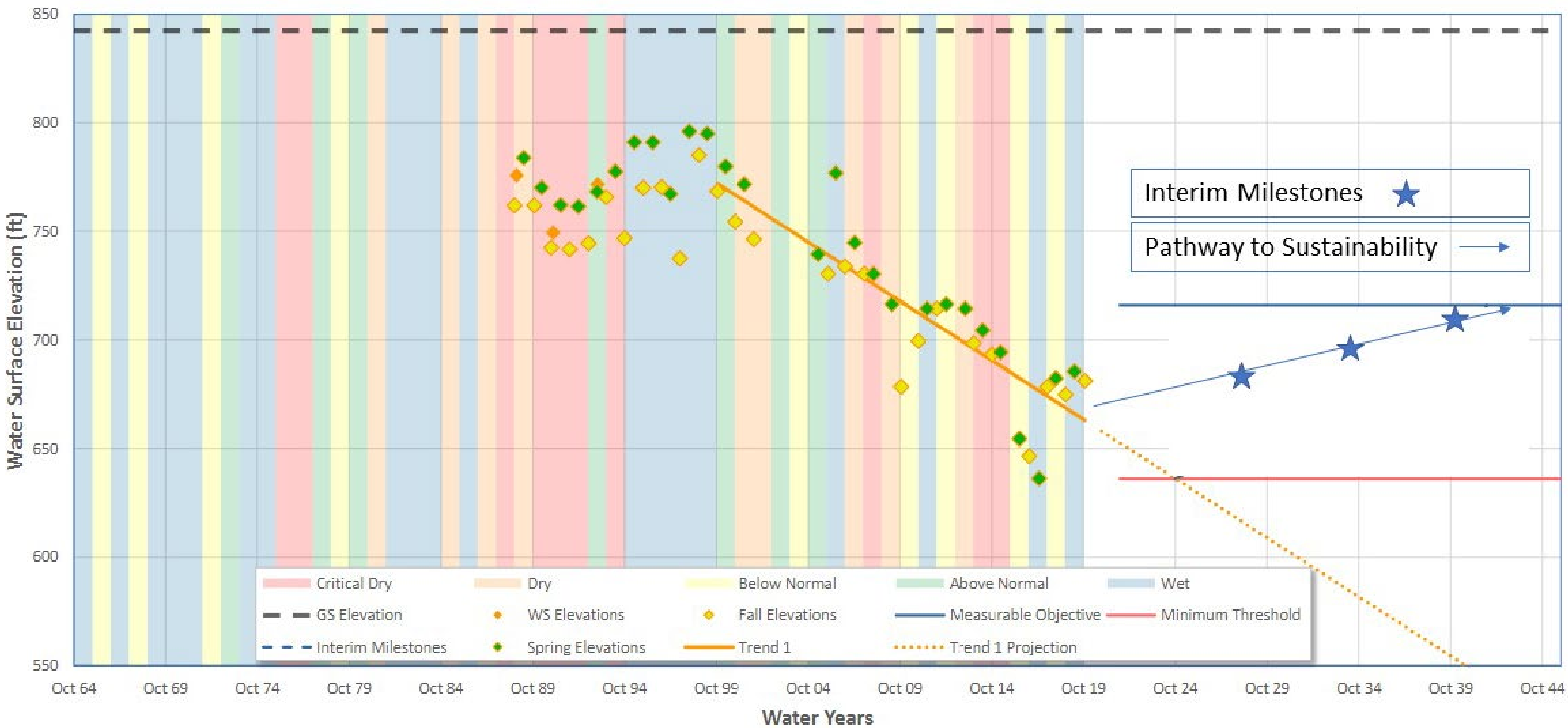

Figure 8-2. Groundwater Level Interim Milestones

Table 8-1. Groundwater Levels Sustainable Management Criteria

Aquifer	Well ID	Well Name	State Well Number	Well Depth (ft)	Ground Surface Elevation (ft)	Reference Point Elevation (ft)	Screen Interval Range (ft btoc)	Water Surface Elevation Range (ft. msl)	2000-2020 Trend Results (ft/year)	Proposed MT (ft)	Proposed MO (ft)	Interim Milestones 2027	2032	2037	2042	Comments
Alluvial Aquifer (Qa)	001946-PASO-0182	PASO-0182	27S12E09N002M	85	721	721	44-85	658.0 - 696.8	0.127	658	677	NA	NA	NA	NA	
	002125-27S/12E-21XX6	27S/12E-21XX6		61	754.18	754.18	31-51	725.4 - 738.2	2.919	725	731	NA	NA	NA	NA	Data only from 2017 to present, not shown on map
	002134-27S/12E-29H03	27S/12E-29H03	27S12E29H003M	65		753	35-55	709.6 - 739.3	0.119	709	724	NA	NA	NA	NA	
	002014-28S/12E-04J04	28S/12E-04J04	28S12E04J004M	70	802.37	802.4	30-70	729.3 - 793.8	0.65	729	761	NA	NA	NA	NA	
	002023-28S/12E-05AX2	28S/12E-05AX2		60	796.21	796.2	25-55	774.9 - 783.1	0.253	774	778	NA	NA	NA	NA	Data only from 2017 to present, not shown on map
	001996-28S/12E-04J02	28S/12E-04J02	28S12E04J002M	86	801.99	795.8	21-86	742.0 - 785.7	0.675	742	764	754	756	758	764	
	001995-28S/12E-10R04	28S/12E-10R04	28S12E10R004M	75	825.02	820	46-75	770.9 - 804.5	0.344	770	787	785	783	785	787	
	001993-28S/12E-14K04	28S/12E-14K04	28S12E14K004M	105	838.78	835	50-100	785.8 - 817.0	0.091	785	801	NA	NA	NA	NA	
	002033-28S/12E-25B03	28S/12E-25B03	28S12E25B003M	120	866.78	867.8	100-120	832.8 - 857.1	0.106	832	844	NA	NA	NA	NA	
	002053-SL0607989492	SL0607989492	E11W-26B	35	1002.97	1003	Oct-35	977.5 - 990.0	0.032	977	980	NA	NA	NA	NA	
	001710-PASO-0263	PASO-0263	29S13E19H004M	57	1002.5	1005	29-49	979.8 - 1000.7	0.054	979	989	NA	NA	NA	NA	
		TCSD Selby Well		50		764.5	25-50									No water level data to display
Paso Robles Formation Aquifer (Qtp)	002126-27S/12E-17B02	27S/12E-17B02	27S12E17B002M	400	828.31	828.3	200-360 380-400	570.3 - 782.3	0.409	570	676	NA	NA	NA	NA	
	001707-PASO-0328	PASO-0328	27S12E17E001M	310	842.4	842.4	190-300	636.1 - 796.1	5.448	636	716	620	652	684	716	
	002132-27S/12E-20A02	27S/12E-20A02	27S12E20A002M	205	779.35	776	105-195	698.0 - 755.0	1.242	698	726	702	700	713	726	
	001926-PASO-0283	PASO-0283	27S12E20R001M	230	771	771	110-230	673 - 747	0.787	673	710	NA	NA	702	710	
	002078-27S/12E-22M01	27S/12E-22M01	27S12E22M001M	550	854.15	850.5	pump @ 300'	679.0 - 810.7	1.846	679	745	731	736	741	745	Low of water surface range driven by historical data. MT selected from more current data
	002083-27S/12E-33G01	27S/12E-33G01	27S12E33G001M	460	901.46	892	200-460	678.3 - 783.2	0.898	678	730	NA	NA	NA	NA	
	001708-PASO-0317	PASO-0317	28S12E04J006M	153	800.51	800.5	93-153	709.2 - 791.3	0.83	709	750	NA	744	746	750	
	002001-28S/12E-10A03	28S/12E-10A03	28S12E10A003M	500	810.95	808.3	157-500	631.1 - 793.0	1.331	631	712	NA	NA	NA	NA	
	001927-PASO-0399	PASO-0399	28S12E11K002M	603	820	882	300-600	180 - 766	0.328	707	736	NA	NA	NA	NA	Water surface range driven by data prior to 1981, possibly inaccurate
	002002-28S/13E-31F02	28S/13E-31F02	28S13E31F002M	310	878.54	884.3	55-300	785.7 - 873.2	0.851	786	829	NA	NA	823	829	
	002124-27S/12E-21XX5	27S/12E-21XX5		360	752.46	752.5	110-140 180-250 300-360	661.1 - 737.5	10.874	661	699	NA	NA	NA	NA	Lack of fall data likely contributes to extreme trend, not shown on map
	002082-27S/12E-33F01	27S/12E-33F01	27S12E33F001M	340	882.13	880	140-340	689.8 - 790	0.916	689	739	NA	NA	NA	NA	Not shown on map
		27S/12E-XXXX1		650		723.2	260-420 440-640									No water level data to display
	002016-28S/12E-04J05	28S/12E-04J05	28S12E04J005M	360	803.13	803.1	145-190 210-360	696.8 - 795.0	1.132	697	746	NA	NA	737	746	Not shown on map

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8.5.5 *Minimum Thresholds*

Methodology for setting minimum thresholds is described in Section 8.5.3 – Information and Methodology Used to Establish Measurable Objectives and Minimum Thresholds.

8.5.5.1 Alluvial Formation

Minimum Thresholds for Alluvial Aquifer wells are listed in Table 8-1 and SMC hydrographs for each Alluvial Formation well is provided in Appendix 8B.

8.5.5.2 Paso Robles Formation

Minimum Thresholds for Paso Robles Formation wells are listed in Table 8-1 and SMC hydrographs for each Paso Robles Formation well is provided in Appendix 8C.

8.5.5.3 Minimum Threshold Impacts on Domestic Wells

Impacts to domestic wells by fluctuating groundwater levels have not been reported in the Basin. Given that minimum thresholds have been set at the lowest groundwater levels historically measured in each representative monitoring well, we do not expect these levels to have a negative impact on domestic wells in the future. A reliable database of existing domestic wells including number, location and depth of wells was not available for direct comparison against minimum threshold values established in the representative monitoring network for this initial GSP. This data gap will be filled during the implementation period through implementation of a private well survey and registration program. More information on this program is provided in Section 8.5.2 – Locally Defined Undesirable Results.

8.5.5.4 Relation to Other Sustainability Indicators

Since minimum thresholds were derived by reviewing historic water level data for each well and represent the historic low levels experienced in the past at each of these well locations, it is unlikely that conflicts between wells or between other sustainability indicators will occur since conflicts have not been observed in the past based on our understanding of groundwater Basin conditions described in the early sections of this GSP.

Groundwater Storage: Thresholds set to maintain consistent levels over time that are at or below the sustainable yield so should not adversely affect storage.

Seawater Intrusion: Due to the location of the Atascadero Basin, seawater intrusion is not applicable.

Degraded Water Quality: Since groundwater levels will be maintained, there will be no degradation of water quality through upwelling of poor-quality water. Changes in gradients could cause poor quality water flowing towards supply wells This is dependent on changes in groundwater gradients and not levels themselves.

Subsidence: A significant and unreasonable condition for subsidence is permanent pumping induced subsidence that substantially interferes with surface land use. Subsidence is caused by dewatering and compaction of clay-rich sediments in response to lowering groundwater levels. Land surface subsidence occurs when groundwater levels drop below historic low levels in an area of the Basin and if compressible clays are also present at depth in the same areas experience groundwater level declines. Because groundwater levels minimum thresholds at representative monitoring wells are being set at, but not below historic groundwater level lows in the Basin, land surface subsidence will not be triggered in the Atascadero Basin even if vulnerable clay material is present at depth.

Depletion of Interconnected Surface Water: Section 5 – Groundwater Conditions and Section 6 – Water Budgets, describe and quantify surface water inflow and outflow to the Basin as well as steam flow gain and depletion that has occurred historically. Groundwater levels measured at representative monitoring wells will serve as a proxy for depletion of interconnected surface water, and in addition, where available stream flow gages will continue to measure surface water inflow and outflow allowing for direct measurement of surface water gains and losses to the groundwater systems based on future hydrologic and pumping conditions in the Basin.

8.5.5.5 Effects on Neighboring Basins

The Atascadero Basin is hydrologically separated from Paso Robles Basin by the Rinconada fault. Groundwater levels in the Atascadero Basin are not expected to impact the Paso Robles Basin, but the two basins will work together to ensure no adverse effects.

8.5.5.6 Effects on Beneficial Users and Land Users

Ag Users: Minimum Thresholds could limit pumping in the basins and therefore limit crop production and economic growth.

Urban Land Uses and Users: Limits groundwater production in the Basin and may limit urban growth.

Domestic Land Uses and Users: Threshold protects most domestic wells and therefore should have positive benefit. However, some of the shallowest wells may necessitate owners drill deeper wells. May limit non-de minimis groundwater uses.

Ecological Land Uses and Users: Threshold protects ecological habitats as they are set to avoid long term declines and impacts.

8.5.5.7 Relevant Federal, State, or Local Standards

There are no relevant standards to lowering of groundwater levels.

8.5.5.8 Method for Quantitative Measurement of Minimum Threshold

Groundwater levels will be directly measured from existing or new monitoring wells included in the Representative Monitoring Network. Monitoring will meet the requirements outlined in the technical and reporting standards under SGMA regulations.

8.5.5.9 Interim Milestones

Interim milestones will be directly measured from existing or new monitoring wells included in the Representative Monitoring Network. Monitoring will meet the requirements outlined in the technical and reporting standards under SGMA regulations.

8.6 Reduction in Groundwater Storage – SMC

This section presents SMC for management of groundwater storage in the Basin. By way of context, the water budget analysis completed in Section 6 – Water Budgets, quantified the groundwater budget and calculated cumulative change in Basin storage for the historical water budget period 1981 to 2011, the current budget period 2012 to 2016 and the future/projected water budget period of through 2042. In summary, cumulative change in groundwater storage for the historical period increased by 43,200 AF, decreased by 12,600 AF during the current budget period which included the most recent drought and then is projected to increase by 18,000 AF through the projected future water budget in 2042. The Basin has and is projected to continue to be very healthy from the groundwater storage perspective and the SMC presented in this section provide the criteria by which successful sustainable groundwater management will be determined.

8.6.1 *Undesirable Results*

8.6.1.1 Criteria for Establishing Undesirable Results

The reduction in groundwater storage undesirable result is a quantitative combination of reduction in groundwater storage minimum threshold exceedances. There is only one reduction in groundwater storage minimum threshold because groundwater storage is a basin-wide determination. Therefore, no minimum threshold exceedances are allowed and the "reduction in groundwater storage undesirable" result is:

> During average hydrologic conditions, and as a long-term average over all hydrologic conditions, there shall be no reduction in groundwater storage below the historical low in cumulative groundwater storage that occurred during the historical water budget period in the early 1990's.

8.6.1.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the reduction in groundwater storage sustainability indicator include the following:

- Expansion of non-de minimis pumping. Additional non-de minimis pumping may result in continued decline in groundwater elevations and exceedance of the groundwater level SMC that is used as proxy for reduction in groundwater storage minimum threshold.
- Expansion of de minimis pumping. Pumping by de minimis users is not regulated under this GSP. Adding domestic de minimis pumpers in the Basin may result in lower groundwater elevations, and an exceedance of the proxy minimum threshold.
- Extensive, unanticipated drought. Minimum thresholds are established based on reasonable anticipated future climatic conditions. Extensive, unanticipated droughts may lead to excessively low groundwater recharge and unanticipated high pumping rates that could cause lower groundwater elevations and an exceedance of the proxy minimum threshold.

8.6.1.3 Effects on Beneficial Users and Land Use

The practical effect of this GSP for protecting against the "reduction in groundwater storage undesirable" result is that it encourages no net change in groundwater elevations and storage during average hydrologic conditions and over the long-term. Therefore, during average hydrologic conditions and over the long-term, beneficial uses and users will have access to the same amount of groundwater in storage that currently exists, and the beneficial users and uses of groundwater are protected from undesirable results. Pumping at the long-term sustainable yield during dry years would likely temporarily lower groundwater elevations and reduce the amount of groundwater in storage. Such short-term impacts, due to drought, are anticipated in SGMA and management actions should contain sufficient flexibility to accommodate reductions in groundwater in storage by ensuring periods of declines in groundwater levels or storage are offset by increases in groundwater levels or storage during normal or wet periods. Prolonged reductions in the amount of groundwater in storage could lead to undesirable results affecting beneficial users and uses of groundwater. During dry periods, groundwater pumpers may be temporarily impacted by temporary reductions in the amount of groundwater in storage drops and lower water levels in their wells.

8.6.2 *Locally defined Significant and Unreasonable Conditions*

As stated in Section 8.4.1 – Sustainable Management Criteria, the locally defined undesirable result for groundwater storage conditions is:

> During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, there shall be no reduction in groundwater storage below the historical low in cumulative groundwater storage that occurred during the historical water budget period in the early 1990's.

Groundwater storage conditions that are considered significant and unreasonable would include any instance in which cumulative groundwater storage drops below the lowest level in the historic record, -36,000 AF (Figure 8-3).

8.6.3 *Minimum Thresholds*

> **Reduction of Groundwater Storage.** The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.
>
> – *§ 354.28 Minimum Thresholds (c)(2)*

Figure 8-3 shows that the minimum threshold is the historical low in cumulative groundwater storage that occurred in the early 1990's at -36,000 AF. At this time in the Basin alfalfa (a high-water using crop) was one of the predominate crops grown. Over time beginning in the 1990's the alfalfa was converted to vineyards that have a much lower water requirement.

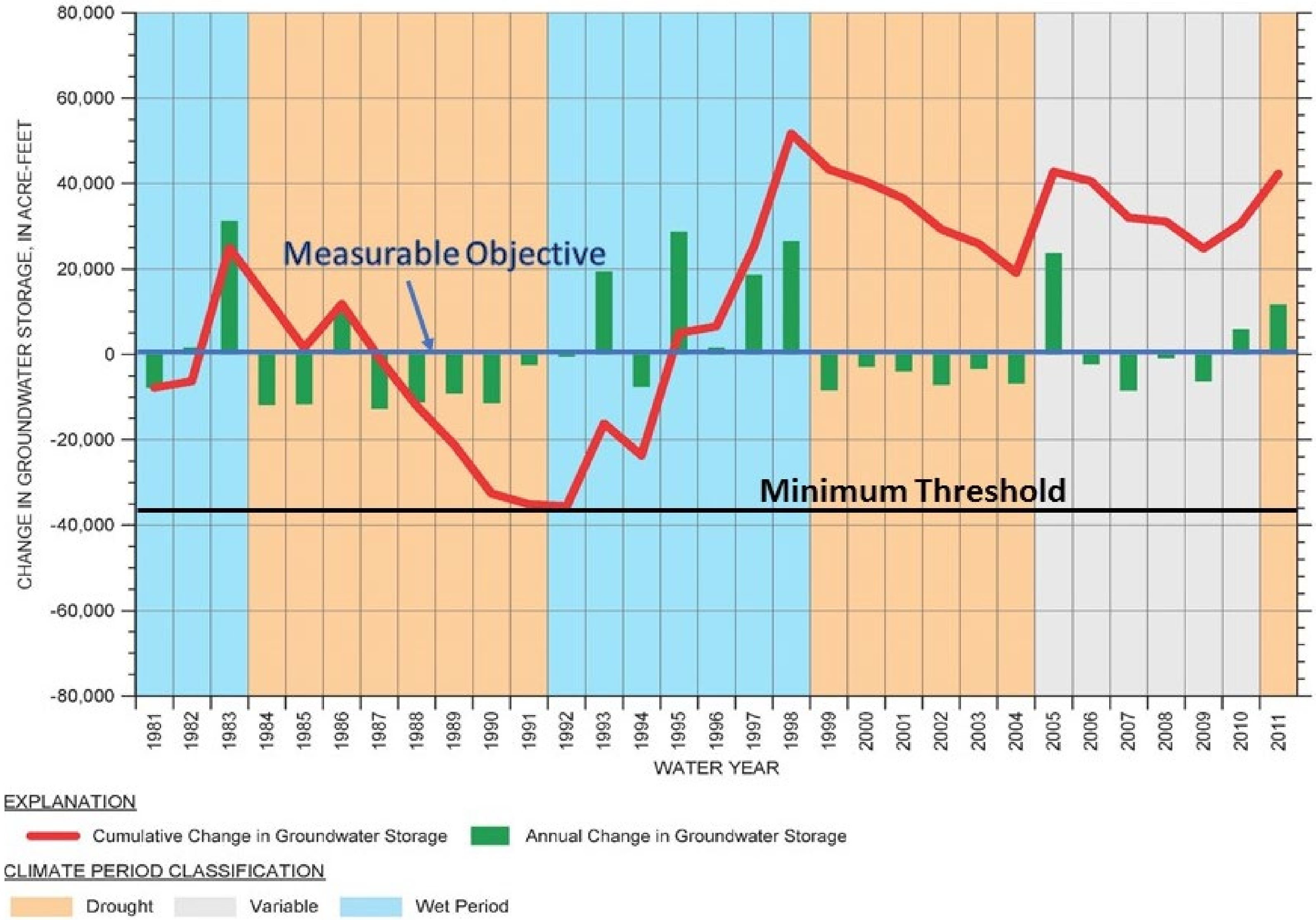

Figure 8-3. Minimum Threshold and Measurable Objective for Atascadero Basin

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8.6.3.1 Information Used and Methodology for Establishing Reduction in Storage Minimum Thresholds

Information used in establishing the minimum threshold includes the following information presented and described in Section 6 – Water Budgets:

- Cumulative change in Basin storage through the historical water budget period
- Cumulative change in Basin storage through the current budget period
- Cumulative change in Basin storage projected through the projected future water budget
- SMC developed for groundwater levels described in Section 8.3 – Sustainability Goal
- Safe yield estimates of the Basin presented in Section 6 – Water Budgets
- Results of public/stakeholder survey in the Basin (Appendix 8A)

Tracking changes in cumulative groundwater storage will be performed by the GSA each year and reported in annual reports. This will be accomplished by following this methodology:

1. For first annual report, update Figure 8-3 – Sustainability Goal, to show cumulative storage change through 2022
2. Continue to update cumulative change in storage each year by calculating change in the Basin each year by comparing the average spring and fall groundwater levels measures from each of the wells within the representative monitoring well with the average values from the previous year.
3. Calculate the volumetric storage difference between the contoured groundwater elevations for both years and multiplying by the best available estimate of specific yield values for the Basin material.
4. Report cumulative Basin storage in relation to minimum threshold in each annual report.

8.6.3.2 Relationship Between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Chronic Lowering of Groundwater Levels: Both groundwater level minimum thresholds and groundwater storage minimum thresholds are based on the consistent methodology of using historical lows encountered in the Basin (Figure 8-3). The key data for computations of groundwater storage changes each year are the well levels measured at each of the groundwater levels representative monitoring wells.

Seawater Intrusion: Due to the location of the Atascadero Basin, seawater intrusion is not applicable.

Degraded Water Quality: Because groundwater storage will be managed within the historical range, it is not expected that the minimum threshold value chosen will have a negative impact on groundwater quality within the Basin.

Subsidence: Because both groundwater levels and groundwater storage will be managed above the historic low levels encountered in the Basin, the GSA is protecting against any future land surface subsidence. However, the GSA has established thresholds and will continue to monitor for subsidence within the Basin.

Depletion of Interconnected Surface Water: Both groundwater level minimum thresholds and groundwater storage minimum thresholds are based on the consistent methodology of using historical lows encountered in the Basin. Measurables objectives for both are set as midway points between historic low and historic high values. For this reason, negative impacts to surface water flow and the habitat it supports is not anticipated under this GSP.

8.6.3.3 Effect of Minimum Threshold on Neighboring Basin

Thresholds for groundwater level and groundwater storage between Atascadero's only neighboring subbasin, Paso Robles Basin, are not in conflict. In addition, the two basins are largely hydrogeological separated preventing subsurface inflows and outflow as detailed in Section 4 – Basin Setting and Section 5 – Groundwater Conditions.

8.6.3.4 Effect on Beneficial Uses and Users

Thresholds and objectives are set to protect and ensure adequate water supply for public water supply and agriculture and habitat protection.

8.6.3.5 Relation to State, Federal, and Local Standards

To our knowledge, there are no state, federal, or local standards relevant to the management of groundwater storage above the defined minimum threshold in the Atascadero Basin.

8.6.3.6 Methods for Quantitative Measurement of Minimum Threshold

Refer to Section 8.6.3.1 – Information Used and Methodology for Establishing Reduction in Storage Minimum Thresholds.

8.6.4 *Measurable Objective*

The Measurable Objective for the Atascadero Basin is set at a net zero change in cumulative groundwater storage (Figure 8-3).

8.6.4.1 Method for Setting Measurable Objective

Information used in establishing the measurable objective includes the following information presented and described in Section 6 – Water Budgets:

- Cumulative change in Basin storage through the historical water budget period
- Cumulative change in Basin storage through the current budget period
- Cumulative change in Basin storage projected through the projected future water budget

- SMC developed for groundwater levels described in Section 8.3 – Sustainability Goal
- Safe yield estimates of the Basin were presented in Section 6 – Water Budgets
- Results of public/stakeholder survey in the Basin. (Appendix 8A)

Recognizing the Basin has been managed sustainably based on review of past and projected future trends in groundwater levels and Basin storage, it was agreed that setting the measurable objective at zero net change in cumulative groundwater storage for the period beginning in 1981 and extending through 2042 is acceptable because this period includes a wide range of hydrologic year types covering the range that could likely be encounter in the future and also takes into account anticipated impacts on the water budget caused by climate change in the Basin.

8.6.4.2 Interim Milestones

Interim milestones have not been established for this initial GSP because cumulative groundwater storage is currently above the measurable objective value and is projected to stay above based on the future projected water budget presented in Chapter 6 – Water Budgets. If, during the implementation period, cumulative groundwater storage drops below the measurable objective and is approaching the minimum thresholds, then interim milestones will be established along with projects/management actions to achieve the measurable objective by 2042.

8.7 Seawater Intrusion SMC

Due to the location of the Atascadero Basin, the seawater intrusion SMC is not applicable.

8.8 Degraded Water Quality Sustainable Management Criteria

Under SGMA, the purpose of the degraded water quality SMC is to prevent any degradation in groundwater quality as a result of groundwater management under the GSP. SGMA is not intended to serve as impetus to improve water quality within the Basin. The Atascadero Basin is considered sustainable by the DWR and current water quality is not considered degraded. For these reasons, the SMC in this section are set to maintain current conditions in the Basin from potential degradation as a result of groundwater management under this GSP.

In setting SMCs, water quality constituents were identified to be addressed in annual reporting under the GSP. Constituents were identified based on 1) exceedances of regulatory drinking water standards 2) exceedances of thresholds set by Basin-wide water quality programs, and 3) frequency and extend of threshold exceedances. For a constituent to be addressed as a part of this GSP, it must have had multiple historical exceedances of thresholds governing water quality in the Basin, have the potential to affect beneficial use/uses, and/or being of regional concern in the Basin. Constituents with one threshold exceedance or few intermittent exceedances, along with constituents only found at isolated sites, were not addressed in this GSP. Identified constituents were based on information from:

- Title 22 Regulations
- Water Quality Control Plan for the Central Coast Basin (WQCP) (RWQCB 2019)
- Geotracker GAMA database
- Irrigated Lands Regulatory Program

The WQCP (RWQCB 2019), along with this GSP, identify the primary beneficial uses/users of water in the Basin being drinking water supply (public and private) and agriculture. Groundwater use for drinking water purposes is protected under the Title 22 regulations. Agricultural use of groundwater is protected under the WQCP and the ILRP. Within the ILRP, groundwater quality as a result of agricultural use is monitored through the Central Coast Agriculture Coalition (CCAC). The CCAC, under the purview of the ILRP, samples all domestic and irrigation wells within the Basin for impacts due to agricultural use. Additional uses of groundwater are protected under the WQCP. These programs are in place to protect groundwater quality in the Basin and monitoring and reporting under said programs will be used in development of annual reports and monitoring as part of the GSP implementation.

Constituents to be addressed as part of GSP implementation and reporting were selected from the aforementioned Basin-wide water quality programs and are identified below.

<u>Title 22 Drinking Water Regulations</u>

- Arsenic
- Gross Alpha
- Nitrate (as N)
- Selenium
- Selenium
- *Chloride (SMCL)*
- *Sulfate (SMCL)*
- *Iron (SMCL)*
- *Manganese (SMCL)*
- *Total Dissolved Solids (TDS)*

<u>WQCP Water Quality Objectives</u>

- Boron
- Chloride
- Nitrate (as N)
- Sulfate
- Sodium
- TDS

Some constituents are monitored under both the Title 22 and the WQCP. When addressing SMCs, monitoring sites will be assessed only for the constituents associated with the regulatory program associated with each well. For instance, public supply and domestic wells will be assessed based on the Title 22 drinking water MCLs. Irrigation wells shall be assessed based on the Water Quality Objectives (WQOs) of the WQCP.

The Geotracker GAMA database was queried in review of historical water quality concerns for the region. Regulatory exceedances were identified for other constituents within the Basin, but these were minor or at isolated sites. These constituents will only be monitored through their applicable regulatory program, but the GSA is aware of their presence. If increased degradation of water quality is observed, constituents monitored under this GSP will be re-assessed.

As discussed in Section 5 – Groundwater Conditions, there are no known contaminant plumes within the Basin. Active Geotracker sites will be monitored through the Geotracker program. If contaminant plumes are discovered in the future, the GSA will assess the effects of GSP implementation, including projects/management actions, on Geotracker sites.

8.8.1 *Undesirable Results*

Based on SGMA regulations, an undesirable result for degraded water quality is based on a quantitative combination of groundwater quality minimum threshold exceedances. Undesirable results occur when minimum threshold exceedances result in significant or unreasonable conditions in the Basin. Undesirable results were identified to protect groundwater for the two main beneficial uses of groundwater in the Basin, agriculture and water supply. For the Atascadero Basin, the undesirable result is:

> On average for any year, an increase in groundwater quality minimum threshold exceedances at 10 percent of the representative monitoring sites, in relation to 2015 Basin conditions, as a result of projects and management actions implemented as part of the GSP.

8.8.1.1 Locally Defined Significant and Unreasonable Conditions

The defined degraded water quality undesirable result was based on the locally defined significant and unreasonable conditions for the Basin. These were determined based on state and federal drinking water and groundwater regulations, public input and surveys, and discussions with the GSA. Significant and unreasonable conditions as a result of GSP implementation were identified as:

> An increase in constituent concentrations that may result in:
>
> 1) reduced public water supply capacity or significant increase in costs for public or private water supply
> 2) reduced crop production.

8.8.1.2 Potential Causes of Undesirable Results

Changes to Groundwater Pumping within the Basin: Changes to the location and rate of groundwater pumping within the Basin as a result of GSP implementation may cause changes in groundwater elevations and flow. Changes in flow may cause Constituents of Concern (COCs) of higher concentrations to migrate toward water supply wells. Increased pumping may also cause increased concentrations of COCs such as TDS.

Groundwater Recharge: Increased groundwater recharge through GSP implementation may increase local groundwater elevation and effect groundwater flow patterns. This could potentially cause migration of COCs towards supply wells. Furthermore, recharged water may contain COC levels that adversely affect groundwater and could potentially interact with native groundwater or the aquifer matrix to mobilize contaminants, such as arsenic, not previously found in groundwater.

Adverse effects to water quality as a result of GSP implementation of projects/management actions shall be monitored by the individual projects/management actions as described in Section 9 – Projects and Management Actions.

8.8.1.3 Effects on Beneficial Users or Land Use

As determined by this GSP, undesirable results were established to reduce or eliminate degradation of water quality within the Basin prior to implementation of management actions. This limits the impact of undesirable results on beneficial groundwater users within the Basin. However, potential effects of undesirable results include:

- Increased water treatment costs for public and domestic supply wells to offset increased constituent levels
- Reduced crop production or irrigation costs

Due to the conservative nature of the undesirable result as defined in the GSP, projects/ management actions would be implemented to address any degradation in water quality likely before any of the above effects are realized.

8.8.2 *Minimum Thresholds*

> **Degraded Water Quality.** The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.
>
> – *§ 354.28 Minimum Thresholds (c)(4)*

Minimum thresholds were established for each RMS for both the Alluvial Aquifer and the Paso Robles Formation Aquifer. Minimum thresholds were established for the constituents discussed above and are listed, along with applicable regulatory standards, Table 8-2.

Table 8-2. Minimum Thresholds for Identified Constituents

Constituent	Units	MCLs	WQO
TDS	mg/L	*1,000**	550
Chloride	mg/L	*250*	70
Nitrate (as N)	mg/L	10	2.3
Sulfate	mg/L	*250*	85
Boron	mg/L	NA	0.3
Sodium	mg/L	NA	65
Arsenic	mg/L	0.01	
Iron	mg/L	*0.3*	
Gross Alpha	pCi/L	15	
Manganese	mg/L	*0.05*	
Selenium	mg/L	0.05	

Notes: NA - Not Applicable
* recommended level of 500 upper limit of 1,000
Secondary MCL

Minimum thresholds were established for each RMS well based the on regulatory programs protecting beneficial uses of groundwater in the Basin: Title 22 drinking water MCLs and WQOs from the WQCP. Minimum thresholds were assigned based on well type and the regulatory program responsible for monitoring at the well site. For all public supply wells, monitoring is conducted through the Title 22 drinking water program and thresholds were set at drinking water MCLs. For monitoring wells, domestic wells, and irrigation wells, monitoring is conducted under the ILRP CCAC guidelines. For irrigation and monitoring wells, the minimum threshold was set at the WQOs. Since domestic wells are used for water supply purposes, minimum thresholds were set at drinking water MCLs even though monitoring is under the ILRP.

Monitoring of the RMS locations shall be conducted by the associated monitoring programs as frequencies dictated by said programs. The GSA will review results and reports generated by these programs as it pertains to the degraded water quality SMCs and sustainable management under this GSP. Results will be summarized in the annual reports. Should minimum threshold exceedances be observed and result in an undesirable result, the GSA shall further investigate whether the minimum threshold exceedances were a result of GSP implementation and if further action by the GSA is required.

8.8.2.1 Paso Robles Formation Aquifer

Minimum threshold groups and monitoring entities for degraded water quality at the RMS locations for the Paso Robles Formation Aquifer are presented in Table 8-3. Minimum threshold groups denote the constituents and MCLs assessed for this GSP, as discussed in Section 8.8.2 – Minimum Thresholds. A total of 27 public supply wells, 41 irrigation wells, and 13 domestic wells were identified as RMS sites for the Paso Robles Formation Aquifer, as discussed in Section 5 – Groundwater Conditions.

Table 8-3. Minimum Threshold and RMS Wells for the Paso Robles Formation Aquifer

Well ID	Type of Well	Minimum Threshold Group	Monitoring Entity
Atascadero MWC-6A	PWS	Title 22	DDW
Atascadero MWC-7	PWS	Title 22	DDW
Atascadero MWC-8A	PWS	Title 22	DDW
Atascadero MWC-9A	PWS	Title 22	DDW
Atascadero MWC-10	PWS	Title 22	DDW
Atascadero MWC-12	PWS	Title 22	DDW
Atascadero MWC-25	PWS	Title 22	DDW
Atascadero MWC-26	PWS	Title 22	DDW
Templeton CSD-Bonita Well 01	PWS	Title 22	DDW
Templeton CSD-Claussen Well 01	PWS	Title 22	DDW
Templeton CSD-Cow Meadows	PWS	Title 22	DDW
Templeton CSD-Creekside Deep Well	PWS	Title 22	DDW
Templeton CSD-Davis Well	PWS	Title 22	DDW
Templeton CSD-Fortini Well	PWS	Title 22	DDW
Templeton CSD-Platz Well 04	PWS	Title 22	DDW
Templeton CSD-Saunders Well	PWS	Title 22	DDW
Templeton CSD-Silva Well 01	PWS	Title 22	DDW
LOS ROBLES MOBILE HOME ESTATES - WELL 01	PWS	Title 22	DDW
LOS ROBLES MOBILE HOME ESTATES - WELL 02	PWS	Title 22	DDW
LOS ROBLES MOBILE HOME ESTATES - WELL 03	PWS	Title 22	DDW
SANTA YSABEL RANCH MWC - WELL 01, RESERVIOR WELL	PWS	Title 22	DDW
SANTA YSABEL RANCH MWC - WELL 02, RANCH HOUSE WELL	PWS	Title 22	DDW
WALNUT HILLS MUTUAL WATER CO - WELL 01	PWS	Title 22	DDW
ALMIRA WATER ASSOCIATION - WELL 02	PWS	Title 22	DDW
PASO ROBLES CHEVROLET CADILLAC - WELL 01	PWS	Title 22	DDW
WALNUT HILLS MUTUAL WATER CO - WELL 04	PWS	Title 22	DDW
WALNUT HILLS MUTUAL WATER CO - WELL 07	PWS	Title 22	DDW
AGL020003068-AW	Irrigation	WQO	ILRP
AGL020005225-DW AW	Domestic	Title 22	ILRP
AGL020000484-ROOS-HOMESTEAD	Irrigation	WQO	ILRP

Well ID	Type of Well	Minimum Threshold Group	Monitoring Entity
AGL020000508-AW	Irrigation	WQO	ILRP
AGL020001000-LAGO FOSSIL	Irrigation	WQO	ILRP
AGL020001138-PRIMARY AW	Irrigation	WQO	ILRP
AGL020001433-WHALE ROCK #1	Irrigation	WQO	ILRP
AGL020001744-BARN WELL	Irrigation	WQO	ILRP
AGL020001744-POND WELL	Irrigation	WQO	ILRP
AGL020002364-AG WELL	Irrigation	WQO	ILRP
AGL020002753-OLEA WELL	Irrigation	WQO	ILRP
AGL020002801-PROPERTY WELL	Irrigation	WQO	ILRP
AGL020002926-AW DW	Irrigation	WQO	ILRP
AGL020003146-BARN	Irrigation	WQO	ILRP
AGL020003461-AG WELL	Irrigation	WQO	ILRP
AGL020004031-POMAR RIDGE	Irrigation	WQO	ILRP
AGL020004709-IRR1	Irrigation	WQO	ILRP
AGL020004789-IRRIGATION	Irrigation	WQO	ILRP
AGL020007196-DWS NEW	Irrigation	WQO	ILRP
AGL020007294-AW	Irrigation	WQO	ILRP
AGL020007507-ONLY WELL	Irrigation	WQO	ILRP
AGL020007659-YRLY WTR SAMPLE	Irrigation	WQO	ILRP
AGL020007709-AG WELL	Irrigation	WQO	ILRP
AGL020012109-WELL #1	Irrigation	WQO	ILRP
AGL020012322-WELL 1	Irrigation	WQO	ILRP
AGL020012322-WELL 2	Irrigation	WQO	ILRP
AGL020012842-AG WELL	Irrigation	WQO	ILRP
AGL020013302-WELL 1	Irrigation	WQO	ILRP
AGL020015262-AVR IRR	Irrigation	WQO	ILRP
AGL020017182-AG WELL	Irrigation	WQO	ILRP
AGL020017862-ANDERSON	Irrigation	WQO	ILRP
AGL020018782-BELLETTO	Irrigation	WQO	ILRP
AGL020022602-WELL	Irrigation	WQO	ILRP
AGL020025242-PRIMARY AG	Irrigation	WQO	ILRP
AGL020027472-JAVADI - CAT 1	Irrigation	WQO	ILRP
AGL020027483-VAQUERO IW	Irrigation	WQO	ILRP
AGL020027660-AG WELL	Irrigation	WQO	ILRP
AGL020027743-PRIMARY AG	Irrigation	WQO	ILRP
AGL020027968-J DUSI WELL 1	Irrigation	WQO	ILRP

Well ID	Type of Well	Minimum Threshold Group	Monitoring Entity
AGL020028424-WELL	Irrigation	WQO	ILRP
AGL020028474-KCV PRIMARY AG	Irrigation	WQO	ILRP
AGL020035655-ARBORMAIN_IRR	Irrigation	WQO	ILRP
AGL020000508-DW	Domestic	Title 22	ILRP
AGL020001003-HOME DOMESTIC	Domestic	Title 22	ILRP
AGL020001087-PRIMARY AW DW	Domestic	Title 22	ILRP
AGL020005112-DW	Domestic	Title 22	ILRP
AGL020007294-DW	Domestic	Title 22	ILRP
AGL020015262-AVR DW	Domestic	Title 22	ILRP
AGL020027467-BLACKSETH DW	Domestic	Title 22	ILRP
AGL020027660-DOM WELL	Domestic	Title 22	ILRP
AGL020028468-AOK DOM	Domestic	Title 22	ILRP
AGL020028474-KCV DOM 1	Domestic	Title 22	ILRP
AGL020028474-KCV DOM 2	Domestic	Title 22	ILRP
AGL020028474-KCV DOM 3	Domestic	Title 22	ILRP
AGL020035786-MAINCOPIA_DOM	Domestic	Title 22	ILRP

Notes:

PWS – Public Water Supply
DDW – Division of Drinking Water

8.8.2.2 Alluvial Aquifer

Minimum threshold groups and monitoring entities for degraded water quality at the RMS locations for the Alluvial Aquifer are presented in Table 8-4. Minimum threshold groups denote the constituents and MCLs assessed for this GSP, as discussed in Section 8.8.2 – Minimum Thresholds. A total of 26 public supply wells, 12 monitoring wells, two irrigation wells, and one domestic well were identified as RMS sites for the Alluvial Aquifer, as discussed in Section 5 – Groundwater Conditions.

Table 8-4. Minimum Threshold and RMS Wells for the Alluvial Aquifer

Well ID	Type of Well	Minimum Threshold Group	Monitoring Entity
Atascadero MWC-1B	PWS	Title 22	DDW
Atascadero MWC-2A	PWS	Title 22	DDW
Atascadero MWC-4	PWS	Title 22	DDW
Atascadero MWC-5	PWS	Title 22	DDW
Atascadero MWC-5A	PWS	Title 22	DDW
Atascadero MWC-13A	PWS	Title 22	DDW
Atascadero MWC-16	PWS	Title 22	DDW
Atascadero MWC-19	PWS	Title 22	DDW
Atascadero State Hosp - WELL 02 (1968) -	PWS	Title 22	DDW
CSA23 Well-3	PWS	Title 22	DDW
CSA23 Well-4	PWS	Title 22	DDW
Garden Farms 1	PWS	Title 22	DDW
Garden Farms 3	PWS	Title 22	DDW
Paso Robles-Thunderbird 10	PWS	Title 22	DDW
Paso Robles-Thunderbird 13	PWS	Title 22	DDW
Paso Robles-Thunderbird 17	PWS	Title 22	DDW
Paso Robles-Thunderbird 23	PWS	Title 22	DDW
Templeton CSD-Creekside River Well	PWS	Title 22	DDW
Templeton CSD-Platz Well 02	PWS	Title 22	DDW
Templeton CSD-Smith River Well	PWS	Title 22	DDW
Atascadero State Hosp - WELL 03 (1969)	PWS	Title 22	DDW
Garden Farms 2	PWS	Title 22	DDW
Atascadero State Hosp - WELL 01 (1953)	PWS	Title 22	DDW
Atascadero State Hosp - WELL 04	PWS	Title 22	DDW
SANTA LUCIA SCHOOL - WELL 01	PWS	Title 22	DDW
T0607900001-MW-10	MW	WQO	ILRP
T0607900001-MW-12	MW	WQO	ILRP
T0607900001-MW-14	MW	WQO	ILRP
T0607900001-MW-2	MW	WQO	ILRP
T0607900001-MW-5	MW	WQO	ILRP
T10000009038-MW1	MW	WQO	ILRP
T10000009038-MW2	MW	WQO	ILRP
T10000009038-MW3	MW	WQO	ILRP
SL0607989492-E11W-26B	MW	WQO	ILRP
SL0607989492-E3W-22	MW	WQO	ILRP
SL0607989492-S11-B9	MW	WQO	ILRP
SL0607989492-S11-B18	MW	WQO	ILRP
AGL020003146-RIVER	Irrigation	WQO	ILRP
AGL020027481-RIVER WELL	Irrigation	WQO	ILRP
AGL020027483-VAQUERO DW	Domestic	Title 22	ILRP

Notes: PWS – Public Water Supply; DDW – Division of Drinking Water

8.8.2.3 Information Used and Methodology for Establishing Water Quality Minimum Thresholds

Information used for establishing the degraded groundwater quality thresholds include:

- Historical Groundwater Quality: Water quality data analyzed from public water supply, domestic water supply, irrigation, and monitoring wells within the Basin via the GAMA database and DDW.
- Federal and state drinking water standards (Title 22)
- Water Quality Control Plan (RWQCB 2019)
- Irrigated Lands Reporting Program
- Feedback form GSA staff and public

8.8.2.4 Relationship Between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Minimum thresholds for each COC were set based on the regulatory standards for drinking water quality and for:

- **Groundwater Levels:** Water quality minimum thresholds may impact groundwater levels in the Basin by affecting groundwater pumping and recharge activities. Exceedances of water quality minimum thresholds may reduce pumping in some areas of the Basin, leading to stabilization of water levels regionally. Minimum thresholds will also limit the water types acceptable for recharge, as they must meet the minimum thresholds identified in this section. Overall, water quality minimum thresholds should not have a negative impact on water levels as they do not promote increased pumping.
- **Groundwater Storage:** Groundwater quality minimum thresholds will not impact groundwater storage within the Basin as they do not promote increased pumping within the Basin. Water quality minimum thresholds will not impact pumping in relation to the sustainable yield of the Basin.
- **Seawater Intrusion:** This sustainability indicator is not applicable to this Basin.
- **Subsidence:** Water quality minimum thresholds will not promote activities that could lead to subsidence within the Basin and will therefore not result in an exceedance of the subsidence minimum thresholds or significant and unreasonable conditions.
- **Depletion of Interconnected Surface Water:** Water quality minimum thresholds will not impact interconnected surface waters as they will not promote increased pumping within the Basin. Therefore, water quality minimum thresholds will not cause significant and unreasonable conditions with relation to interconnected surface water.

8.8.2.5 Effect of Minimum Thresholds on Neighboring Basins

A hydrologic barrier to flow exists between the Atascadero Basin and the Paso Robles Basin. This barrier would restrict groundwater from flowing into the neighboring basin. Furthermore, minimum thresholds are established to maintain water quality in the Basin above regulatory standards for drinking water and WQOs for the region. No other groundwater basins neighbor the Atascadero Basin.

8.8.2.6 Effect on Beneficial Uses and Users

Agricultural Uses and Users: Minimum thresholds for water quality were established based on the WQOs outlined in the Water Quality Control Plan (RWQCB 2019) for the region. These WQOs set limits for constituents that may adversely affect crop production. Since the minimum thresholds will hold water quality in the Basin above these WQOs, they will not adversely affect agricultural use.

Urban/Public Water Supply Use and Users: Minimum thresholds for water quality were set as the state and federal drinking water standards. The number of minimum thresholds required for an undesirable result to occur in the Basin limits the number of wells that can exceed federal and state standards. This will maintain a level of water quality in the Basin that will benefit urban use and public water supply.

Domestic Water Supply Use and Users: Minimum thresholds for water quality were set as the state and federal drinking water standards. The number of minimum thresholds required for an undesirable result to occur in the Basin limits the number of wells that can exceed federal and state standards. This will maintain a level of water quality in the Basin that will benefit domestic use and users.

8.8.2.7 Relation to State, Federal, or Local Standers

Minimum thresholds were established based on the state and federal drinking water standards. Local standards for water quality, as identified in the Water Quality Control Plan (RWQCB 2019) were incorporated as well.

8.8.2.8 Method for Quantitative Measurement of Minimum Thresholds

Minimum thresholds will be assessed at all sites identified as a RMS. Water quality sampling shall be conducted by the regulatory program associated with the RMS well (Title 22, ILRP) and reviewed by the GSA when published for annual reporting requirements.

8.8.3 *Measurable Objectives*

Measurable objectives were set at levels above the minimum thresholds established for each RMS location, as described in Section 8.8.2.1 – Paso Robles Formation Aquifer and Section 8.8.2.2 – Alluvial Aquifer, for both the Paso Roble Formation and Alluvial Aquifer. As these levels are above either regulatory standards, this will maintain conditions in the Basin and will not adversely impact beneficial uses and users of groundwater in the Basin.

8.8.3.1 Methods for Setting Measurable Objectives

Measurable objectives were set above state and federal drinking water standards as well as WQOs as defined in the Water Quality Control Plan (RWQCB 2019) or current conditions. Measurable objectives will maintain water quality within the Basin to support beneficial use.

8.8.3.2 Interim Milestones

Interim milestones are set as milestones as a GSA moves toward sustainable management of the groundwater Basin. The Atascadero Basin is currently considered sustainable by the DWR. As the minimum thresholds and measurable objectives for degraded water quality are set to maintain current conditions and support beneficial use of groundwater, interim milestones are not required. If through implementation of the GSP, degraded water quality is observed and projects/management actions are required, interim milestones will be re-assessed to provide a path to reach sustainability. This re-assessment of Basin conditions and modifications to this plan would occur during the 5-year update.

8.9 Land Subsidence SMC

Section 5 – Groundwater Conditions, explains that there is no evidence that land subsidence caused by groundwater extraction exists within the Basin. Because the following conditions exist within the Atascadero Basin:

- Groundwater level minimum thresholds are set at historical low groundwater level
- Measurable objectives for groundwater levels are set significantly above historic low levels
- Basin storage is projected to increase during the implementation period

land subsidence caused by groundwater extractions is not projected and therefore, SMC are not established in this initial GSP. The GSA will continue to review InSAR data and monitoring groundwater levels within the groundwater levels RMS. If groundwater levels drop unexpectedly or InSAR indicates that subsidence is being detected in the Basin, then land subsidence SMCs will be established in a future update to this GSP.

- **Land Subsidence:** Gradual settling of land surface caused by compaction of subsurface materials due to lowering of groundwater elevations form pumping.
- **Land Surface Fluctuation:** Periodic or annual measurement of the ground surface. Lowering levels may not indicate long term subsidence.

8.9.1 *Undesirable Results*

Based on SGMA regulations, undesirable results for land subsidence is a result of a quantitative combination of land subsidence minimum threshold exceedances. While historical land surface fluctuations are observed, there is no historical evidence of land subsidence within the Basin.

Based on the lack of historical subsidence and the locally defined significant and unreasonable conditions, the undesirable result for land subsidence in the Atascadero Basin was established as:

> Observed subsidence within the Basin, as a result groundwater management under this GSP, that interferes with critical infrastructure or surface land use.

In order for land subsidence to be considered an undesirable result, it must impact critical infrastructure and it must be as a result of groundwater management under the GSP. To determine if subsidence minimum threshold exceedances have triggered an undesirable result, they must be observed with water level minimum threshold exceedances below historic levels and impacts to infrastructure. If undesirable results for land subsidence are observed, the GSA shall assess what projects/management actions are required.

8.9.2 *Locally Defined Significant and Unreasonable Conditions*

The locally defined significant and unreasonable conditions for land subsidence was determined based on historic subsidence data, SGMA regulations, public input and surveys, and discussion with the GSA. Locally defined significant and unreasonable conditions are:

> Permanent land subsidence, as a result of groundwater management under the GSP, that adversely effects critical infrastructure or land use.

8.9.2.1 Potential Causes of Undesirable Results

Land subsidence undesirable results, as described in this GSP, as a result of groundwater management under SGMA would be likely caused by changes in groundwater pumping in the Basin. Increased pumping or shifts in the location of pumping, that cause groundwater levels to decline past historic lows could cause land subsidence that impacts critical infrastructure. This is considered unlikely, however, as management under this GSP shall keep groundwater levels above historic lows.

8.9.2.2 Effects on Beneficial Users and Land Use

Potential effects on beneficial users and land due to observed undesirable results would be damaging critical infrastructure that would limit use and adversely affecting surface land uses. However, groundwater management under this GSP aims to protect against undesirable results. Maintaining groundwater levels above historic lows, and a lack of historical subsidence in the Basin, make it unlikely that beneficial uses or users will be affected.

8.9.3 *Minimum Thresholds*

> **Land Subsidence.** The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:
>
> (A) Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.
>
> (B) Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.
>
> *– § 354.28 Minimum Thresholds (c)(5)*

As the Basin has not historically seen subsidence, the minimum threshold for land subsidence shall be any observed subsidence as a result of groundwater management. Land subsidence shall be monitored using InSAR data provided by the DWR. The minimum threshold for land subsidence under this GSP is:

> Measured subsidence, using InSAR data, between June of 1 year and June of the subsequent year shall be no more than 0.1 foot in any 1-year and a cumulative 0.5 foot in any 5-year period, as a result of groundwater management under the GSP, and shall not result in long-term permanent subsidence.

8.9.3.1 Information Used a Methodology for Establishing Subsidence Minimum Thresholds

Minimum thresholds were established based on historical subsidence in the Basin, accuracy and availability of subsidence data, and the locally defined significant and unreasonable conditions that may affect beneficial uses. As there is no historical evidence of subsidence in the Basin, the minimum threshold was set as any observed long-term subsidence as a result of groundwater management under the GSP.

Monitoring for land subsidence shall be done using the InSAR data provided by DWR. InSAR, or interferometric synthetic aperture radar, is land surface elevation data collected via satellite and provides regional changes in land surface elevation. As defined by DWR, the error associated with InSAR data collected between June 2015 and June 2018 are (GSP, Paso Robles Basin, 2020):

1. 0.052 feet with a 95% confidence level between InSAR and continuous GPS data
2. 0.048 feet with 95% confidence interval for measurement accuracy when converting raw InSAR data to the maps provided by DWR

For the purpose of this GSP, the errors for InSAR data is considered the sum of errors 1 and 2 for a total error of 0.1 feet. Therefore, observed changes in land surface of 0.1 feet or greater will be considered potential subsidence. As described previously, land surface elevations may fluctuate naturally. For this reason, subsidence shall be monitored at the same location and same date year to year, to reduce the influence of general fluctuations in land surface elevations.

If any subsidence is observed, there must be a correlation to lowering groundwater levels for a minimum threshold to be exceeded. Since there is no historical evidence of subsidence within the Basin, groundwater levels would need to drop below historic lows for pumping for subsidence to occur. Minimum thresholds for subsidence shall be evaluated by lowering land surface elevations by 0.1 feet and a decline in water levels below historic lows (or a groundwater levels minimum threshold exceedance).

8.9.3.2 Relationship Between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Minimum thresholds for subsidence will have the following impacts on other minimum thresholds and sustainability indicators:

- **Groundwater Levels:** Subsidence minimum thresholds will not directly impact the groundwater levels SMC. However, a groundwater levels minimum threshold exceedance may result in a subsidence minimum threshold exceedance, as lowering of groundwater levels could result in subsidence.
- **Groundwater Storage:** Subsidence minimum thresholds will not impact groundwater storage SMC. If subsidence due to lowering groundwater levels is observed, any changes to pumping in the Basin would likely serve to improve groundwater storage as well.
- **Seawater Intrusion:** This sustainability indicator is not applicable to this Basin.
- **Degraded Water Quality:** Subsidence minimum thresholds will not impact the degraded water quality SMC.
- **Depletion of Interconnected Surface Water:** Subsidence minimum thresholds will not impact the interconnected surface water SMC. Pumping will not increase as a result of the subsidence sustainability indicator and should not affect or cause depletion of interconnected surface water.

8.9.3.3 Effect on Neighboring Basins

As the subsidence minimum thresholds are set to avoid long-term subsidence that may damage infrastructure, there is not anticipated to be any effect on the neighboring Paso Robles Basin.

8.9.3.4 Effects on Beneficial Users and Uses

There are no anticipated effects on beneficial users and uses of groundwater as a result of the subsidence minimum thresholds. In the event that minimum threshold exceedances result in undesirable results, there could be damage to infrastructure associated with beneficial use of groundwater.

8.9.3.5 Relation to State, Federal, or Local Standards:

There are no federal, state, or local regulations related to subsidence.

8.9.3.6 Method for Quantitative Measurement of Minimum Threshold

Minimum thresholds will be assessed using InSAR data, provided by DWR, to determine the measured change in elevation data from year to year. If a change of elevation greater than 0.1 feet is observed, groundwater levels for that year will be assessed to determine if levels dropped below historic lows and if subsidence may be caused by groundwater management.

8.9.4 *Measurable Objectives*

The measurable objective for subsidence within the Basin is maintaining historical rates as a result of groundwater management. Since there has not been historical subsidence in the Basin, the measurable objective is managing subsidence at a rate of 0 feet/year as a result of groundwater management.

8.9.4.1 Method for Setting MO

Measurable objectives were set based on historical records showing no history of subsidence in the Basin. Measurable objectives shall be monitored using the DWR InSAR data.

8.9.4.2 Interim Milestones

Since the measurable objective is to maintain current subsidence rates, and there is no historical evidence of subsidence in the Basin, interim milestones are not necessary to reach sustainability. Should a minimum threshold exceedance occur, interim milestones shall be addressed in the next GSP update to identify a path to reach the measurable objective.

8.10 Depletion of Interconnected Surface Water SMC

Natural hydraulic connections can exist between shallow groundwater systems and some surface water bodies. These surface water bodies can be gaining (receiving water from groundwater) or losing (contributing water to groundwater). These interflow relationships can change in magnitude and direction across wet and dry cycles and in response to changes in surface water operations or groundwater management practices.

The Salinas River is significant to the management of groundwater in the Basin. The Salinas River is ephemeral, and during most of the year loses water to the shallow alluvial aquifer. A complete description and quantification of the stream/aquifer interaction is included in Sections 5 – Groundwater Conditions, Section 6 – Water Budget, and Section 7 Monitoring Networks. The water budget shows that stream depletion is highly variable depending on rainfall events and the hydrologic year type. In wetter years, when flows in the Salinas River are high there is greater amounts of recharge from the river to the groundwater system. In drier years, when flows in the Salinas River are low, there is less stream recharge to the groundwater system. In both cases the amount of recharge to the groundwater system is small compared to the volume of surface water flowing down the river and out the northern boundary of the Basin.

As described in Section 3.6.3.1 – Salinas River Live Stream Requirements (1972), the Salinas River is also under the 'Live Stream Requirement' by the State Water Board regarding the operation of Salinas Reservoir to protect vested downstream rights. The decision presumed that downstream rights would be met if a visible surface flow (i.e., a "live" stream) existed in the Salinas River between the Salinas Reservoir and the confluence with the Nacimiento River. If there was no live stream, then total daily inflow to the Salinas Reservoir was to be released from the Salinas Dam.

These two factors including highly variable hydrology and Salinas Dam operations to meet the Live Stream Reequipment control the flows in the Salinas River. This has been the case for past conditions and is expected to continue in the future. The highly variable hydrologic conditions and the Live Stream Requirement dictating reservoir releases to the river culminate in streambed infiltration resulting in higher groundwater levels in the Alluvial Aquifer.

Because of the relationship between groundwater levels in the Alluvial Aquifer and Depletions of Interconnected Surface Water, the Chronic Lower of Groundwater Levels will be used as a proxy for Depletions of Interconnected Surface Water.

8.10.1 *Undesirable Results*

The undesirable result for depletions of interconnected surface water is a result that causes significant and unreasonable adverse effects on beneficial uses of interconnected surface water within the Atascadero Basin over the planning and implementation horizon of this GSP.

8.10.1.1 Criteria for Defining Undesirable Results

The information used for establishing the of the criteria for defining undesirable results for the chronic lowering of groundwater levels (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.1.1 – Criteria for Defining Undesirable Results.

8.10.1.2 Potential Causes of Undesirable Results

The information used for establishing the of the criteria for defining potential causes of undesirable results for the chronic lowering of groundwater levels (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.1.2 – Potential Causes of Undesirable Results.

8.10.1.3 Effects on Beneficial Users and Land Use

If depletions of interconnected surface water were to reach undesirable results, the adverse effects could potentially include reduced ability of surface water flows to meet in-stream flow requirements. Fisheries, riparian habitat, and recreational opportunities within the Atascadero could also be impacted if groundwater pumping significantly reduces stream flows below the minimum thresholds.

8.10.2 *Locally Defined Significant and Unreasonable Conditions*

Significant and unreasonable groundwater level depletions in the Basin are those that significantly reduces stream flows below the minimum thresholds or interfere with SGMA sustainability indicators.

8.10.3 *Information Used a Methodology for Establishing Depletion of Interconnected Surface Water Measurable Objectives and Minimum Thresholds*

The information used for establishing the chronic lowering of groundwater levels measurable objective and minimum thresholds (our proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.3 – Information and Methodology Used to Establish Measurable Objectives and Minimum Thresholds.

8.10.4 *Measurable Objectives*

The Measurable Objective for the chronic lowering of groundwater levels measurable objective and minimum thresholds (our proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.4 – Measurable Objectives.

8.10.4.1 Method for Setting Measurable Objective

The method for setting the Measurable Objective for the chronic lowering of groundwater levels measurable objective in the Alluvial Aquifer (our proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.4.2 – Alluvial Aquifer Measurable Objectives.

8.10.5 *Minimum Thresholds*

The information used for establishing the minimum thresholds for the chronic lowering of groundwater levels for the Alluvial Aquifer (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.5.1 – Alluvial Formation.

> **Depletions of Interconnected Surface Water.** The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results. The minimum threshold established for depletions of interconnected surface water shall be supported by the following:
>
> (C) The location, quantity, and timing of depletions of interconnected surface water.
>
> (D) A description of the groundwater and surface water model used to quantify surface water depletion. If a numerical groundwater and surface water model is not used to quantify surface

> water depletion, the Plan shall identify and describe an equally effective method, tool, or analytical model to accomplish the requirements of this Paragraph.
>
> – *§ 354.28 Minimum Thresholds (c)(6)*

8.10.5.1 Information Used for Establishing Depletion of Interconnected Surface Water Minimum Thresholds

Information used to establish the minimum threshold includes the following:

- Historic groundwater levels in the Alluvial Aquifer
- Historic stream flow records
- Analysis of riparian habitat including estimation of rooting depth
- Distribution of monitoring wells screened in the Alluvial Aquifer

8.10.5.2 Relationship Between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The information used for establishing the relationship of minimum thresholds to other sustainability indicators of groundwater levels (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.5.4 – Relation to Other Sustainability Indicators.

8.10.5.3 Effect on Neighboring Basins

The Salinas River flows through the Atascadero Basin to the Paso Robles Basin. The Live Stream Requirement includes the Salinas River downstream of the Atascadero Basin. We do not expect any changes in depletion of interconnected surface waters in the future conditions relative to historic conditions, and do not expected to impact the Paso Robles Basin, but the two basins will coordinate to ensure no adverse effects.

8.10.5.4 Relation to State, Federal, or Local Standards:

The State Water Board enforces the Live Stream Requirement on the Salinas River as described in Section 3.6.3.1 – Salinas River Live Stream Requirements (1972).

8.10.5.5 Method for Quantitative Measurement of Minimum Threshold

The information used for establishing the method for quantitative measurement of minimum threshold for groundwater levels (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.5.8 – Method for Quantitative Measurement of Minimum Threshold.

8.10.5.6 Interim Milestones

The information used for establishing interim milestones groundwater levels (proxy for Depletion of Interconnected Surface Water) is described in Section 8.5.5.9 – Interim Milestones.

8.11 Management Areas

No Management Areas have been established in the Basin. For planning purposes, concepts for future management areas provided.

8.11.1 *Future Management Area Concept*

The Atascadero Basin is considered sustainable by DWR. There is not current need to have management areas. Future designation of management areas may be developed based on the existence of a geologic and geographic divides in the Basin that result in different conditions or management actions to achieve sustainability.

8.11.1.1 Minimum Thresholds and Measurable Objectives

Established to ensure groundwater levels remain above historic water levels in each management are to maintain historical groundwater conditions. Groundwater quality will not be degraded due to poor quality water moving into productive aquifers.

8.11.1.2 Monitoring

A more expansive monitoring network might reveal the need for management areas, but at this time no management areas are planned.

8.11.2 *How Management areas will avoid undesirable results*

The Atascadero Basin is considered sustainable by DWR. There is not current need to have management areas.

8.11.3 *Management*

The Atascadero Basin is considered sustainable by DWR. There is not current need to have management areas.

9. Projects and Management Actions

The participating agencies of the Atascadero Basin GSA agree to work together to protect the groundwater resources of the Atascadero Basin (Basin) to meet the current and future beneficial uses in the Basin by developing a GSP that conforms with the requirements of the SGMA.

The hydrologic conditions and hydrogeologic setting of the Basin and ongoing proactive water management have demonstrated the resilient nature of the Basin and avoidance of groundwater overdraft conditions. As a result, the DWR has designated the Basin as very low basin priority that is being sustainably managed.

This section describes the projects and management actions that will be developed and implemented in the Basin to continue to sustainably operate the Basin in accordance with §354.42 and §354.44 of the SGMA regulations.

Because the Basin is currently being managed sustainably, as evidenced by historic groundwater levels in the Basin, there are no projects or management actions that are required to achieve sustainability. Some future projects and management actions may assist in improving the understanding of the groundwater system to enhance the overall water management capability in the Basin to continually meet existing and new requirements and accountability for improved and more efficient water management.

The projects and management actions outlined below will be implemented with an as-needed, adaptive-management approach, with decisions based largely on funding availability and identified need at the time. The projects and management actions identified in this section are supported by the adaptive management strategy described in Section 10 – Groundwater Sustainability Plan Implementation, which allow for the GSA to respond to unexpected changes in conditions so that potential future undesirable results can be avoided.

9.1 Summary of Projects

Because the Basin is currently managed sustainably there are no projects that are required to achieve sustainability. However, there are some projects that are desired to fill existing data gaps and to enhance the GSA's understanding of the Basin.

9.1.1 *Supplement the Monitoring Network*

The existing monitoring network and Representative Monitoring Network are presented in Section 7 – Monitoring Networks. This section identified the existing monitoring networks (for groundwater levels and groundwater quality) satisfy the requirements of the guidelines in the GSP regulations and Best Management Practices (BMPs) published by DWR on monitoring networks (DWR, 2016). Section 7 also identified some data gaps and plans to fill those data gaps which are outlined below. The initial priority to fill the data gaps includes identifying existing wells that can be added to the monitoring network. Where existing wells cannot be identified or permission provided by well owners for their wells to be added to the monitoring network, new dedicated monitoring wells may be constructed to fill the data gaps

9.1.1.1 Groundwater Level Monitoring Improvements

The San Luis Obispo County Flood Control and Water Conservation District (county) has been monitoring groundwater levels county-wide on a semi-annual basis for more than 50 years to support general planning and for engineering purposes. Groundwater level measurements are taken once in the spring and once in the fall. The monitoring takes place from a voluntary network of wells. The voluntary monitoring network has changed over time as access to wells has been lost or new wells have been added to the network. Routine monitoring of groundwater levels is conducted by the county in the Basin. The monitoring network also includes private wells in the Basin that are monitored under confidentiality agreements. These wells are not shown on GSP maps and figures.

The existing GSP groundwater level monitoring network satisfies the requirements cited in DWR's BMP. However, hydrogeologists working with the GSA have identified two areas in the Basin where the network could be enhanced. These data gaps are in the Paso Robles Formation Aquifer and Alluvial Aquifer in locations where existing private agricultural and domestic supply wells exist.

The GSA will take the initial steps to fill these data gaps by reaching out to the private well owners in these areas to assess their willingness to participate in the monitoring program and the suitability of their well(s) for inclusion in the monitoring network. Notices will also be placed on the project website to inform the public and other agencies regarding the expansion of the monitoring network. The GSA will investigate incorporating existing wells into the monitoring network to the extent that they meet the needs and requirements of the monitoring program.

This activity will be completed within the first 5 years of implementation to supplement the existing monitoring network. This activity will continue to improve the understanding of aquifer conditions, support development of the groundwater model, and monitor groundwater conditions. This activity supports the development of the best available information in the basin and helps reduce the uncertainty of the basin setting and groundwater conditions.

Because this activity focuses on using existing wells there are no permitting or regulatory processes required. The GSA will plan to get permission from the well owners to allow their information to be included in the voluntary network so the data from the well may be shared with the public, otherwise the information will be collected under the confidentiality agreement.

A portion of this activity will be directed by the purveyors in the Basin, or the county as part of their normal operations, so there is no anticipated additional cost for the identification of potential wells to be considered. Additional consulting support will be needed to evaluate the specific wells to add to the network, assessing the suitability of the well (proximity to others, aquifer, well depth, screen intervals, etc), contacting the owners, and incorporating the new wells into the network. This activity will be directed and paid for by the GSA and may have costs ranging from $50,000 to $100,000 over the 5-year period.

9.1.1.2 Groundwater Quality Monitoring Improvements

The GSP groundwater quality monitoring network is based on existing supply wells and there are no spatial data gaps in the network. There is adequate spatial coverage in the network for both principal aquifers to assess impacts to beneficial uses and users. The primary data gap is that well depth and construction information for many wells in the monitoring network is unknown. The GSA will try to fill this data gap by trying to match wells included in the groundwater quality monitoring network with well logs.

This activity supports the development of the best available information in the basin and helps reduce the uncertainty of the basin setting and groundwater quality conditions by providing additional understanding of the water quality withing the primary aquifers. This activity will be completed within the first 5 years of implementation for the wells currently in the groundwater quality monitoring network. Because this activity focuses on using existing wells there are no permitting or regulatory processes required. This activity will be directed by the purveyors in the Basin, or the county as part of their normal operations, so there is no anticipated additional cost for this activity. Additional consulting support will be needed to evaluate the specific well logs to add to the wells included in the groundwater quality network. This activity will be directed and paid for by the GSA and may have costs ranging from $20,000 to $50,000 over the 5-year period.

9.1.1.3 Identify New Monitoring Wells for Incorporation into the Groundwater Level Monitoring Network

The GSA will investigate the need for new monitoring wells on an as-needed basis, to the extent existing wells cannot fill groundwater level data gaps. These wells can fill gaps spatially, with depth, or gaps related to GDEs and surface water/groundwater interaction. Additionally, the wells may provide locations to assist in aquifer testing and may provide additional locations for water quality monitoring. The GSA will evaluate the need for new monitoring wells in the very shallow subsurface to improve the understanding of GDEs and surface water/groundwater interaction.

This activity will be completed within the first 5 years of implementation to supplement the existing monitoring network to continue improving the understanding of aquifer conditions. This activity supports the development of the best available information in the basin and helps reduce the uncertainty of the basin setting and groundwater conditions by filling data gaps in the basin setting and monitoring basin conditions

This activity will be directed and paid for by the GSA and may have costs ranging from $100,000 to $250,000 over the 5-year period. Because this activity focuses on new wells there will be some permitting or regulatory processes required. Notices will also be placed on the project website to inform the public and other agencies regarding the potential expansion of the monitoring network.

9.1.2 *Develop a Groundwater Model*

A groundwater model will need to be developed specific to the Basin and surrounding watersheds to improve the basin understanding to support ongoing sustainable management of the Basin. The model will need to reflect the latest groundwater basin boundaries identified in the 2016 Basin Boundary Modification. The model should account for the water demands of the beneficial users in the Basin and represent surface and subsurface inflows from the surrounding watersheds. The model should correlate with the model used in the adjacent Paso Robles Subbasin to reflect boundary conditions between the two basins.

Once developed, the model with be the primary technical tool in overall groundwater management, including supporting GSP updates and implementation. Scheduled within the first 5 years of implementation, the GSA will lead development of the model. The model will be updated as needed, but no less than every 5 years, to maintain an accurate representation of groundwater management activities and their impact on the groundwater resources within the Basin.

This activity will be completed within the first 5 years of implementation to continue improving the understanding of aquifer conditions and management considerations in the Basin and assess and potentially refine the sustainable management criteria. This activity supports the development of the best available information in the basin and helps reduce the uncertainty of the basin setting and groundwater conditions.

There are no regulatory or permitting requirements to develop the groundwater model. This activity will be directed and funded by the GSA and may have costs ranging from $200,000 to $300,000. Actual costs to develop the groundwater model will need to be refined based on developing the modeling goals and objectives.

Notices will also be placed on the project website to inform the public and other agencies regarding the development of the groundwater model.

9.2 Summary of Management Actions

The stakeholders of the Basin have actively managed the Basin for many years prior to and following the signing of the SGMA in 2014. Currently the Basin is identified as a very low priority basin based on the 2019 DWR Basin Prioritization. As a result of the Basin status and ongoing groundwater management activities, implementation of many of the actions identified in this GSP will occur on an as-needed basis during the first 5 years of implementation to maintain the sustainable groundwater conditions of the Basin.

In general, basin-wide management actions will apply to all areas within the Basin and reflect basic GSP implementation requirements such as monitoring, reporting, and outreach, including necessary studies and early planning work; monitoring and filling data gaps with additional monitoring sites; and annual reports and GSP updates. Area-specific management actions may be implemented in those areas experiencing persistent issues that may not support the continuing sustainable management of the Basin. An adaptive management approach will be implemented to identify the specific actions necessary to meet local needs and support basin-wide sustainable groundwater management.

9.2.1 *Basin-Wide Management Actions*

The GSA will take the initial steps on the Basin-wide management actions associated with monitoring and reporting information associated with implementation of the GSP described below.

To inform stakeholders and interested parties of these activities, notices will be included in billing statements issued by water purveyors. Those individuals not receiving water from one of the waters providers in the Basin will be contacted by mail. This approach has been used during the development of the GSP. Additionally, a notice will be placed on the project website to inform the public and other agencies regarding the status of these activities.

This activity will be completed on an as-needed basis throughout the first 5 years of implementation. This activity supports the development and distribution of the best available information in the basin and helps inform other agencies, basin stakeholders and interested parties.

There are no permitting requirements associated with this activity. This activity will be directed by the purveyors in the Basin, or the county as part of their normal operations, so there is no anticipated additional cost for this activity. Information regarding GSP implementation will be included in bills for customers within the boundaries of water purveyors. For landowners outside of the boundaries will be contacted by mail. During previous groundwater management activities, including the preparation of this GSP, Atascadero MWC has sent out information to those property owners outside the purveyor boundaries in the Atascadero Basin, and will continue to do that during the first 5-year implementation period.

9.2.1.1 Monitoring, Reporting, and Outreach

Monitoring, reporting, and outreach reflect the core functions that the GSAs need to provide to comply with SGMA regulations. The GSAs will direct the monitoring programs outlined in Section 7 – Monitoring Networks, to track Basin conditions related to the five sustainability indicators that are applicable to the Basin. Data from the monitoring programs will be routinely evaluated to ensure sustainability is maintained or to identify whether undesirable results are on the horizon. Data will be maintained in the DMS. Data from the monitoring program will be used by the GSA to guide decisions on management actions in the Basin. Data will be used to prepare annual reports to Basin stakeholders and the DWR. The reports will provide information to guide decisions on projects that may affect the Basin. Reports will comply with DWR submittal requirements and will be signed by a GSA authorized party. Data will be organized and available to the public to document Basin conditions relative to Sustainable Management Criteria (Section 8 – Sustainable Management Criteria).

9.2.1.2 De Minimis Self-Certification

De minimis extractor means a person who extracts, for domestic purposes, 2 acre-feet or less per year. During the first 5 years of implementation if it is determined that the current estimates of de minimis extractions may not represent the pumping amounts, the GSA will consider developing a process to allow *de minimis* basin extractors to self-certify that they extract 2 acre-feet or less per year for domestic purposes. If needed this activity will be directed and paid for by the GSA and may have costs ranging up to $50,000 over the 5-year period.

9.2.1.3 Non-De Minimis Extraction and Reporting Program

The GSA will adopt water duty factors representative of various land uses within the basin to estimate groundwater extractions. These duty factors will be developed using metered data from properties with representative land uses. During the first 5 years of implementation if it is determined that the current estimates of pumping for non-de minimis extractions may not represent the actual pumping amounts, the GSA will consider developing a process to refine this information. If needed this activity will be directed and paid for by the GSA and may have costs ranging up to $50,000 over the 5-year period.

9.2.1.4 Annual Reports (SGMA Regulation §356.2)

Annual reports will be submitted to DWR starting on April 1, 2022. The purpose of the report is to provide monitoring and total groundwater use data to DWR, compare monitoring data to the sustainable management criteria, and to report on management actions and projects implemented to maintain sustainability. Annual reports will be available to Basin stakeholders.

9.2.1.5 5-Year GSP Updates and Amendments (SGMA Regulation §356.2)

In accordance with SGMA regulatory requirements (§356.4), 5-year GSP assessment reports will be provided to DWR starting in 2027. The GSA will evaluate the GSP at least every 5 years to assess whether it is maintaining the sustainability goal in the Basin. The assessments will include a description of significant new information that has been made available since GSP adoption or amendment and whether the new information or understanding warrants changes to any aspect of the plan.

9.2.1.6 Develop Public Data Portals and Coordinate on Data

The Basin is included in the county-wide Groundwater DMS being developed for San Luis Obispo County to manage data collected and used to support groundwater management activities in the groundwater basins located within the county. The DMS is needed to meet SGMA requirements (§352.6). The DMS will be used to store collected data needed to support the management and reporting for the Basin. The DMS will need regular updates of the data collected for the Basin.

This activity is scheduled to be completed on a regular basis, anticipated to be twice a year, to enter water level and other data into the DMS to keep it current to support various reporting requirements.

9.2.1.7 Continued Groundwater Dependent Ecosystems Evaluation

GDEs are defined in the GSP regulations as "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface." A process was performed to identify potential GDEs, as separate from vegetation that may receive water supplies from other sources.

The analysis was based on the best available science, including the NCCAG database and information on the local near surface hydrogeologic conditions as well as the connectivity between rivers and streams and the shallow aquifer. Rooting depths of the nearby vegetation was also considered in the GDE evaluation.

Scheduled within the first 5 years of implementation, the GSAs will consider analyzing a combination of shallow groundwater level data and remote sensing data on vegetative cover to further analyze any relationship between lower groundwater levels and reduced GDE health.

9.2.1.8 Estimation of Groundwater Uses

Metering groundwater production has been avoided due to the high initial and ongoing costs and the limited benefits of metering compared to available methods for estimating production. However, while domestic use can be estimated based on population and per-capita use, and agricultural use can be estimated based on crop type, self-supplied groundwater uses can be more difficult to estimate.

The initial approach is to conduct a study using existing metered wells at selected agricultural locations of various crop types to assess the accuracy of agricultural groundwater use. These estimates could utilize CIMIS data from the Atascadero Station (Station 163) to refine these estimates.

9.2.2 *Specific Management Actions*

Area-specific management actions may be implemented to target a localized area or aquifer to continue to meet local needs while supporting sustainable operation of the Basin. Some of the management actions listed below may be implemented as-needed based on implementation of the adaptive management approach.

9.2.2.1 Supplemental Supplies from Nacimiento Water Project

Several of the water purveyors within the Basin entered Water Delivery Entitlement Contracts with the county to participate in the NWP. The NWP annual water supply allocations listed previously in Table 3-2 are for the purveyors in the Basin. As described in Section 6 – Water Budgets, during the current water budget period, representing the 2012 to 2016 period, the deliveries from the NWP ranged from 730 to 4,790 acre-feet per year and averaged 2,160 acre-feet per year. If needed in dry years, additional deliveries from the NWP up to the existing allocations could be imported to support groundwater pumping from the alluvial aquifer. The city of Paso Robles utilizes their NPW allocation in both the Atascadero Basin and the Paso Robles

Subbasin. Only that portion of the NWP allocation used in the Atascadero Basin will be considered as this potential supply.

This activity is part of normal operations and will be implemented annually by each NWP Partner throughout GSP implementation. This activity provides the greatest opportunity in the Basin to provide additional water supplies into the Basin to support sustainable groundwater management. This activity uses existing facilities and operations, so no additional permitting or regulatory processes are required. This activity will be directed by the NWP Partners in the Basin and is part of their normal operating costs, so there is no anticipated additional cost for this activity. The actual operations will be documented and reported to DWR, other agencies, and the public in the GSP annual reports.

9.3 Projects and Management Actions Implementation

The Basin will implement projects and management actions under an adaptive management strategy when opportunity and funding are available. The GSA developed the two matrices below to support the decision-making process for initiation of projects and management action. Table 9-2 provides a summary of the status, criteria for implementation, the potential range of costs and the benefits of each project and management action. Table 9-3 summarizes how each project and management action will address the sustainability indicators for the Atascadero Basin.

Table 9-2. Projects and Actions Implementation Matrix

Activity	Status	Implementation Timing/Criteria for Implementation	Range of Costs	Accrual of Benefits
PROJECTS				
Supplement the Monitoring Network	Ongoing	As needed	Considered to occur within existing operational costs of the water purveyors. Additional costs for specific activities are listed below	Continuous improvement of monitoring network to support understanding of basin conditions
Groundwater Levels	Ongoing	Near-term. To occur within first 5 years	Additional costs could range $50,000 to $100,000 over first 5 years	Fill groundwater level monitoring data gaps
Groundwater Quality	Ongoing	Near-term. To occur within first 5 years	Additional costs could range $20,000 to $50,000 over first 5 years	Improve understanding of water quality in principal aquifers
New Monitoring Well Identification and installation	As Needed	Near-term. To occur within first 5 years	Additional costs could range $100,000 to $250,000 over first 5 years	Fill groundwater level monitoring data gaps
Develop a Groundwater Model	Planned	Near-term. To occur within the first 5 years	$200,000 to $300,000	Provide updates to first GSP update. Continually benefits from updated information to improve groundwater management
MANAGEMENT ACTIONS (BASINWIDE)				
De Minimis Self Certification	Planned	Near-term. To occur within the first 5 years	Up to $50,000 over first 5 years of implementation	Improve understanding of groundwater pumping amounts in Basin
Non-De Minimis Extraction and Reporting Program	Planned	Near-term. To occur within the first 5 years	Up to $50,000 over first 5 years of implementation	Improve understanding of groundwater pumping amounts in Basin
Annual Reports	Planned to comply with SGMA requirements.	Near-term. To occur each year	Estimated at $70,000 for initial annual report. Less than that for following years	Provide annual updates of continued sustainable management of Basin

5-Year GSP Updates and Amendments	Planned to comply with SGMA requirements.	Near-term. To occur within the first 5 years	Estimated at $250,000 to $300,000.	Provide updated state of the basin and documentation of sustainable groundwater management of Basin
Develop Public Data Portals and Coordinate on Data	Ongoing	Near-term. To occur Each year	Considered to occur within existing operational costs	Continuous throughout GSP implementation. Evaluated through coordination activities and improvements to data management
Continued GDE Evaluation	Planned	Near-term. To occur within the first 5 years	$50,000 to $100,000 over first 5 years	Improve understanding GDE's in basin and surface water-groundwater interaction
Estimation of Groundwater Uses	Planned	Near-term. To occur within the first 5 years	Less than $50,000 over first 5 years	Improve understanding of groundwater pumping amounts in Basin
MANAGEMENT ACTIONS (AREA-SPECIFIC)				
Supplemental Supplies from NWP	Ongoing	To occur each year as part of normal operations; may be modified to address drought conditions	Considered to occur within existing operational costs	Continuous throughout GSP implementation

Table 9-3 Adaptive Management Strategy by Sustainability Indicator

Activity	Chronic Lowering of Groundwater Levels and Change in Groundwater Storage	Degraded Water Quality	Land Subsidence	Depletion of Interconnected Surface Water
		PROJECTS		
Supplement the Monitoring Network	Continuation of existing monitoring network to continue improving the understanding of aquifer conditions and groundwater movement to monitor for meeting sustainable management criteria	Continuation of groundwater level monitoring to support analysis related to other sustainability indicators	Continuation of groundwater level monitoring to support analysis related to other sustainability indicators	Continuation of existing monitoring network to continue improving the understanding of aquifer conditions and groundwater movement to monitor for meeting sustainable management criteria
Groundwater Levels	Further improvement of monitoring network to better understand aquifer conditions	Further improvement of monitoring network to support analysis related to other sustainability indicators	Further improvement of monitoring network to support analysis related to other sustainability indicators	Further improvement of monitoring network to support analysis related to other sustainability indicators
Groundwater Quality	Not applicable	Further improvement of monitoring network to better understand aquifer conditions	Not applicable	Not applicable
New Monitoring Well Identification	Further improvement of monitoring network in order to better understand aquifer conditions	Further improvement of monitoring network to support analysis related to other sustainability indicators	Further improvement of monitoring network to support analysis related to other sustainability indicators	Further improvement of monitoring network to support analysis related to other sustainability indicators
Develop a Groundwater Model	Atascadero Basin groundwater model will improve the understanding of the basin and groundwater management	The groundwater model will improve the improve the ability to manage quality changes driven by upwelling or changes in flow direction	The groundwater model will improve the improve the ability to manage groundwater levels, which influences the risk of subsidence	The groundwater model will improve the improve the ability to understand and manage surface water depletions

MANAGEMENT ACTIONS (BASINWIDE)				
De Minimis Self Certification	Improves the understanding of groundwater production, improving the ability to manage groundwater levels	Not applicable	Improves the understanding of groundwater production, improving the ability to manage groundwater levels, which influences the risk of subsidence	Improves the understanding of groundwater production, improving the ability to manage groundwater levels, and the related depletions
Non-De Minimis Extraction and Reporting Program	Improves the understanding of groundwater production, improving the ability to manage groundwater levels	Not applicable	Improves the understanding of groundwater production, improving the ability to manage groundwater levels, which influences the potential for subsidence	Improves the understanding of groundwater production, improving the ability to manage groundwater levels, and the related depletions
Annual Reports	Openness and transparency of GSP showing continued sustainable management	Openness and transparency of GSP showing continued sustainable management	Openness and transparency of GSP showing continued sustainable management	Openness and transparency of GSP showing continued sustainable management
5-Year GSP Updates and Amendments	Continued and improved sharing of data across organizations, including data to support indicators	Continued and improved sharing of data across organizations, including data to support indicators	Continued and improved sharing of data across organizations, including data to support indicators	Continued and improved sharing of data across organizations, including data to support indicators
Develop Public Data Portals and Coordinate on Data	Improved data maintenance, data access, data sharing, and transparency	Improved data maintenance, data access, data sharing, and transparency	Improved data maintenance, data access, data sharing, and transparency	Improved data maintenance, data access, data sharing, and transparency
Continued GDE Evaluation	Improves the understanding of how GDEs relate to the groundwater aquifer accessed by pumping. May allow for refinement of how GDEs are incorporated into the criteria	Not applicable	Not applicable	Improvement in the understanding of the interaction of deep and shallow groundwater conditions may benefit understanding of depletions
Estimation of Groundwater Uses	Improves the understanding of groundwater production, improving the ability	Not applicable	Improves the understanding of groundwater production, improving the	Improves the understanding of groundwater production, improving the

	to manage groundwater levels		ability to manage groundwater levels, which influences the risk of subsidence	ability to manage groundwater levels, and the related depletions
MANAGEMENT ACTIONS (AREA-SPECIFIC)				
Supplemental Supplies from NWP	Provides operational flexibility to manage groundwater levels in the Basin to meet sustainable management criteria	Provides operational flexibility to manage groundwater levels in the Basin to meet sustainable management criteria	Provides operational flexibility to manage groundwater levels in the Basin to meet sustainable management criteria	Provides operational flexibility to manage groundwater levels in the Basin to meet sustainable management criteria

10. Groundwater Sustainability Plan Implementation

This section is intended to serve as a conceptual roadmap for the Atascadero Basin GSA to start implementing the GSP over the first 5 years and discusses implementation effects in accordance with the SGMA regulations sections 354.8(f)(2) and (3).

The implementation plan provided in this chapter is based on current understanding of Atascadero Basin (Basin) conditions and includes consideration of projects and management actions included in Section 9 – Projects and Management Actions, as well as other actions that are needed to successfully implement the GSP including the following:

- GSP implementation, administration, and management
- Reporting, including annual reports and 5-year evaluations and updates
- Adaptive management strategies
- Funding
- Evaluation of Effects

10.1 GSP Implementation, Administration, and Management

The Basin was actively managed for many years prior to the signing of the SGMA in 2014 and is currently a very low priority basin based on the 2019 DWR Basin Prioritization. As a result of the Basin status and ongoing groundwater management activities, implementation of much of the GSP will occur on an as-needed basis to maintain the sustainable groundwater conditions of the Basin.

Several projects and management actions are scheduled to be fully or partially completed within the first 5 years:

- Identify existing wells for incorporation into the groundwater level monitoring network
- Identify and install new dedicated monitoring wells for incorporation into the groundwater level monitoring network to fill data gaps
- Refine our understanding of the relationship between groundwater levels and GDE health, which may include the installation of very shallow monitoring wells near potential GDEs
- Develop a groundwater model for the Basin
- Continue to utilize imports from the NWP to continue sustainable management of the Basin
- Improve public access to groundwater data
- Implement adaptive management activities if a triggering event occurs, as described in

Section 10.3 – Adaptive Management Strategies

To meet the requirements of SGMA, implementation of the GSP will require additional effort and coordination among the GSA Forming Parties and Participating Parties in the Basin. As described in Section 2.2 – Agency Organization and Management Structure, the Atascadero Basin GSA is comprised of four forming parties and six participating parties.

Forming Parties

- City of Atascadero
- City of Paso Robles
- County of San Luis Obispo
- Templeton Community Services District

Participating Parties

- Atascadero Mutual Water Company
- Atascadero State Hospital
- SMR Mutual Water Company
- Santa Ysabel Ranch Mutual Water Company
- Walnut Hills Mutual Water Company
- Garden Farms Water District

The GSP calls for GSAs to routinely provide information to the public about GSP implementation and ongoing sustainable management of the Basin. The GSP calls for a website to be maintained as a communication tool for posting data, reports, and meeting information. The website may also include forms for on-line reporting of information needed by the GSAs (e.g., annual pumping amounts) and an interactive mapping function for viewing Basin features and monitoring information.

10.2 Reporting

Reporting to be performed as part of GSP implementation includes development of annual reports and development of 5-year evaluations, which could lead to updates of the GSP.

10.2.1 *Annual Reports*

Annual reports must be submitted by April 1st of each year following GSP adoption, except years when 5-year or periodic assessments are submitted. The GSA will compile information relevant to annual reports and the Basin Point of Contact will coordinate collection of information and submit a single annual report for the Basin to DWR.

Annual reports will be developed to address current needs in the Basin and the requirements of SGMA. Modifications may include additional information and presentation of data over the prior water year (October 1 – September 30). An annual groundwater fact sheet will be developed for dissemination of information to the public.

Annual reports are anticipated to include three key sections: General Information, Basin Conditions, and Implementation Progress.

10.2.1.1 General Information

General information will include an executive summary that highlights the key content of the annual report. As part of the executive summary, this section will include a map of the Basin, a description of the sustainability goal, a description of GSP projects and their progress, as well as an annual update to the GSP implementation schedule. Key required components include:

- Executive Summary
- Map of the Atascadero Basin

10.2.1.2 Basin Conditions

Basin conditions will describe the current groundwater conditions and monitoring results in the Basin. This section will include an evaluation of how conditions have changed over the previous year and will compare groundwater data for the water year to historical groundwater data. Pumping data, effects of project implementation (if applicable), surface water deliveries total water use, and groundwater storage data will be included. Key required components include:

- Groundwater level data from the monitoring network, including contour maps of seasonal high and seasonal low levels maps for the principal aquifers
- Hydrographs of groundwater elevation data at RMS
- Groundwater extraction data by water use sector
- Surface water supply availability and use data by water use sector and source
- Total water use data
- Change in groundwater in storage, including maps for the aquifer
- Subsidence rates and associated survey data

10.2.1.3 Implementation Progress

Progress toward successful GSP implementation will be included in the annual report. This section of the annual report will describe the progress made toward achieving interim milestones as well as implementation of projects and management actions. Key required components include:

- GSP implementation progress, including proposed changes to the GSP
- Progress toward maintaining the Basin sustainability goal

Development of annual reports will begin following the end of the water year, September 30, and will include an assessment of the previous water year. The assessment will be submitted to DWR on April 1st of the following calendar year. The 2021 annual report covering water year 2021 will be submitted by the GSA by April 1, 2022. Five annual reports for the Basin will be submitted to DWR between 2022 and 2026, prior to the first 5-year assessment to this GSP, which is to be submitted to DWR in January 2027.

10.2.2 *Five-Year Evaluation Reports*

An evaluation of the GSP and progress toward meeting the approved sustainability goals will occur at least every 5 years and with every amendment to the GSP. A written 5-year evaluation report (or periodic evaluation report) will be prepared and submitted to DWR. The information to be included in the evaluation reports are provided in the sections below.

10.2.2.1 Sustainability Evaluation

A Sustainability Evaluation will contain a description of current groundwater conditions for each applicable sustainability indicator and will include a discussion of overall sustainability in the Basin. Progress toward achieving interim milestones and measurable objectives will be included, along with an evaluation of status relative to minimum thresholds. If any of the adaptive management triggers are found to be met during this evaluation, a plan for implementing adaptive management as described in the GSP will be included.

10.2.2.2 Plan Implementation Progress

A Plan Implementation Progress section will describe the current status of project and management action implementation and whether any adaptive management actions have been implemented since the previous report. An updated project implementation schedule will be included, along with any new projects developed to support the sustainability goal of the GSP and a description of any projects that are no longer included in the GSP. The benefits of projects and management actions that have been implemented will be described and updates on projects and management actions that are underway at the time of the report will be documented.

10.2.2.3 Reconsideration of GSP Elements

As additional monitoring data are collected, land uses and community characteristics change, and GSP projects and management actions are implemented, it may become necessary to reconsider elements of this GSP and revise the GSP as appropriate. GSP elements to be reassessed may include basin setting, management areas, undesirable results, minimum thresholds, and measurable objectives. If appropriate, a revised GSP completed at the end of the 5-year assessment period will include revisions informed by the outcomes of the monitoring network and changes in the Basin, including changes to groundwater uses or supplies, and outcomes of project implementation.

10.2.2.4 Monitoring Network Description

A description of the monitoring network will be provided. An assessment of the monitoring network's function will be included, along with an analysis of data collected to date. If data gaps are identified, the GSP will be revised to include a method for addressing these data gaps, along with an implementation schedule for addressing gaps and a description of how the GSA will incorporate updated data into the GSP.

10.2.2.5 New Information

New information available since the last 5-year evaluation or GSP amendment will be described and evaluated. If the new information should warrant a change to the GSP, this will also be included, as described previously in Reconsideration of GSP Elements.

10.2.2.6 Regulations or Ordinances

A summary of the regulations or ordinances related to the GSP that have been implemented by DWR or others since the previous report will be provided. The report will include a discussion of any required updates to the GSP.

10.2.2.7 Legal or Enforcement Actions

Legal or enforcement actions taken by the GSA in relation to the GSP will be summarized, including an explanation of how such actions support sustainability in the Basin.

10.2.2.8 Plan Amendments

A description of amendments to the GSP will be provided in the 5-year evaluation report, including adopted amendments, recommended amendments for future updates, and amendments that are underway.

10.2.2.9 Coordination

Ongoing coordination will be required among the GSA Forming Parties and Participating Parties, as well as between the GSA and GSAs in Paso Robles Subbasin. The 5-year evaluation report will describe coordination activities between these entities such as meetings, joint projects, or data collection and sharing and groundwater modeling efforts.

10.2.2.10 Reporting to Stakeholders and the Public

Significant outreach activities associated with the GSP assessment and resultant updates will be documented in the 5-year evaluation report.

10.3 Adaptive Management Strategies

As part of implementation, adaptive management strategies will be considered for implementation if designated trigger events occur. Triggers for implementation of adaptive management allow for a variety of actions, ranging from coordination and monitoring to management of groundwater extractions and recharge. Triggering events are based on monitoring results and are set in relation to the sustainable management criteria described in Section 8 – Sustainable Management Criteria.

10.3.1 *Adaptive Management Triggers*

The purpose of this adaptive management approach is for the GSA to take necessary action to investigate the cause of observed groundwater level declines below expected levels for the season and annual hydrologic conditions and provide a framework for response to prevent reaching the minimum threshold. Adaptive management will also occur should other sustainability indicators approach minimum thresholds, even though local management levels are not defined for these other indicators. For other indicators, adaptive management is triggered when minimum thresholds are exceeded, even if not in the percentages or timing defined as undesirable results.

10.3.2 *Trigger Response*

The minimum thresholds established in Section 8 – Sustainable Management Criteria, will be used to establish triggers for responses. The GSA will flag the representative monitoring site where the exceedance is observed and bring the flagged monitoring site to the attention of the Executive Committee. The Executive Committee will consider the results of an investigation of the exceedance performed by the GSA to determine if it is a locally driven change in conditions, or representative of a long-term, Basin-wide change in conditions. The Executive Committee will advise the GSA on a recommended course of action which may include working with water managers near the site. The GSA will take the action it determines to be necessary, including corrective action, additional study, or management modification, if any, in the area influencing the monitoring site.

10.3.3 *Corrective Actions*

Recognizing that the Basin has been operated sustainably, it is not anticipated the significant corrective actions will be needed to maintain ongoing sustainable groundwater management. Some initial corrective actions to better understand or mitigate impacts may include increased monitoring frequency, coordination and information sharing with overlying land use planning agencies or other water management entities to determine the cause of exceedances.

Additional corrective actions to address declining groundwater levels that have not reached the minimum thresholds may include localized actions such as delivering more NWP allocations up to the full allocation amount, implementing demand management measures, or modifying municipal pumping operations to mitigate impacts to private users. In some extreme cases, halting or reducing groundwater pumping in the depths and areas influenced by the representative monitoring site may be considered until conditions recover.

Given the current, historical, and projected sustainable nature of the Basin and given the cost associated with developing detailed response plans, details of these adaptive management actions will be further developed only if conditions suggest a reasonable potential for implementation of such strategies.

The corrective action or information gathering will be deemed successful in returning the Basin to sustainable conditions when monitoring indicates that conditions are above the local management level or minimum threshold, or that the issue was a result of localized conditions.

10.3.4 *Public Notice and Outreach*

Public notice of exceedances of the local management level or minimum threshold at an individual monitoring site will first be made via a web page or public data portal, to the extent developed at that time. Notice will also be provided as an agenda item at associated Forming Parties' or Participating Parties' board or city council meeting or Executive Committee meeting. Actions taken regarding discussion of the cause or corrective action to be taken to improve conditions will be considered during the GSA Executive Committee meetings. Additionally, any exceedances relative to the minimum thresholds and status compared to the other sustainable management criteria will be reported to DWR in annual reports under this GSP, which will be publicly available following submission to DWR.

10.3.5 *Permitting and Regulatory Process*

Implementation of this adaptive management strategy itself is not anticipated to require permitting or regulatory approvals. However, actions or projects resulting from a need to improve conditions relative to the local management level or minimum threshold will be subject to the appropriate permitting and regulatory processes, if any, and will be addressed on a case-by-case basis.

10.3.6 *Adaptive Management Strategy Benefits*

The primary benefit anticipated as a result of this adaptive management strategy is continued sustainable groundwater management and maintaining the sustainability goals established for this GSP. Expected benefits also include continued cooperative management of groundwater conditions among the GSA participants. Benefits will be evaluated based on observed groundwater conditions following implementation of this adaptive management strategy and evaluation of long-term conditions at, or improved relative to, the local management level or minimum threshold. An additional benefit of the adaptive management strategy is avoidance of high-cost, restrictive management efforts unless clearly needed as indicated by data and analysis of the data.

10.3.7 *Adaptive Management Responsibilities*

Implementation of the adaptive management strategy will be conducted by the GSA. The Forming and Participating Parties will inform the Executive Committee of exceedances of the minimum thresholds and will provide analysis, as needed, to the Executive Committee to identify the cause for the exceedance, whether it is localized or indicative of long-term, regional trends, and the corrective actions, if any, needed to return conditions to those above the local management level. The Executive Committee acts in an advisory role in the effort. The Forming and Participating Parties will take into consideration the Executive Committee's recommendation when implementing actions.

10.3.8 *Status and Timing*

This adaptive management strategy will commence as monitoring activities described in this GSP begin for the purpose of assessing conditions relative to the established sustainable management criteria. If exceedances of the local management level or minimum threshold occur, the management process described above will take place and corrective action or additional study will be initiated by the GSA and put in place until conditions are improved. The accrual of benefits is expected to be continuous throughout the GSP implementation timeframe.

10.3.9 *Legal Authority*

The GSA adopting this GSP is responsible for the sustainable management of groundwater based on the power and authority granted under the Water Code. As such, the adopting GSA has the authority to take action deemed appropriate within its legal authority to maintain sustainable groundwater conditions within the Basin.

10.3.10 *Costs*

Costs associated with this adaptive management strategy include staff time, consultant costs, contractor costs, transportation costs for in-person meetings (if necessary), monitoring and data collection, and actions associated with corrective management. Given the nature of adaptive management, including the broad range of actions that could be taken, these costs cannot be estimated at this time. GSA participants are expected to perform the monitoring and data collection tasks associated with GSP implementation and absorb these costs into their ongoing operations budgets.

10.3.11 *Technical Justification*

Management of sustainability indicators relative to the established sustainable management criteria is crucial to maintain sustainable conditions within the Basin. It is anticipated that Basin conditions will fluctuate around the established measurable objectives and that long-term trends will demonstrate continued sustainable conditions throughout the Basin across sustainability indicators. This adaptive management strategy outlines a uniform procedure for the GSA to follow in the unprecedented event that collected measurements indicate conditions may be approaching local management levels or minimum thresholds, which protect against undesirable results. With a procedure in place to guide the GSA, early detection and correction of unsustainable conditions is likely to occur.

10.3.12 *Reducing Uncertainty*

This adaptive management strategy addresses uncertainty by providing a flexible framework to address potential exceedances of local management levels and minimum thresholds should conditions within the Basin change as a result of unforeseen circumstances.

10.4 Funding

Implementation of this GSP is estimated to cost approximately between $100,000 and $200,000 per year for the first 5 years of implementation. The development of the initial groundwater model is estimated to total $200,000 to $300,000. Estimates of future annual implementation costs including model updates will be developed during future updates of the GSP. The costs of specific projects and management actions will like vary year by year based in part on needed adaptive management activities and may potentially add between zero dollars to $300,000 per year or more. Some of these costs are already being incurred through existing groundwater management efforts by GSA participants in their existing operational budgets.

10.4.1 *GSP Development Funds*

Development of this GSP was partially funded through a Proposition 1 Sustainable Groundwater Planning Grant from DWR, along with in-kind contributions from the Forming and Participating Parties in the process. The implementation of the GSP, including projects and management actions, will be funded through available grant funding as well as existing revenue streams provided by the Parties.

10.4.2 *GSP Implementation Funding Support*

As described above, there are substantial costs associated with GSP implementation for the Basin, including costs within the first 5 years of implementation. Some of these costs are already being incurred through existing groundwater management. While the GSA in the Basin has the powers and authority to impose fees and assessments, other funding sources will be sought by the GSA to reduce the local financial burden. Examples of available other funding sources include various state grant programs through DWR and the State Water Board and federal sources such as the Reclamation grant programs.

San Luis Obispo County, the city of Paso Robles, Templeton CSD, and Atascadero MWC have been successful in pursuing past grant funding, such as through DWR's Local Groundwater Assistance Fund, IRWMP implementation and planning grant programs, and Sustainable Groundwater Planning Grant programs. The continued availability of state and federal grant funding to implement this GSP will aid in continued sustainable groundwater management of the Basin. The GSA will track and pursue grant opportunities to fund groundwater sustainability activities and local water infrastructure projects. These projects may include supporting the actions described in this section, or other relevant activities. The nature of projects included in grant applications will depend on the nature of the grant, including allowable projects and projects that are most likely to receive funding.

Implementation of management actions will vary by available funding programs and projects eligible to receive funding. As available outside funding opportunities are identified that fit the needs of the Basin relative to this GSP, the project proponent and the GSA will be notified of the potential to pursue funding. The appropriate entity will then be identified to develop the grant application and associated materials. Grant application materials will be prepared, and proper public notice and outreach will take place to provide opportunity for public comment as specified by the grant program identified. After the grant application is submitted and funding awards have been announced, the successful grant recipient will work with the funding agency to develop a grant agreement to receive funds and maintain funding eligibility. Proper noticing of activities or work products produced with the awarded grant funds will take place according to the grant agreement and funding program guidelines. Details regarding the implementation process for a project will vary by funding program and agreements in place between the funding agency and project proponent. Such activities will take place as funding opportunities are available and as grant agreements are active.

On an as-needed basis, the GSA will track and pursue appropriate funding opportunities through various outside funding sources to implement elements of this GSP. Tracking of outside grant opportunities will be on-going throughout GSP implementation and timing will be highly dependent on available funding programs as well as project status for which funds are being sought. Table 10-1 summarizes potential grant programs or local funding sources that may be used for GSP implementation along with an assessment of the likelihood that the funding source could be obtained to help fund GSP implementation.

Table 10-1. Potential Funding Sources for GSP Implementation

Funding Source	Likelihood
General Funds or Capital Improvement Funds (of Project Proponents)	**High** – General or capital improvement funds are set aside by agencies to fund general operations and construction of facility improvements. Depends upon agency approval.
Proposition 68 grant programs administered by various state agencies	**Medium** – Grant programs funded through Proposition 68, which was passed by California voters in June 2018, are expected to be applicable to fund GSP implementation activities. Grant programs are expected to be competitive. Round 3 is expected to be announced in summer 2021.
Integrated Regional Water Management implementation grants administered by DWR	**Medium** – Proposition 1 Round 2 IRWM Implementation Grants are expected to be announced in late 2021.
WaterSMART Program grants administered by Reclamation	**Medium** – Programs include Water and Energy Efficiency Grants (WEEG), Drought Response Program grants, Applied Science grants, and more. In 2021, $42M was awarded for WEEG projects alone. Examples of funded projects include canal lining/piping, municipal metering, supervisory control, and data acquisition (SCADA) systems, water storage, water recharge, well construction, and more. Funding is typically available annually or twice a year.
Regional Conservation Partnership Program grants administered by USDA Natural Resources Conservation Service	**Medium** –The 2018 Farm Bill established the Regional Conservation Partnership Program (RCPP) as a standalone program with $300M available annually. Once a lead agency executes an RCPP agreement producers and landowners can participate in RCPP funding. The announcement for the next round of RCPP Classic funding is expected to be released in summer 2021. Eligibility requirements will be included in funding announcement.
Water & Waste Disposal Loan & Grant Program administered by USDA	**Low** – Long-term, low-interest loans and grants available for drinking water systems, disposal, and storm water drainage in rural areas (population of 10,000 or less). Applications are accepted year-round.

10.5 GSP Implementation Effects

10.5.1 *Effects on Existing Land Use*

The projected water budget (Section 6 – Water Budgets) accounts for modest increases in municipal and agricultural water demands that include potential changes in land use but is not likely to limit planned land uses. However, all such regulations will need to be consistent with the applicable statutory constraints, including those described in Water Code Section 10726.4(a)(2) which provides that such regulations shall be consistent with the applicable elements of the city or county general plan, unless there is insufficient sustainable yield in the Basin to serve a land use designated in the city or county general plan and Water Code Section 10726.8(f) which states that nothing contained in SGMA or in a GSP shall be interpreted as superseding the land use authority of cities and counties.

10.5.2 *Effects on Water Supply*

GSP implementation will not significantly alter the existing water supply of the Basin. If entities decide to take their full NWP allocation as outlined in Chapter 9, the Basin's water supply could increase.

10.5.3 *Effects on Local and Regional Economy*

GSP implementation is not expected to impact economic conditions since the Basin is already operated sustainably.

11. Notices and Communications

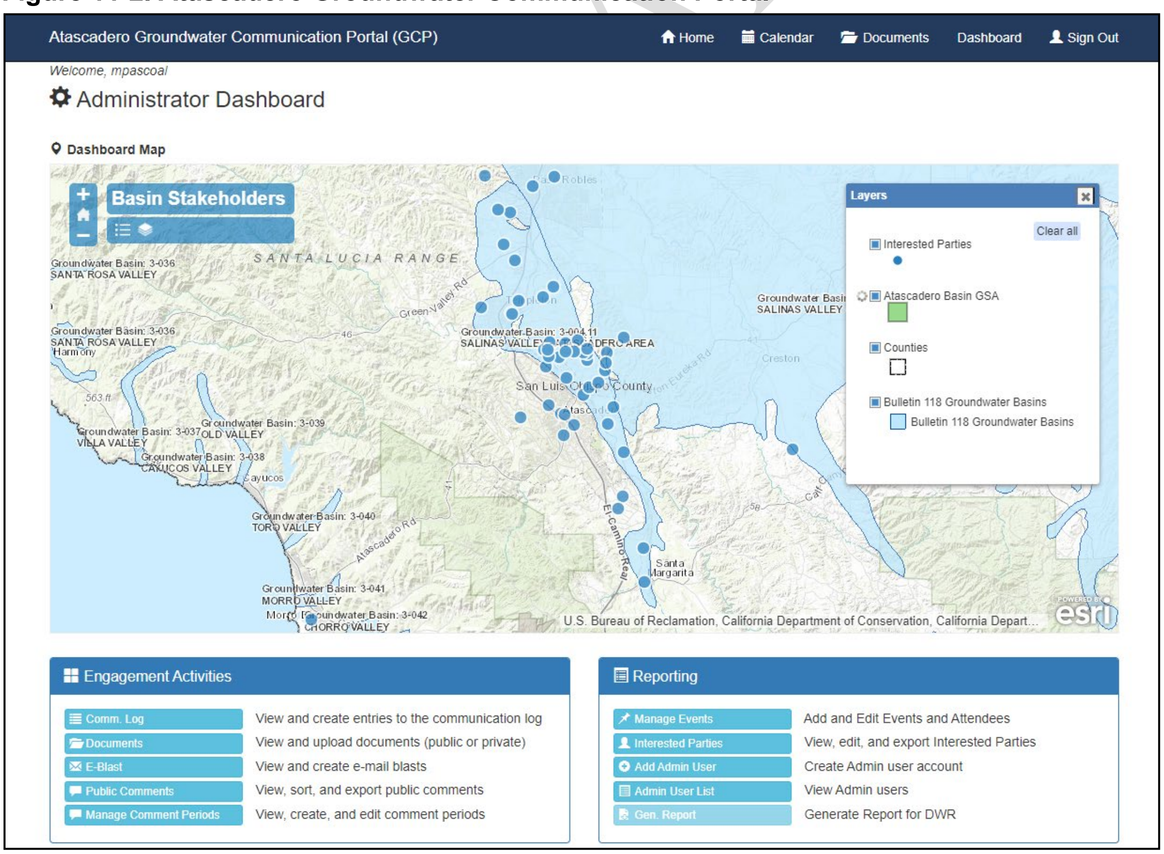
The Atascadero Basin began to conduct outreach almost immediately after SGMA was signed into law in September 2014. Local agencies launched a website, www.atascaderobasin.com (**Figure 11-1**) and started to solicit public input and educate stakeholders about the new law. Since that time, basin leadership dedicated their time and energy to support stakeholder engagement through multiple avenues:

- Built a robust interested parties list of 845 people
- Expanded the website to include a Communication Portal (**Figure 11-2**) used to display the meeting calendar, send e-blasts, store the interested parties list, publish draft sections of the GSP for public review, and collect public comments
- Produced and executed a Communication and Engagement Plan (**Appendix 11A**)
- Provided notices to water purveyor customers in the Basin with their water bills and provided two direct mailings to Basin residents located outside water purveyor boundaries (**Appendix 11B**)
- Conducted two stakeholder surveys to collect feedback regarding groundwater management in the basin (**Appendix 11C**)
- Published and distributed basin updates during the COVID-19 emergency period in the Spring and Summer of 2020 to keep stakeholders informed about how their participation may continue (**Appendix 11D**)
- Published 10 draft sections of the GSP and collected comments from interested parties and the public (**Appendix 11E**)
- Hosted 12 public meetings focused on SGMA implementation, including a public workshop focused on sustainable management criteria (**Appendix 11F**)
- Distributed e-mail notifications to the interested parties list when opportunities for public participation were available (**Appendix 11G**)

The outreach activities conducted to support GSP development are documented in Appendices A through F. Additionally, pre-SGMA groundwater management outreach efforts are attached as **Appendix 11H**.

Figure 11-1. Atascadero Basin Website

Figure 11-2. Atascadero Groundwater Communication Portal



12. Interagency Agreements

The Atascadero GSA directed the development of a single GSP that covers the entire Atascadero Basin so no interagency agreements are necessary to implement this GSP.

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