This minimum threshold was selected because undesirable results have not been observed in the last 20 years and this rate of subsidence would indicate an increased rate of subsidence compared to the average rate of subsidence measured at the UNAVCO CGPS Station ORES from 2000 to 2020 (0.04 feet or 0.5 inches per year).

Table 4-4. Land Subsidence Minimum Threshold

RMS ID	Minimum Threshold Rate of Land Subsidence (feet per year)
UNAVCO CGPS Station ORES	0.05[1]

Notes

[1] Land subsidence must also cause damage to groundwater supply, land uses, infrastructure, and/or property interests
CGPS = Continuous Global Positioning System
ORES = Name of UNAVCO CGPS Station
RMS = representative monitoring site
UNAVCO = University NAVSTAR Consortium

4.9.2.1 Relationship between Individual Minimum Thresholds and Other Sustainability Indicators [§ 354.28(b)(2)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(2) The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.

Subsidence minimum thresholds have little or no impact on other minimum thresholds, as described below.

- **Avoid Chronic Lowering of Groundwater Levels.** Subsidence minimum thresholds will not result in significant or unreasonable lowering of groundwater levels.
- **Avoid Chronic Reduction of Groundwater in Storage.** The subsidence minimum thresholds will not change the amount of groundwater pumping and will not result in a significant or unreasonable change of groundwater in storage.
- **Avoid Degraded Groundwater Quality.** The subsidence minimum thresholds will not change the groundwater flow directions or gradients of groundwater pumping and therefore and will not result in a significant or unreasonable change in groundwater quality.
- **Avoid Depletion of Interconnected Surface Waters.** The groundwater level subsidence minimum thresholds will not change the amount or location of groundwater pumping and will not result in a significant or unreasonable depletion of interconnected surface waters.
- **Avoid Seawater Intrusion.** This sustainability indicator is not applicable in the Basin.

4.9.2.2 Effects of Minimum Thresholds on Neighboring Basins [§ 354.28(b)(3)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(3) How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.

The ground surface subsidence minimum thresholds are set to prevent any long-term subsidence that could harm groundwater supply, land uses, infrastructure, and property interests. Currently, no neighboring groundwater basin as defined by DWR Bulletin 118 or SABGSA has been created for this region and therefore this section of the SGMA regulations is not applicable to the Basin or GSP.

4.9.2.3 Effects of Minimum Thresholds on Beneficial Uses and Land Uses [§ 354.28(b)(4)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

The subsidence minimum thresholds are set to prevent subsidence that could harm groundwater supply, land uses (including agricultural, residential, rural residential, and town buildings), infrastructure (including LACSD wells, WWTP, and associated infrastructure), and property interests. Available data indicate that there is currently little subsidence occurring in the Basin that affects groundwater supply, land uses, infrastructure, and property interests. Therefore, there is no likely negative impact on any beneficial user.

4.9.2.4 Relevant Federal, State, or Local Standards [§ 354.28(b)(5)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(5) How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.

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

4.9.2.5 Methods for Quantitative Measurement of Minimum Thresholds [§ 354.28(b)(6)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

Minimum thresholds will be assessed using UNAVCO CGPS station data (see Section 3.2.4).

4.9.3 Measurable Objectives for Land Subsidence [§ 354.30(a)]

§ 354.30 Measurable Objectives.

(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

4.9.3.1 Methodology for Setting Measurable Objectives

The measurable objectives are set based on maintaining current conditions and changes and are measured by UNAVCO CGPS station data.

4.9.3.2 Measurable Objectives for the Basin [§ 354.30(b),(c),(d), and (g)]

§ 354.30 Measurable Objectives.

(b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

(c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.

(d) An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.

(g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.

The measurable objectives for subsidence represent target subsidence rates in the Basin. Available information does not suggest the occurrence of significant and unreasonable subsidence in the Basin. Therefore, the measurable objective for subsidence is based on maintaining current conditions and average rate of subsidence measured at the UNAVCO CGPS Station ORES from 2000 to 2020 (0.5 inches per year) and is summarized in Table 4-5.

Table 4-5. Land Subsidence Measurable Objective

RMS ID	Measurable Objective Rate of Land Subsidence (feet per year)
UNAVCO CGPS Station ORES	0.04

Notes

CGPS = Continuous Global Positioning System
ORES = Name of UNAVCO CGPS Station
RMS = representative monitoring site
UNAVCO = University NAVSTAR Consortium

4.9.4 Interim Milestones for Land Subsidence [§ 354.30(e)]

§ 354.30 Measurable Objective.

(e) Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin with 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.

Interim milestones show how the SABGSA anticipates moving from current conditions to meeting the measurable objectives. No significant or unreasonable effect has been observed in the Basin in association with land subsidence. Therefore, no interim milestones are being proposed.

4.10 Depletion of Interconnected Surface Water Sustainable Management Criterion

4.10.1 Undesirable Results for Surface Water Depletion [§ 354.26(a),(b)(1)(2), and (d)]

§ 354.26 Undesirable Results.

(a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.

(b) The description of undesirable results shall include the following:

(1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.

(2) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.

(d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.

Conditions that may lead to an undesirable result for interconnected surface water in the Basin include the following:

- **Groundwater level declines** caused by groundwater pumping in the Basin could reduce the amount of groundwater discharging to interconnected surface water and Barka Slough resulting in an impact to GDEs.
- **Severe drought** that reduces mountain front recharge, streamflow percolation, percolation of direction precipitation, and recharge to the Paso Robles Formation and Careaga Sand; thus, lowering groundwater levels and reducing surface water flow into the Slough, resulting in an impact to GDEs. Short-term impacts due to drought are anticipated in the SGMA regulations with recognition that management actions need sufficient flexibility to accommodate drought periods and ensure short-term impacts can be offset by increases in groundwater levels or storage during normal or wet periods.

Locally defined significant and unreasonable conditions for depletion of interconnected surface water were assessed using several resources:

- Potential GDE identification utilizing the Natural Communities Commonly Associated with Groundwater (NCCAG) data set from DWR (see Figure 3-56) and The Nature Conservancy guidance for screening of potential GDEs (The Nature Conservancy, 2019)

- A biological assessment completed in 2019 by AECOM to evaluate the potential effects that the development of the Vandenberg Dunes Golf Courses Project located west of the Basin could have on federally and state listed species existing in environmental settings comparable and downgradient of Barka Slough (see Section 3.2.6; AECOM, 2019).
- Various studies in the area, including the Wetlands and Riparian Habitats Management Plan prepared for the Vandenberg Air Force Base (now the VSFB) (ManTech, 2010).
- Identification of interconnected surface water (see Section 3.2.5)
- Groundwater elevation monitoring data including calculations of vertical groundwater flow into the Slough (see Section 3.2.1.2)
- Available stream gage data (e.g., Casmalia stream gage)
- Water budget computations that include quantifications of groundwater discharge to surface water (see Section 3.3).

Avoiding adverse impacts on beneficial uses of interconnected surface water in the Basin and preserving existing habitat are the focus of this sustainability indicator because groundwater present in the Paso Robles Formation and Careaga Sand discharge into surface water that flows into the Slough. Direct uses of surface water (for recreation, irrigation, or municipal purposes) are not present or expected as a future significant beneficial use in the Basin, therefore the sustainability criterion for depletion of interconnected surface water is focused on avoiding impacts to GDEs and sensitive species. There is no intention at this time, nor a regulatory requirement, to create new habitat or restore habitat that existed prior to the enactment of SGMA in January of 2015. In conjunction with the TNC guidance, mapped GDEs in the watershed that include both aquatic and riparian habitat types are located in Barka Slough, the Las Flores watershed, and northeast of Los Alamos on Price Ranch (see Figure 3-56). Except for the Slough, without additional analysis, it is unknown whether the groundwater source of these springs or seeps is from the underlying principal aquifer or perched water within the channel alluvium. Therefore, until flow of groundwater is better understood in these areas, meaningful SMCs related to interconnected surface water and supporting associated GDEs cannot be developed. If analysis of these areas indicates interconnected surface water with the Paso Robles Formation or the Careaga Sand, SMCs will be developed pursuant to avoid undesirable results as described below. Planned additional analysis of these areas are described in Section 6.

Groundwater levels measured in wells located near the Slough indicate that groundwater levels have fallen below the Slough surface elevation in a number of locations since about 1983. In addition, upward vertical gradients within the Careaga Sand near the Slough (see Figure 3-71) have been reduced. This indicates that groundwater flow into the Slough has likely declined. Surface water also discharges into the Slough; there is a strong correlation between precipitation and measured flow at the Casmalia stream gage (11136100) located in San Antonio Creek west of Barka Slough. Available information shows that San Antonio Creek east of the Slough is intermittent and the Casmalia stream gage located 2.5 miles west of the Slough shows perennial flow. This indicates a probable groundwater contribution to the Slough. Without a stream gage at the east end of the Slough, it is not known what the surface water contribution is or whether surface water flow into the Slough has been decreasing. This is a data gap that will be addressed in the projects and management actions section of the GSP. Due to gaps in recorded data at the Casmalia stream gage (2003–2015) it is not possible to accurately determine the direct effect of pumping in the Basin on measured surface water flow using the Casmalia stream gage. Regardless, the existing condition supports significant habitat values. As a result, significant and unreasonable depletion of surface water and reduction of groundwater flowing into the Slough causing impacts to GDEs at the Slough would include the following undesirable result:

- Permanent loss or significant degradation of existing native riparian or aquatic habitat due to lowered groundwater levels and reduced surface water flow into Barka Slough caused by groundwater pumping.

A sustained decrease in surface water and groundwater flow into the Slough caused by pumping that results in groundwater levels dropping below root zones could result in permanent loss of GDEs and, as such, a monitoring program and management actions that are focused on preventing continued decline in groundwater levels are needed. Monitoring of groundwater levels in the Barka Slough area will continue to be conducted by the SABGSA as part of its Basin monitoring programs (see Section 5) to assess whether there is potential for a long-term decline in the health of the vegetation and eventual permanent habitat loss. Additional characterization of the nature, type, and extent of GDE communities in the Slough is needed.

The surface water component of flow into the Slough is equally as important as groundwater discharge into the Slough. Until new stream gages are installed that measure surface water flow entering and exiting the Slough, the Casmalia stream gage located downstream of the Slough will be monitored, as outlined in Section 5.

4.10.2 Minimum Thresholds for Surface Water Depletion [§ 354.28(a),(b)(1),(c)(6)(A)(B),(e), and (d)]

§ 354.28 Minimum Thresholds.

(a) Each Agency in its Plan shall establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26.

(b) The description of minimum thresholds shall include the following:

(1) The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by the uncertainty in the understanding of the basin setting.

(c) Minimum thresholds for each sustainability indicator shall be defined as follows:

(6) 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:

(A) The location, quantity, and timing of depletions of interconnected surface water.

(B) 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.

(e) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish minimum thresholds related to those sustainability indicators.

(d) An Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported by adequate evidence.

Section 354.28(c)(6) of the SGMA regulations states that "The minimum thresholds for depletion 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 DWR BMPs indicate that a groundwater model should be used to estimate surface water depletion. Because the USGS model for the Basin is still under development and could not be used to estimate

depletion, other methods were used, including analysis of surface water discharges leaving Barka Slough at the Casmalia stream gage and results from the water budget computations. Figure 4-2 shows the hydrograph for surface water flow measured at the Casmalia stream gage, located over 2.5 miles downstream of Barka Slough, outside of the Basin.

As shown on Figure 4-2, surface water flow measured at this gage shows significant variability resulting from climatic effects and that base flow has been fairly constant since 2015, with a geometric mean of 0.5 cubic feet per second (cfs) since 2015. There is no significant depletion of streamflow evident in the hydrograph for this period; however, it is possible that depletion may have occurred prior to 2015. There is a gap in data between 2003 and 2015.

Figure 4-3 shows the relationship between rainfall and groundwater discharge to surface water derived from the historical water budget (see Section 3.3). This figure also shows a strong correlation between rainfall and groundwater discharge to surface water. This is not unexpected because the methodology used to develop the groundwater discharge to surface water term in the water budget includes rainfall and streamflow as inflow terms in the water budget.

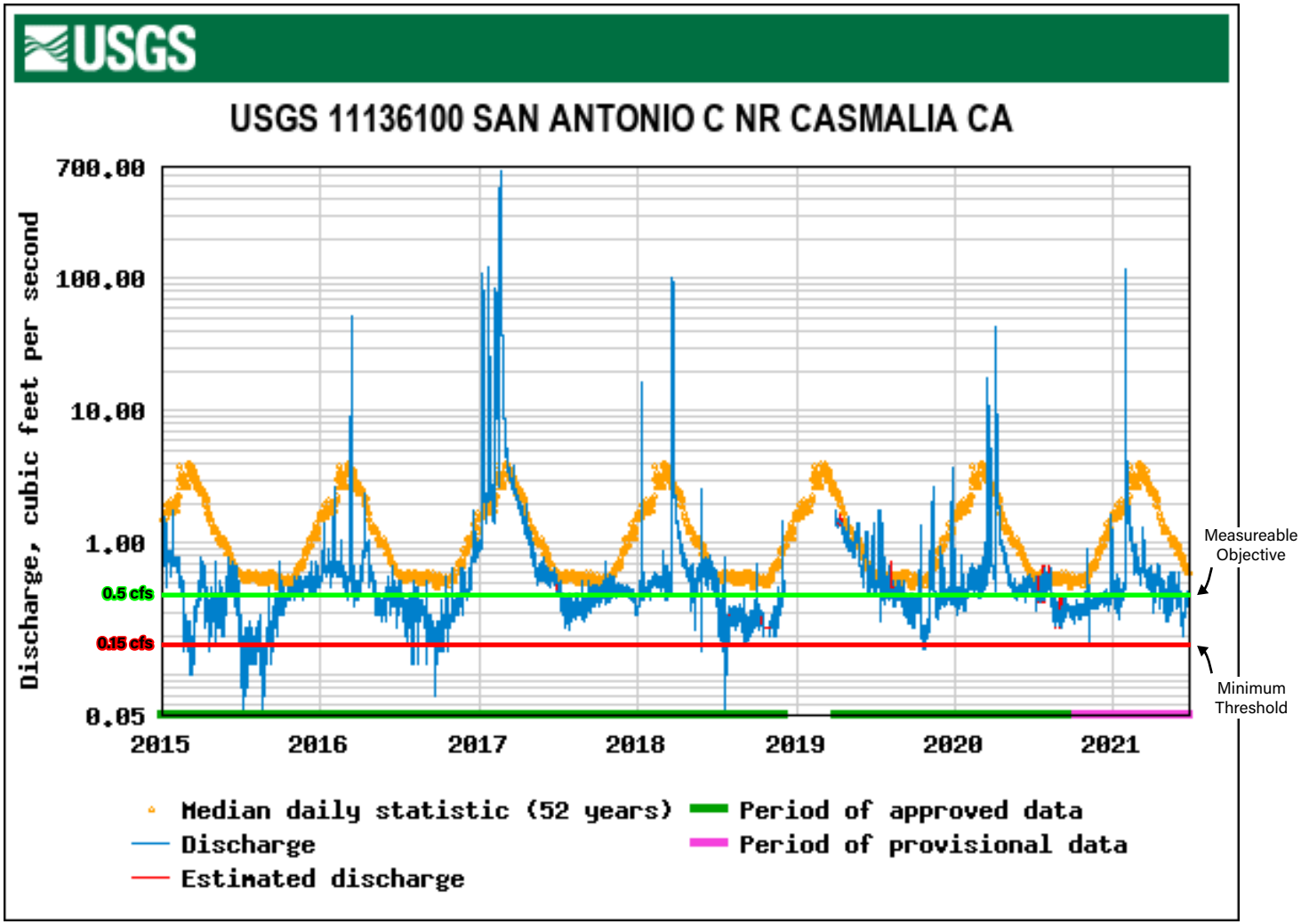

FIGURE 4-2

Casmalia Stream Gage Measured Flow

Groundwater Sustainability Plan
San Antonio Creek Valley Groundwater Basin

NOTE
cfs: cubic feet per second

Data Sources: USGS

GSI Water Solutions, Inc.

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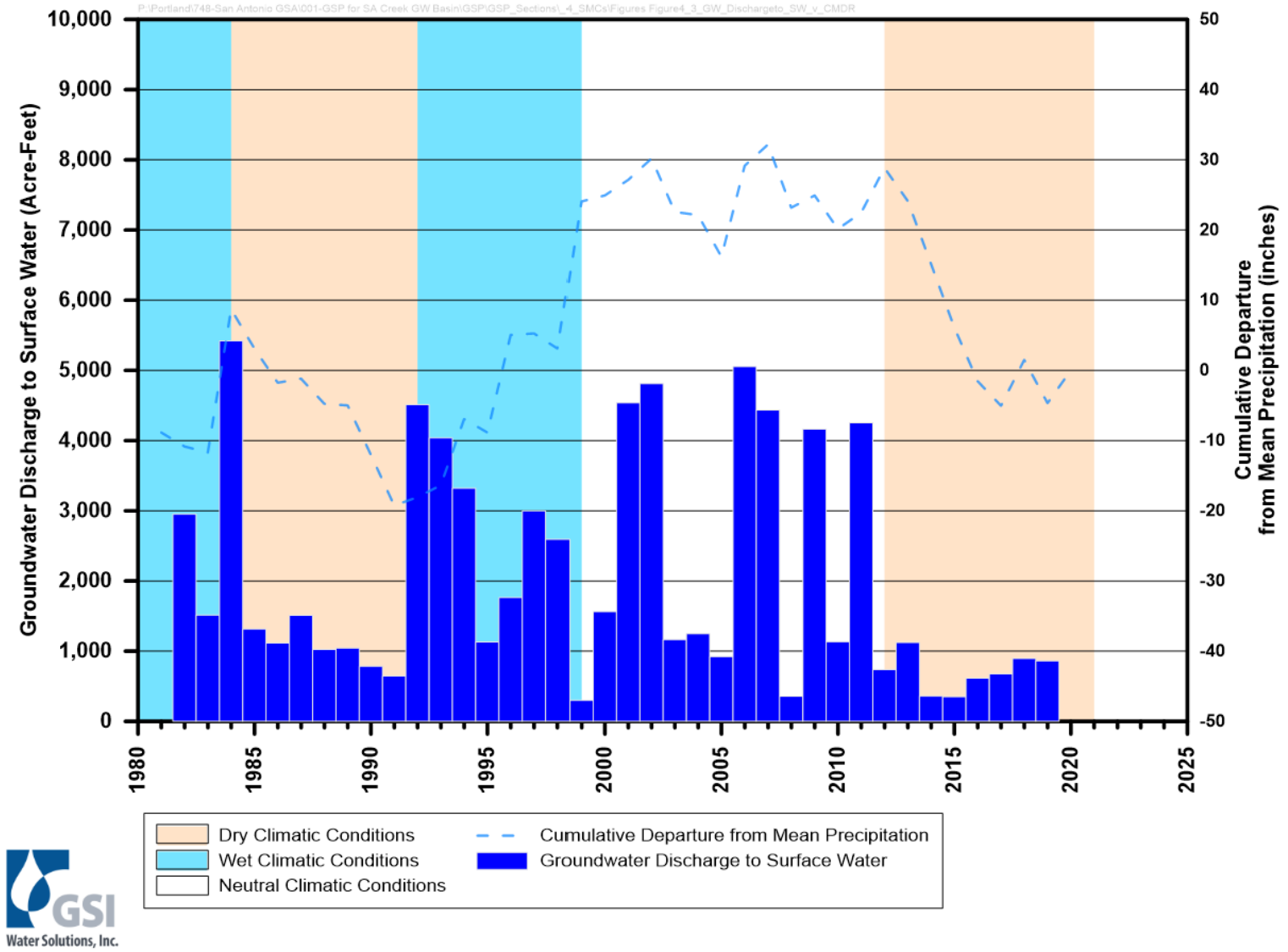


Figure 4-3. Groundwater Discharge to Surface Water at Barka Slough and Cumulative Departure from Mean Precipitation

Based on this evaluation, it is unclear to what extent groundwater pumping has caused surface water depletion; however, the observed reduction over time in the vertical gradients in wells completed in the Careaga Sand adjacent to the Slough (e.g., nested wells 16C2 and 16C4) indicate that there is less groundwater discharging into the Slough than in the past. Using Darcy's Law and assumed hydraulic characteristics and observed vertical gradients in the Careaga Sand beneath the Slough, the reduction in groundwater discharge to the Slough during the historical period is on the order of 350 AFY. While some of this is a result of drying conditions and reduced rainfall, the data indicate that some of the reduction in groundwater discharge may be caused by groundwater pumping in the Basin. This can be evaluated further once the USGS groundwater model becomes available.

Avoiding adverse impacts on beneficial uses of interconnected surface water in the Basin is the focus of this sustainability indicator. Because direct uses of surface water for recreation, irrigation, or municipal purposes are not present or expected in the future in the Basin, the minimum thresholds for depletion of interconnected surface water are focused on avoiding impacts to GDEs. The slough area is the only location in the Basin identified where groundwater is interconnected with surface water.

The Barka Slough exhibits a diverse and complex interaction between surface water and groundwater and determination of what portions of the Slough are sustained by surface water flows and areas sustained by groundwater is not straightforward. There is an approximately 25 to 50 feet thick confining layer of peat and clay beneath the Slough (Martin, 1985). Without an improved understanding of the slough water budget, it is not possible at this time to confidently establish a minimum threshold for depletion of interconnected surface water. Actions described in Section 6 are intended to stabilize groundwater levels in the Basin, which will likely result in avoiding impacts to GDEs present in the Slough.

Until more is known about the relationship between groundwater and surface water in the vicinity of the Slough and depletion can be quantified and monitored, an interim minimum threshold, based on the best available information, focusses on avoiding depletion and maintaining surface water and groundwater flow entering and leaving the Slough. The interim minimum threshold is presented below and summarized in Table 4-6:

- 0.15 cfs of surface water flow measured at the Casmalia stream gage west of the Slough. This threshold was selected based on the analysis of historical base flow at the Casmalia stream gage presented on Figure 4-2.

This is considered an interim threshold that is subject to change as more information is obtained in the future. Figure 4-4 shows the location of the Casmalia stream gage relative to Barka Slough.

Table 4-6. Depletion of Interconnected Surface Water Minimum Thresholds

RMS ID	Minimum Threshold
Casmalia stream gage[1]	0.15 cfs average base flow[2]

Notes

[1] See Figure 4-4 for the location of the Casmalia stream gage. Measurement location and minimum threshold may change if additional stream gages are installed.

[2] Measured over 3 consecutive months from June to September.

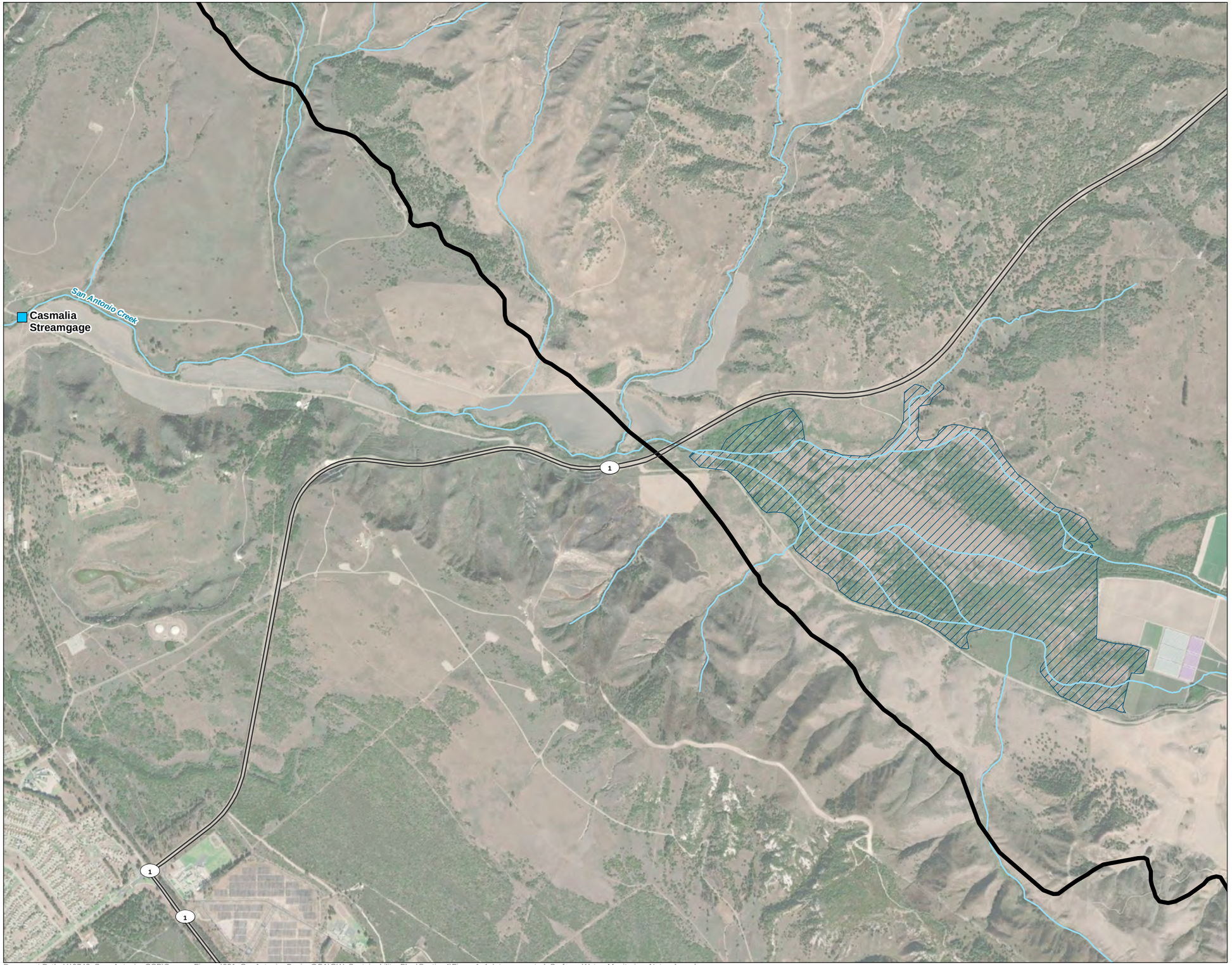
cfs = cubic feet per second

RMS = representative monitoring site

FIGURE 4-4

Interconnected Surface Water Monitoring Network

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin

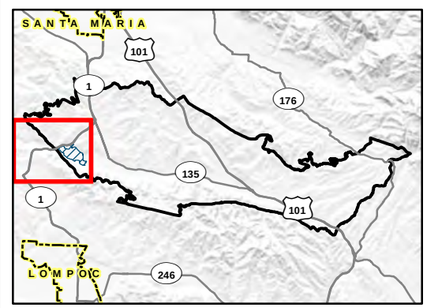


LEGEND

- Streamgage

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary



N

0 1,000 2,000 3,000
Feet

Date: November 18, 2021
Data Sources: ESRI, DWR (2018), USGS (2020), Maxar Imagery (2020)

GSI Water Solutions, Inc.

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4.10.2.1 Relationship between Individual Minimum Thresholds and to Other Sustainability Indicators [§ 354.28(b)(2)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(2) The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.

Because of the interrelationship between groundwater level, changes in storage, and interconnected surface water, it is possible that one set of thresholds could affect the other set of thresholds for these indicators. The relationship between the depletion of interconnected surface water and the other sustainability indicators is presented below.

- **Avoid Chronic Lowering of Groundwater Levels.** The depletion of surface water minimum threshold is related to groundwater level minimum thresholds elsewhere in the Basin because they are interdependent. The relationship between Basin groundwater levels and groundwater discharge to the Slough is not well understood; additionally, it is unclear if the surface water depletion minimum threshold will drive the need to adjust the minimum threshold for chronic lowering of groundwater levels.
- **Avoid Chronic Reduction of Groundwater in Storage.** Nothing about the GDE minimum thresholds promotes groundwater pumping in excess of the sustainable yield. Therefore, the GDE minimum thresholds will not result in an exceedance of the groundwater in storage minimum threshold.
- **Avoid Degraded Groundwater Quality.** The GDE minimum thresholds will not change the groundwater flow directions or gradients, and therefore will not result in a significant or unreasonable change in groundwater quality.
- **Avoid Land Subsidence.** Nothing about the GDE minimum thresholds promotes a condition that will lead to additional subsidence. Therefore, the GDE minimum thresholds will not result in a significant or unreasonable level of subsidence.
- **Avoid Seawater Intrusion.** This sustainability indicator is not applicable to this Basin.

4.10.2.2 Effects of Minimum Thresholds on Neighboring Basins [§ 354.28(b)(3)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(3) How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.

As discussed in Section 3.1, the Basin is a closed basin; therefore, groundwater is not accounted for as an inflow or an outflow component of the water budget. However, depletion of interconnected surface waters is directly related to removing groundwater from storage in the Basin and lowering of groundwater levels. Lowering groundwater levels reduces the discharge of groundwater to surface water in Barka Slough. Surface water in the Slough exits the Basin in San Antonio Creek and flows west toward the Pacific Ocean,

becoming available to potential users outside the Basin. Currently, no groundwater basin as defined by DWR Bulletin 118 or SABGSA has been created for this region and, therefore, this section of the SGMA regulations is not applicable to the Basin or GSP.

4.10.2.3 Effects on Beneficial Uses and Land Uses [§ 354.28(b)(4)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Minimum thresholds relating to depletion of interconnected surface water have been selected to avoid impacts to GDEs in the Basin while providing a reliable and sustainable groundwater supply. The minimum thresholds for reduction of groundwater in storage and lowering of groundwater levels have been established to avoid undesirable results. For this reason, groundwater serving beneficial uses (including GDEs) and land uses will not be adversely affected.

4.10.2.4 Relevant Federal, State, or Local Standards [§ 354.28(b)(5)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(5) How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.

There are no federal, state, or local regulations related to interconnected surface water depletion other than those that are intended to protect aquatic and terrestrial threatened and endangered species. The thresholds and management actions described herein are intended to prevent impacts to these species and associated habitats.

4.10.2.5 Methods for Quantitative Measurement of Minimum Thresholds [§ 354.28(b)(6)]

§ 354.28 Minimum Thresholds.

(b) The description of minimum thresholds shall include the following:

(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

Continuous flow measurements at the Casmalia stream gage are the best indication of flow entering and existing Barka Slough as shown on Figure 4-4. Details of this monitoring program are presented in Section 5.

4.10.3 Measurable Objectives for Surface Water Depletion [§ 354.30(a),(b),(c),(d), and (g)]

§ 354.30 Measurable Objectives.

(a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.

(b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

(c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.

(d) An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.

(g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.

Groundwater and surface water exit the Basin as surface water flow from Barka Slough. Consequently, if surface water flow can be measured exiting the Basin, it is inferred that there is sufficient water available to GDEs in the Slough. If surface flow exiting Barka Slough ceased, there is a potential that there is no longer enough water, whether entering the Slough as groundwater or surface water, available to GDEs located in the Slough.

Figure 4-2 shows measured flow at the Casmalia stream gage between 2015 and 2021. The measurable objective for depletion of interconnected surface water is surface water flow measured at the Casmalia stream gage equal to the geometric mean flow (0.5 cfs) between 2015 and 2018 (since enactment of SGMA through the end of the historical and current water budget) (see Table 4-7). Figure 4-4 shows the location of the Casmalia stream gage in relation to Barka Slough. Daily measurements collected at the Casmalia stream gage will be averaged during each 5-year GSP update period (i.e., 2027, 2032, 2037, and 2042) and compared to the measurable objective.

Table 4-7. Depletion of Interconnected Surface Water Measurable Objective

RMS ID	Measurable Objectives
Casmalia stream gage	0.5[1]

Notes

[1] Value reported as geometric mean daily discharge measured in cubic feet per second at the Casmalia stream gage between 2015–2018.
RMS = representative monitoring site

4.10.4 Interim Milestones for Surface Water Depletion [§ 354.30(e)]

§ 354.30 Measurable Objective.

(e) Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin with 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.

Interim milestones show how the SABGSA anticipates moving from current conditions to meeting the measurable objectives. Based on available information, there are no reported or observed significant or unreasonable effects related to depletion of interconnected surface water that is directly attributable to groundwater pumping. However, there are considerable uncertainties regarding the degree to which reduction of groundwater discharging to the Slough is impacting the Slough. Additional study and data collection is needed as described in Section 6.

4.11 References and Technical Studies [§ 354.4(b)]

§ 354.4 General Information.

(b) Each Plan shall include the following general information: A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.

AECOM. 2019. *Biological Assessment, Potential Effects to California Red-legged Frog, El Segundo Blue Butterfly, Tidewater Goby, Unarmored Threespine Stickleback, and Beach Layia, Vandenberg Dunes Golf Courses Project, Vandenberg Air Force Base, Santa Barbara County*. September 25.

DWR. 2018. 3-014 San Antonio Creek Valley Basin Boundaries. Prepared by the California Department of Water Resources.

DWR. 2017. *Best Management Practices for the Sustainable Management of Groundwater: DRAFT Sustainable Management Criteria.* Prepared by the California Department of Water Resources Sustainable Groundwater Management Program.

ManTech. 2010. Wetlands and Riparian Habitats Management Plan – Vandenberg Air Force Base, California. Prepared by ManTech SRS Technologies. March 2010.

Martin, P. 1985. *Development and Calibration of a Two-Dimensional Digital Model for the Analysis of the Ground-Water Flow System in the San Antonio Creek Valley, Santa Barbara County, California*. U.S. Geological Survey Water-Resources Investigations Report 84-4340.

Maxar. 2020. Base maps for California. Provided by Maxar Imagery.

The Nature Conservancy. 2019. *Identifying GDEs under SGMA, Best Practices for Using the NC Dataset.* July.

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SECTION 5: Monitoring Networks [Article 5, SubArticle 4]

5.1 Introduction to Monitoring Networks [§ 354.32]

§ 354.32 Introduction to Monitoring Networks. This Subarticle describes the monitoring network that shall be developed for each basin, including monitoring objectives, monitoring protocols, and data reporting requirements. The monitoring network shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.

This section describes existing monitoring networks and improvements to the monitoring networks that will be developed for the San Antonio Creek Valley Groundwater Basin (Basin). This section is prepared in accordance with the Sustainable Groundwater Management Act (SGMA) regulations § 354.32, § 354.34, § 354.36, § 354.38, and § 354.40 and includes monitoring objectives, monitoring protocols, assessment and improvement of monitoring networks, representative monitoring, and data reporting requirements.

The monitoring networks presented in this section are based on existing monitoring sites. During the 20-year Groundwater Sustainability Plan (GSP) implementation period, it may 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 and data gaps are described for each of the five applicable sustainability indicators. Identified data gaps will be addressed during GSP implementation to improve the San Antonio Basin Groundwater Sustainability Agency's (SABGSA's) ability to track progress and demonstrate sustainability.

The groundwater monitoring network section of this GSP is largely based on historical groundwater data compiled by the U.S. Geological Survey (USGS) National Water Information System (NWIS) program, the USGS Groundwater Ambient Monitoring and Assessment (GAMA) Program, the California Statewide Groundwater Elevation Monitoring (CASGEM),[48] and quarterly groundwater monitoring completed by the SABGSA beginning the fourth quarter of 2019 to present.

[48] Available at NWIS https://maps.waterdata.usgs.gov/mapper/index.html; GAMA, https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/; and CASGEM, https://water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM, respectively (Accessed May 18, 2021.)

5.2 Monitoring Network Objectives and Design Criteria [§ 354.34(a),(b)(1),(b)(2),(b)(3),(b)(4),(d),(f)(1),(f)(2),(f)(3), and (f)(4)]

§ 354.34 Monitoring Network.

(a) Each Agency shall develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate Plan implementation.

(b) Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:

(1) Demonstrate progress toward achieving measurable objectives described in the Plan.

(2) Monitor impacts to the beneficial uses or users of groundwater.

(3) Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.

(4) Quantify annual changes in water budget components.

(d) The monitoring network shall be designed to ensure adequate coverage of sustainability indicators. 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.

(f) The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:

(1) Amount of current and projected groundwater use.

(2) Aquifer characteristics, including confined or unconfined aquifer conditions, or other physical characteristics that affect groundwater flow.

(3) Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.

(4) Whether the Agency has adequate long-term existing monitoring results or other technical information to demonstrate an understanding of aquifer response.

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 4.

5.2.1 Monitoring Networks

Monitoring networks have been developed for each of the five sustainability indicators that are applicable to the Basin. These indicators are described in SGMA as conditions to be avoided:

- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Degraded water quality
- Land subsidence
- Depletion of interconnected surface water

The Basin is located approximately 8 miles inland from the Pacific Ocean and a bedrock high is located at the western end of the Basin. No exchange of groundwater, except in the form of groundwater discharge to surface water, has been identified at the western (downgradient) end of the Basin (see Section 3). Consequently, a sixth sustainability indicator, seawater intrusion, is not applicable in the Basin and this GSP does not describe monitoring for seawater intrusion.

The SGMA regulations allow the GSA to use existing monitoring sites for the monitoring network; however, some monitoring sites do not presently meet all SGMA requirements that include unique well identification number, well location, ground surface elevation, well depth, and perforated intervals. Currently, some wells in the groundwater level monitoring network do not have perforated interval information. Perforated interval and other monitoring well information will be obtained during GSP implementation.

The approach for establishing the monitoring networks for the Basin is to leverage historical or existing monitoring programs and incorporate, as needed, 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 and methods for filling those data gaps.

5.2.2 Management Areas

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.

5.3 Groundwater Level Monitoring Network [§ 354.34(e),(g)(1)(2)(3),(h), and (j)]

§ 354.34 Monitoring Network.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

The minimum thresholds and measurable objectives for the chronic lowering of groundwater levels sustainability indicator are evaluated by monitoring groundwater levels at groundwater wells identified as representative monitoring sites (RMSs). 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.

Groundwater well construction information and water level data were obtained from the following public sources:

- USGS NWIS
- California Department of Water Resources (DWR) CASGEM
- DWR Online System for Well Completion Reports (OSWCR)
- The Los Alamos Community Services District (LACSD)

These data sources resulted in a data set of more than 200 wells, each analyzed using the following criteria to assess whether they would be included in the groundwater level monitoring network:

- **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 2015 or later. Wells that have collapsed or have been destroyed since 2015 were also excluded. All the groundwater level monitoring data available for the Basin that met this criterion were provided by the USGS, DWR CASGEM, LACSD, or the GSA for a total of 55 wells.
- **Remove wells for which access agreements were denied by well owners:** The GSA was not able to obtain access agreements for five of the wells included in the USGS-led groundwater level monitoring program for the Basin. These wells are excluded from the existing groundwater level monitoring network. An effort is ongoing to reach out to well owners with pending well access agreements to discuss participation in the groundwater level monitoring network.[49] The groundwater level data that met this criterion resulted in a total of 50 wells, including wells with pending well access agreements.

The wells included in the groundwater level monitoring network are listed in Table 5-1 and shown on Figure 3-11. A subset of wells from the monitoring network has been selected as RMSs. RMSs 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 (SMCs) in Section 4. The groundwater level RMS network is summarized in Table 5-1 and shown on Figure 5-1. RMSs with pending access agreements are noted in Table 5-1. Further rationale for selection of RMSs is provided in Section 4.4.

All but six wells in the groundwater level monitoring network are monitored by the GSA. Four of the six wells are monitored by the LACSD using pressure transducers coupled to a Supervisory Control and Data Acquisition (SCADA) system. Static water levels are provided to the GSA on a quarterly basis in association with the GSA's quarterly monitoring events. The remaining two wells are monitored by Santa Barbara County semiannually, in March and October, as part of the DWR CASGEM program. The most recent available measurements for all wells included in the groundwater level monitoring network were collected in 2019, 2020, or 2021.

Pressure transducers are installed in 10 wells in the groundwater level monitoring network. Each transducer is programmed to measure groundwater elevation once every 4 hours and is calibrated quarterly. Wells equipped with transducers are shown in Figure 5-2.

[49] To date, this outreach has resulted in the addition of several wells to the groundwater level monitoring network.

Table 5-1. Groundwater Level Monitoring Network

Well ID	Well Type	Well Depth (ft)	Screen Interval(s) (ft bgs)	Ground Elevation (ft NAVD 88)	Elevation Reference Point Description (ft NAVD 88)	First Date Measured	Last Date Measured	Years Measured	Total Number of Measurements	Screened Aquifer	RMS Well (Y/N)
13C1	Agricultural	1,070	—	776.8	777.8	2/25/2004	2/25/2021	17	30	Careaga Sand	Y
13Q1[2]	Agricultural	295	47-295	662.3	663.3	11/7/1957	10/5/2020	63	37	Paso Robles Formation	N
14L1	Monitoring	593	500-560	328.7	330.4	6/20/1980	2/25/2021	41	1958	Careaga Sand	N
16C2[1]	Monitoring	169	—	328.6	330.2	2/5/1970	2/26/2021	51	299	Careaga Sand	N
16C4[1]	Monitoring	560	—	328.6	330.0	2/5/1970	2/26/2021	51	298	Careaga Sand	N
16F1	Monitoring	57.8	—	276.4	280.5	8/1/1978	2/26/2021	43	149	Careaga Sand	N
16G3	Monitoring	55.5	—	294.5	297.5	2/25/1976	2/26/2021	45	179	Careaga Sand	Y
17E1[3]	Monitoring	89	—	243	247.1	2/25/1976	2/25/2021	45	180	Careaga Sand	N
17H1[3]	Monitoring	61	—	260	264.6	3/26/1976	2/26/2021	45	139	Careaga Sand	N
17K2[3]	Monitoring	60	—	260	264.3	9/26/1978	2/25/2021	42	148	Careaga Sand	N
17Q1[3]	Monitoring	48	—	270	275.0	9/26/1978	2/25/2021	42	121	Careaga Sand	N
20Q2[2]	Agricultural	—	—	406.4	407.9	1/16/1958	6/25/2019	61	130	Paso Robles Formation	Y
21A1	Monitoring	271	—	301	304.0	12/16/1977	2/25/2021	43	1056	Careaga Sand	N
22J1[2,3]	Agricultural	—	—	1,435	1436.0	3/22/1990	6/26/2019	29	33	Careaga Sand	N
22K3[2]	Agricultural	250	—	453.2	453.3	11/5/1971	10/5/2020	49	44	Paso Robles Formation	Y
22M1[2,3]	Agricultural	—	—	1,268	1268.4	1/19/2018	6/26/2019	1	5	Careaga Sand	N
22N1[2,3]	Agricultural	175	—	1,201	1201.7	1/5/2017	6/26/2019	2	5	Paso Robles Formation	N
24 E1[2,3]	Agricultural	580	310-570	350	351.3	6/3/1977	6/25/2019	42	99	Careaga Sand	Y
25D1[2]	Agricultural	700	268-700	764.9	766.4	4/22/1977	6/26/2019	42	102	Careaga Sand	Y
2M1	Agricultural	750	240-500	419.4	420.0	6/15/1977	2/25/2021	44	105	Paso Robles Formation	Y
2N1[3]	Agricultural	980	290-960	827	827.3	3/14/2017	2/25/2021	4	8	Careaga Sand	N
2R1[3]	Agricultural	370	220-320	776	778.0	11/5/2019	2/25/2021	1	5	Careaga Sand	N
30D1[2, 3]	Agricultural	895	265-895	540	541.0	6/16/1977	6/26/2019	42	869	Paso Robles Formation	Y
34P1	Monitoring	222.5	—	452.5	455.0	8/9/1979	2/25/2021	42	97	Careaga Sand	Y
4-Deer Field[3]	Agricultural	490	—	639	639.4	1/25/2018	2/25/2021	3	11	Careaga Sand	N
4-Deer Highway	Agricultural	349	—	689.2	689.7	12/1/1955	2/25/2021	65	13	Careaga Sand	N
LACSD 3a[3]	Municipal	521	180-510	589	589.9	11/17/2010	6/25/2020	10	214	Paso Robles Formation	N
LACSD 4[3]	Municipal	535	230-530	604	605.0	3/28/1994	6/25/2020	26	467	Paso Robles Formation	Y
LACSD 5[3]	Municipal	1,010	502-952	560.2	561.9	1/31/2007	6/25/2020	13	266	Paso Robles Formation	N
LACSD 6[3]	Municipal	1,005	190-950	566	568.1	12/18/2019	6/25/2020	1	10	Paso Robles Formation	N
Mesa Vineyard	Agricultural	—	—	805	806.8	11/5/2019	2/25/2021	1	6	Careaga Sand	N
SACC 1	Monitoring	980	920-940	586.1	585.1	9/8/2016	2/25/2021	4	26	Paso Robles Formation	Y
SACC 2	Monitoring	720	700-720	586.1	585.1	9/23/2016	2/25/2021	4	25	Paso Robles Formation	N
SACC 3	Monitoring	530	510-530	586.1	585.1	9/8/2016	2/25/2021	4	27	Paso Robles Formation	N
SACC 4	Monitoring	325	305-325	586.1	585.1	9/8/2016	2/25/2021	4	27	Paso Robles Formation	N
SACC 5[1]	Monitoring	120	100-120	586.2	586.1	3/13/2017	2/26/2021	4	384	Paso Robles Formation	N

Well ID	Well Type	Well Depth (ft)	Screen Interval(s) (ft bgs)	Ground Elevation (ft NAVD 88)	Elevation Reference Point Description (ft NAVD 88)	First Date Measured	Last Date Measured	Years Measured	Total Number of Measurements	Screened Aquifer	RMS Well (Y/N)
SACR 1	Monitoring	690	670-690	363	361.9	9/21/2016	2/25/2021	4	25	Careaga Sand	Y
SACR 2	Monitoring	540	520-540	363	361.9	9/21/2016	2/25/2021	4	25	Paso Robles Formation	N
SACR 3	Monitoring	350	330-350	363	361.9	9/21/2016	2/25/2021	4	25	Paso Robles Formation	Y
SACR 4	Monitoring	220	200-220	363	361.9	9/21/2016	2/25/2021	4	25	Paso Robles Formation	N
SACR 5[1]	Monitoring	110	90-110	362.5	365.4	1/4/2017	2/26/2021	4	386	Paso Robles Formation	N
SAGR[1]	Monitoring	90	70-90	329.6	329.7	3/8/2016	2/26/2021	5	387	Paso Robles Formation	N
SAHC[1]	Monitoring	90	70-90	453.2	455.3	3/8/2016	2/26/2021	5	185	Careaga Sand	Y
SAHG[1]	Monitoring	75	55-75	320.6	323.6	3/13/2017	2/26/2021	4	387	Paso Robles Formation	N
SALA[1]	Monitoring	90	70-90	596.5	596.5	3/13/2017	2/26/2021	4	276	Paso Robles Formation	N
SALS[1]	Monitoring	70	50-70	459.5	459.5	3/13/2017	2/26/2021	4	383	Paso Robles Formation	Y
SASA[1]	Monitoring	65	45-65	309.7	311.8	3/8/2016	2/26/2021	5	390	Careaga Sand	N
Schaff Well	Agricultural	669	—	598	599.5	3/10/2017	2/25/2021	4	13	Careaga Sand	N
White Hawk 1	Agricultural	559.5	—	800.6	802.4	11/5/2019	2/25/2021	1	5	Careaga Sand	N
White Hawk 4[3]	Agricultural	820	180-800	781	781.7	3/15/2018	2/25/2021	3	8	Careaga Sand	N

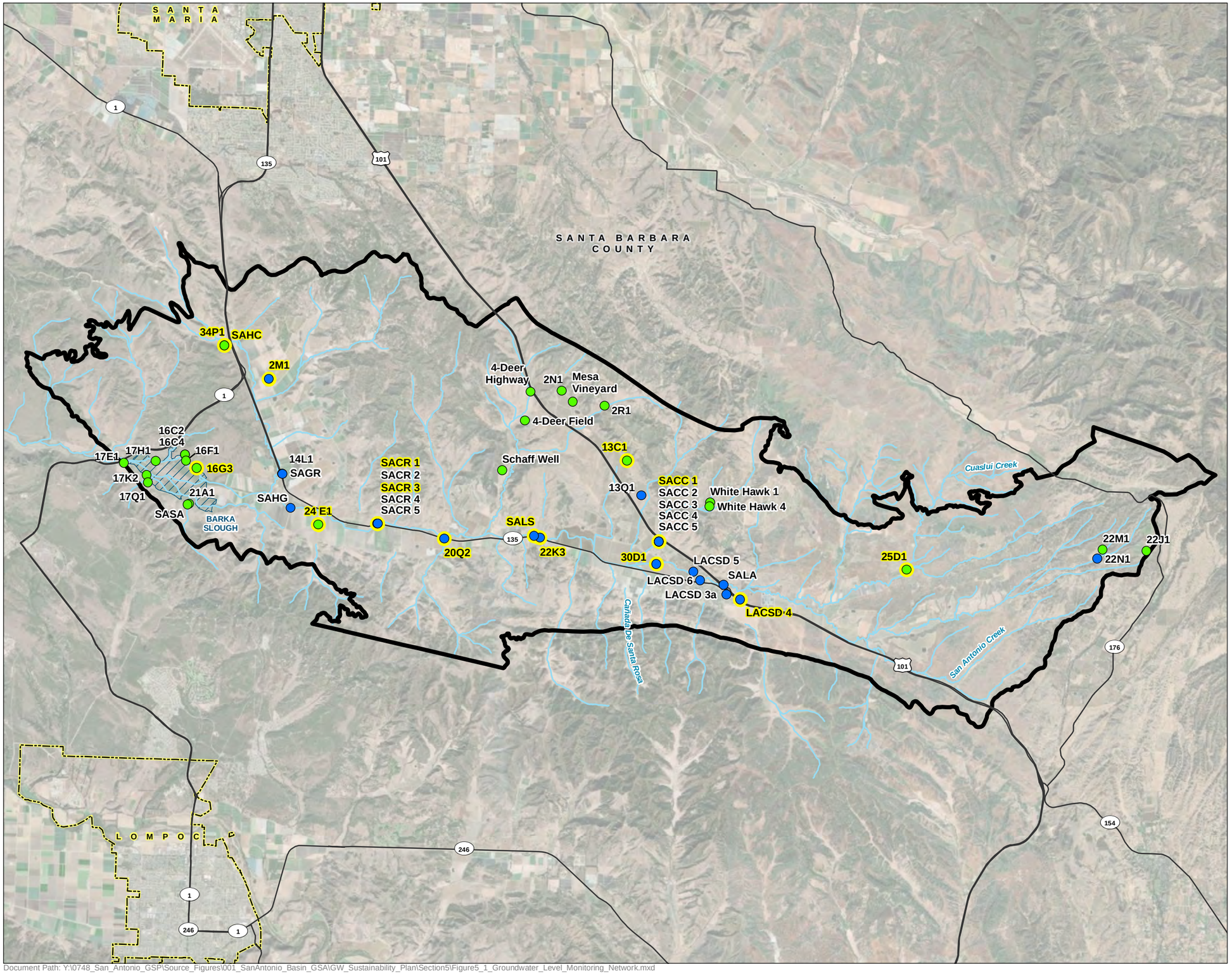
Notes

[1] Pressure transducer installed in well.
[2] Pending access agreement.
[3] Ground surface elevation and reference point elevation exceeding 0.5 ft accuracy
— = No data available
bgs = below ground surface
ft = foot or feet
N = No
NAVD 88 = North American Vertical Datum of 1988
RMS = representative monitoring site
Y = Yes

FIGURE 5-1

Groundwater Level Monitoring Network

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin



LEGEND

- Representative Well

Wells (by screened aquifer)

- Paso Robles Formation
- Careaga Sand

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary

NOTES

*SACR 1 and 14L1 are screened in the Careaga Sand.

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

0 5,000 10,000 15,000
Feet

Date: November 18, 2021
Data Sources: USGS (2020b), ESRI, DWR (2019), Maxar imagery (2020)

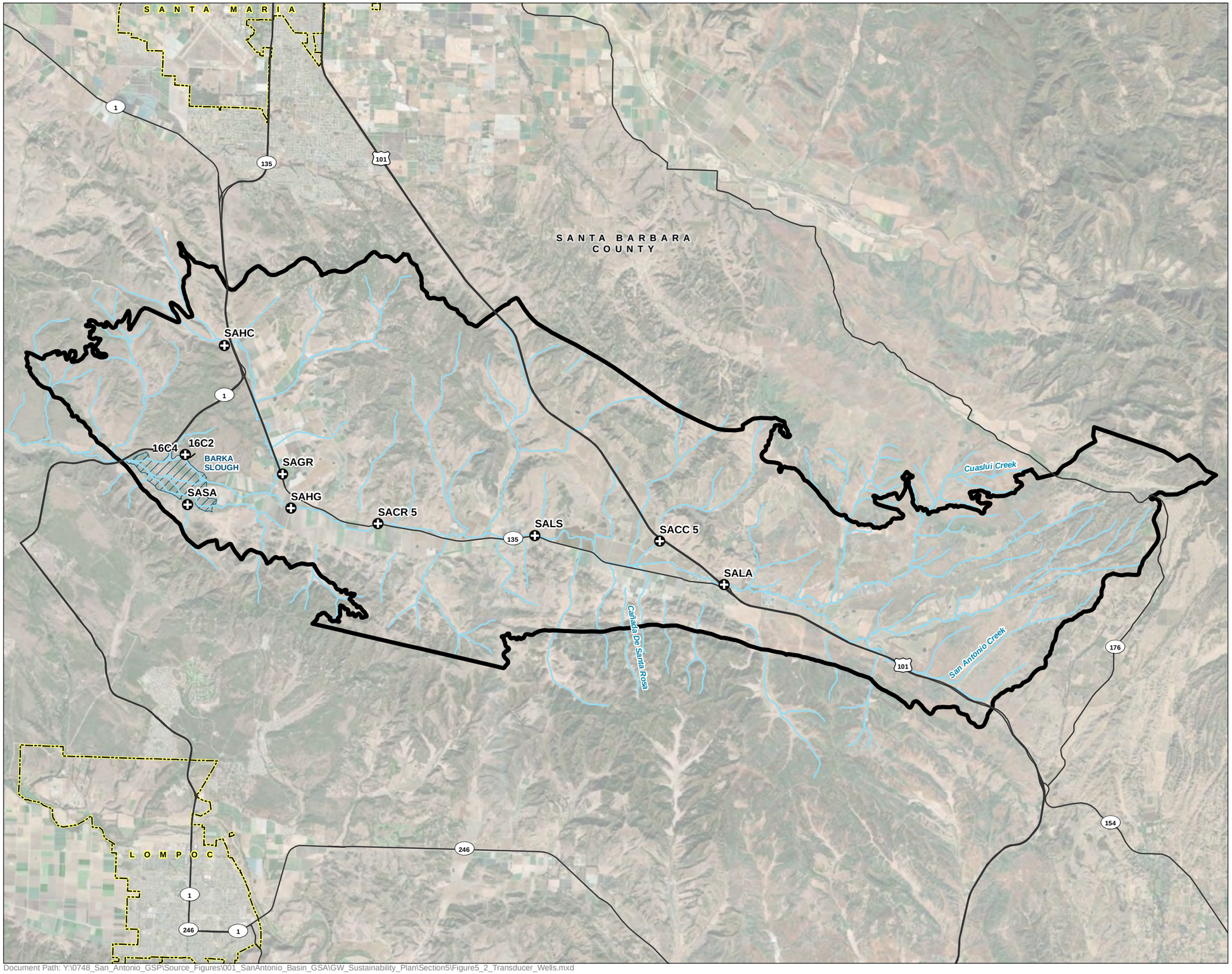
GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\Section5\Figure5_1_Groundwater_Level_Monitoring_Network.mxd

FIGURE 5-2

Wells with Transducers Installed

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin



LEGEND

- Well with Transducer

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary

NOTE

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

0 5,000 10,000 15,000
Feet

Date: November 18, 2021
Data Sources: USGS (2020b), ESRI, DWR (2018b), Maxar imagery (2020)

GSI Water Solutions, Inc.

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5.3.1 Monitoring Protocols [§ 354.34(i)]

§ 354.34 Monitoring Network.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

The GSA adopted monitoring protocols using guidelines in the SGMA regulations and DWR best management practices (BMPs) on monitoring protocols (DWR, 2016a). The following information or procedure is collected and documented for each monitoring site:

- Long-term access agreements. Access agreements include year-round site access to allow for increased monitoring frequency.
- A unique well identifier that includes a general written description of the site location, date established, access instructions and point of contact, type of information to be collected, latitude, longitude, and elevation. The written description for each monitoring location also tracks all modifications to the site in a modification log.

Protocols for measuring groundwater levels include:

- Groundwater level data are taken from the correct location and correlated to a unique well identifier.
- Groundwater level data are accurate and reproducible
- Groundwater level data collection protocols are completed in accordance with the data quality objectives (DQOs) process defined by the U.S. Environmental Protection Agency (EPA) *Guidance on Systematic Planning Using the Data Quality Objective Process* (EPA, 2006)
- All salient information is recorded to correct, if necessary, and compare data
- A data collection and management quality assurance/quality control (QA/QC) program is implemented to ensure data integrity. QA/QC protocols include ensuring that the well is not pumping at the time a depth to water measurement is taken, confirming that the depth to water measurement is a static water level measurement by collecting two consecutive measurements, and comparing the depth to water measurement to historical trends and flagging inconsistencies. Additionally, the sampler removes the appropriate cap, lid, or plug that covers the monitoring access point listening for pressure release. If a release is observed, the measurement is taken after a period of time to allow the water level to equilibrate.
- Quarterly groundwater levels are collected within as short a time as possible, preferably within a 1- to 2-day period.
- Depth to groundwater is measured relative to an established reference point (RP) on the well casing. The RP is usually identified with a permanent marker, paint spot, or a notch in the lip of the well casing. By convention, in open casing monitoring wells, the RP is located on the north side of the well casing. If no mark is apparent, the person performing the measurement measures the depth to groundwater from the north side of the top of the well casing. RP descriptions are included in the Data Management System (DMS). The elevation of the RP of each well is surveyed to the North American Vertical Datum of 1988 (NAVD 88). The elevation of the RP is accurate to within 0.5 foot.

- Depth to water measurements are collected in accordance with protocols described in "Measuring Water Levels by Use of an Electric Tape" (USGS, 2010). Groundwater levels are measured to the nearest 0.01 foot relative to the RP. The water level meter is decontaminated prior to initial use and after measuring each well in accordance with the *National Field Manual for the Collection of Water-Quality Data* (USGS, 2004).
- Transducer data are:
  - Downloaded on a quarterly basis
  - Calibrated on a quarterly basis using a depth-to-water measurement
  - Compensated using a barometric pressure sensor

Protocols for the manual collection of groundwater levels are included in Appendix G. Protocols for the collection of groundwater levels obtained by pressure transducers are included in Appendix G.

5.3.2 Assessment and Improvement of Monitoring Network [§ 354.38(a),(b),(c)(1)(A)(B),(c)(2),(d),(e)(1)(2)(3)(4), and § 354.34(c)(1)(A)(B)]

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(1) Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:

(A) A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.

(B) Static groundwater elevation measurements shall be collected at least two times per year, to represent seasonal low and seasonal high groundwater conditions.

The GSA identified data gaps using guidelines in the SGMA regulations and DWR BMPs on monitoring networks (DWR, 2016b) and § 354.38 of the regulations. Table 5-2 compares the suggested attributes of a groundwater level monitoring network from the DWR BMPs to the attributes of 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 judgment is also used to determine an adequate level of monitoring density.

The DWR BMPs (2016b) cite a well density range of 0.2 to 10 wells per 100 square miles, with a median of 5 wells per 100 square miles. The Basin is approximately 105 square miles, and the groundwater level monitoring network consists of 23 wells in the Paso Robles Formation Aquifer and 27 wells in the Careaga Sand, which equates to approximately 22 wells and 26 wells per 100 square miles for well density in the Paso Robles Formation and Careaga Sand, respectively.

Although the existing groundwater level monitoring network satisfies the well density guidance cited in the DWR BMPs, there are areas identified within the Basin (see Figure 5-3) where the addition of monitoring wells would improve the hydrogeologic conceptual model (HCM) discussed in Section 3.1. Two areas with low well density were identified for both principal aquifers in the Basin: the eastern uplands and the central to northwestern uplands. Based on the State Water Resources Control Board (SWRCB) Irrigated Lands Regulatory Program (ILRP), private agricultural supply wells have been identified in the eastern uplands area. An effort will be made during GSP implementation to contact well owners of wells in the eastern uplands area to determine if they can be included in the monitoring program. Including these additional wells in the groundwater level monitoring network would minimize the uncertainty of groundwater elevation trends and benefit sustainable management of the Basin. Two wells in the central to northwestern uplands area, completed in the Careaga Sand, were previously monitored by the USGS or GSA. However, well access has been denied by the well owners. An effort will be made by the GSA to negotiate access to these wells.

Table 5-2. Summary of Best Management Practices, Groundwater Level Monitoring Well Network, and Data Gaps

Best Management Practice (DWR, 2016b)	Current Monitoring Network	Data Gap
Groundwater level data will be collected from each principal aquifer in the basin.	Groundwater level data are collected from 23 wells in the Paso Robles Formation and 27 wells in the Careaga Sand as part of the groundwater level monitoring network.	There is a low density of monitoring points identified in two areas in the Paso Robles Formation and two areas in the Careaga Sand shown on Figure 5-3. The GSA has been contacting well owners in these areas to determine if wells can be added to the groundwater level monitoring network.
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).	The groundwater level monitoring network is sufficiently distributed to identify changes in groundwater flow direction and gradient throughout the Basin.	Some wells used to prepare groundwater elevation contour maps (see Section 3.2) lack WCRs. For wells without available WCRs, well depth information, well coordinates, and the USGS Geohydrologic Framework Model (USGS, 2020a) were used to determine an aquifer of completion. Well construction information will be obtained from video surveys as funding allows.
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 wells in the groundwater level monitoring network with executed well access agreements are monitored on a quarterly basis. Ten of the wells are measured once every 4 hours by pressure transducers.	None identified.

Best Management Practice (DWR, 2016b)	Current Monitoring Network	Data Gap
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.	The groundwater level monitoring network is sufficiently distributed to map groundwater depressions, recharge areas, and along margins of the Basin where groundwater flow is known to enter or leave a Basin (i.e., Barka Slough).	None identified.
Well density must be adequate to determine changes in storage.	The groundwater level monitoring network is sufficiently distributed and meets DWR well density requirements to determine changes of groundwater in storage.	None identified.
The elevation of the RP of each well is surveyed to NAVD 88. The elevation of the RP is accurate to within 0.5 ft.	Thirty-four wells in the groundwater level monitoring network have RP elevations surveyed to within 0.5 ft accuracy. These elevations were surveyed by the USGS.	Sixteen wells in the groundwater level monitoring network have RP elevations exceeding 0.5 ft accuracy. Wells with access agreements will be surveyed in 2022.

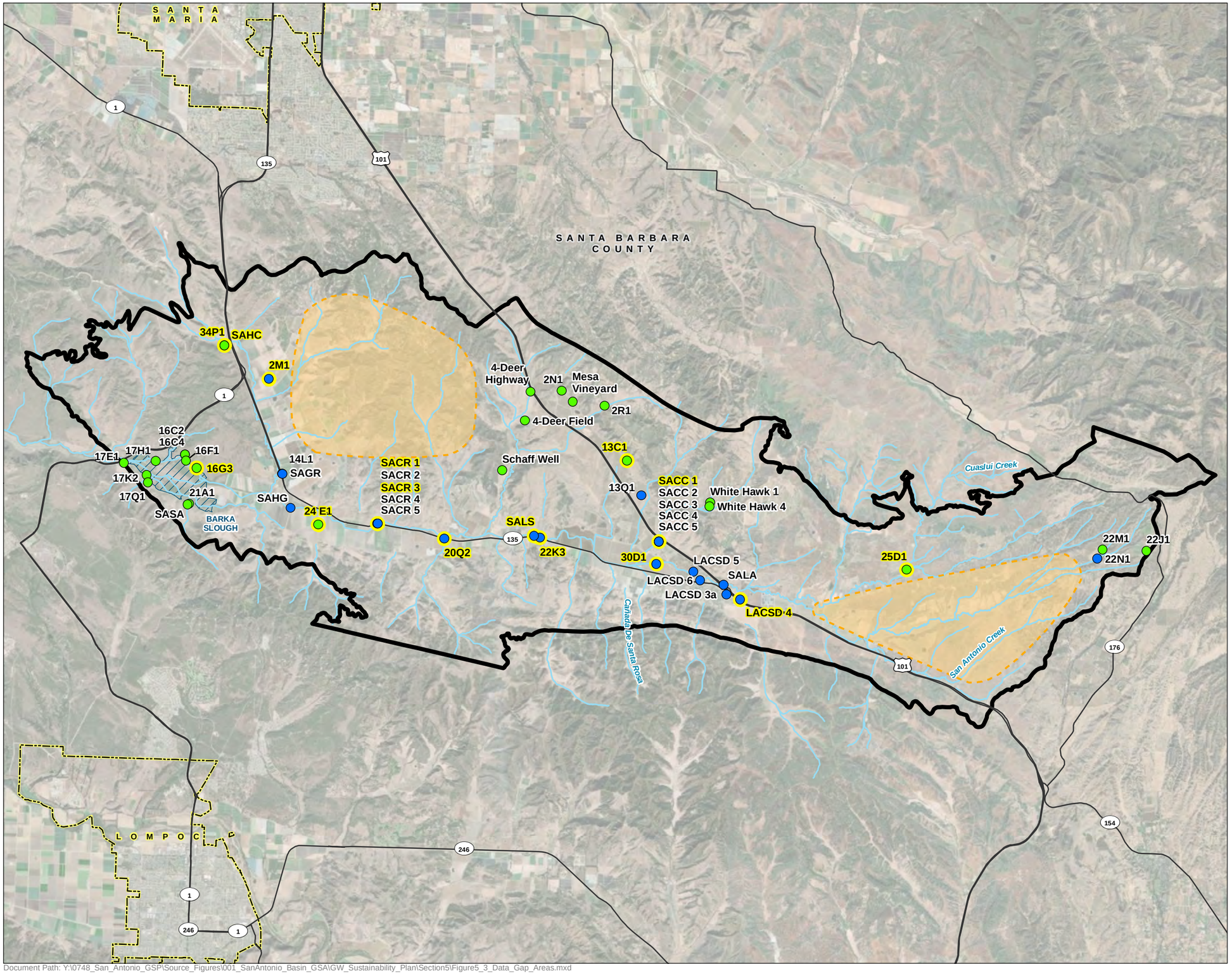
Notes

ft = foot or feet
NAVD 88 = North American Vertical Datum of 1988
RP = reference point
USGS = U.S. Geological Survey

FIGURE 5-3

Groundwater Level Monitoring Network - Low Density Areas

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin



LEGEND

- Data Gap Area
- Representative Well

Wells (by screened aquifer)

- Paso Robles Formation
- Careaga Sand

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary

NOTES

*SACR 1 and 14L1 are screened in the Careaga Sand.

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

0 5,000 10,000 15,000
Feet

Date: November 18, 2021
Data Sources: USGS (2020b), ESRI, DWR (2019), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\Section5\Figure5_3_Data_Gap_Areas.mxd

Although well completion reports (WCRs) are available online via DWR's OSWCR database, the WCR identification numbers are unknown for many of the wells in the 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 G. In lieu of WCRs, well depth and well coordinate information provided by USGS NWIS were used in conjunction with the USGS Geohydrologic Framework Model (USGS, 2020a) to determine an aquifer of completion. Well construction information will be incorporated into the database as available. Alternatively, if well construction information cannot be found for a particular well, specifically an RMS well, then another well in the monitoring network with well construction information and representative of groundwater conditions in that area will be selected to replace the well in the RMS monitoring network. If funding is available, the GSA is also considering conducting video surveys of certain RMSs in order to document well construction.

Ground surface elevations and reference point elevations accurate to within 0.5 feet (ft) are not available for a total of 16 wells: four wells with pending access agreements, four wells recently added to the monitoring network, four wells recently cleared of vegetation in Barka Slough (Slough), and the four LACSD wells. The GSA will continue to pursue access agreements. When access agreements are obtained, ground surface elevations and RP elevations will be surveyed and incorporated into the database. A survey of wells with access agreements and an RP elevation accuracy of greater than 0.5 ft will be conducted in 2022.

There may be opportunities to optimize the groundwater level monitoring network in the Basin. The number of wells included in the groundwater level monitoring network will be evaluated during each 5-year GSP interim period. Hydrograph signatures from wells included in the groundwater level monitoring network will be compared for redundancy.

5.4 Groundwater Storage Monitoring Network [§ 354.34(e),(g)(1)(2)(3),(h), and (j)]

§ 354.34 Monitoring Network.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

This GSP adopts groundwater levels as a proxy for assessing change in groundwater storage (see Section 4). The groundwater level monitoring network described in Section 5.3 was used to create historical groundwater elevation contour maps and calculate change of groundwater in storage for each principal aquifer (see Section 3.2). A total of approximately 50 wells were used for these groundwater elevation analyses. The locations of these wells are shown on Figure 3-11 and are listed in Table 5-1.

5.4.1 Monitoring Protocols [§ 354.34(i)]

§ 354.34 Monitoring Network.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

The groundwater level monitoring network will be used as a proxy for the groundwater storage monitoring network. Therefore, the protocols described in Section 5.3.1 for the groundwater level monitoring network are representative of protocols for the groundwater storage monitoring network. Protocols for the manual

collection of groundwater levels are included in Appendix G. Protocols for the collection of groundwater levels obtained by pressure transducers are included in Appendix G.

5.4.2 Assessment and Improvement of Monitoring Network [§ 354.38(a),(b),(c)(1)(2),(d),(e)(1)(2)(3)(4), § 354.34(c)(2)]

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(2) Reduction of Groundwater Storage. Provide an estimate of the change in annual groundwater in storage.

The groundwater level monitoring network will be used as a proxy for the groundwater storage monitoring network. Therefore, the data gaps discussed in Section 5.3.2 for the groundwater level monitoring network are representative of data gaps in the groundwater storage monitoring network.

5.5 Seawater Intrusion Monitoring Network [§ 354.34(c)3),(e),(g)(1)(2)(3),(h),(i),(j) and § 354.38(a),(b),(c)(1)(2),(d),(e)(1)(2)(3)(4)]

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(3) Seawater Intrusion. Monitor seawater intrusion using chloride concentrations, or other measurements convertible to chloride concentrations, so that the current and projected rate and extent of seawater intrusion for each applicable principal aquifer may be calculated.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

The Basin is located approximately 8 miles inland from the Pacific Ocean and a bedrock high is located at the western end of the Basin. No exchange of groundwater, except in the form of groundwater discharge to surface water, has been identified at the western (downgradient) end of the Basin (see Section 3). Consequently, the seawater intrusion sustainability indicator is not applicable in the Basin and this GSP does not describe monitoring for seawater intrusion.

5.6 Degraded Water Quality Monitoring Network [§ 354.34(e),(g)(1)(2)(3),(h), and (j)]

§ 354.34 Monitoring Network.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

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 in each principal aquifer to determine groundwater quality trends for water quality indicators to address known water quality issues.

There are no known contaminant plumes in the Basin (see Section 3.2.3), therefore only nonpoint source and naturally occurring constituents of concern are present in the Basin.

According to the California Department of Conservation, Geologic Energy Management Division online Well Finder, or WellSTAR, tool, nine named oil and gas fields are within or adjacent to the Basin: Cat Canyon, Zaca, Barham Ranch, Los Alamos, Lompoc, Harris Canyon (abandoned), Careaga, Orcutt, and Four Deer (abandoned) (see Figure 3-47).[50] The USGS, in cooperation with the SWRCB, initiated the California Oil, Gas, and Groundwater (COGG) Program in 2015.[51] The objective of the COGG Program is to determine where and to what extent groundwater quality may be adversely impacted by proximal oil and gas development activities (Davis, et al., 2018). Results and interpretations from the COGG Program are not yet available for review, as of second quarter 2021. If results and interpretations become available during the implementation period of this GSP, the GSA will consider these findings during GSP 5-year interim periods as part of the overall groundwater quality monitoring program.

[50] Available at https://www.conservation.ca.gov/calgem/Pages/WellFinder.aspx. (Accessed May 3, 2021.)
[51] Description available at https://webapps.usgs.gov/cogg/. (Accessed May 18, 2021.)

Existing groundwater quality monitoring programs in the Basin and groundwater quality distribution and trends are described in Section 3.2.3. Identified constituents of concern are based on state and federal regulatory standards (maximum contaminant levels [MCLs] and secondary MCLs [SMCLs]) for drinking water established by the SWRCB Division of Drinking Water (DDW) and the EPA, respectively.[52] For agricultural uses, constituents of concern are based on Basin water quality objectives (WQOs) presented in the *Water Quality Control Plan for the Central Coastal Basin* (Basin Plan) (RWQCB, 2019). No minimum thresholds have been established for regulated contaminants because state regulatory agencies, including the Central Coast Regional Water Quality Control Board (RWQCB) and the Department of Toxic Substances Control, have the responsibility and authority to regulate and direct actions that address contamination. Minimum thresholds and measurable objectives pertaining to salts and nutrients (total dissolved solids [TDS], chloride, sulfate, boron, sodium, and nitrate) have been established based upon WQOs established in the Basin Plan by the RWQCB.

Constituents of concern for drinking water will be assessed at public water supply wells as part of the SWRCB DDW public supply well water quality program. Constituents of concern for agricultural and domestic use will be assessed as part of the state ILRP and reported on the state GeoTracker website. According to the RWQCB proposed Ag Order 4.0, beginning in 2022, all growers enrolled in the ILRP must conduct annual sampling of all on-farm domestic drinking water supply and irrigation wells between March 1 and May 31 of each year. All groundwater samples must be collected by a qualified third party using proper sample collecting and handling methodologies. All groundwater monitoring data sampled to meet the minimum groundwater monitoring requirements of the Order will be submitted electronically to the SWRCB's GeoTracker database by the testing laboratory (RWQCB, 2021). Additionally, all growers enrolled in the ILRP are required to implement groundwater trend monitoring work plans either individually or as part of a cooperative regional monitoring program. Work plans for groundwater trend monitoring must be submitted by a date dependent on the phase area. The work plan due date is September 1, 2027, for the Basin.

Wells included in the groundwater quality monitoring network are listed in Table 5-3 and shown on Figure 5-4. All the wells from the GSP groundwater water quality monitoring network are RMS wells. The groundwater quality monitoring network includes eight municipal drinking water supply wells that were identified by reviewing data available from the SWRCB DDW in the SWRCB's GAMA database. Selected wells were sampled for at least one of the constituents of concern during 2015 or more recently. The eight wells are listed in Table 5-3 and shown on Figure 5-4. Four of the municipal drinking water supply wells are completed in the Paso Robles Formation, and four are completed in the Careaga Sand. The wells completed in the Paso Robles Formation are owned and operated by the LACSD and located near Los Alamos. The wells completed in the Careaga Sand are owned and operated by Vandenberg Space Force Base and located on the on the north side of Barka Slough.

[52] The list of MCLs and SMCLs is available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html. (Accessed May 3, 2021.)

Table 5-3. Groundwater Quality Monitoring Network

Well ID	Well Type	Well Depth (ft bgs)	Screen Interval(s) (ft bgs)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Principal Aquifer
4210002-004	Municipal	535	230-530	11/21/1988	5/5/2021	80	Paso Robles Formation
4210002-007	Municipal	962	502-952	11/9/2006	5/5/2021	35	Paso Robles Formation
4210002-009	Municipal	510	180-510	9/21/2010	5/5/2021	30	Paso Robles Formation
4210002-012	Municipal	959	190-950	6/5/2019	5/5/2021	8	Paso Robles Formation
4210700-001	Municipal	–	162-	6/27/1989	4/21/2021	109	Careaga Sand
4210700-002	Municipal	–	160-	4/10/1984	4/21/2021	102	Careaga Sand
4210700-003	Municipal	–	220-	3/6/1984	4/21/2021	109	Careaga Sand
4210700-016	Municipal	–	200-	6/3/1996	4/21/2021	90	Careaga Sand
AGC100000001-CCGC_0581	Agricultural	–	–	6/23/2015	6/23/2015	1	Unknown
AGL020000787-OFFICE_D	Domestic	–	–	8/24/2015	11/29/2017	4	Unknown
AGL020000787-WELL2_WH	Agricultural	–	–	5/23/2017	11/29/2017	2	Unknown
AGL020000788-#1 OLD	Agricultural	–	–	12/26/2012	10/30/2017	4	Unknown
AGL020000788-#2 NEW	Agricultural	–	–	12/26/2012	10/30/2017	4	Unknown
AGL020000976-DW1	Domestic	370	220-320	11/29/2012	11/15/2017	4	Unknown
AGL020000976-IW3	Agricultural	–	–	11/29/2012	11/15/2017	4	Unknown
AGL020000990-AG WELL	Agricultural	–	–	11/29/2012	4/25/2017	3	Unknown
AGL020000990-DOMESTIC WELL	Domestic	–	–	11/29/2012	4/25/2017	3	Unknown
AGL020001186-CARRARI	Agricultural	–	–	7/28/2014	4/5/2018	3	Unknown
AGL020001186-DANS HOUSE	Domestic	–	–	7/28/2014	4/5/2018	3	Unknown
AGL020001194-LOS ALAMOS	Agricultural	–	–	7/28/2014	4/5/2018	3	Unknown
AGL020001197-DON MIGUEL	Agricultural	–	–	7/28/2014	4/5/2018	3	Unknown
AGL020001199-RONS HOUSE	Domestic	–	–	7/28/2014	4/5/2018	3	Unknown
AGL020001230-DOMESTIC WELL	Domestic	–	–	2/7/2013	11/29/2017	4	Unknown
AGL020001230-WELL #6	Agricultural	–	–	2/7/2013	11/29/2017	4	Unknown
AGL020003431-DOM/IRR	Domestic	–	–	12/2/2013	8/3/2017	3	Unknown
AGL020003506-RANCH11_IR	Agricultural	–	–	12/2/2013	11/13/2017	3	Unknown
AGL020003593-WELL 1	Agricultural	–	–	12/12/2012	1/4/2018	3	Unknown
AGL020003826-BEVENS WELL	Agricultural	–	–	1/31/2013	11/15/2017	4	Unknown
AGL020003826-BEVENS WELL 2	Agricultural	–	–	1/31/2013	11/15/2017	4	Unknown
AGL020003826-MONIGHETTI	Agricultural	–	–	1/31/2013	11/15/2017	4	Unknown
AGL020004324-GEOFFREY_D	Domestic	–	–	1/23/2014	11/27/2017	3	Unknown
AGL020004324-GEOFFREY_I	Agricultural	–	–	1/23/2014	11/27/2017	3	Unknown
AGL020004328-MISSIONP_I	Agricultural	–	–	1/23/2014	11/27/2017	3	Unknown
AGL020004330-MISSIONT_D	Domestic	–	–	1/23/2014	11/27/2017	3	Unknown
AGL020004330-MISSIONT_I	Agricultural	–	–	1/23/2014	11/27/2017	3	Unknown
AGL020004333-JFWNEELY_I	Agricultural	–	–	7/23/2018	7/23/2018	1	Unknown

Well ID	Well Type	Well Depth (ft bgs)	Screen Interval(s) (ft bgs)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Principal Aquifer
AGL020004334-SAINZ_DOM	Domestic	—	—	7/23/2014	11/27/2017	2	Unknown
AGL020004336-BARHAMV_D	Domestic	370	260-360	7/23/2014	11/27/2017	3	Unknown
AGL020004336-BARHAMV_I	Agricultural	—	—	1/23/2014	11/27/2017	3	Unknown
AGL020004336-BARHAMV2_D	Domestic	—	—	1/23/2014	11/27/2017	3	Unknown
AGL020004388-DW	Domestic	—	—	12/12/2012	10/2/2018	3	Unknown
AGL020004388-WELL 1	Agricultural	—	—	7/9/2013	10/16/2018	2	Unknown
AGL020004388-WELL 3	Agricultural	—	—	7/9/2013	10/2/2018	2	Unknown
AGL020004388-WELL 4	Agricultural	—	—	7/9/2013	10/2/2018	2	Unknown
AGL020004396-DW	Domestic	525	345-445	12/12/2012	10/2/2018	4	Unknown
AGL020004507-3207_I	Agricultural	—	—	1/23/2014	8/28/2017	3	Unknown
AGL020004507-3507_I	Agricultural	—	—	1/23/2014	8/28/2017	3	Unknown
AGL020004512-LOS ALAMOS #1	Agricultural	—	—	12/21/2012	11/13/2017	4	Unknown
AGL020004512-LOS ALAMOS #5	Agricultural	—	—	12/21/2012	11/7/2017	4	Unknown
AGL020004520-LOMA VERDE #1	Agricultural	—	—	12/21/2012	11/7/2017	4	Unknown
AGL020004541-EL CAMINO #1	Agricultural	—	—	12/21/2012	11/7/2017	4	Unknown
AGL020004541-EL CAMINO DW #1	Domestic	—	—	12/21/2012	11/7/2017	4	Unknown
AGL020004845-RANCH1_IRR	Agricultural	—	—	12/4/2013	6/26/2017	3	Unknown
AGL020004945-WELL 1	Agricultural	—	—	11/25/2012	2/22/2019	5	Unknown
AGL020004945-WELL 2	Agricultural	—	—	11/5/2018	11/5/2018	1	Unknown
AGL020004975-RANCH7_IRR	Agricultural	—	—	12/4/2013	6/26/2017	4	Unknown
AGL020007205-DOMESTIC	Domestic	—	—	6/29/2017	6/29/2017	1	Unknown
AGL020007472-MAIN WELL	Agricultural	—	—	7/1/2015	7/1/2015	1	Unknown
AGL020007578-DOMESTIC	Domestic	—	—	9/19/2012	12/4/2017	4	Unknown
AGL020007578-PRIMARY AG	Agricultural	—	—	9/19/2012	12/4/2017	4	Unknown
AGL020008902-DOMESTIC	Domestic	—	—	9/5/2012	11/28/2017	5	Unknown
AGL020008902-WELL 4	Agricultural	—	—	5/28/2013	6/29/2017	3	Unknown
AGL020008902-WELL 5	Agricultural	—	—	11/28/2017	11/28/2017	1	Unknown
AGL020010504-WELL 1	Agricultural	—	—	12/21/2012	12/28/2017	4	Unknown
AGL020010504-WELL 2	Agricultural	—	—	12/21/2012	12/28/2017	5	Unknown
AGL020011702-DOMESTIC	Domestic	—	—	12/11/2013	11/28/2017	4	Unknown
AGL020012002-WELL 13	Agricultural	250	160-240-	9/5/2012	5/23/2017	3	Unknown
AGL020014928-IRRIGATION	Agricultural	—	—	12/2/2013	8/3/2017	3	Unknown
AGL020020322-ALISOS_IRR	Agricultural	—	—	12/4/2013	3/19/2019	4	Unknown
AGL020022802-RANCH9_IRR	Agricultural	—	—	6/21/2017	11/29/2017	2	Unknown
AGL020026466-WELL6_IRR	Agricultural	—	—	5/22/2017	5/22/2017	1	Unknown
AGL020026804-R4-W-1	Agricultural	—	—	6/6/2017	6/6/2017	1	Unknown
AGL020027576-AW GLAD	Agricultural	—	—	6/21/2017	11/29/2017	2	Unknown

Well ID	Well Type	Well Depth (ft bgs)	Screen Interval(s) (ft bgs)	First Sampling Event Date	Last Sampling Event Date	Number of Sampling Events	Principal Aquifer
AGL020027596-PH #1	Agricultural	—	—	6/15/2017	12/1/2017	2	Unknown
AGL020027597-WELL 1	Agricultural	—	—	10/30/2015	12/1/2017	3	Unknown
AGL020027908-R2 W1 MONIG	Agricultural	—	—	12/21/2017	12/21/2017	1	Unknown
AGL020027908-R2 W2 MONIG	Agricultural	—	—	12/21/2017	12/21/2017	1	Unknown
AGL020027910-GLAD_WELL_3	Agricultural	—	—	5/23/2017	1/4/2018	2	Unknown
AGL020027955-RANCH36_D	Domestic	—	—	4/27/2016	8/28/2017	3	Unknown
AGL020028062-3RAN2701_I	Agricultural	—	—	8/2/2017	8/2/2017	1	Unknown
AGL020028148-WHITE48	Agricultural	—	—	5/24/2017	12/28/2017	4	Unknown
AGL020028151-HARRIS51	Agricultural	—	—	5/24/2017	5/24/2017	1	Unknown
AGL020028275-SHOKV DOM	Domestic	—	—	5/11/2018	9/25/2018	2	Unknown
AGL020028275-SHOKV IRR	Agricultural	—	—	5/11/2018	9/25/2018	2	Unknown
AGL020028322-GLAD_WELL_11	Agricultural	—	—	5/23/2017	1/4/2018	2	Unknown
AGL020029934-WELL 1 IRR	Agricultural	—	—	11/7/2017	11/7/2017	1	Unknown
AGL020033821-NOLANAG#1_IRR	Agricultural	—	—	7/11/2018	10/26/2018	2	Unknown
AGL020033821-NOLANAG#5_IRR	Agricultural	—	—	12/20/2018	12/20/2018	1	Unknown
AGL020033821-NOLANAG#6_IRR	Agricultural	—	—	12/20/2018	12/20/2018	1	Unknown

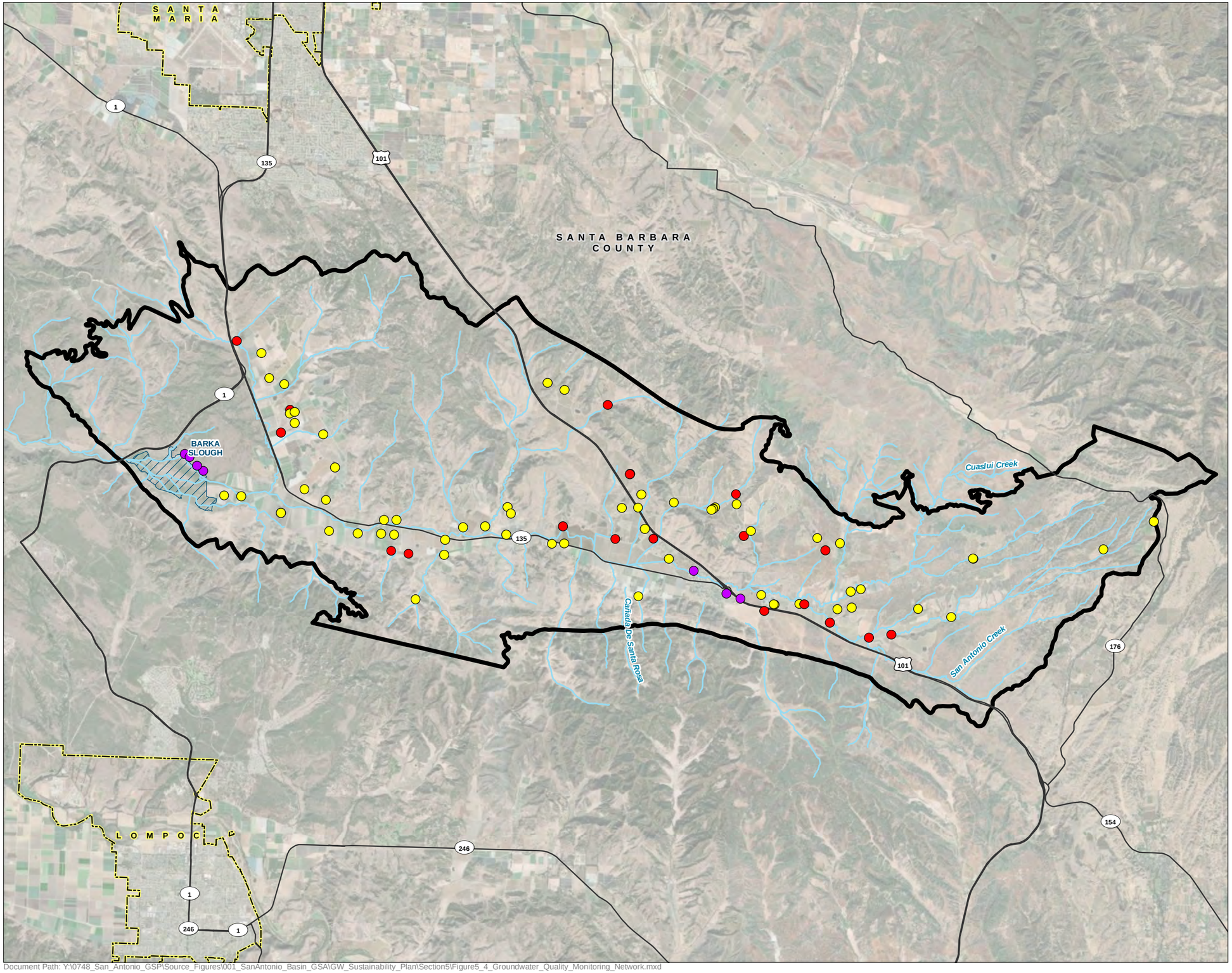
Notes

Refer to Figure 5-4 for well locations.
— = No data available
bgs = below ground surface
ft = feet
Source: Data are available from the Groundwater Ambient Monitoring and Assessment (GAMA) Program: https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/

FIGURE 5-4

Groundwater Quality Monitoring Network

Groundwater Sustainability Plan
San Antonio Creek Valley
Groundwater Basin



LEGEND

Well Type

- Agricultural
- Domestic
- Municipal

All Other Features

- San Antonio Creek or Tributary
- Major Road
- San Antonio Creek Valley Groundwater Basin
- Barka Slough
- City Boundary

NOTES

*SACR 1 and 14L1 are screened in the Careaga Sand.

San Antonio Creek Valley Groundwater Basin Boundary as defined in the California Department of Water Resources Bulletin 118.

N

0 5,000 10,000 15,000
Feet

Date: November 18, 2021
Data Sources: USGS (2020b), ESRI, DWR (2019), Maxar imagery (2020)

GSI Water Solutions, Inc.

Document Path: Y:\0748_San_Antonio_GSP\Source_Figures\001_SanAntonio_Basin_GSA\GW_Sustainability_Plan\Section5\Figure5_4_Groundwater_Quality_Monitoring_Network.mxd

The agricultural supply wells and domestic supply wells included in the groundwater quality monitoring network were identified by reviewing data available from the ILRP located in the SWRCB's GAMA database. Selected wells were sampled in 2015 or more recently. There is a total of 81 ILRP wells in the groundwater quality monitoring network; 21 wells were determined to be domestic supply wells based on their GAMA ID, and 60 wells were determined to be agricultural supply wells. Well construction information is unknown for the majority ILRP wells. Some well construction information has been compiled for the domestic wells using OSWCR. The agricultural supply wells and associated domestic supply wells are listed in Table 5-3 and shown on Figure 5-4.

A groundwater quality monitoring event was completed by the USGS in 2017 as part of its Groundwater Supply Availability Study (USGS, 2021). For the purposes of this GSP, the 2017 monitoring event is considered a baseline survey of water quality in the Basin around the time SGMA was enacted. The wells included in the 2017 USGS monitoring event are observation wells constructed by the USGS with available well completion information and are not included in the SWRCB DDW public supply well water quality program or ILRP; and therefore, are not included in the groundwater quality monitoring network. The information collected from the 2017 USGS monitoring event was used to determine groundwater quality trends for each principal aquifer. Groundwater quality results from the 2017 USGS monitoring event are presented in Section 3.2.3. Well completion reports and geophysical logs are available for the USGS wells and are included as Appendix G.

5.6.1 Monitoring Protocols [§ 354.34(i)]

§ 354.34 Monitoring Network.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

Water quality samples are currently being collected in accordance with the SWRCB DDW for municipal drinking water supply wells and ILRP requirements for agricultural and domestic wells. Beginning in 2022, ILRP data will be collected under Central Coast RWQCB Ag Order 4.0. Copies of these monitoring and reporting programs are included in Appendix G and incorporated herein as monitoring protocols. These protocols will continue to be followed during GSP implementation for the groundwater quality monitoring.

5.6.2 Assessment and Improvement of Monitoring Network [§ 354.38(a),(b),(c)(1)(2),(d),(e)(1)(2)(3)(4) and § 354.34(c)(4)]

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(4) Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.

Groundwater quality data do not indicate a need for additional monitoring locations. Current programs provide adequate spatial and temporal coverage for the purposes for the GSP. There is adequate spatial coverage in the groundwater quality monitoring network to assess impacts, if any, to beneficial uses and users. Table 5-4 summarizes the recommendations for groundwater quality monitoring from DWR BMPs, the

current groundwater quality monitoring network, and data gaps. Well construction information for 77 of 89 wells in the groundwater quality monitoring network is unknown. This is a data gap that will be addressed during GSP implementation by using OSWCR and by continued outreach by the GSA to groundwater users in the Basin.

Table 5-4. Summary of Best Management Practices, Groundwater Quality Monitoring Well Network, and Data Gaps

Best Management Practice (DWR, 2016a)	Current Monitoring 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.	Public databases provide adequate spatial and temporal water quality data to identify and evaluate water quality trends in principal aquifers in the Basin.	The current monitoring network contains adequate spatial distribution to map or supplement mapping of any known contaminants. Well construction information for 77 of 89 wells in the monitoring network is unknown. Well construction information will be developed as funding allows.
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.	The water quality monitoring network includes eight municipal wells (monitored by the SWRCB DDW program) and 81 IRLP wells within the Basin that have been regularly sampled for groundwater quality since at least 2015. Four of the municipal wells are completed in the Paso Robles Formation and four municipal wells are completed in the Careaga Sand. Well construction information for the majority of wells in the IRLP is unknown.	The current monitoring network utilizes existing water quality monitoring data from the SWRCB DDW program and ILRP. Wells included in these programs provide adequate spatial distribution to map water quality in principal aquifers in the Basin. Well construction information for 77 of 89 wells in the groundwater quality monitoring network is unknown. Well construction information will be developed as funding allows.
Define the three-dimensional extent of any existing degraded water quality impact.	Historical water quality data provides adequate spatial distribution and coverage of principal aquifers (including multiple-zone completion wells) to define the three-dimensional extent of existing degraded water quality impacts.	Well construction information for 77 of 89 wells in the GSP water quality monitoring network is unknown. Well construction information will be developed as funding allows.

Best Management Practice (DWR, 2016a)	Current Monitoring Network	Data Gap
Data should be sufficient to assess groundwater quality impacts to beneficial uses and users.	The water quality monitoring network provides sufficient water quality data, spatial distribution, and coverage of principal aquifers to assess potential impacts to beneficial uses and users of groundwater in the Basin.	Well construction information for 77 of 89 wells in the current water quality monitoring network is unknown. Well construction information will be developed as funding allows.
Data should be adequate to evaluate whether management activities are contributing to water quality degradation.	Projects and management actions proposed for implementation by the GSA will be evaluated for potential impacts to all five sustainability indicators applicable to the Basin. Existing groundwater quality monitoring programs (SWRCB DDW and ILRP), spatial distribution of monitored wells, and coverage of principal aquifers will provide adequate data to evaluate whether management activities are contributing to water quality degradation throughout the GSP implementation period. Additionally, select projects and management actions (e.g., recharge of treated wastewater) may be subject to further regulatory review, such as the California Environmental Quality Act.	None identified.

Notes

DDW = Division of Drinking Water

GSA = Groundwater Sustainability Agency

GSP = Groundwater Sustainability Plan

ILRP = Irrigated Lands Regulatory Program

SWRCB = State Water Resources Control Board

5.7 Land Subsidence Monitoring Network [§ 354.34(c)(5),(e),(g)(1)(3),(h), and (j)]

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(5) Land Subsidence. Identify the rate and extent of land subsidence, which may be measured by extensometers, surveying, remote sensing technology, or other appropriate method.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

Locally defined significant and unreasonable conditions for land subsidence are (1) land subsidence rates exceeding rates observed from 2000 through 2020 at the University NAVSTAR Consortium (UNAVCO) Continuous Global Positioning System (CGPS) Station ORES in the town of Los Alamos, near Los Alamos Park; and (2) land subsidence that causes damage to groundwater supply, land uses, infrastructure, and property interests. Currently, ground surface elevation is being monitored at one CGPS site (ORES) in the Basin as reported by UNAVCO from its Data Archive Interface.[53] Since the beginning of data collection in 2000, the net vertical displacement is negative (-0.82 ft). This means that the land surface elevation has decreased (negative displacement) 0.82 ft in the last 20 years. The Basin is located near the intersection of the Coastal Ranges and Transverse Ranges California Geomorphic Provinces. Consequently, the Basin is in a very tectonically active region. The 0.82 ft of vertical displacement measured at the UNAVCO station could be due to tectonic activity, groundwater extraction, oil and gas extraction, or a combination of the three. In addition, Interferometric Synthetic Aperture Radar (InSAR) data provided by DWR shows that significant land subsidence did not occur during the period between June 2015 and June 2019 (available InSAR data period of record) in the Basin (see Section 3.2.4).

[53] The UNAVCO Data Archive Interface is available at http://www.unavco.org/data/data.html. (Accessed May 3, 2021.).

5.7.1 Monitoring Protocols [§ 354.34(g)(2), (i)]

§ 354.34 Monitoring Network.

(g) Each Plan shall describe the following information about the monitoring network:

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

The DWR BMPs note that no standard operating procedures exist for collecting land subsidence data (DWR, 2016b). UNAVCO CGPS and DWR InSAR data will continue to be monitored annually throughout the GSP implementation period. If additional relevant data sets become available, they will be evaluated and incorporated into the monitoring program. Should potential land subsidence be observed at rates exceeding the minimum threshold (see Section 4.9.2), the GSA will first assess whether the subsidence may be due to (1) groundwater pumping (2) elastic processes (subsidence that will recover with rising groundwater) (3) oil and gas extraction or (4) tectonic activity. If subsidence is observed, approaches the minimum threshold, causes undesirable results, and appears to be related to groundwater pumping, the GSA will undertake a program to install land surface elevation benchmarks at critical infrastructure locations, and monitor subsidence with measured land surface elevations on an annual basis.

5.7.2 Assessment and Improvement of Monitoring Network [§ 354.38(a),(b),(c)(1)(2),(d), and (e)(1)(2)(3)(4)]

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

The subsidence minimum thresholds are set to avoid subsidence that could harm groundwater supply, land uses, infrastructure, and property interests. Available data indicate that there is currently little subsidence occurring in the Basin that affects groundwater supply, land uses, infrastructure, and property interests. If an undesirable result occurs, the land subsidence monitoring network may be expanded to include additional monitoring stations near areas identified as having critical infrastructure, oil and gas extraction, or significant groundwater pumping.

5.8 Depletion of Interconnected Surface Water Monitoring Network [§ 354.34(c)(6)(A,B,C,D),(e),(g)(1)(2)(3),(h), and (j)]

§ 354.34 Monitoring Network.

(c) Each monitoring network shall be designed to accomplish the following for each sustainability indicator:

(6) Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:

(A) Flow conditions including surface water discharge, surface water head, and baseflow contribution.

(B) Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.

(C) Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.

(D) Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.

(e) A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.

(g) Each Plan shall describe the following information about the monitoring network:

(3) For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.

(h) The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.

§ 354.34 Monitoring Network.

(g) Each Plan shall describe the following information about the monitoring network:

(1) Scientific rationale for the monitoring site selection process.

(2) Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.

(j) An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.

Based on the USGS National Hydrography Dataset (NHD), all the streams in the Basin are classified as intermittent and suspected to be losing streams, except for stream channels located in Barka Slough, which are classified as perennial and suspected to be gaining streams (see Figure 3-53). Ephemeral surface water flows in the Basin make it difficult to assess the interconnectivity of surface water and groundwater and to quantify the degree to which surface water depletion has occurred. According to the USGS NHD, three springs or seeps were identified in the Basin (see Figure 3-9). Based on the location of these three springs or seeps, they appear to be overlying the Paso Robles Formation. Two additional springs or seeps and associated groundwater-dependent ecosystems (GDEs) were identified by a local landowner, the Natural Communities data set (DWR, 2020), and the Cachuma Resource Conservation District (CRCD, 2003) (see Section 3.2.6). The two springs or seeps are located northeast of Los Alamos on Price Ranch within a tributary to San Antonio Creek and in the Las Flores watershed, a tributary to San Antonio Creek, in the low-lying grassland areas immediately west of U.S. Highway 101 (CRCD, 2003) (see Figure 3-56). Based on location, the spring or seep located in the Las Flores watershed overlies the Paso Robles Formation and the Price Ranch spring or seep is located near the contact between the Paso Robles Formation and the Careaga Sand. Without additional analysis, it is unknown whether the groundwater source of these springs or seeps is from the underlying principal aquifer or perched water within the channel alluvium. Therefore, until flow of groundwater is better understood in these areas, a representative monitoring network related to interconnected surface water at these locations cannot be developed. If analysis of these areas indicates interconnected surface water with the Paso Robles Formation or the Careaga Sand, a monitoring network will be developed in accordance with protocols described in Section 5.8.1. Planned additional analysis of these areas are described in Section 6.

Interconnected surface water and groundwater within the Paso Robles Formation and Careaga Sand is indicated by discharge of groundwater into Barka Slough and by the perennial classification of streams in that area. See Figure 3-31 for a conceptual model of groundwater flow as it reaches Barka Slough.

Groundwater levels measured in wells completed in the Careaga Sand located near Barka Slough indicate that groundwater levels have fallen below the Slough elevation in a number of locations since about 1983. In addition, upward vertical gradients within the Careaga Sand near the Slough (see Figure 3-71) have decreased; indicating groundwater flow into the Slough has likely declined. Surface water also discharges into the Slough. It is unknown whether surface water flow into the Slough has been decreasing due to the lack of a stream gage at the east end of the Slough. This is a data gap that will be addressed in the projects and management actions section of the GSP (see Section 6).

Currently no stream gage exists where surface water flow enters or exits the Slough. The Casmalia stream gage is located more than 2.5 miles west of the Slough. The SABGSA intends to install two surface water gages on San Antonio Creek: one upstream and one downstream of Barka Slough to measure surface water inflow and outflow to the Slough and assess surface water depletion and potential for impacts to Barka Slough. Until those gages are installed, the Casmalia gage located 2.5 miles downstream of Barka Slough will be used to assess surface water depletion and impacts to Barka Slough. Monitoring of groundwater levels in monitoring wells completed in the Careaga Sand surrounding the Barka Slough area will also continue to be conducted by the GSA as part of the groundwater level monitoring network (see Section 5.3). The SABGSA is going to assess the feasibility of installing shallow piezometers within the sediments underlying Barka Slough if access can be achieved and maintained through the dense vegetation and if CDFW will permit the piezometer installation and monitoring within the Slough. If achievable, the piezometers will provide important data regarding the elevation of the water table relative to the plant rooting depths in the Slough. It is anticipated that these data will be used to better define the water budget at the Slough and to determine if SMCs for this indicator should be adjusted.

It is apparent that there is a connection between Basin groundwater levels and the Slough; however, there is considerable uncertainty about how much lower groundwater levels can go in the Basin without causing significant and unreasonable impacts to the Slough. To address this uncertainty, additional work is planned, including:

- Characterization of the nature, type, and extent of the GDEs in the Slough,
- Installation of surface water gages in the east and west end of the Slough,
- Evaluation of the Slough water budget and effects of the water level minimum thresholds on surface water depletion using the USGS groundwater model when it is available.

These actions are described in Section 6.

The interconnected surface water monitoring network is summarized below, and the location of the Casmalia stream gage in relation to Barka Slough is shown on Figure 4-1:

- Surface water flow exiting Barka Slough will be measured using the Casmalia stream gage (Station 11136100)
- Surface water flow entering and leaving the Slough will be monitored when new surface water gages are installed
- Groundwater vertical flux will be measured using continuously monitored nested well set 16C2 and 16C4

If observations and data collected as part of the interconnected surface water monitoring network (preceding bulleted statements) indicate the minimum thresholds for the interconnected surface water sustainability indicator (see Section 4) are being approached or reached, an Enhanced Vegetation Index (EVI) analysis (consistent with the EVI analysis discussed in Section 3.2) will be completed to assess the condition of the vegetation in Barka Slough to determine if GDEs may be impacted.

5.8.1 Monitoring Protocols [§ 354.34(i)]

§ 354.34 Monitoring Network.

(i) The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.

Casmalia stream gage is monitored and maintained by the USGS. Measured stream flow recorded at the stream gage will be reviewed on a quarterly basis and included in the Basin's groundwater level monitoring program quarterly reports. Groundwater vertical gradient will be calculated from continuously monitored nested well set 16C2 and 16C4. Therefore, the protocols described in Section 5.3.1 for the groundwater level monitoring network are representative of protocols for the interconnected surface water network. Protocols for the collection of groundwater levels obtained by pressure transducers are included in Appendix G. If it is feasible to install shallow piezometers in the Slough, the monitoring protocols for groundwater levels will also be followed.

5.8.2 Assessment and Improvement of Monitoring Network [§ 354.38(a),(b),(c)(1),(c)(2),(d),(e)(1),(e)(2),(e)(3), and(e)(4)]

§ 354.38 Assessment and Improvement of Monitoring Network.

(a) Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.

(b) Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.

(c) If the monitoring network contains data gaps, the Plan shall include a description of the following:

(1) The location and reason for data gaps in the monitoring network.

(2) Local issues and circumstances that limit or prevent monitoring.

(d) Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.

(e) Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:

(1) Minimum threshold exceedances.

(2) Highly variable spatial or temporal conditions.

(3) Adverse impacts to beneficial uses and users of groundwater.

(4) The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.

There are currently no stream gages immediately east or west of Barka Slough. As discussed in Section 3.3, estimated volumes of surface water flow entering and exiting the Slough are based on the USGS Basin Characterization Model (BCM) and surface water flow volumes recorded at the Casmalia stream gage. Likewise, groundwater discharging to surface water in the Slough was calculated using the USGS BCM, surface water flow volumes recorded at the Casmalia stream gage, and Darcian flux calculations. Two locations have been identified for installation of a stream gage to supplement characterization of spatial and temporal exchanges between surface water and groundwater relative to Barka Slough. A stream gage downstream of the confluence of San Antonio Creek and Harris Canyon Creek and upstream of the Slough would enable direct quantification of surface water entering the Slough. The addition of a stream gage at this location would supplement the water budget and the ability to assess the interconnected surface water SMCs described in Section 4.10. DWR has evaluated locations downstream of the confluence of Harris Canyon Creek and San Antonio Creek and did not find any of the sites suitable for gaging. Cross sections of the two locations have been collected by Santa Barbara County and included in Appendix G. A stream gage

at the west end of Barka Slough (where surface water discharges from the Basin) near California State Highway 1 would provide a more direct quantification of surface water discharge exiting the Slough than using the Casmalia stream gage. The addition of a stream gage at this location would supplement the water budget and the ability to assess the interconnected surface water SMCs described in Section 4.10. The USGS evaluated these locations and submitted a proposal to the GSA to install and maintain stream gages.

Installation of shallow piezometers and/or soil moisture probes (streambed electrical resistance sensors [SERS]) in select locations in the interior of the Slough are also being considered to measure groundwater elevation and soil moisture, respectively, in the sediments underlying Barka Slough. These data would be monitored to evaluate water levels or soil moisture compared to rooting depths of plants present in the Slough. Feasibility of the installation and on-going monitoring as well as the efficacy and permanence of the piezometers and SERS is being evaluated.

5.9 Representative Monitoring Sites [§ 354.36(a),(b)(1),(b)(2), and (c)]

§ 354.36 Representative Monitoring. Each Agency may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin, as follows:

(a) Representative monitoring sites may be designated by the Agency as the point at which sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined.

(b) Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following:

(1) Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy.

(2) Measurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy.

(c) The designation of a representative monitoring site shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area.

Minimum thresholds and measurable objectives are established at RMSs (also referred to as representative wells) that are deemed to be representative of local and basin wide groundwater conditions in each principal aquifer. Representative wells for the groundwater level monitoring network were selected from a subset of the wells that have been monitored over time in the Basin and have the following characteristics:

- They have known well construction information and are screened exclusively within either the Paso Robles Formation or the Careaga Sand.
- They are spatially distributed to provide information across most of the Basin.
- They have recent monitoring data and a reasonably long record of data (period of record) so that trends can be determined.
- They have hydrograph signatures that are representative of wells in the surrounding area.

The RMS network for groundwater level monitoring consists of 15 wells (8 wells in the Paso Robles Formation and 7 wells in the Careaga Sand) that will be used to help identify chronic reductions in groundwater levels and storage. One representative well is an observation well located adjacent to Barka Slough in the vicinity of the Vandenberg Space Force Base wellfield near the west end of the Basin. One representative well is a municipal drinking water supply well operated by the LACSD. Five representative wells are production wells used for agricultural irrigation. While not ideal for use as monitoring wells, these five production wells are currently included as RMSs because of their location in the Basin, available well construction information, and long period of record (see Table 5-1). These five wells have been matched individually with nearby observation wells (non-pumping wells) that provide comparable spatial coverage of the Basin, have known well construction and aquifer completion data, but do not have a long period of record. Therefore, the five sets of paired wells will continue to be monitored until the period of record for the observation wells is adequate to identify trends in groundwater elevations and confirm that the observation wells are representative of the pumping well that will be eventually replaced in the monitoring program.

Minimum thresholds and measurable objectives for chronic lowering of groundwater levels are presented in Section 4.5, and minimum thresholds and measurable objectives for reduction of groundwater in storage are presented in Section 4.6. The potential for impacts to GDEs for the chronic lowering of groundwater levels sustainability indicator are discussed in Section 4.5 and for the depletion of interconnected surface water sustainability indicator in Section 4.10.

RMS wells are included in the broader GSP groundwater quality monitoring program that includes municipal wells monitored for DDW compliance and agricultural and domestic wells that are sampled as part of the ILRP. Data from RMS wells are evaluated in terms of SMCs presented in Section 4. The groundwater quality network is indicated in Table 5-3 and shown in Figure 5-4. Minimum thresholds and measurable objectives for degraded groundwater quality are discussed in Section 4.8.

5.10 Reporting Monitoring Data to the Department (Data Management System) [§ 354.40]

§ 354.40 Reporting Monitoring Data to the Department. Monitoring data shall be stored in the data management system 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.

The SGMA regulations state that a GSP must adhere to the following guidelines for a DMS:

- Article 3, Section 352.6: Each Agency shall develop and maintain a data management system 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.

SGMA-related data for the Basin is being incorporated into the DMS (currently under development). The GSA and entities that collect and report data within the Basin will have access to the DMS and authorization to upload data into the DMS. The data and information stored in the DMS will be checked for quality. The DMS will manage and present the data in a centralized environment to enable utilization of the data by the SABGSA Board and GSP consultant. The data will be used to support GSP development, demonstrate

progress towards Basin sustainability, and will be used to communicate with basin stakeholders and the state. The data that will be housed in the DMS are listed in Table 5-5.

Data sources used to populate the DMS are listed in Table 5-6. Categories marked with an X indicate data sets that are publicly accessible. Data are compiled and reviewed to comply with the DQO process defined by EPA guidance (EPA, 2006). The review includes the following:

- Identifying data that is inconsistent with preceding data collected over the period of record or not representative of area conditions based on adjacent measurements collected during the same event.
- Removing or flagging inconsistent data. This applies to historical water level data, water quality data, and water level over time data.

Table 5-5. Overview of Data Management System

Data	Description
Groundwater Levels	Water level data, well construction information, and salient information related to measurements
Groundwater Storage	Groundwater storage monitoring network sites
Water Quality	Water quality well and station data as reported by the SWRCB DDW and ILRP
Land Subsidence	Land subsidence data from the UNAVCO CGPS ORES and InSAR data
Interconnected Surface Water	Data related to the interconnected surface water sustainability indicator such as groundwater levels, stream gages, visual streamflow observations, and precipitation stations.
Water use data	Irrigation, municipal, and domestic water use estimates

Notes
CGPS = Continuous Global Positioning System
DDW = Division of Drinking Water
ILRP = Irrigated Lands Regulatory Program
InSAR = Interferometric Synthetic Aperture Radar
SWRCB = State Water Resources Control Board
UNAVCO = University NAVSTAR Consortium

Table 5-6. Summary of Data Management System Data Sources

Data Sets	Well and Site Info	Well Construction	Aquifer Properties and Lithology	Water Level	Pumping	Recharge	Water Quality
DWR (CASGEM)	X	X	—	X	—	—	—
DWR Well Completion Report Map Application	X	X	X	—	X	—	—
USGS NWIS	X	X	—	X	—	—	—
USGS SAB Study	X	X	X	—	—	—	—
LACSD	X	X	X	X	X	—	—
SRWCB GeoTracker[1]	X	X	—	—	—	—	X
GeoTracker GAMA [2]	X	X	—	—	—	—	X

Notes

[1] Available at https://geotracker.waterboards.ca.gov/

[2] Available at https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/

— = not applicable
CASGEM = California Statewide Groundwater Elevation Monitoring
DWR = California Department of Water Resources
GAMA = Groundwater Ambient Monitoring and Assessment
LACSD = Los Alamos Community Services District
NWIS = National Water Information System
SAB = San Antonio Basin
SWRCB = State Water Resources Control Board
USGS = U.S. Geological Survey

5.11 References and Technical Studies [§ 354.4(b)]

§ 354.4 General Information.

(b) Each Plan shall include the following general information: A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.

Davis, T.A, M.K Landon, and G.L Bennett. 2018. Prioritization of Oil and Gas Fields for Regional Groundwater Monitoring Based on Preliminary Assessment of Petroleum Resource Development and Proximity to California's Groundwater Resources. Scientific Investigation Report 2018-5065.

DWR. 2016a. *Best Management Practices for the Sustainable Management of Groundwater – Monitoring Protocols, Standards, and Sites*.

DWR. 2016b. *Best Management Practices for the Sustainable Management of Groundwater – Monitoring Networks and Identification of Data Gaps*.

DWR. 2018a. San Antonio Creek Valley Groundwater Basin Bulletin 118 Update 2016. Prepared by the California Department of Water Resources.

DWR. 2018b. 3-014 San Antonio Creek Valley Basin Boundaries. Prepared by the California Department of Water Resources.

EPA. 2006. *Guidance on Systematic Planning Using the Data Quality Objective Process*. Prepared by the U.S. Environmental Protection Agency.

Maxar. 2020. Base maps for California. Provided by Maxar Imagery.

RWQCB. 2019. Water Quality Control Plan for the Central Coastal Basin. June.

RWQCB. 2021. Proposed General Waste Discharge Requirements for Discharges from Irrigated Lands. April.

The Nature Conservancy, 2019. Identifying GDEs Under SGMA, Best Practices for using the TNC Dataset.

USGS. 2004. *National Field Manual for the Collection of Water Quality Data*. U.S. Geological Survey.

USGS. 2010. Measuring Water Levels by Use of an Electric Tape. U.S. Geological Survey.

USGS. 2020a. Geohydrologic Framework Model: Section Locations and Sections. U.S. Geological Survey.

USGS. 2020b. The National Map, Data Download and Visualization Services. NHDPlus High Resolution Data Model v1.0. Provided by the U.S. Geological Survey. Available at https://www.usgs.gov/media/files/nhdplus-high-resolution-data-model-v10. (Accessed August 5, 2021.)

USGS. 2021. San Antonio Creek Water Availability. U.S. Geological Survey (USGS). Available at https://ca.water.usgs.gov/projects/san-antonio-creek/san-antonio-creek-water-quality.html. (Accessed May 3, 2021.)

SECTION 6: Projects and Management Actions [Article 5, SubArticle 5]

6.1 Introduction [§ 354.42, 354.44(a),(c), and (d)]

§ 354.42 Introduction to Projects and Management Actions. This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.

§ 354.44 Projects and Management Actions

(a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.

(c) Projects and management actions shall be supported by best available information and best available science.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

Sustainable Groundwater Management Act (SGMA) regulations require each Groundwater Sustainability Plan (GSP) to include a description of projects and management actions necessary to achieve the basin sustainability goals and to respond to changing conditions in the basin discussed. This section describes the projects and management actions, which can be implemented in a phased manner, that will allow the San Antonio Creek Valley Groundwater Basin (Basin), as part of GSP implementation, to attain sustainability in accordance with § 354.42 and § 354.44 of the SGMA regulations. In this GSP, groundwater management actions generally refer to activities that support groundwater sustainability through policy and regulations without infrastructure; projects are defined as activities supporting groundwater sustainability that require infrastructure.

The identified management actions and potential future projects are classified using a tiered system, with the implementation of Tier 1 management actions to be initiated within 1 year of GSP adoption by the San Antonio Basin Groundwater Sustainability Agency (SABGSA). Because the SABGSA desires to begin addressing the observed water level declines and the storage deficit soon after adoption of the GSP, Tier 2 management actions will also be initiated. The Tier 3 and 4 management actions and priority projects will be considered for implementation in the future as conditions in the Basin dictate, and as the effectiveness of the lower tiered initiatives are assessed.

Based on the results of the comprehensive multi-phased analysis that was performed in conjunction with the development of this GSP, the SABGSA concluded that the sustainability goals described in this GSP and required under the provisions of SGMA, can be achieved through the implementation of the management actions and priority projects described in Sections 6.3 through 6.10. Although several Tier 4 projects were identified for potential future consideration, the SABGSA does not plan to initiate the construction of any non-priority project infrastructure for the specific goal of achieving sustainability until such time that evidence exists that the effects of the implemented management actions and priority projects are proving

insufficient. Non-priority projects were identified for possible future consideration. These possible future projects are assigned Tier 4 status and are briefly described in Section 6.11.

The SABGSA member agencies plan to continually monitor and assess the sustainable management criteria (SMCs) (see Section 4) and under conditions where minimum thresholds are projected to be reached, the SABGSA will perform assessments to determine if the trends are caused by groundwater pumping, caused by drought conditions, or both. If a determination is made that the trends toward reaching minimum thresholds are a direct consequence of groundwater pumping in the Basin, then the SABGSA member agencies will initiate the implementation of higher tier management actions and projects. Conversely, if the SABGSA determines that the degraded conditions in the Basin are due to sustained drought conditions, then the SABGSA will continue to monitor conditions and implement Tier 1 and, possibly, Tier 2 management actions but may elect not to implement higher tier management actions and/or projects until it is determined that the declining conditions in the Basin will not recover after the drought conditions cease.

Management actions and projects discussed in this section are developed to address sustainability goals, measurable objectives, and undesirable results identified for the Basin in Section 4. Inclusion of management actions and projects in this GSP does not forego obligations under local, state, or federal regulatory programs. While the SABGSA has an obligation to oversee progress towards groundwater sustainability, it is not the primary regulator of land use, water quality, or environmental project compliance. It is the responsibility of the implementing agency to ensure that it is working with outside regulatory agencies to keep its projects and management actions in compliance with all applicable laws. Nevertheless, the SABGSA may choose to collaborate with regulatory agencies on specific overlapping interests, such as water quality monitoring and oversight of projects developed within the Basin.

The management actions and projects in this GSP are designed to achieve several outcomes, including:

- Achieving groundwater sustainability by meeting basin-specific SMCs by actions that will allow the Basin to achieve sustainability within 20 years of plan submittal.
- Support the environmental health of the Barka Slough (Slough).
- Providing equity between who benefits from projects and who pays for projects.
- Providing a source of funding for SABGSA operations, management actions and project implementation, and basin monitoring.
- Providing controls and incentives to constrain groundwater pumping within limits so that the Basin is operated within its sustainable yield on a long-term basis.

The management actions and projects included in this section outline a framework for achieving sustainability; however, many details must be negotiated before any of the management actions and projects can be implemented. Costs for implementing projects and management actions are in addition to the agreed-upon funding to sustain the operation of the SABGSA, and the funding needed for monitoring and reporting. The collection of management actions and projects included in this section demonstrate that sufficient options exist to reach sustainability. Not all management actions and projects have to be implemented to attain sustainability, and they have not yet all been agreed upon by stakeholders. Therefore, the projects and management actions included here should be considered a list of prioritized options that will be refined during GSP implementation.

SGMA regulations § 354.44 require that each management action and conceptual project described in the GSP include a discussion about:

- Relevant measurable objectives it would address
- The expected benefits of the action
- The circumstances under which management actions or projects will be implemented
- How the public will be noticed
- Relevant regulatory and permitting considerations
- Implementation schedules
- Legal authority required to take the actions
- Estimated costs

A summary of the management actions and projects that have been identified by the SABGSA are listed below.

Management Actions

- Address Data Gaps
  - Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density
  - Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction
  - Install Stream Gages and Shallow Piezometers at Barka Slough
  - Los Alamos Community Services District (LACSD) Wellfield Pumping Coordination/Offsite Well Impact Mitigation
  - Review/Update Water Usage Factors and Crop Acreages and Update Water Budget
  - Survey and Investigate Potential Groundwater Dependent Ecosystems (GDEs) in the Basin
  - Review U.S. Geological Survey (USGS) Groundwater Model/Update Hydrogeologic Conceptual Model (HCM)
- Groundwater Pumping Fee Program
- Well Registration Program and Well Meter Installation Program
- Water Use Efficiency Programs
- Groundwater Base Pumping Allocation (BPA) Program
- Groundwater Extraction Credit (GEC) Marketing and Trading Program
- Voluntary Agricultural Crop Fallowing Programs

Projects

- Non-Native/Invasive Species Eradication
- Barka Slough Augmentation Project with Groundwater Supplies
- Watershed Management Projects, Including Controlled Burns
- Distributed Storm Water Managed Aquifer Recharge (DSW-MAR) Basins (In-Channel and Off-Stream Basins)
- LACSD Wastewater Treatment Facility (WWTF) Recycled Water and Reuse In Lieu of Groundwater Pumping or Indirect Potable Reuse
- SABGSA to Become Funding Partner to Santa Barbara County Precipitation Enhancement Program

- Vandenberg Space Force Base (VSFB), previously Vandenberg Air Force Base (VAFB), Groundwater Pumping Reduction Capital Project Participation (Desalination and/or Recharge and Recovery)
- Barka Slough Augmentation Project with State Water Project (SWP) or Banked Supplemental Water Supplies
- In Lieu Recharge Projects to Deliver Unused and Surplus Imported Water to Offset Groundwater Extractions from LACSD and Agricultural Pumpers
- SABGSA to provide Technical Assistance and Financial Incentives for High Tunnel ("Hoop Houses") Rainwater Harvesting Projects for Supplemental Irrigation Water Supplies and/or Groundwater Recharge
- Additional Projects for Potential Future Consideration by SABGSA
  - Development of Water Supply Wells in Bedrock Formations
  - Use of Treated Oilfield Produced Water for Irrigation
  - Water Exchanges to Secure Other Agency State Water Project Allocations

Table 6-1 presents a summary of the benefits, cost, reliability, and permitting requirements for management actions and projects presented in this GSP. These actions and projects are itemized by tier designation to provide the clearest description of when management actions and potential future projects will be considered by the SABGSA for implementation to reach sustainability. The SABGSA will perform annual assessments of the effectiveness of the implemented projects and management actions and utilize adaptive management strategies to re-evaluate the implementation sequencing and priorities, as deemed appropriate. As part of the development of the projects and management actions, the SABGSA will incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results. At any point, the SABGSA may choose to implement individual projects or programs listed in subsequent tiers, if it is determined that it would be beneficial to do so. A brief description of each tier is presented below, followed by more detailed discussion of each management action and project.

Table 6-1. Summary of Benefits, Cost, Reliability, and Permitting Requirements for Management Actions and Projects

	Implementation Tier Level	Relevant Measurable Objective Benefits					Required Permits	Pumping Reduction Outcome Reliability	Estimated Implementation Cost	Benefit : Cost Ratio
		Groundwater Levels	Reduction in Storage	Water Quality	Depletion of Interconnected Surface Water	Subsidence				
Management Actions										
Address Data Gaps										
Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density	1	N/A	N/A	N/A	N/A	N/A	Santa Barbara County (if a new well)	N/A	$20,000 to $200,000	Moderate - High
Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction	1	N/A	N/A	N/A	N/A	N/A	None	N/A	$25,000 to $75,000	High
Install Stream Gages at Barka Slough	1	N/A	N/A	N/A	N/A	N/A	Santa Barbara County, CDFW	N/A	$75,000 to $125,000	High
LACSD Wellfield Pumping Coordination/ Offsite Well Impact Mitigation	1	X	X	N/A	N/A	N/A	None	N/A	$15,000 to $30,000	High
Review/Update Water Usage Factors and Crop Acreages and Update Water Budget	1	N/A	N/A	N/A	N/A	N/A	None	N/A	$20,000 to $30,000	High
Survey and Investigate Potential GDEs in the Basin and further characterize Barka Slough	1	N/A	N/A	N/A	N/A	N/A	None	N/A	$50,000 to $75,000	High
Review USGS Groundwater Model/ Update Hydrologic Conceptual Model, Develop Water Budget for Barka Slough	1	N/A	N/A	N/A	N/A	N/A	None	N/A	$50,000 to $100,000	High
Groundwater Pumping Fee Program	1	X	X	X	X	X	Proposition 26/218 or Local Ballot Initiative	Moderately Reliable	$100,000 to $200,000	Moderate - High
Well Registration and Well Meter Installation Programs	1	X	X	X	X	X	None	Moderately Reliable	$75,000 to $150,000	Moderate - High
Water Use Efficiency Programs	1	X	X	X	X	X	None	Moderately Reliable	$50,000 to $125,000	Moderate - High
Groundwater BPA Program	2	X	X	X	X	X	None	Highly Reliable	$75,000 to $150,000	Moderate - High
Groundwater Extraction Credit (GEC) Marketing and Trading Program	2	X	X	X	X	X	None	Highly Reliable	$150,000 to $200,000	Moderate - High
Voluntary Agricultural Crop Fallowing Programs	2	X	X	X	X	X	None	Highly Reliable	$75,000 to $150,000	Moderate - High

	Implementation Tier Level	Relevant Measurable Objective Benefits					Required Permits	Pumping Reduction Outcome Reliability	Estimated Implementation Cost	Benefit : Cost Ratio
		Groundwater Levels	Reduction in Storage	Water Quality	Depletion of Interconnected Surface Water	Subsidence				
Projects										
Non-Native/Invasive Species Eradication	3	X	X	N/A	X	X	Santa Barbara County, CDFW, CEQA	Moderately Reliable	>$200,000	Moderate
Barka Slough Augmentation Project with Groundwater Supplies Using Existing Wells	3	X	X	N/A	X	X	Santa Barbara County, RWQCB, DWR, USACE, CDFW, CEQA	Moderately Reliable	$200,000 - >$1,000,000	Low - Moderate
Watershed Management Projects, Including Controlled Burns	3	X	X	X	X	X	Santa Barbara County, CDFW, CEQA	Highly Variable	>$200,000	Moderate
Distributed Storm Water Managed Aquifer Recharge (DSW-MAR) Basins (In-Channel and Off-Stream Basins)	4	X	X	X	X	X	Santa Barbara County, RWQCB, DWR, USACE, CDFW, CEQA	Highly Variable	>$1,000,000	Low - Moderate
LACSD WWTF Recycled Water and Reuse In Lieu of Groundwater Pumping or Indirect Potable Reuse	4	X	X	N/A	X	X	Santa Barbara County, RWQCB, DWR, CDFW, CEQA	Moderately Reliable	>$5,000,000	Low
SABGSA to Become Funding Partner to Santa Barbara County Precipitation Enhancement Program	4	X	X	X	X	X	Santa Barbara County, CEQA	Highly Variable	>$200,000	Moderate
VSFB Groundwater Pumping Reduction Capital Project Participation (Desalination and/or Recharge and Recovery)	4	X	X	N/A	X	X	Santa Barbara County, RWQCB, DWR, USACE, CDFW, USAF, CEQA	Moderately Reliable	>$5,000,000	Low
Barka Slough Augmentation Project with SWP or Banked Supplemental Water Supplies	4	X	X	N/A	X	X	Santa Barbara County, RWQCB, DWR, USACE, CDFW, CEQA	Moderately Reliable	>$1,000,000	Low
In Lieu Recharge Projects to Deliver Unused and Surplus Imported Water to Offset Groundwater Extractions from LACSD and Agricultural Pumpers	4	X	X	N/A	X	X	Santa Barbara County, RWQCB, DWR, CDFW, CEQA	Moderately Reliable	>$5,000,000	Low
SABGSA to Provide Technical Assistance and Financial Incentives for High Tunnel ("Hoop Houses") Rainwater Harvesting Projects for Supplemental Irrigation Water Supplies and/or Groundwater Recharge	4	X	X	N/A	X	X	Santa Barbara County, RWQCB, CEQA	Moderately Reliable	>$200,000	Moderate

	Implementation Tier Level	Relevant Measurable Objective Benefits					Required Permits	Pumping Reduction Outcome Reliability	Estimated Implementation Cost	Benefit : Cost Ratio
		Groundwater Levels	Reduction in Storage	Water Quality	Depletion of Interconnected Surface Water	Subsidence				

Notes

BPA = Base Pumping Allocation
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
DSW-MAR = Distributed Storm Water Managed Aquifer Recharge
DWR = California Department of Water Resources
GDE = groundwater dependent ecosystem
LACSD = Los Alamos Community Services District
N/A = not applicable
RWQCB = Regional Water Quality Control Board
SWP = State Water Project
SABGSA = San Antonio Basin Groundwater Sustainability Agency
USACE = U.S. Army Corps of Engineers
USAF = U.S. Air Force
USGS = U.S. Geological Survey
VSFB = Vandenberg Space Force Base (previously Vandenberg Air Force Base)
WWTF = Wastewater Treatment Facility

Tier 1 Management Actions

The SABGSA member agencies will initiate work on Tier 1 management actions within 1 year of GSP adoption. These management actions are focused primarily on filling identified data gaps, developing funding for SABGSA operations and future basin monitoring, registering and metering wells, and developing new and expanding existing water use efficiency programs for implementation within the Basin. As a critical element of GSP implementation, the Groundwater Pumping Fee Program is included as a Tier 1 management action to provide the SABGSA with a source of funding for operation and the continued monitoring of conditions in the Basin. The ancillary benefits include the generation of funding for the SABGSA to invest in the management actions and priority projects described in this GSP, and future projects, should they be deemed feasible.

A key aspect of Tier 1 management actions is addressing data gaps that are necessary to reduce uncertainty (e.g., how much surface water is entering and leaving the Slough relative to groundwater) and improve understanding of basin conditions so that better information is available to the SABGSA for managing the Basin and considering the efficacy of the initial SMCs that have been selected.

The SABGSA member agencies will monitor the effectiveness of these Tier 1 management actions on an annual basis to determine if they will be sufficient to achieve groundwater basin sustainability. The overall effectiveness of individual management actions will also be evaluated annually to determine if continued investment in those actions is warranted or if other actions should be considered. If progress toward reaching measurable objectives is not achieved after implementing Tier 1 management actions, then the SABGSA will perform an evaluation of basin conditions. If it is determined that water level declines during a period of extended drought is expected to reverse before undesirable results are reached, then the SABGSA may defer implementing higher tier management actions and projects. If the downward trend toward undesirable results continues and is determined to be the result of groundwater pumping, then higher tiered management actions and, if warranted, future projects, will be implemented.

Tier 2 Management Actions

The SABGSA member agencies will initiate work on Tier 2 management actions within 3 years of GSP adoption and will be available for implementation to allow time for funding to be secured and for implementation of Tier 1 management actions that are necessary to effectively implement Tier 2 actions (e.g., metering program). Tier 2 management actions include the development and implementation of a Groundwater BPA Program, a GEC Marketing and Trading Program, and Voluntary Agricultural Crop Fallowing Programs. As one of the central tools to achieving sustainability within the Basin, the Groundwater BPA Program will allow the SABGSA to manage the volume of groundwater that is extracted on an annual basis and implement, if necessary, an allocation schedule which may be adjusted every 1 to 2 years until a trend towards sustainability is achieved. The GEC Marketing and Trading Program and the Voluntary Agricultural Crop Fallowing Programs will provide flexibility for groundwater pumpers to adjust their operations and business models to allow for enhanced water conservation, voluntary fallowing of irrigated agricultural croplands, and promotion of beneficial uses of water and land uses by providing for the potential to monetize voluntary water conservation and the elimination of water intensive uses. In combination, the Tier 2 management actions will result in the avoidance of undesirable results, including chronic lowering of groundwater levels, reduction of groundwater in storage, and potentially degraded water quality. Tier 2 management actions are planned to be initiated within approximately 3 years of GSP adoption because accurate flow monitoring is necessary, and time is needed for the Tier 1 well metering program to be fully implemented.

The SABGSA member agencies will monitor the effectiveness of these Tier 2 management actions to determine if they will be sufficient to achieve groundwater basin sustainability. The overall effectiveness of

individual Tier 2 management actions will also be evaluated annually to determine if continued investment in those actions is warranted or if other actions should be considered. If it appears that progress toward reaching measurable objectives is not achieved because of implementing the Tier 2 management actions, then the SABGSA will perform an evaluation of basin conditions. If it is determined that groundwater level declines observed during a period of extended drought are expected to reverse before undesirable results are reached, then the SABGSA may defer implementing higher tier management actions and projects. If the downward trend toward undesirable results continues and is determined to be the result of groundwater pumping, then potential future projects may be implemented.

Tier 3 Priority Projects

Activities in Tier 3 include priority projects that the SABGSA member agencies may initiate work on within 5 years of GSP adoption and will be available for implementation if the management actions implemented previously either fail to be implemented or do not avoid undesirable results. The Tier 3 priority projects include non-native/invasive species eradication projects; watershed management projects, including potential controlled burns; and the Barka Slough augmentation project which will provide groundwater supplies which are pumped from the Basin to support the Barka Slough GDE.

Tier 4 Non-Priority Projects

In this GSP, all non-priority projects that were identified and evaluated are classified as Tier 4. The SABGSA does not plan to initiate the construction of any Tier 4 project infrastructure, for the specific goal of achieving basin sustainability, until such time that evidence exists that the effects of the implemented management actions are proving insufficient. Although the SABGSA has no near-term plans to initiate construction of any specific non-priority projects for the purposes of achieving basin sustainability, there may be interest in proceeding with the study, planning and preliminary design/engineering, and permitting phases for a number of projects that were identified by the SABGSA for potential future consideration.

As work on supplemental water supply and resource management efforts is ongoing, it may be the case that additional projects will be identified and added to the list in future GSP updates.

6.2 Management Action Implementation Approach [§ 354.44(b)(6)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(6) An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.

Using authorities outlined in §§ 10725 to 10726.9 of the California Water Code, the SABGSA will ensure the maximum degree of local control and flexibility consistent with this GSP to commence management actions. Because the amount of groundwater pumping in the Basin in recent years is more than the estimated basin yield of about 8,900 acre-feet per year (AFY), as discussed in Section 3.3, and groundwater levels are declining in certain areas, the SABGSA will begin to implement Tier 1 management actions within 1 year after GSP adoption. The effect of the management actions will be reviewed annually, and additional higher tiered management actions and priority projects will be implemented as necessary to avoid undesirable results. A graphical depiction of the implementation sequence is presented in Figure 6-1.

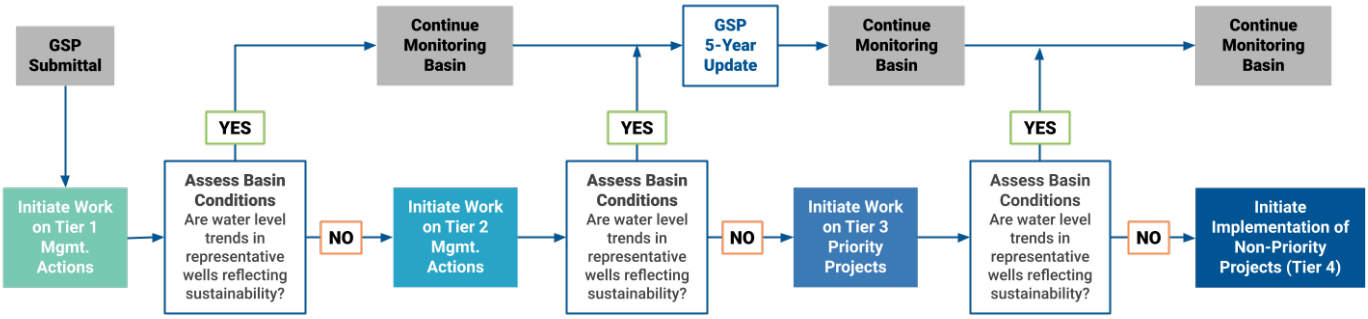


Figure 6-1. Implementation Sequence for Management Actions and Projects

In general, basin-wide management actions will apply to all areas within the Basin and reflect basic GSP implementation requirements, such as extraction measurement, monitoring, reporting and outreach, necessary studies and early planning work, monitoring and filling data gaps, annual reports and GSP updates, and implementing an allocation program that includes limitations on groundwater pumping aimed at both keeping groundwater levels stable and avoiding undesirable results. The SABGSA anticipates that new policies, ordinances, and regulations will be required in advance of the implementation of some of the planned management actions. Because developing and adopting these policies and regulations will require substantial negotiations between the SABGSA member agencies and stakeholders, efforts to define and gain approvals for the scope and detail associated with a regulation will begin soon after GSP adoption. Public meetings and hearings will be held during the process of determining when and where in the basin management actions and priority projects are to be implemented to maximize benefits to the Basin. Some of these may require California Environmental Quality Act (CEQA) compliance and legal support and guidance. A proportional and equitable approach to funding implementation of the GSP and any optional actions will be developed in accordance with all State laws and applicable public process requirements. During these meetings and hearings, input from the public, interested stakeholders, and groundwater pumpers will be considered and incorporated into the decision-making process. The SABGSA will annually assess the effectiveness that management actions and priority projects have achieved in stabilizing groundwater levels and meeting the basin sustainability goals described in this GSP and will reassess the need for continuing and/or expanding these actions. At a minimum, the reassessment process will be done annually as part of the annual reporting process or as part of the required 5-year review and report to California Department of Water Resources (DWR).

6.3 Tier 1 Management Action 1 – Address Data Gaps [§ 354.44(b)(1), (d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

The SGMA regulations require identification of data gaps and a plan for filling them (§ 354.38). In conjunction with the development of this GSP, data was collected and reported for each of the five sustainability indicators that are relevant to:

- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Degraded water quality
- Land subsidence
- Depletion of interconnected surface water

As part of the process, it was determined that specific data gaps exist and require additional investigation. The SABGSA has determined that the initial management actions that will be undertaken will be for the purposes of filling the identified data gaps and will include the following activities:

- Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density
- Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction
- Install Stream Gages at Barka Slough
- Implement LACSD Wellfield Pumping Coordination/Offsite Well Impact Mitigation
- Review/Update Water Usage Factors and Crop Acreages and Update Water Budget
- Survey and Investigate Potential GDEs in the Basin and further Characterize Barka Slough
- Review USGS Groundwater Model/Update HCM and Develop Water Budget for Barka Slough

Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density

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

While there is no definitive rule on well density, the best management practices from DWR (2016) cites a range of 0.2 to 10 wells per 100 square miles, with a median of 5 wells per 100 square miles from various cited studies. The Basin is approximately 105 square miles, and the groundwater level monitoring network consists of 23 wells in the Paso Robles Formation Aquifer and 27 wells in the Careaga Sand, which equates to approximately 22 wells and 26 wells per 100 square miles for well density in the Paso Robles Formation and Careaga Sand, respectively.

Although the existing groundwater level monitoring network satisfies the well density guidance cited by DWR (2016), there are areas identified within the Basin (see Figure 5-3) where the addition of monitoring wells would substantially improve the understanding of groundwater conditions as discussed in Section 3.2. This is important information that the SABGSA needs to inform its management decisions. Two low density areas in both principal aquifers were identified in the Basin: the eastern uplands and the central to northwestern uplands. Based on the State Water Resources Control Board (SWRCB) Irrigated Lands Regulatory Program (ILRP), private agricultural supply wells have been identified in the eastern uplands area. An effort will be made during GSP implementation to contact well owners of wells in the eastern uplands area to determine if they can be included in the monitoring program. Including these additional wells in the groundwater level monitoring network would minimize the uncertainty of groundwater elevation trends and benefit sustainable management of the Basin. Two wells in the central to northwestern uplands area, completed in the Careaga Sand, were previously monitored by the USGS or SABGSA. However, well access has been denied by the well owners. An effort will be made by the SABGSA to negotiate access to these wells.

The proposed strategy for adding monitoring wells and representative monitoring sites (RMS) to the monitoring network will be to first incorporate existing wells to the extent possible. Owners of all candidate existing wells will be contacted to determine interest in participating in the monitoring program. Wells considered for incorporation into the monitoring network will be inspected to ensure they are adequate for monitoring and to determine depth, perforated intervals, and aquifer designation. Access agreements will be secured with well owners to ensure that data can be reported from the wells.

If an existing well cannot be identified or permission to use data from an existing well cannot be secured to fill a data gap, then consideration will be given to installing a new monitoring well and/or RMS. The SABGSA will obtain required permits and access agreements before drilling new wells. The SABGSA will retain the services of licensed geologists or engineers and qualified drilling companies for drilling new wells. The SABGSA will also evaluate the availability of grant funds through DWR for new monitoring wells. Once drilled, the new wells will be tested as necessary and equipped for monitoring. All well construction information, including the aquifer that is being monitored, will be registered with the well.

Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction

The SABGSA has determined that there are wells that are now included in the GSP Monitoring Well Network that do not have adequate documentation regarding the reference point elevation, depth, geologic formations intersected, casing characteristics, screened intervals, pump setting, and/or well construction details. To address this data gap, the SABGSA will identify those wells lacking this information, obtain permission from well owners, and perform reference point surveys and video logging to ascertain well construction details, and the location of well production zones. The information gained will be incorporated into the monitoring well network.

A survey of the reference point elevations is needed for all existing wells that are now, or will be in the future, included in the basin monitoring program. This is needed because not all wells in the program have been surveyed and because different vertical elevation datums have been used in the past. The planned reference point survey will be performed using high-resolution Global Positioning System (GPS) equipment to ensure that all groundwater level data are referenced to the same vertical datum in the future.

Concurrent with the reference point surveys, the SABGSA will perform video surveys on all wells to be included in the GSP Monitoring Well Network. During these surveys, SABGSA representatives will interview each well owner regarding the maintenance history, operational issues or events, surface issues that may affect the well, and water quality within the well. The objective of the video survey work and owner interview is to assess the characteristics of each well regarding the following criteria:

- Depth
- Screened interval
- Material type and condition of the casing and screen
- Presence of scaling, sediment, or bacteria
- Well integrity
- Color and clarity of the water
- Gas intrusion
- Water quality
- Other similar observations that may relate to potential water-quality issues
- Historical pumping rate and pumping levels so that any depletion of supply can be identified in the future
- Specific capacity

Note that some information may be unobtainable due to well construction or other factors.

All relevant information acquired on wells will be added to the Data Management System (DMS). All wells in the monitoring well network and wells identified as RMSs, including those used for water quality monitoring, will be registered under the GSP Well Registration Program. During the reference point elevation and well video survey process, if other public or agricultural supply wells are identified that are deemed to improve the network, they may be added to the network.

Install Stream Gages at Barka Slough

As discussed in Section 4.10, all the streams in the Basin are classified as intermittent and suspected to be losing streams, except for stream channels located immediately upstream and within the Barka Slough, which are classified as perennial and suspected to be gaining streams. Interconnected surface water and groundwater within the Careaga Sand is indicated by discharge of groundwater into Barka Slough and by the perennial classification of streams in that area.

Groundwater levels measured in wells located in the vicinity of Barka Slough indicate that groundwater levels have fallen below the Slough ground surface elevation in several locations since about 1983. In addition, upward vertical gradients within the Careaga Sand near the Slough have decreased (see Figure 3-71), which indicate that groundwater flow into the Slough has likely declined.

Surface water also discharges into the Slough. The surface water component of flow into the Slough is equally as important as groundwater discharge into the Slough. Currently, no stream gage exists where surface water flow enters or exits the Slough. The Casmalia stream gage is located more than 2.5 miles west of the Slough and there are groundwater uses between the Slough and the Casmalia gage. Due to a lack of local stream gage data, the presence or absence of surface water flow entering and exiting the Slough is unknown and specifically whether surface water flow into the Slough has been decreasing. Thus, there is considerable uncertainty regarding the sources and quantities of water supporting the Slough and how SMCs should be set in this area (see Section 4).

Two locations have been identified for installation of a stream gage to supplement characterization of spatial and temporal exchanges between surface water and groundwater relative to Barka Slough. A stream gage downstream of the confluence of San Antonio Creek and Harris Canyon Creek and upstream of the Slough would enable direct quantification of surface water entering the Slough.

Additionally, a stream gage at the west end of Barka Slough (where surface water discharges from the Basin), near California State Highway 1, would provide a more direct quantification of surface water discharge exiting the Slough. The addition of a stream gage at this location would inform the water budget for the Slough and improve the ability to assess the interconnected surface water SMCs described in Section 4.10. The SABGSA is in the process of identifying willing landowners who will provide access to the gage(s) and is working with the USGS for assistance.

Measurement of groundwater levels within the Barka Slough sediments would aid in understanding the water budget and groundwater conditions within the Slough. If it is determined that access can be obtained and maintained and CDFW is willing to permit this activity, the SABGSA is considering the installation of shallow piezometers within the Barka Slough sediments to allow monitoring of groundwater levels within the root zone of the plants in the Slough. The feasibility and permit requirements for this activity requires further evaluation.

LACSD Wellfield Pumping Coordination/Offsite Well Impact Mitigation

The LACSD provides potable water supply to approximately 1,800 residents. The source of the water is supplied from four municipal wells that are located within the LACSD boundary. The wells range in depth from approximately 500 feet (ft) to 800 ft. Each of the wells is completed in the Paso Robles Formation. The combined pumping from the subject wells is approximately 250,000 gallons per day (gpd). Each of the wells is operated through a Supervisory Control and Data Acquisition (SCADA) system. One feature of the SCADA system is that it provides continuous information on static and pumping depths within the subject wells. The LACSD's water wells are equipped with variable frequency drives that allow the LACSD to control the pumping rate at the wells and adjust accordingly to the community's water needs.

As described in Section 3.2.1.1, low groundwater elevation contour lines near the town of Los Alamos indicate a groundwater pumping center may exist in this area. Based on the review of available well location data, it appears that the LACSD municipal wells are located in an area that coincide with the presence of numerous agricultural irrigation wells. Pumping from this area of concentrated wells appears to be resulting in a localized and lower groundwater levels in the aquifer. Static and pumping levels in LACSD wells are close to the top of well screens. The LACSD has been reviewing its pumping schedules and initiated discussions with the surrounding agricultural pumpers to explore the potential for implementing a coordinated pumping schedule program to assess the feasibility of distributing pumping from all wells in the affected area to address this localized issue and raise static and pumping levels at LACSD wells.

The SABGSA has identified this as a data gap and plans to initiate a study to evaluate the localized impacts in the Basin which are occurring from the existing pumping operations and explore strategies for implementing a groundwater pumping management program to improve the conditions in the Basin and mitigate the impacts to the LACSD water supply system.

Review/Update Water Usage Factors and Crop Acreages and Update Water Budget

As described in Section 3.3, in 2020 there was approximately 13,459 acres of irrigated cropland within the Basin that accounts for an estimated 62 percent (average 17,300 AFY) of the groundwater pumped from the basin annually. This volume of water pumped is based primarily on estimates. In the absence of metered pumping records, agricultural irrigation pumping was estimated using periodic land use survey data (from 1959, 1968, 1977, 1986, 1996, 2006, 2016, and 2020) provided by the USGS (USGS, 2020) and the Santa Barbara County Agricultural Commissioner, Weights and Measures Department (Santa Barbara County, 2020) to determine crop types and acreages. Crop-specific water duty factors for the Basin were derived from the Groundwater Production Information and Instructions pamphlet prepared by Santa Ynez River Valley Water Conservation District (SYRWCD, 2010). Some crop duty factors were adjusted based on feedback from some growers in the Basin. These crop-specific water duty factors were applied to the acreage associated with agricultural land use type in the land survey data provided by USGS and Santa Barbara County for the Basin. Land use surveys were not available for every year, so spatial-temporal interpolations were made between the land use surveys for the intervening years.

While the accuracy of the land use mapping of irrigated crops for the recent years are acceptable for the GSP, uncertainty remains in the estimates of water use from these irrigated lands and hence the assumed amount of pumping needed to meet the crop water requirement. The uncertainty of this groundwater budget component is considered moderate. To address this uncertainty and increase the accuracy of the annual groundwater pumping estimates and basin water budget calculations in future years until a metering program is fully implemented, the SABGSA has identified this as a data gap and plans to review and update water usage factors and crop acreages, which will be incorporated into future refinements in the basin water budget.

Survey and Investigate Potential GDEs and Further Characterize Barka Slough

As described in Section 3.2.6, a preliminary assessment was performed to evaluate the potential that GDEs are present within the Basin. The assessment methodology was based on guidance developed by The Nature Conservancy (TNC, 2019). Based on the results of the screening level assessment, it was determined that GDEs exist within the Barka Slough and some additional isolated areas within the Basin. Although mapping of GDEs and potential GDEs has been the primary focus of this GSP, no biological or habitat surveys were completed to verify the existence of the potential GDEs or to characterize GDEs in Barka Slough in preparation of the GSP. As described above, the SABGSA plans to install stream gages to develop a better understanding of the surface water/groundwater interaction and further assess the Barka Slough water budget.

At present there is insufficient data available to confirm the nature and spatial extent of GDEs within Barka Slough and elsewhere and the degree to which they are supported by surface water and/or groundwater. To address this uncertainty, the SABGSA has identified this as a data gap and plans to perform a habitat survey in Barka Slough and further investigate potential GDEs elsewhere in the Basin. This information will be used to further identify GDEs that can be affected by pumping and groundwater management activities and to understand groundwater and surface water conditions in Barka Slough so that SMCs can be updated to avoid impacts to GDEs.

Review USGS Groundwater Model/Update HCM, Develop Water Budget for Barka Slough

As of this writing in 2021, a groundwater model developed by the USGS was being calibrated as part of a multi-year groundwater basin study. The groundwater model and related information was not made available for use in the preparation of this GSP and therefore, it was necessary to use a spreadsheet tool to develop the water budgets for the Basin and to assess projects and management actions needed to bring the Basin into sustainability. While a groundwater model would be preferred, the spreadsheet tool can be used for this purpose in accordance with § 354.18 of the SGMA regulations.

Utilizing the spreadsheet tool, water budget components for the Basin were developed using various publicly available data sets organized in a tabular accounting methodology by water year. Table 3-14 presents a summary of the data sources used for developing the water budgets and a description of each data set's qualitative data rating.

A qualitative discussion of the estimated level of uncertainty associated with each data source is described in Table 3-14 and for each water budget term. This discussion focuses on the level of uncertainty and the confidence in the data, as well as the assumptions and interpretations of the information used to develop the water budgets. The level of uncertainty can significantly affect the SABGSA's ability to sustainably manage the Basin. The calculated and modeled values are generally of medium quality. Data derived from other sources, including water duty factors for irrigated crops for the estimation of agricultural pumping and related irrigation return flow, are less certain and therefore of medium/low quality (with the highest uncertainty). In addition, there is considerable uncertainty about how much groundwater and surface water are discharging into Barka Slough and how pumping in the Basin may impact the Slough.

To address this uncertainty, improve the accuracy of the annual groundwater pumping estimates and basin water budget calculations in future years, and assess the water budget for Barka Slough, the SABGSA plans to review and utilize the USGS Basin Groundwater Model when the model is made available by the USGS.

6.3.1 Relevant Measurable Objective(s) for Addressing Data Gaps [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

Each of the management actions described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of the groundwater conditions in the Basin, the interconnected surface water systems in critical areas of the Basin, and the agricultural water demands in the Basin, from a spatial and temporal perspective. The information that will be gained through these management actions will provide the basis for future refinements in the basin HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). Although extremely valuable and important for making management decisions, the implementation of these management actions will not have any direct impact on meeting any of the measurable objectives as described in Section 4 of this GSP.

6.3.2 Implementation Triggers for Addressing Data Gaps [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The management actions described in this section are deemed critical for the successful implementation of the GSP and are included in the Tier 1 implementation category. Activities in Tier 1 are management actions that the SABGSA member agencies plan to initiate work on within 1 year of GSP adoption. The subject management actions are not directly linked to any of the defined SMCs as defined in this GSP (see Section 4) other than additional data will be used to consider modifications to SMCs in the future.

6.3.3 Public Notice Process for Addressing Data Gaps [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

Public outreach meetings, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the groundwater pumpers and other stakeholders of the current and projected basin conditions and the need for addressing data gaps. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how the management actions related to addressing data gaps are being implemented in the Basin. Information on how progress towards achieving

an enhanced understanding of groundwater conditions in the Basin, amount of pumping, the interconnected surface water systems in critical areas of the Basin, the nature and extent of GDEs, and the agricultural water demands in the Basin will also be provided through annual GSP reports and links to relevant information on SABGSA and member agency websites. Specific well owners, to be identified by the SABGSA, will be contacted directly to discuss specific management actions, including the potential for adding additional existing wells to the monitoring and/or RMS network. Additionally, specific well owners to be identified by the SABGSA will be contacted directly to obtain access to wells for performing reference point elevation and video surveys to determine operational status, construction details, and aquifer designation. Lastly, the well registration and metering program will be developed with stakeholder input.

6.3.4 Overdraft Mitigation for Addressing Data Gaps [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

Each of the management actions described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of groundwater pumping, the groundwater conditions in the Basin, the interconnected surface water systems in critical areas of the Basin, the nature and extent of GDEs, and the agricultural water demands in the Basin, from a spatial and temporal perspective. The information that will be gained through these management actions will provide the basis for future refinements in the basin HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). Although extremely valuable and important, the implementation of these management actions will not have any direct impact on the mitigation of the estimated storage deficit as described in Section 3.3 of this GSP, other than metering of wells has been shown to reduce overall groundwater production in other basins.

6.3.5 Permitting and Regulatory Process for Addressing Data Gaps [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

The SABGSA anticipates that well construction permits will be required to be obtained from Santa Barbara County Department of Public Health Environmental Health Services for any new wells that are drilled. Because well drilling permits are a ministerial action in Santa Barbara County, which historically have been exempt from CEQA requirements, the SABGSA would not need to prepare CEQA documentation prior to construction of monitoring wells. Well drilling would not trigger the National Environmental Policy Act unless

federal funding or permits are required for implementation of this management action, which is not considered to be the case.

No permitting or regulatory processes are required for the implementation of the remaining management actions that are associated with filling data gaps.

6.3.6 Implementation Timeline for Addressing Data Gaps [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The management actions described in this section are deemed critical for the successful implementation of the GSP and are included in the Tier 1 implementation category. Activities in Tier 1 are management actions that the SABGSA member agencies plan to initiate work on within 1 year of GSP adoption.

6.3.7 Anticipated Benefits for Addressing Data Gaps [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

The management actions described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of groundwater conditions in the Basin, the effect of pumping on interconnected surface water and potential impacts on GDEs in Barka Slough, and the agricultural water demands in the Basin, from a spatial and temporal perspective. The information that will be gained through these management actions will provide improved understanding of the condition of the Basin and allow for future refinements in the HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). In addition, the information acquired though the implementation of the management actions described in this section will help guide the SABGSA in determining the optimal strategy for sequencing the implementation of the higher tiered management actions, priority projects, and potential future non-priority projects (if needed) which are described in Sections 6.4 through 6.10. The information will also help the SABGSA understand whether the SMCs are set at appropriate levels.

6.3.8 Legal Authority for Addressing Data Gaps [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

SGMA regulations require identification of data gaps and a plan for filling them (§ 354.38).

6.3.9 Cost and Funding for Addressing Data Gaps [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

For budgetary planning purposes, the following estimates are provided for each of the identified data gaps:

- Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density
  - Budgetary Estimate: $20,000 to $200,000
- Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction
  - Budgetary Estimate: $25,000 to $75,000
- Install Stream Gages at Barka Slough
  - Budgetary Estimate: $75,000 to $125,000
- LACSD Wellfield Pumping Coordination/Offsite Well Impact Mitigation
  - Budgetary Estimate: $15,000 to $30,000
- Review/Update Water Usage Factors and Crop Acreages and Update Water Budget
  - Budgetary Estimate: $20,000 to $30,000
- Survey and Investigate Potential GDEs in the Basin and Further Characterize Barka Slough
  - Budgetary Estimate: $50,000 to $75,000
- Review USGS Groundwater Model/Update HCM and Develop Water Budget for Barka Slough
  - Budgetary Estimate: $50,000 to $100,000

6.3.10 Drought Offset Measures for Addressing Data Gaps [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

Each of the management actions described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of groundwater conditions in the Basin, the interconnected surface water system in critical areas of the Basin, and the agricultural water demands in the Basin, from a spatial and temporal perspective. The information that will be gained through these management actions will provide the basis for future refinements in the HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). Although extremely valuable and important, the implementation of these management actions will not have any direct impact regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

6.4 Tier 1 Management Action 2 – Groundwater Pumping Fee Program [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

As part of the GSP implementation process, the SABGSA will explore various financing options to cover its operational costs and to generate funding for monitoring of the Basin and the implementation of management actions and potential future projects. Based on the results of these efforts, the SABGSA may adopt a management action to levy groundwater pumping fees for the purposes of generating funding for the SABGSA operations and the ongoing monitoring of the condition of the Basin and funds for the development and implementation of the identified management actions and potential projects. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. The SABGSA will consider an investigative study to determine the most effective and equitable fee and incentive structure. In conjunction with the development of the

Groundwater Pumping Fee Program, the SABGSA will ensure that any charges that the SABGSA plans to place on groundwater extraction will be carefully reviewed by legal counsel to determine if those charges are appropriate, and what regulatory/statutory processes will be required for them. They will also be reviewed so that they are consistent with the fee structure that the San Antonio Basin Water District has in place. The following potential fee structures and incentives would affect groundwater users differently, so a composite fee and incentives structure may also be considered.

- **Per Parcel Fee:** This fee is envisioned to be a regulatory fee charged at a uniform amount to all parcel owners within the Basin. A regulatory fee can be assessed with SABGSA approval rather than through an election. Benefits of a parcel fee include that it would spread the cost of the SABGSA administration and the implementation of selected management actions and potential future projects to all parcel owners, which would distribute the cost relatively equally. This approach has several issues though, including the fact that some parcels in the Basin may not use groundwater directly. There may also be concerns about the constitutionality of assessing this fee, as it could be considered a tax and subject to legal challenge.
- **Parcel Fee and Groundwater Extraction Based Fee:** This fee structure would provide for an assessment of a small fee on all parcels, and then distribute the remaining costs based on groundwater extraction. It is considered because it would provide for the distribution a small amount of cost to all parcel owners, recognizing the benefits to all for sustainably managed groundwater, but it would also provide for charging the direct users of groundwater proportionally to their actual use. This fee is compelling for the reasons listed but has similar issues regarding constitutionality concerns as the per parcel fee.
- **Parcel Tax:** This approach would constitute a voter-approved parcel tax, and require the initiative be decided through an election process. It would be similar to the per parcel fee structure but would not have the same legal concerns. It has similar benefits that the per parcel fee structure would provide such that the costs associated with GSP implementation be kept relatively low and evenly distributed, however, this approach will require voter approval by a two-thirds majority. Additionally, placing a parcel tax measure on the ballot would substantially increase costs to the SABGSA. The SABGSA would also have to incur costs associated with polling and the creation and distribution of educational materials. Finally, a campaign would be required (which could not be undertaken by the SABGSA itself), and there is no guarantee of success at the polls.
- **Fee on Groundwater Extraction:** This approach would provide for fees to be assessed on all groundwater users based on actual groundwater extraction but would not include the levy of a parcel fee. This approach has the benefit of having a direct nexus between the regulated activity (pumping groundwater) and the regulatory fee. It would provide for directly measuring the extraction by all water service providers, as well as agricultural groundwater pumpers. Currently, only municipal and other public water supply systems, along with a portion of the agricultural pumpers in the Basin, meter and report their groundwater usage. Under this system, meters will be required to be installed on all non-de minimis wells, or the adoption of an alternative groundwater extraction measurement methodology to be approved by the SABGSA. Lastly, this approach would require a different approach for de minimis users (residential users that use under 2 AFY).
- **Member Agency Funding:** Another option for funding the implementation of the GSP would be member agency funding. This method has inherent difficulties related to the gathering of appropriate data to be used in making equitable fee calculations during the program development process. Local government agencies who are SABGSA member agencies would have to continue funding the SABGSA past GSP development. This approach would require universal member agency approval and cost sharing agreement and requires many landowners that use little to no groundwater to pay for the management of the Basin, while other large groundwater pumpers may not pay an equitable share of the GSP implementation costs.

- **Fee on Estimated Groundwater Extraction:** This approach relies on estimating groundwater use across the Basin and applying a fee based on estimated usage. This approach is similar in concept to the fee on measured groundwater use except that the installation of meters on all wells would not be required. It has similar benefits as the fee on groundwater use but does not suffer from the drawbacks with needing to measure groundwater use of all kinds. The issues with this approach include challenges associated with formulating a reasonable basis of estimating groundwater use based on estimates of crop water use and acreage estimated using satellite imagery. These methods for estimating water use have fairly high levels of uncertainty. It may be necessary for the SABGSA to use this approach until a metering program is fully in place.

The Groundwater Pumping Fee Program will be developed as part of a portfolio of management actions, which may also include the Well Registration and Well Metering Installation Programs; Voluntary Agricultural Crop Fallowing Programs; Groundwater BPA Program; and the GEC Marketing and Trading Program. The fees to be levied for groundwater pumping will likely be in addition to a tiered base fee structure that will be levied against all groundwater pumpers in the Basin, including de minimis (less than 2 AFY) pumpers. The base fees will provide funding for the general administration and operation of the SABGSA. The groundwater pumping fees to be collected would also be used to fund the costs of SABGSA operations, monitoring of the Basin, and for the implementation of the management actions described in this GSP. If the implementation of the management actions proves insufficient to achieve basin sustainability, then the fees may also be used for the funding of the projects identified as Tier 3 alternatives. De minimus pumpers will not be metered and will not be required to pay an extraction-related pumping fee.

6.4.1 Relevant Measurable Objective(s) for the Groundwater Pumping Fee Program [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The primary benefits that result from the implementation of the Groundwater Pumping Fee Program will be to provide a source of funding to the SABGSA for administration, operation, and continued monitoring of the condition of the Basin. Secondarily, the measurable objectives benefiting from the implementation of the Groundwater Pumping Fee Program include:

- **Groundwater Elevation Measurable Objectives:** The Groundwater Pumping Fee Program will focus on creating financial incentives for pumpers to reduce pumping, which will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of the Groundwater Pumping Fee Program will focus on motivating pumpers to reduce pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.

- **Land Subsidence Measurable Objectives:** The Groundwater Pumping Fee Program will focus on reducing pumping, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** The Groundwater Pumping Fee Program will focus on reducing pumping which will result in higher groundwater elevations which will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and total dissolved solids (TDS) infiltrating to the aquifer.

6.4.2 Implementation Triggers for the Groundwater Pumping Fee Program [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The management action described in this section is deemed critical for the successful implementation of the GSP and is included in the Tier 1 implementation category. The SABGSA member agencies will initiate work on Tier 1 management actions within 1 year of GSP adoption. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. As part of program development, the SABGSA will determine the most effective and equitable fee and incentive structure. In conjunction with the development of the Groundwater Pumping Fee Program, the SABGSA will ensure that any charges that the SABGSA plans to place on groundwater extraction will be carefully reviewed by legal counsel to determine if those charges are appropriate, and what regulatory/statutory processes will be required for them. Prerequisites of levying groundwater pumping fees will be the installation of flow meters or other quantification methods for groundwater users (excluding de minimis users) as described in Section 6.5. Metering will be required with implementation of this GSP with all non-de minimis wells in the Basin to be equipped with meters, or an approved alternative form of extraction measurement, within 12 months of GSP acceptance by DWR. Once fully implemented, the Groundwater Pumping Fee Program will result in immediate benefit to the Basin by providing needed funds for SABGSA administration and operation, along with funding to support ongoing monitoring of the Basin. Additionally, funds may be available for management action and priority project implementation and for potential future projects, if necessary. The program will be ongoing throughout the GSP implementation period and will be modified as annual adjustments to the pumping allocations are made.

6.4.3 Public Notice Process for the Groundwater Pumping Fee Program [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

The Groundwater Pumping Fee Program will be developed in an open and transparent process. Targeted outreach meetings and technical workshops, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform all groundwater pumpers and other stakeholders about the details of the Groundwater Pumping Fee Program. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to learn about the programs as well as the opportunity to provide input and comments on how the pumping fee program will being implemented in the Basin. The targeted public outreach meetings and technical workshops will be supplemented with informational mailers to be sent to all well owners and growers in the Basin and informational press releases will be distributed to local media. If deemed valuable, SABGSA representatives may work directly with individual well owners to explain program requirements and help with program implementation. The Groundwater Pumping Fee Program will also be promoted through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.4.4 Overdraft Mitigation for the Groundwater Pumping Fee Program [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

The development and implementation of the Groundwater Pumping Fee Program will provide the SABGSA with funding necessary for SABGSA administration and operation, as well as for implementing the management actions and for future projects, if necessary, as described in this GSP. The implementation of these management actions and future projects, if necessary, will directly result in a reduction of the volume of groundwater that will be pumped from the Basin and consequently mitigation of the estimated storage deficit within the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions.

6.4.5 Permitting and Regulatory Process for the Groundwater Pumping Fee Program [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

SGMA's enabling legislation included establishing California Water Code § 10730. This legislation states that:

> *A groundwater sustainability agency may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs of a groundwater sustainability program, including, but not limited to, preparation, adoption, and amendment of a groundwater sustainability plan, and investigations, inspections, compliance assistance, enforcement, and program administration, including a prudent reserve. A groundwater sustainability agency shall not impose a fee pursuant to this subdivision on a de Minimis extractor unless the agency has regulated the users pursuant to this part.*

Some elements of the Groundwater Pumping Fee program may be subject to CEQA and Proposition 218 requirements. The program will be developed in accordance with all applicable groundwater laws and respect all groundwater rights.

6.4.6 Implementation Timeline for the Groundwater Pumping Fee Program [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The management action described in this section is deemed critical for funding the operations of the SABGSA and for the successful implementation of this GSP and is included in the Tier 1 implementation category. The SABGSA member agencies will initiate work on Tier 1 management actions within 1 year of GSP adoption. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. This phase is anticipated to take from 12 to 18 months. Metering will be required with implementation of this GSP with all non-de minimis wells in the Basin to be equipped with meters, or an SABGSA approved alternative method of extraction measurement, within 12 months of GSP acceptance by DWR. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program will result in immediate benefit to the Basin. The program

will be ongoing throughout the GSP implementation period with periodic fee structure reviews to occur as annual adjustments to the pumping allocations are made and the effectiveness of the implemented management actions, and potential projects, are assessed.

6.4.7 Anticipated Benefits for the Groundwater Pumping Fee Program [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

The primary purpose of the program will be to provide a source of funding for SABGSA operations and basin future monitoring. Funding may also be used for the development and implementation of management actions and potential future projects.

As a critical element of the GSP implementation, the Groundwater Pumping Fee Program is expected to mitigate a portion of the estimated storage deficit by motivating groundwater users to reduce pumping or pump groundwater supplies in a sustainable fashion. In 2018, there was an estimated 7,329 acres of irrigated cropland in the Basin with a corresponding water demand of approximately 14,545 AFY. Assuming a groundwater pumping fee program would result in a 5 percent reduction in basin-wide agricultural pumping on an annual basis, the resulting benefit would be approximately 725 AFY.

The Groundwater Pumping Fee Program will contribute to the avoidance of undesirable results, including chronic lowering of groundwater levels, reduction of groundwater in storage, and potentially degraded water quality. The benefits to the Basin may vary significantly depending upon levied fees, water year, and available transfers/banked groundwater extraction credits, as described in Management Action 7 (see Section 6.9).

6.4.8 Legal Authority for the Groundwater Pumping Fee Program [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

SGMA's enabling legislation included establishing California Water Code § 10730. This legislation states that:

> *A groundwater sustainability agency may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs of a groundwater sustainability program, including, but not limited to, preparation, adoption, and*

amendment of a groundwater sustainability plan, and investigations, inspections, compliance assistance, enforcement, and program administration, including a prudent reserve. A groundwater sustainability agency shall not impose a fee pursuant to this subdivision on a de Minimis extractor unless the agency has regulated the users pursuant to this part.

6.4.9 Cost and Funding for the Groundwater Pumping Fee Program [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Planning-level development cost for establishing the Groundwater Pumping Fee Program is estimated to be approximately $100,000 to $200,000 and separate from development of this GSP.

Potential sources of funding for the Groundwater Pumping Fee Program components include state grants, contributions from SABGSA member agencies, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.4.10 Drought Offset Measures for the Groundwater Pumping Fee Program [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The development and implementation of the mandatory Groundwater Pumping Fee Program within the Basin will result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. This program will also provide financial incentives to basin pumpers to reduce groundwater extractions.

As monitoring of the groundwater levels in the Basin occurs in the future, the SABGSA will quantify the beneficial impact that the implemented management actions are having on the condition of the Basin which will allow for future refinements in the basin water budget. The information acquired will be critical to the SABGSA in making informed adaptive management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought can offset by increases in groundwater levels or storage during other periods.

6.5 Tier 1 Management Action 3 – Well Registration and Well Meter Installation Programs [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

In conjunction with the pumping fee program, the SABGSA will require that all groundwater production wells, including wells used by de minimis pumpers, be registered with the SABGSA. If the wells have a meter, the meter should be calibrated on a regular schedule in accordance with manufacturer standards and any programs developed by the SABGSA. Well registration is intended to establish a relatively accurate count of all the active wells, including an accurate location of each well, in the Basin. Well metering is intended to improve estimates of the amount of groundwater extracted from the Basin. SGMA does not authorize GSAs to require metering of de minimis (and domestic) well users, and therefore well metering will be limited to non-de minimis wells.

The information to be acquired through the well registration program can be used by the SABGSA for the purposes of potential risk and impact assessment with regard to the water supply adequacy and water quality for domestic and community drinking water wells within the Basin. If the information obtained through the well registration program indicates that there is a potential for adverse impacts to the future water supply adequacy or water quality of domestic and/or community drinking water supply wells then the SABGSA can elect to develop and implement a Drinking Water Well Impact Mitigation Program.

The SABGSA will require all non-de minimis groundwater pumpers to report extractions annually and use a water-measuring method satisfactory to the SABGSA in accordance with Water Code § 10725.8. For the purposes of this management action, de minimis users shall be defined as “a pumper who extracts, for domestic purposes, two acre-feet or less (of groundwater) per year.” It is anticipated that the SABGSA will develop and adopt guidelines and a regulatory framework to implement this program, which may also include a system for reporting and accounting for water conservation initiatives, voluntary irrigated land fallowing (temporary and permanent), storm water capture projects, or other activities that individual pumpers may elect to implement. The information collected will be used to account for pumping that would have otherwise occurred, to provide additional information to be used by the SABGSA for analyzing projected basin conditions, updating the HCM, and completing annual reports and 5-year GSP assessment reports for DWR.

The existing water supply wells that are operated by the LACSD are currently fully metered and groundwater extractions are reported at least annually to the Regional Water Quality Control Board (RWQCB). However, extraction measurements by private well owners within the Basin have not been heretofore required.

Extractions from these wells, which are used primarily for irrigated agricultural operations, will be required to be metered and extractions reported.

Agriculture irrigators have voiced concerns regarding the costs associated with the requirement for meters. Although the cost associated with installing and maintaining meters is a legitimate concern, meters can improve the overall management of water and improve the efficiency of the groundwater supply system, over the long term, and the resulting improvement of water efficiency provides a return on the investment. Research and on-the-ground observations have demonstrated that greater water use efficiency directly benefits pumpers by lowering pumping and distribution costs and reducing water use. Research at the Irrigation Technology Center at Texas A&M University has demonstrated that water measurement by itself can reduce crop irrigation water use by 10 percent. When measurement was combined with education about proper on-farm irrigation management, water use was reduced by 20 to 40 percent (TWRI, 2001).

As a Tier 1 management action, the SABGSA plans to initiate a pilot program to determine the most feasible means of complying with SGMA's measurement provision within 1 year of GSP adoption. The measurement alternatives and data processing methods to be evaluated may include the following:

- Use of power records to correlate energy usage with volume of water pumped
- Conventional mechanical or magnetic flow meters
- Automated meter infrastructure systems

Although the SABGSA does not have permitting authority for issuing permits for new well construction within the Basin (permits for new wells are required to be obtained from the Santa Barbara County Department of Public Health Environmental Health Services), the SABGSA will require registration of all new wells and the installation of meters on those wells and may require a CEQA analysis before the new well can be placed into operation. For the purposes of this action, a new well will be any new non-de minimis well that is issued a construction permit after the date that the GSP is submitted to DWR. Given that the Basin currently has a storage deficit, the SABGSA may elect to place a limitation on the volume of water that can be pumped annually from any new well or new production from existing wells. The SABGSA may also consider modifying the pumping limitations that are placed on new wells and production in conjunction with the development of the Groundwater BPA Program (see Management Action 6 in Section 6.8).

6.5.1 Relevant Measurable Objective(s) for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The management action described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of the volume of water being extracted from the Basin, from both municipal agencies and the agricultural groundwater pumpers in the Basin, both from a spatial and temporal perspective. The information that will be gained through this management

action will provide the basis for future refinements in the basin HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). The installation of metering on non-de minimis wells may result in a reduction in the volume of groundwater extracted on an annual basis. These reductions may result in benefits to the Basin, including:

- **Groundwater Elevation Measurable Objectives:** Water Use Efficiency Programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of Water Use Efficiency Programs will focus on identifying best water use practices that will reduce pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- **Land Subsidence Measurable Objectives:** Water Use Efficiency Programs will focus on reducing pumping through water conservation, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** Water Use Efficiency Programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations, which will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and TDS infiltrating to the aquifer.

6.5.2 Implementation Triggers for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The management action described in this section is deemed critical for the successful implementation of this GSP and is included in the Tier 1 implementation category. The SABGSA will initiate work on the Tier 1 management actions within 1 year of GSP adoption. This management action is not directly linked to any of the SMCs (see Section 4). This management action is linked to the pumping fee program and is a prerequisite to the implementation of the Groundwater BPA Program (see Management Action 6 in Section 6.8).

6.5.3 Public Notice Process for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

Public outreach meetings, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the groundwater pumpers, municipal and domestic pumpers, rural residents and other stakeholders regarding the development and implementation of the Well Registration and Well Metering Program. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how the management actions related to registering wells and the requirements for groundwater extraction measurement are being implemented in the Basin. The public outreach meetings will be supplemented with informational mailers to be sent to all well owners in the Basin and informational press releases will be distributed to local media. It is probable that SABGSA representatives will need to contact some individual well owners to explain the program requirements and help some well owners in achieving compliance.

As additional information is gained through the implementation of these management actions, it will be conveyed to the participants in future public outreach meetings and will contribute to the database that is the basis for future refinements in the basin HCM and the basin water budget (see Sections 3.1 and 3.3, respectively). These future refinements will also be provided through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.5.4 Overdraft Mitigation for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

The management action described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of the volume of water being extracted from the Basin, from both pumpers meeting municipal and public drinking water demands and by the agricultural groundwater pumpers in the Basin, both from a spatial and temporal perspective. The

information that will be gained through this management action will help the SABGSA better understand the causes of the storage deficit and how it can be mitigated. Although extremely valuable and important, the implementation of this management action will not have any direct impact on the mitigation of the estimated storage deficit as described in Section 3.3. Studies have shown that metering results in some reduction in pumping.

6.5.5 Permitting and Regulatory Process for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

To provide for implementation of this management action, the SABGSA will develop a program that requires all non-de minimis extractors to report extractions and use a water-measuring method satisfactory to the SABGSA in accordance with Water Code § 10725.8. It is anticipated that the SABGSA will adopt a regulation governing the Well Registration and Well Meter Installation Program.

6.5.6 Implementation Timeline for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The management action described in this section is deemed critical for the successful implementation of this GSP and is included in the Tier 1 implementation category. The SABGSA member agencies will initiate work on Tier 1 management actions within 1 year of GSP adoption. This management action is a prerequisite to the implementation of the Groundwater BPA Program (see Management Action 6 in Section 6.8).

6.5.7 Anticipated Benefits for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

The management action described in this section will be designed and implemented for the specific purpose of obtaining valuable data that will allow an enhanced understanding of the volume of water being extracted from the Basin, from pumpers meeting municipal and public drinking water demands and by the agricultural groundwater pumpers in the Basin, both from a spatial and temporal perspective. The information that will be gained through this management action will provide improved understanding of groundwater extractions so that other actions, including the BPA can be effectively managed. In addition, the information acquired though the implementation of this management action will help guide the SABGSA in determining the optimal strategy for sequencing the implementation of the higher tiered management actions and projects should they be necessary, which are described in Sections 6.5 through 6.10. This management action is a prerequisite to the implementation of the Groundwater BPA Program (see Management Action 6 in Section 6.8).

Additionally, studies have shown that the installation of meters on wells can directly result in reduced groundwater pumping by 10 percent or more. For perspective, assuming the meter installation program achieves 5 percent reduction in pumping, the resulting benefit would be approximately 725 AFY.

6.5.8 Legal Authority for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

The legal authority to empower the SABGSA to require well registration and groundwater extraction by pumpers in the Basin is included in SGMA. For example, Water Code § 10725.8 authorizes a SABGSA to require through their GSP that the use of every groundwater extraction facility (except those operated by de minimis extractors) be measured.

6.5.9 Cost and Funding for the Well Registration and Well Meter Installation Programs [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Planning-level costs for developing and establishing the Well Registration and Well Meter Installation Programs are estimated to be approximately $75,000 to $150,000 (not including the cost of meters) and are separate from development of this GSP. According to Water Code § 10725.8(b), costs associated with individual measurement devices are to be borne by the well owner/operator, so the cost exposure to SABGSA member agencies for implementing Well Registration and Well Metering Programs can be distributed among all well owners, including de minimis. Depending on the method of extraction measurement that the SABGSA ultimately approves, the costs associated with the selected method to measure and record groundwater extractions within the Basin may vary widely, based on the requirements for equipment, infrastructure, installation, and for operations and maintenance. Since the SABGSA members that provide public water supplies already fund and operate extraction metering facilities, most of the costs associated with the acquisition and installation of metering equipment will be borne by the owner's wells used for agricultural irrigation water supply and other non-de minimis uses.

Potential sources of funding for the Well Registration and Well Meter Installation Programs' components include state and Santa Barbara County grants, contributions from SABGSA member agencies, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.5.10 Drought Offset for the Measures Well Registration and Well Meter Installation Programs [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The information that will be gained through the metering of all non-de minimis groundwater pumpers will provide improved understanding of groundwater extractions so that other actions, including the BPA, can be effectively managed. In addition, the metered groundwater extraction data would be used in the development and administration of the GEC Marketing and Trading Programs should it be necessary. The information acquired through well metering will be critical to the SABGSA's ability to make informed adaptive

management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought can be offset by increases in groundwater levels or storage during other periods.

6.6 Tier 1 Management Action 4 – Water Use Efficiency Programs [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

In the 2019 update of the Integrated Regional Water Management Plan, Santa Barbara County identified the development and implementation of Water Use Efficiency Programs as recommended resource management strategies (Santa Barbara County, 2019). The SABGSA has also identified the implementation of Water Use Efficiency Programs, for both public water agencies and agricultural groundwater pumpers, as a Tier 1 management action. The Water Use Efficiency Programs are generally described as follows:

- **Urban Water Use Efficiency Programs:** Initiatives that promote increasing water use efficiency by achieving reductions in the amount of water used for municipal, commercial, industrial, landscape irrigation, and aesthetic purposes. These programs can include incentives, public education, technical support, and other efficiency-enhancing programs.
- **Agricultural Water Use Efficiency Programs:** Initiatives that promote increasing water use and irrigation efficiency and achieving reductions in the amount of water used for agricultural irrigation. These programs can include incentives, public education, technical support, training, implementation of best water use practices, and other efficiency-enhancing programs.

Urban and agricultural water use efficiency has been practiced in the Basin for more than two decades and have been effective in significantly reducing water use within the region. Existing programs promote responsible design of landscapes and appropriate choices of appliances, irrigation equipment, and the other water-using devices to enhance the wise use of water. In recent years, many agencies in the state have passed regulations that require efficient plumbing devices, appliances, and landscape designs. Some of the agencies in the Basin offer programs that provide rebates to customers as an incentive to conserve. Over the years, agricultural water users have consistently improved irrigation methods (e.g., conversion to drip irrigation systems).

The water use efficiency management actions to be developed for implementation by municipal, agricultural, and domestic pumpers will promote expansion and supplementation of the water use efficiency programs that currently exist. These programs will also be developed to be aligned with the requirements of water conservation mandates that been put in place by the State of California. These include conservation mandates contained in Senate Bill (SB) 606 and Assembly Bill (AB) 1668. Both bills were signed into law in

May 2018. Based on that legislation, indoor residential use is to be capped at 55 gallons per capita per day (gpcd) in 2019 and ramped down to 50 gpcd by 2030, and outdoor residential use is to be capped in the future based on local climate and size of landscaped areas. Standards for outdoor usage are to be defined in a SWRCB rule-making process to be completed by June 2022. Effective urban water use efficiency measures could include:

- High water use outreach (e.g., high use reports)
- Meter audits to proactively detect leaks (e.g., leak reports)
- Rebates on water-saving fixtures (e.g., clothes/dish washers)
- Rebates on sustainable landscape conversion programs (e.g., Cash for Grass)
- Water awareness outreach events (e.g., library/outdoor market events)
- Enhanced efficient irrigation/best water use practices
- U.S. Environmental Protection Agency's WaterSense Program Alignment (e.g., Fix-a-Leak Week)

As described in Section 3.3, groundwater pumping from the Basin for agricultural irrigation represents a significant demand. For this reason, the SABGSA will strongly encourage and incentivize pumpers to implement the most effective water use efficiency methods applicable, often referred to as best practices. Additionally, provisions of the Water Conservation Act (amending Division 6, Part 2.55 of the Water Code) passed into law in November 2009 regarding agricultural water conservation and management. While these new laws do not require water use objectives or savings thresholds, they do encourage more efficient use of water by the agricultural sector and its suppliers. It is anticipated that industry leaders in the Basin will assist the SABGSA in facilitating workshops and technical training programs or support the implementation of other programs designed to communicate what the latest best water use practices are for their industry. Effective best water use practices could result in:

- Enhanced efficient irrigation/best water use practices.
- Irrigation audits and delivery of technical support for optimizing water use.
- Development of new weather stations and automated data for landowners using frost protection.
- Conversion to non-water intensive methods for frost protection.
- Increased use of soil amendments (organic compost) to improve health of soils, plant health, and reduce water use.
- More optimal irrigation practices by monitoring crop water use with soil and plant monitoring devices and tie monitoring data to evapotranspiration estimates.
- Conversion from high water demand crops to lower water demand crops.
- Use of satellite spectral/remote sensing data to refine irrigation practices.

Many growers already use best water use practices, but improvements can be made. A goal of promoting best water use practices is to broaden their use to more growers in the Basin. Rural de minimis groundwater users will be encouraged to use these best practices as well. Promoting best water use practices will include broad outreach to groundwater pumpers in the Basin to emphasize the importance of using best practices and understanding their positive benefits for mitigating declining groundwater levels and forestalling potential mandated limitations in groundwater extraction on their property.

The SABGSA will also collaborate with other entities that can offer resources and technical assistance to the water users in the Basin. The organizations will include the Cachuma Resource Conservation District; the U.S. Department of Agriculture, Natural Resources Conservation Service, Conservation Technical Assistance

Program; California Water Efficiency Partnership; Santa Barbara Water Wise Program; and the California Polytechnic State University Irrigation Training and Research Center.

6.6.1 Relevant Measurable Objective(s) for the Water Use Efficiency Programs [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The measurable objectives benefiting from the implementation of Water Use Efficiency Programs include:

- **Groundwater Elevation Measurable Objectives:** Water use efficiency programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of water use efficiency programs will focus on identifying best practices that will reduce pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- **Land Subsidence Measurable Objectives:** Water use efficiency programs will focus on reducing pumping through water conservation, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** Water use efficiency programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations which will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and TDS infiltrating to the aquifer.

6.6.2 Implementation Triggers for the Water Use Efficiency Programs [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The management action described in this section is deemed critical for the successful implementation of the GSP and is included in the Tier 1 implementation category. The SABGSA member agencies will initiate work on Tier 1 management actions within 1 year of GSP adoption.

6.6.3 Public Notice Process for the Water Use Efficiency Programs [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

Targeted outreach meetings and technical and training workshops, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the groundwater pumpers, municipal and domestic pumpers, rural residents and other stakeholders regarding the development and implementation of the water use efficiency workshops. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to learn about water conservation methods, technologies, and best practices as well as the opportunity to provide input and comments on how the management actions related to development, implementation and performance of the water use efficiency programs that are being implemented in the Basin. The targeted public outreach meetings and technical and training workshops will be supplemented with informational mailers to be sent to all well owners and water agency customers in the Basin and informational press releases will be distributed to local media. If deemed valuable, the SABGSA representatives may work directly with individual well owners to explain program requirements and help with program implementation. The Water Use Efficiency Programs will also be promoted through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.6.4 Overdraft Mitigation for the Water Use Efficiency Programs [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

The development and implementation of Water Use Efficiency Programs within the Basin are intended to directly result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions that occur as a result of the implementation of both urban and agricultural water efficiency programs will directly result in groundwater pumping demand reductions and mitigation of the estimated storage deficit within the Basin.

6.6.5 Permitting and Regulatory Process for the Water Use Efficiency Programs [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

No permitting or regulatory process is needed for the development and implementation of urban and agricultural water use efficiency programs.

6.6.6 Implementation Timeline for the Water Use Efficiency Programs [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The management action described in this section is deemed critical for the successful implementation of this GSP and included in the Tier 1 implementation category. The SABGSA member agencies will initiate

work on Tier 1 management actions within 1 year of GSP adoption. These management actions are directly linked to the SMCs (see Section 4) and will help the Basin achieve the groundwater elevation, groundwater storage, land subsidence, and interconnected surface water measurable objectives.

6.6.7 Anticipated Benefits for the Water Use Efficiency Programs [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

The benefits to the Basin from the implementation of Water Use Efficiency Programs include:

- Water use efficiency programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations.
- The implementation of water use efficiency programs will focus on identifying best practices that will reduce pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- Water use efficiency programs will focus on reducing pumping through water conservation, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- Water use efficiency programs will focus on reducing pumping through water conservation. Less pumping will result in higher groundwater elevations which will eventually benefit GDEs.

For perspective, the implementation of water use efficiency and best management practices have been shown to reduce water usage by up to 20 percent or more. Assuming basin-wide implementation of these programs achieves a 10 percent reduction in pumping, the resulting benefit would be approximately 2,360 AFY.

6.6.8 Legal Authority for the Water Use Efficiency Programs [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

Regulatory compliance resides with those provisions of the Water Conservation Act of 2009, AB 1668, and SB 606 now codified into state law.

6.6.9 Cost and Funding for the Water Use Efficiency Programs [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Planning-level development costs for establishing the Water Use Efficiency Programs are estimated to be approximately $50,000 to $125,000 and separate from development of this GSP.

Potential sources of funding for the Water Use Efficiency Programs' components include state grants, contributions from SABGSA member agencies, Cachuma Water Conservation District, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.6.10 Drought Offset Measures for the Water Use Efficiency Programs [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The development and implementation of Water Use Efficiency Programs within the Basin will directly result in a reduction of the volume of groundwater that will be pumped from the Basin which will contribute to the mitigation of the estimated storage deficit within the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions.

As monitoring of the groundwater levels in the Basin occur in the future, the SABGSA will quantify the beneficial impact that the water use efficiency initiatives are having on the condition of the Basin, which will allow for future refinements in the basin water budget (see Section 3.3). The information acquired will be critical to the SABGSA in making informed adaptive management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought can be offset by increases in groundwater levels or storage during other periods.

6.7 Tier 2 Management Action 5 – Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

The volume of groundwater that is pumped from the Basin in recent years is more than the estimated basin yield of about 8,900 AFY. This condition has led to a persistent deficit of groundwater in storage. Although there will be benefits to the Basin because of the other management actions and potential future project implementation, the SABGSA has determined that the volume of groundwater being pumped must be reduced to the sustainable yield of the Basin. To achieve this goal, the SABGSA may develop and implement a regulatory program to equitably allocate a groundwater BPA volume of water to be pumped from the Basin annually. Once the program is implemented, individual non-de minimis pumper's will be provided an annual groundwater BPA which will start at historically used quantities of water and ramp down over time to bring pumping in the Basin within its sustainable yield by 2042. As described in SGMA, any limitation on extractions by the SABGSA "shall not be construed to be a final determination of rights to extract groundwater from the basin or any portion of the basin" (Water Code § 10726.4(a)(2)).

The amount of needed pumping reduction in the future is uncertain and will depend on several factors, including climate conditions, the effectiveness and timeliness of voluntary actions by pumpers, and the success of other management actions described in this GSP. The water budget presented in Section 3.3 indicates that the estimated annual storage deficit is approximately 10,600 AFY. It is reasonable to expect that the Tier 1 management actions may eliminate some of this deficit; however, it is likely that it will be necessary to implement the Groundwater BPA Program to have a demand management program that can be used by the SABGSA to achieve sustainability. The SABGSA may also consider implementing the BPA program if drought conditions persist. After GSP adoption, developing the Groundwater BPA Program would likely require the following steps:

- Establishing a methodology for determining baseline pumping considering:
  - Historical pumping
  - Sustainable yield of the Basin
  - Groundwater level trends
  - Land uses and corresponding irrigation requirements
- Establishing a methodology to determine individual annual allocations considering documented historical water use, opportunities for improved efficiency, and evaluation of anticipated benefits from other relevant actions individual pumpers may take. Alternatively, the SABGSA may define the allocations based on acreage and crop type.

- A timeline for implementing limitations on pumping ("ramp down") within the Basin as required to avoid undesirable results and reduce the impact on local growers.
- Approving a formal regulation to enact the program.

To develop the Groundwater BPA Program, the SABGSA may consider guidance developed by DWR in response to legislative directives for consistent implementation of the Water Conservation Act of 2009, as is used in Urban Water Management Plans. It is anticipated that the baseline pumping allocation schedule may be ramped down over time to meet basin groundwater extraction targets (consistent with the sustainable yield) until it is projected that groundwater levels will stabilize. Analyses will be updated periodically as new data are developed. The initial pumping ramp down schedule will be developed during program development. The rate of ramp down and ramp down schedules will depend on when the program starts and projections of how long and to what degree lower pumping rates are required to avoid undesirable results. The specific ramp down amounts and timing will be reassessed periodically and adjusted by the SABGSA as needed to achieve sustainability. These adjustments will occur when additional data and analyses are available. It is anticipated that groundwater monitoring data and the basin groundwater model will be used as a tool to evaluate alternative pumping reduction schemes and schedules.

It is anticipated that the Groundwater BPA Program will consist of the following general components: (1) estimation of the basin sustainable yield, (2) determination of pumping allocation amounts (i.e., groundwater extraction credits) for each non-de minimis pumper, and (3) pumping allocation reduction recommendations over the implementation period to reach the estimated sustainable yield by 2042. In summary, each non-de minimis groundwater user within the Basin will be assigned an allocation based on criteria to be established by the SABGSA. That allocation will be reduced incrementally, in accordance with the pumping ramp down schedule, as necessary until 2042 such that the total extraction from the Basin will be equal to the estimated sustainable yield at the end of that period. Non-de minimis groundwater users will be able to trade their groundwater extraction credits in accordance with SABGSA defined guidelines, but the total volume of pumping allowances within the Basin will decrease over time. The SABGSA understands that municipalities and public water agency groundwater pumpers have limitations regarding the volume of water that their agency is required to pump to meet customer demands. These limitations will be considered and addressed during the development of the Groundwater BPA Program. Actions taken to increase the amount of water available to the Basin through groundwater recharge or importation of water (see Section 6.11) will be considered when setting allocations.

The SABGSA realizes certain landowners will need or elect to periodically use an amount of groundwater in excess of their annual allocation. It is anticipated that the pumping fee policy will include provisions that will allow landowners, under special circumstances, to pump groundwater beyond the current groundwater allocation, but at considerably higher cost. To meet such demands while still avoiding undesirable results and sustaining the groundwater Basin, the SABGSA must employ other measures to manage demands within the sustainable yield of the Basin.

In addition, the SABGSA may incorporate supplemental conditions to be placed on new wells and new production from existing wells in the Basin in conjunction with the development of the Groundwater BPA Program. For the purposes of this action, a new well will be any new non-de minimis well that is issued a construction permit after the date that the GSP is adopted. Given that the Basin currently has an estimated storage deficit, the SABGSA may elect to place an adjustment factor in the groundwater BPA that would establish an additional limitation on the volume of water that can be pumped annually from any new well and new production from existing wells.

6.7.1 Relevant Measurable Objective(s) for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The measurable objectives benefiting from the implementation of the Groundwater BPA Program include:

- **Groundwater Elevation Measurable Objectives:** The Groundwater BPA Program will focus on reducing pumping which will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of the Groundwater BPA Program will focus on reducing pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- **Land Subsidence Measurable Objectives:** The Groundwater BPA Program will focus on reducing pumping, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** The Groundwater BPA Program will focus on reducing pumping which will result in higher groundwater elevations which will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and TDS infiltrating to the aquifer.

6.7.2 Implementation Triggers for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The management action described in this section is included in the Tier 2 implementation category and will be considered by the SABGSA if previous management actions do not achieve the sustainability goals. If necessary, the SABGSA will initiate work on Tier 2 management actions within 3 years of GSP adoption. This timeframe allows for development of funding to be obtained and put in place and to establish the metering program that supports this management action. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. This phase is anticipated to take from 12 to 18 months. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program will result in immediate benefit to the Basin. The program will be ongoing throughout the GSP implementation period as annual adjustments to the pumping allocations are made. It is anticipated that the pumping ramp down schedules will be revisited annually, if not more frequently.

6.7.3 Public Notice Process for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

The Groundwater BPA Program will be developed in an open and transparent process. Targeted outreach meetings and technical workshops, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the non-de minimis groundwater pumpers and other stakeholders about the details of the Groundwater BPA Program. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to learn about the programs, as well as the opportunity to provide input and comments on how the allocation program is being developed and implemented in the Basin. The targeted public outreach

meetings and technical workshops will be supplemented with informational mailers to be sent to all non-de minimis well owners and growers in the Basin and informational press releases will be distributed to local media. If deemed valuable, SABGSA representatives may work directly with individual well owners to explain program requirements and help with program implementation. The Groundwater BPA Program will also be promoted through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.7.4 Overdraft Mitigation for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

Implementation of the Groundwater BPA Program within the Basin will directly result in a reduction of the volume of groundwater that will be pumped from the Basin because the SABGSA assigns specific extraction allocations on an annual basis that can be adjusted depending upon observed groundwater levels. These reductions in pumping would occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions associated with this program are intended to directly result in groundwater pumping demand reductions and mitigation of the estimated storage deficit within the Basin.

6.7.5 Permitting and Regulatory Process for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

Any permitting or other regulatory compliance requirements will be identified and pursued during the initial phase of the implementation of this management action. Consistent with Water Code § 10730(a), this initial phase of an allocation program will exclude those well owners who extract less than 2 AFY (i.e., de minimis extractors).

The mandatory Groundwater BPA Program will be subject to CEQA. The program will be developed in accordance with all applicable groundwater laws and respect all groundwater rights.

6.7.6 Implementation Timeline for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The management action described in this section may be considered for implementation by the SABGSA within 3 years of GSP adoption. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. This phase is anticipated to take from 12 to 18 months. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program will result in immediate benefit to the Basin. The program will be ongoing throughout the GSP implementation period as annual adjustments to the pumping allocations are made. It is anticipated that the pumping ramp down schedules will be revisited annually, if not more frequently.

6.7.7 Anticipated Benefits for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

The Groundwater BPA Program will result in the avoidance of undesirable results, including chronic lowering of groundwater levels, reduction of groundwater in storage, depletion of surface water, and potentially degraded water quality. Peripheral benefits may include potential investment in alternate land uses or taking advantage of the groundwater extraction credits (discussed later) and/or land fallowing management programs. To achieve the required reductions, the non-de minimis pumpers will be incentivized to implement conservation measures resulting in more efficient use of water and greater resiliency to long-term climate variability.

6.7.8 Legal Authority for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

SGMA provides the SABGSA with authority to: "control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate…or otherwise establishing groundwater extraction allocations" (Water Code § 10726.4(a)).

6.7.9 Cost and Funding for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Planning-level development cost for establishing the Groundwater BPA Program is estimated to be approximately $75,000 to $150,000 and separate from development of this GSP.

Potential sources of funding for the Groundwater BPA Program components include state grants, contributions from SABGSA member agencies, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.7.10 Drought Offset Measures for the Groundwater Base Pumping Allocation (BPA) Program [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The development and implementation of the Groundwater BPA Program within the Basin will directly result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions that occur because of the implementation of this program will directly result in groundwater pumping demand reductions and mitigation of the estimated storage deficit within the Basin.

As monitoring of the groundwater levels in the Basin occurs in the future, the SABGSA will quantify the beneficial impact that the groundwater allocation initiatives are having on the condition of the Basin which will allow for future refinements in the basin water budget. The information acquired will be critical to the SABGSA in modifying the allocations and pumping ramp-down schedule over time and making informed adaptive management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought can be offset by increases in groundwater levels or storage during other periods.

6.8 Tier 2 Management Action 6 – Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

As previously described, the SABGSA will develop and implement a regulatory program to equitably allocate a pre-determined groundwater BPA to be extracted from the Basin annually. As necessary, individual non-de minimis pumper's allocations will be ramped down over time to bring pumping in the Basin to within its sustainable yield by within 20 years of the adoption of the GSP. In conjunction with the Groundwater BPA

Program, the SABGSA will pursue the development and implementation of a GEC Marketing and Trading Program to provide non-de minimis users with increased flexibility in using their annual allocations. The program will enable voluntary permanent transfer of allocations between parties, through an exchange of GECs. In addition, the program will provide options for potentially long-term or short-term temporary transfer of GECs, including credits derived from voluntary fallowing or conversion to lower water use crops (see Section 6.9). The program is intended to allow groundwater users or new development to acquire needed groundwater allocation, in the form of GEC, from other pumpers to maintain economic activities in the Basin, encourage and incentivize water conservation, encourage and incentivize temporary and permanent fallowing of agricultural lands, encourage conversion to lower water use crops, and facilitate a ramp-down of pumping allocations as water demands and basin conditions fluctuate during the 20-year GSP implementation period.

If needed and upon adoption and implementation of the Groundwater BPA Program, the SABGSA would allocate a specific volume of allowable groundwater use (pumping allowance) to non-de minimis pumpers consistent with the finalized groundwater BPA. During the initial years, the groundwater BPA is anticipated to be marginally decreased from historical levels. This will provide an opportunity for existing pumpers to prepare for and implement changes to their operations to accommodate potentially more aggressive reductions in annual pumping allocations in subsequent years and allow the SABGSA to evaluate the impacts from the previously implemented management actions. The subsequent annual allocations are anticipated to be ramped down more aggressively. Each year during GSP implementation, the SABGSA would publish a 5-year look-ahead schedule of the projected annual pumping allowances. Non-de minimis pumpers will be able to privately negotiate the sale of all or a portion of their groundwater pumping extraction credit allowance with willing purchasers, within the confines and rules of the GEC Marketing and Trading Program managed by the SABGSA. Upon agreement between pumpers, a proposed trade would be submitted to the SABGSA for review and approval, or separate mechanisms may be established regarding trades. If approved, the credit exchange parties would be notified, the trade certified, and the SABGSA would update the official, publicly accessible register to notate the trade and the updated annual pumping allowances. The provisions of the Groundwater BPA Program will provide that a percentage of all traded groundwater BPA credits be transferred to the SABGSA to be used to improve the conditions of the Basin and achieve sustainability goals.

The SABGSA will agree upon and approve details of the GEC Marketing and Trading Program, which may include either temporary or permanent water allocation transfers, or both. Each user's pumping allowance will represent and entitle the user to extract a specific volume of groundwater established by the SABGSA, adjusted commensurate with the ramp-down pumping reduction schedule developed by the SABGSA and where applicable, extraction credits between non-de minimis pumpers. The GEC Marketing and Trading Program will be structured by the SABGSA to prevent unintended consequences, such as hoarding, collusion, out-of-basin transfers, off-site well interference, price-fixing, or speculation. For example, to prevent hoarding, the SABGSA could cap the groundwater BPA held by an individual at a maximum percentage of the total groundwater BPA allocated to all users in the Basin. If warranted, the GEC Marketing and Trading Program will be reviewed annually during GSP review and updated as needed to address unintended consequences or other unanticipated program deficiencies. The program will likely include requirements for demonstrating actual water use within a specified period of time for irrigated lands that are being used as a credit and may include requirements and limitations regarding spatial limitations between which properties the GEC's can be traded. For example, the SABGSA may not agree to approve a GEC transfer between properties located at opposite ends of the Basin.

The SABGSA may adopt a policy to define groundwater extraction carryover provisions year-to-year and/or allow multi-year pumping averages. The inter-annual flexibility may be useful to growers who could change cropping patterns or fallow acreage. Though there is a risk that extreme drought may induce exceptionally

high pumping in a single year, under this program, groundwater users may be able to strategize and better manage their assets. The goal of the groundwater extraction credit carryover structure is to provide groundwater pumpers with more flexibility in using their groundwater allocation year to year.

The anticipated development approach of the GEC Marketing and Trading Program by the SABGSA is as follows:

- Identify stakeholders/participants and conduct interviews and meetings to receive input and identify concerns to be addressed in program development.
- Evaluate existing programs in other basins and guidance from the DWR.
- Identify potential unintended consequences of the GEC Marketing and Trading Program to be addressed in development of governing documents (i.e., hoarding, out-of-basin transfers, off-site well interference, speculation, price fixing, collusion, etc.).
- Present findings of the interviews and fact-finding effort and provide recommendations to the SABGSA.
- Collaborate with non-de minimis pumpers and SABGSA member agencies to develop the GEC Marketing and Trading Program.
- Draft preliminary regulations for the GEC Marketing and Trading Program (i.e., allowable frequency and amount of water to be traded), allowable water uses (i.e., area of origin/spatial restrictions, fees and penalties requirements, accounting scope, enforcement requirements, etc.).
- Develop a governing structure for GEC trades and program administration.
- Develop a monitoring and enforcement structure.
- Develop and test an accounting/register system to track groundwater BPA, pumping allowance, GEC trades and compliance through metering of groundwater production.
- Determine applicability of CEQA review to GEC Marketing and Trading Program.
- Finalize the details of the initial GEC Marketing and Trading Program into a comprehensive GEC Marketing and Trading Program Policy document to be approved by the SABGSA.
- Adopt GEC Marketing and Trading Program implementing regulations.

6.8.1 Relevant Measurable Objective(s) for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The GEC Marketing and Trading Program is intended to avoid undesirable results in the Basin by providing incentives and flexibility to basin pumpers for water conservation, the transfer of GECs between users to allow voluntary fallowing and other beneficial uses, conversion of irrigated lands to dry land farming operations, and the reduction of water intensive land uses. The program will be implemented in a manner

consistent with the annual groundwater BPAs and the schedule of pumping ramp downs necessary to achieve the sustainability objectives developed for the GSP.

The measurable objectives benefiting from the implementation of the GEC Marketing and Trading Program include:

- **Groundwater Elevation Measurable Objectives:** The GEC Marketing and Trading Program will provide pumpers with greater flexibility to conserve water, fallow irrigated cropland, and otherwise reduce pumping, which will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of the GEC Marketing and Trading Program will provide pumpers with greater flexibility to conserve water, fallow irrigated cropland, and otherwise reduce pumping, which will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- **Land Subsidence Measurable Objectives:** The GEC Marketing and Trading Program will provide pumpers with greater flexibility to conserve water, fallow irrigated cropland, and otherwise reduce pumping, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** The GEC Marketing and Trading Program will provide pumpers with greater flexibility to conserve water, fallow irrigated cropland, and otherwise reduce pumping, which will result in higher groundwater elevations that will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and TDS infiltrating to the aquifer.

6.8.2 Implementation Triggers for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The SABGSA member agencies will initiate work on Tier 2 management actions within 3 years of GSP adoption. The initial phase of the program will be focused on program design, policy and regulatory development, CEQA compliance, and stakeholder outreach. This phase is anticipated to take from 12 to 18 months. The Groundwater BPA Program (see Section 6.7) and the metering program (see Section 6.5), which will be developed in parallel with this program, will need to be developed and deployed before this management action can be initiated. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program will result in immediate benefit to the Basin and stakeholders by providing flexibility to landowners and allowing for credits to be held by the SABGSA for the

benefit of the Basin. The program will be ongoing throughout the GSP implementation period as annual adjustments to the pumping allocations are made.

6.8.3 Public Notice Process for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

The GEC Marketing and Trading Program will be developed in an open and transparent process. Targeted outreach meetings and technical workshops, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the non-de minimis groundwater pumpers and other stakeholders about the details of the GEC Marketing and Trading Program. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to learn about the program, as well as the opportunity to provide input and comments on how the GEC Marketing and Trading Program is being implemented in the Basin. The targeted public outreach meetings and technical workshops will be supplemented with informational mailers to be sent to all non-de minimis well owners and growers in the Basin and informational press releases will be distributed to local media. If deemed valuable, SABGSA representatives may work directly with individual well owners to explain program requirements and help with program implementation. The GEC Marketing and Trading Program will also be promoted through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.8.4 Overdraft Mitigation for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

The development and implementation of GEC Marketing and Trading Program, in conjunction with the implementation of the mandatory Groundwater BPA Program within the Basin, will directly result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions will mitigate the estimated storage deficit within the Basin.

6.8.5 Permitting and Regulatory Process for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

The SABGSA anticipates that CEQA review and compliance is required for the SABGSA to develop the GEC Marketing and Trading Program or for SABGSA adoption of the GEC Marketing and Trading Program policy. Individual trades may require compliance with CEQA requirements. The program will be developed and implemented in accordance with all applicable groundwater laws and respect all groundwater rights.

6.8.6 Implementation Timeline for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The SABGSA intends to initiate development of the GEC Marketing and Trading Program within 3 years of GSP adoption. The initial phase of work will be to conduct the appropriate stakeholder outreach, draft the policy development, obtain public comment and legal review, develop an accounting system, and finalize an initial GEC policy. This phase is anticipated to take from 12 to 18 months. The Groundwater BPA and Voluntary Agricultural Crop Fallowing Programs (see Sections 6.7 and 6.9, respectively) will be developed in parallel with this program. The Groundwater BPA Program and metering program will need to be developed and deployed before this management action can be initiated. The timetable for implementation of the GEC Marketing and Trading Program is dependent on the schedule to complete CEQA review should it be determined that implementation of the program requires CEQA review.

6.8.7 Anticipated Benefits for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

Once implemented, the program will result in immediate benefits to the Basin. The program will be ongoing throughout the GSP implementation period as annual adjustments to the pumping allocations are made.

As one of the central components to achieving sustainability within the Basin, the GEC Marketing and Trading Program will provide an economic incentive for conserving water, voluntary fallowing of irrigated agricultural croplands, and promote beneficial uses of water and land uses by providing for the potential to monetize voluntary water conservation or the elimination of water intensive uses. For example, the GEC could provide the pumpers in the Basin with the flexibility for replacement of water-intensive crop types with other land uses, such as residential development, lower water use hydroponics, or solar projects. It may also encourage restoration of irrigated lands for use as open or recreational space to shift pumping from areas of depressed groundwater levels to those more favorable for additional pumping. The implementation of the GEC Marketing and Trading Program will result in the avoidance of undesirable results, including chronic lowering of groundwater levels, reduction of groundwater in storage, and potentially degraded water quality, resulting in more efficient use of water and greater resiliency to long-term climate variability.

6.8.8 Legal Authority for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

It is the established policy of the State of California "to facilitate the voluntary transfer of water and water rights where consistent with the public welfare" (Water Code § 109(a)). Additionally, "The Legislature hereby finds and declares that voluntary water transfers between water users can result in a more efficient use of water, benefitting both the buyer and the seller" (Water Code § 475).

Under SGMA, the SABGSA can "authorize temporary and permanent transfers of groundwater extraction allocations within the agency's boundaries, if the total quantity of groundwater extracted in any water year is consistent with the provisions of the groundwater sustainability plan" (Water Code § 10726.4(a)(3)).

6.8.9 Cost and Funding for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

The planning-level development cost for establishing the GEC Marketing and Trading Program is estimated to be approximately $150,000 to $200,000; the cost of this program will be separate from the development of this GSP.

Potential sources of funding for the GEC Marketing and Trading Program components include state grants, contributions from SABGSA member agencies, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.8.10 Drought Offset Measures for the Groundwater Extraction Credit (GEC) Marketing and Trading Program [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The development and implementation of the GEC Marketing and Trading Program, in conjunction with the implementation of the mandatory Groundwater BPA Program within the Basin, will directly result in a reduction of the volume of groundwater that will be pumped from the Basin because water production using these credits will have a cost, resulting in more efficient water use. Likewise, the SABGSA will retain a percentage of the credits that will not be associated with basin pumping. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions will mitigate the estimated storage deficit within the Basin.

As monitoring of the groundwater levels in the Basin occurs in the future, the SABGSA will quantify the beneficial impact that the combined groundwater BPA and GEC initiatives are having on the condition of the Basin, which will allow for future refinements in the basin water budget. The information acquired will be critical to the SABGSA in modifying the allocations and pumping ramp-down schedule and making informed adaptive management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought which can be offset by increases in groundwater levels or storage during other periods.

6.9 Tier 2 Management Action 7 – Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

In 2020, there were approximately 13,459 acres of active irrigated agriculture within the Basin that were being irrigated with approximately 17,300 acre-feet (AF) of water on an average annual basis. Land fallowing has been used historically in other locations as both a temporary and permanent solution to water shortages, but the most effective programs are voluntary. In conjunction with GSP implementation, the SABGSA will develop and implement a voluntary fallowing program that will facilitate the conversion of high water use irrigated agriculture to low water use agriculture use or open space, public land, or other land uses on a voluntary basis. The SABGSA has identified voluntary agricultural crop fallowing is a necessary additional management action to achieve sustainability. The SABGSA will develop programs that will permit both voluntary temporary and long-term or permanent fallowing and conversion to other land uses. An important consideration in developing the voluntary fallowing program will be to include protections of water rights for the overlying landowners that choose to temporarily fallow ground.

Factors that will be considered during the development of the fallowing program include the current extent of agriculture land and documented water use, the intended land and water use after fallowing, and the potential environmental impacts associated with fallowing. These include airborne emissions through wind-blown dust, the introduction or spreading of invasive plant species, and changes to the landscape that could adversely affect visual quality. The land uses proximal to proposed fallowing projects will be considered as part of this management action. For example, there could be differing levels of site stabilization or restoration needed or required based on the land use intended post-fallowing. Temporary stabilization will be less expensive and may be appropriate for properties to be developed for other use in the near term. A passive restoration approach may be applied for permanent fallowing if the goal is for the property to eventually return to native habitat, and active restoration may be applied for relatively near-term restoration to native habitat with the goal of providing open space, parks, or public trails.

The initial program phase will be to evaluate key issues associated with program development as follows:

- Producing guidelines for maintaining water rights on land that is temporarily fallowed.
- Develop a framework for incentivizing landowners to voluntarily fallow.
- Develop and implement an incentive framework for conversion from irrigated agriculture to dry land farming.

- Develop parameters for receiving a credit based on past water use and criteria for documenting historical water use
- Evaluate future land use alternatives.
- Ensure avoidance of unintended consequences from unmanaged fallowed land.
- Identify land restoration goals.
- Identify land management, inspection, and enforcement procedures.
- Develop a regulatory document that includes rules for characterizing tracking fallowed ground as a GEC.
- Consider programmatic and/or project-based CEQA review.
- Develop a tracking system.

As part of this management action, the SABGSA will develop a basin-wide accounting system that tracks landowners who decide to voluntarily fallow their land and cease groundwater pumping or otherwise refrain from using groundwater. If given the opportunity to create a "placeholder" for their ability to pump under regulations adopted by the SABGSA, some property owners currently irrigating crops, or that might want to irrigate in the future, may choose to forego the expense of farming and extracting water if those rights can be accounted for and protected. The Voluntary Agricultural Crop Fallowing Programs will be developed in parallel to the Groundwater BPA and the GEC Marketing and Trading Programs (see Management Actions 5 and 6 in Sections 6.7 and 6.8, respectively). It is also noted that the Voluntary Fallowing Program may potentially be enhanced, or a separate program could be implemented, which may provide for SABGSA to lease or purchase agricultural land for fallowing. The SABGSA could use fees generated through the Groundwater Pumping Fee Program to lease/purchase the lands to be fallowed, if necessary or deemed desirable by the SABGSA. Additionally, the SABGSA may also consider purchasing groundwater extraction credits.

The implementation of voluntary fallowing programs within the Basin may benefit from the provisions of AB 252, which was introduced to the Assembly in January 2021. If passed, AB 252 would create the Multi-Benefit Land Repurposing Incentive Program, which is intended to help alleviate the impacts of SGMA on farmers and ensure that farmland taken out of production due to SGMA is reused to provide conservation, recreation, or other benefits to local communities. Specifically, this bill will create a pilot program to support repurposing formerly irrigated agricultural land for groundwater recharge, biodiversity conservation, pollinator habitat, cattle grazing, and other beneficial and less water-intensive uses. A primary goal of the Multi-Benefit Land Repurposing Program is to help make the critical transition to sustainable groundwater management. The program proposed in this bill also can reduce potential negative impacts of taking land out of production, such as spreading invasive weeds and greater dust emissions, and instead bring substantial benefits to rural communities and wildlife habitat.

6.9.1 Relevant Measurable Objective(s) for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

The measurable objectives benefiting from the implementation of Voluntary Agricultural Crop Fallowing Programs include:

- **Groundwater Elevation Measurable Objectives:** Voluntary fallowing programs will focus on reducing pumping, which will result in higher groundwater elevations.
- **Groundwater Storage Measurable Objectives:** This measurable objective is based on total pumping in the Basin. Therefore, the implementation of voluntary fallowing programs will focus on reducing pumping and will help achieve the goal of reducing total extractions to the long-term sustainable yield.
- **Land Subsidence Measurable Objectives:** Voluntary fallowing programs will focus on reducing pumping, thereby reducing the pumping stress on the local aquifer(s) and reducing the potential for subsidence.
- **Depletion of Interconnected Surface Water Measurable Objective:** Voluntary fallowing programs will focus on reducing pumping, which will result in higher groundwater elevations that will eventually benefit GDEs.
- **Degradation of Water Quality:** Improvements to water quality are expected as a result of reduction of fertilizer use and irrigation return flows to the aquifer, thereby limiting the amount of primarily nitrate and TDS infiltrating to the aquifer.

6.9.2 Implementation Triggers for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The SABGSA will initiate work on Tier 2 management actions within 3 years of GSP adoption. The initial phase of the program will be focused on program design, policy development, and stakeholder outreach. This phase is anticipated to take from 6 to 9 months. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program will result in immediate reductions in groundwater pumping, which will increase with the addition of fallowed lands and fluctuate depending on the nature and timing of converted land use.

6.9.3 Public Notice Process for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

Targeted outreach meetings and technical and training workshops, in addition to regularly scheduled SABGSA meetings, will be held periodically to inform the agricultural groundwater pumpers and other stakeholders about the details of the voluntary fallowing programs. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to learn about the programs as well as the opportunity to provide input and comments on how the fallowing initiatives are being implemented in the Basin. The targeted public outreach meetings and technical and training workshops will be supplemented with informational mailers to be sent to all agricultural well owners and growers in the Basin and informational press releases will be distributed to local media. If deemed valuable, SABGSA representatives may work directly with individual well owners to explain program requirements and help with program implementation. The Voluntary Agricultural Crop Fallowing Programs will also be promoted through annual GSP reports and links to relevant information on the SABGSA and member agencies' websites.

6.9.4 Overdraft Mitigation for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

The development and implementation of voluntary fallowing programs within the Basin will directly result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping

will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions that occur as a result of the implementation of the fallowing programs will directly result in groundwater pumping demand reductions and mitigation of the estimated storage deficit within the Basin.

6.9.5 Permitting and Regulatory Process for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

If necessary, the SABGSA will perform a CEQA evaluation for the Voluntary Agricultural Crop Fallowing Programs to identify potential environmental impacts and identify feasible alternatives or mitigation measures. Establishment of a voluntary land fallowing program is expressly authorized under SGMA (Water Code § 10726.2(c)). The fallowing program, including program standards, will be developed and undergo CEQA review, as necessary.

6.9.6 Implementation Timeline for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The SABGSA will initiate work on Tier 2 management actions within 3 years of GSP adoption. The initial phase of the program will be focused on program design, policy development, and stakeholder outreach. This phase is anticipated to take from 6 to 12 months. Full implementation of the program is anticipated following CEQA review, if needed. Once implemented, the program should result in immediate groundwater savings, which will continue to increase with addition of fallowed lands and fluctuate depending on the nature and timing of converted land use.

6.9.7 Anticipated Benefits for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

In addition to the benefits derived directly from reduced pumping, the program will allow for a level of land use and community planning for converted properties not otherwise available. Depending on the nature of land uses implemented, the program could result in increased recreational space or potential economic benefits from conversion of land use types. For example, the conversion of previously fallowed land to MAR projects may be investigated.

For perspective, in 2020, there was an estimated 14,459 acres of irrigated cropland in the Basin with a corresponding average water demand of approximately 17,300 AFY. A voluntary conversion or fallowing program involving 10 percent of the irrigated cropland would result in a benefit of approximately 2,360 AFY.

6.9.8 Legal Authority for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

Establishment of a voluntary land fallowing program is expressly authorized under SGMA (Water Code § 10726.2(c)).

6.9.9 Cost and Funding for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

The planning-level development cost for establishing the Voluntary Agricultural Crop Fallowing Programs is estimated to be approximately $75,000 to $150,000 and separate from development of this GSP.

Potential sources of funding for the Voluntary Fallowing Program components include state grants, contributions from SABGSA member agencies, groundwater extraction fees, transaction fees from extraction credit trades, and other mechanisms as may be identified by the SABGSA.

6.9.10 Drought Offset Measures for the Voluntary Agricultural Crop Fallowing Programs [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

The development and implementation of Voluntary Agricultural Crop Fallowing Programs within the Basin will directly result in a reduction of the volume of groundwater that will be pumped from the Basin. These reductions in pumping will occur during periods of normal, above normal, and below normal rainfall year conditions. Pumping reductions that occur as a result of the implementation of fallowing programs will directly result in mitigation of the estimated storage deficit within the Basin.

As monitoring of the groundwater levels in the Basin occur in the future, the SABGSA will quantify the beneficial impact that the fallowing initiatives are having on the condition of the Basin, which will allow for future refinements in the basin water budget. The information acquired will be critical to the SABGSA in making informed adaptive management decisions regarding ensuring that chronic lowering of groundwater levels or depletion of supply during periods of drought can be offset by increases in groundwater levels or storage during other periods.

6.10 Tier 3 Priority Projects – [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

Based on the results of the analysis that was performed during development of this GSP, the SABGSA concluded that the basin sustainability goals may be achieved through the implementation of the Tier 1 and 2 management actions described in Sections 6.3 through 6.9. The SABGSA will annually assess the effectiveness that the implemented management actions have achieved in stabilizing groundwater levels and meeting the basin sustainability goals described in this GSP and will reassess the need for continuing and/or expanding these actions on an annual basis. If the SABGSA determines that evidence exists that the effects of the implemented management actions are proving insufficient to meet sustainability goals, then the SABGSA may decide to implement selected projects from the portfolio of identified priority projects in the future. The GSA may choose to implement one or more of the Tier 3 priority projects at any time. The priority projects listed below and described in the following paragraphs were identified by the SABGSA for future consideration:

- Non-Native/Invasive Species Eradication
- Barka Slough Augmentation Project with Groundwater Supplies
- Watershed Management Projects, Including Controlled Burns
- DSW-MAR Basins (In-Channel and Off-Stream Basins)

Non-Native/Invasive Species Eradication

The SABGSA will support and enhance existing programs eradicating non-native and other invasive species along San Antonio Creek, and its major tributaries, in partnership with the Cachuma Resource Conservation District of Santa Barbara County. This project will reduce evapotranspiration from these non-native invasive plants, leaving more water in the San Antonio Creek watershed and increasing aquifer recharge in the Basin.

Species present along San Antonio Creek and its tributaries, including Arundo and tamarisk, consume a significant volume of water annually. These species also create a major fire threat, increase flood risks, and deprive habitat for wildlife. Research published by the California Invasive Plant Council states that on average, removal of 1 acre of Arundo results in a net savings of 20 AF of water per year (CIPC, 2011).

Once the extent of invasive species has been identified, the initial eradication phase will include mechanical and/or chemical treatment of identified invasive species removal in all areas of San Antonio Creek and its major tributaries that have yet to be treated. The final phase will include the on-going monitoring and

maintenance treatment phase. This phase requires annual monitoring for re-growth of the invasive species or new invasive species and chemical treatment every 3 to 5 years.

Barka Slough Augmentation Project with Groundwater Supplies

The SABGSA will consider proceeding with the study, planning, preliminary design/engineering, and permitting phases for an augmentation project that will provide supplemental water to support the Barka Slough GDE during critical periods. The source of the augmentation water will be groundwater extracted from the Basin, through a system of existing agricultural wells located along San Antonio Creek, upstream from the Barka Slough. Additionally, existing VSFB wells will also be evaluated as a potential supply, subject to agreement from the U.S. government. The project infrastructure will be designed to accommodate the potential for using alternative supplemental water supplies, including SWP or other imported supplies, in the future. It is understood that groundwater extraction from basin wells to supply supplemental water to the Slough may exacerbate water level declines in the Basin and so this project is intended to provide water to the Slough only during severe conditions where impacts to the Slough are eminent.

Watershed Management Projects, Including Controlled Burns

The SABGSA will support and enhance watershed management actions and projects within the Basin on both watershed and local levels. Watershed management has proven effective in protecting and enhancing the physical, chemical, and biological processes that make up the riverine based sub-regions of the of San Antonio Creek drainage system.

This Resource Management Strategy is identified in the update of the Santa Barbara County Integrated Regional Water Management Plan (Santa Barbara County 2019) to underscore the importance of mitigating the impact of wildfire using a watershed management approach (including controlled burns) to mitigate the impact of wildfire and associated erosion and to preserve water storage capacity. While controlled burns have not been shown to provide large benefits with respect to enhancement of recharge to aquifers, there has been data to show that they do promote increased runoff. Increased surface water runoff may provide a benefit to Barka Slough.

DSW-MAR Basins (In-Channel and Off-Stream Basins)

DSW-MAR is a landscape management strategy that can help to reduce the storage deficit and maintain long-term water supply reliability. In addition to the potential groundwater recharge benefits that can be achieved with DSW-MAR, ancillary benefits from recharge ponds, reservoirs, and facilities that are developed for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. DSW-MAR targets relatively small drainage areas (generally 100 to 1,000 acres) from which stormwater runoff can be collected to infiltrate 100 to 300 AF of water per year, per individual basin. Infiltration can be accomplished in surface basins, typically having an area of 1 to 5 acres, or potentially through flooding of agricultural fields or flood plains, use of drywells, or other strategies. Smaller projects might provide additional benefit, but unit costs are likely to be somewhat greater. Larger projects may require more infrastructure and/or maintenance costs.

The initial phase of this project may include the completion of a study to identify the optimal number and location of a series of DSW-MAR facilities, based on hydrogeologic and watershed conditions. Based on discussions with SABGSA stakeholders, it is understood that several existing DSW-MAR basins were constructed in the past and some of these basins currently exist, although in disrepair. The subject study will include an assessment of these existing basins for potential renovation and upgrade. In addition, the study may include an evaluation of the potential benefits to the Basin, from an expansion of the precipitation enhancement program described below.

6.10.1 Relevant Measurable Objective(s) [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

Because the SABGSA does not plan to implement the identified Tier 3 projects, they will not have any impact on the measurable objectives for the Basin. If the SABGSA determines that one or more of the projects may be required, then there will be a benefit to all the measurable objectives that are identified in this GSP.

6.10.2 Implementation Triggers [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The projects identified in this section are not deemed critical for the successful implementation of the GSP and are included in the Tier 3 implementation category as future options should they become necessary. The SABGSA does not plan to initiate any of these projects until evidence exists that the effects of the implemented (Tiers 1 and 2) management actions are proving insufficient. Although, the SABGSA has no near-term plans to initiate construction of any specific priority projects, for the purposes of achieving basin sustainability, there may be interest in proceeding with the study, planning, preliminary design/engineering, and permitting phases for several projects that are identified by the SABGSA for potential future consideration.

6.10.3 Public Notice Process [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

No specific notice to the public or other agencies is planned regarding the identified Tier 3 projects. If the SABGSA determines that one or more of the priority projects may require implementation, then a comprehensive program for informing the public and other agencies will be developed and implemented.

6.10.4 Overdraft Mitigation [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

Because the SABGSA does not plan to implement the identified Tier 3 projects, they will not have any impact on the mitigation of the estimated storage deficit within the Basin. The potential effects that any specific priority project will have on the Basin will be addressed during the study, planning and preliminary design/engineering phases of any projects that are identified by the SABGSA for potential future consideration.

6.10.5 Permitting and Regulatory Process [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

Each of the identified Tier 3 projects will require various permits prior to implementation and all will require compliance with applicable regulations, including CEQA. These permitting and regulatory compliance issues

for any specific project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of any project that is identified by the SABGSA for potential future consideration.

6.10.6 Implementation Timeline [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The projects identified in this section are not deemed critical for the successful implementation of the GSP and are included in the Tier 3 implementation category. The SABGSA has no near-term plans to initiate construction of any specific priority projects for the purposes of achieving basin sustainability. However, there may be interest in proceeding with the study, planning, preliminary design/engineering, and permitting phases for several projects that are identified by the SABGSA for potential future consideration.

6.10.7 Anticipated Benefits [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

Because the SABGSA does not presently plan to implement the identified Tier 3 projects, they will not have any direct benefit to the Basin. If the SABGSA determines that one or more of the priority projects may require implementation, then assessment of anticipated benefits will be characterized at that time. Anticipated benefits that any specific project will have on the Basin will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all projects that are identified by the SABGSA for potential future consideration.

6.10.8 Legal Authority [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

Legal authority for any specific project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all priority projects that are identified by the SABGSA for potential future consideration.

6.10.9 Cost and Funding [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Project costs and proposed mechanisms for funding for any specific priority project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all projects that are identified by the SABGSA for potential future consideration. Preliminary costs for developing and implementing Tier 3 projects are presented in Table 6-1.

6.10.10 Drought Offset Measures [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

Because the SABGSA does not plan to implement the identified Tier 3 priority projects, they will not have any impact on mitigating chronic lowering of groundwater levels or depletion of supply during periods of drought within the Basin. The potential effects that any specific project will have on the Basin regarding offsetting the effects of drought, will be addressed during the study, planning, preliminary design/engineering, and permitting phases of any projects that are identified by the SABGSA for potential future consideration.

6.11 Tier 4 Non-Priority Projects – [§ 354.44(b)(1)(d)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

(d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

Based on the results of the analysis that was performed during development of this GSP, the SABGSA concluded that the basin sustainability goals can be achieved through the implementation of the Tier 1 through 2 management actions described in Sections 6.3 through 6.9. The SABGSA will annually assess the effectiveness that the implemented management actions have achieved in stabilizing groundwater levels and meeting the basin sustainability goals described in this GSP and will reassess the need for continuing and/or expanding these actions on an annual basis. If the SABGSA determines that evidence exists that the effects of the implemented management actions are proving insufficient to meet sustainability goals, then the SABGSA may decide to implement one or more of the Tier 4 non-priority projects in the future. Therefore, the SABGSA does not plan to initiate the construction of any non–priority project infrastructure for the specific goal of achieving basin sustainability until such time that evidence exists that the effects of the implemented management actions and, if required, priority projects are proving insufficient to meet sustainability goals. Although the SABGSA has no near-term plans to initiate construction of any specific non-priority projects, for the purposes of achieving basin sustainability, there may be interest in proceeding with the study, planning, preliminary design/engineering, and permitting phases for any number of projects that were identified by the SABGSA for potential future consideration. The following projects listed below and briefly described in the following paragraphs were identified by the SABGSA for future consideration:

- LACSD WWTF Recycled Water and Reuse In Lieu of Groundwater Pumping or Indirect Potable Reuse
- SABGSA to Become Funding Partner to Santa Barbara County Precipitation Enhancement Program
- VSFB Groundwater Pumping Reduction Capital Project Participation (Desalination and/or Recharge and Recovery)
- Barka Slough Augmentation Project with SWP or Banked Supplemental Water Supplies
- In Lieu Recharge Projects to Deliver Unused and Surplus Imported Water to Offset Groundwater Extractions from LACSD and Agricultural Pumpers
- SABGSA to provide Technical Assistance and Financial Incentives for High Tunnel (“Hoop Houses”) Rainwater Harvesting Projects for Supplemental Irrigation Water Supplies and/or Groundwater Recharge Projects
- Additional Projects for Potential Future Consideration by SABGSA
  - Development of Water Supply Wells in Bedrock Formations
  - Use of Treated Oilfield Produced Water for Irrigation
  - Water Exchanges to Secure Other Agency State Water Project Allocations

LACSD WWTF Recycled Water and Reuse In Lieu of GW Pumping or Indirect Potable Reuse

The LACSD currently owns and operates a municipal WWTF, which is regulated under the provisions of Central Coast RWQCB Order No. R3-2005-0133, to discharge a maximum of 225,000 gpd, averaged over each month. The existing WWTF is classified as an aerated facultative treatment pond system and includes a headworks, 3.1-acre facultative pond system, 47.6 acres of irrigation fields, and five retention basins. The treatment capacity is rated at 400,000 gpd. Treated effluent is disposed of through a system of spray irrigation fields, which are located adjacent to the facultative treatment ponds. Facultative pond systems are designed and operated to reduce concentrations of biochemical oxygen demand (BOD), total suspended solids, and coliform numbers (fecal or total) to meet water quality requirements. Facultative pond systems are designed to be operated in a manner in which an aerobic layer (oxygen rich) is present in the shallower depths and an anaerobic zone (oxygen poor) is present in the lower depths. Aerobic treatment processes in the upper layer provide odor control, nutrient and BOD removal. Anaerobic fermentation processes, such as sludge digestion, denitrification, and some BOD removal, occur in the lower layer. The key to successful operation of this type of pond is oxygen production by photosynthetic algae and/or re-aeration at the surface. The total effluent disposal system is approximately 66.18 acres of land which includes approximately 47.6 acres of spray irrigation fields.

Although the LACSD has no current plans to upgrade the WWTF, it may in the future consider adding treatment processes that could allow the LACSD to produce recycled water that meets Title 22 requirements and the construction of a recycled water distribution ("purple pipe") system. The future supply of recycled may be used by agricultural pumpers, which are in the general vicinity of the LACSD service area, in lieu of pumping groundwater. Alternatively, the recycled water could be introduced into the basin aquifers for indirect potable water reuse. The SABGSA, in conjunction with the LACSD, consider proceeding with the study, planning, preliminary design/engineering, and permitting phases for the expansion of the WWTF to add advanced treatment processes that will allow the LACSD to produce recycled water that meets Title 22 requirements.

SABGSA to Become Funding Partner to Santa Barbara County Precipitation Enhancement Program

The SABGSA may consider providing financial assistance in the future to the Santa Barbara County Water Agency for the continued operation and potential expansion of the existing precipitation enhancement program (e.g., cloud seeding program), which has been operated by Santa Barbara County Water Agency since 1981. This program has been historically operated by Santa Barbara County in the vicinity of upper elevation tributaries entering Cachuma Reservoir. The precipitation enhancement project involves implementation of a cloud seeding program to augment natural precipitation to increase surface water runoff and aquifer recharge in the Basin. This process includes introduction of silver iodide into clouds to increase nucleation (i.e., the process by which water in clouds freezes to then precipitate out). The precipitation enhancement program would potentially expand the use of both ground-based seeding and aerial seeding to improve the probability of increased rainfall. Ground-based seeding would be conducted using remote-controlled flare systems, set up along key mountain ridges and would be automated. Aerial seeding would use small aircraft carrying flare racks along its wings to release silver iodide into clouds while flying through and above them. This program has lost participation from some of its historical funding partners and this project would allow the SABGSA to support the continued operation of this program.

VSFB Groundwater Pumping Reduction Capital Project Participation (Desalination and/or Recharge and Recovery)

The SABGSA may consider providing financial assistance and/or other forms of support in the future to support the development and implementation supplemental water supply projects on VSFB, which would

allow VSFB to not increase and further reduce its reliance on groundwater pumping from the Basin. Until October of 1997, all water used at VAFB originated from groundwater pumped from wells in the Basin, supplemented by water from the Santa Ynez Water Treatment Plant (USAF, 2019). In October 1997, VAFB began taking delivery of SWP supplies from the Central Coast Water Authority and since that time, the volume of groundwater being pumped from the Basin by VAFB has significantly decreased during normal operating conditions. During normal operating years, the basin wells are used primarily to augment SWP supplies. During extended drought periods when SWP water is curtailed, the basin wells become the primary water source for VAFB. Such was the case in 2014 and 2015, when VAFB consumed approximately 2,243 AFY in 2014 and 1,552 AFY in 2015 (USAF, 2019).

Of particular concern is the current plan by the U.S. Air Force (USAF) to develop the Vandenberg Dunes Golf Courses Project. The proposed project would redevelop and expand the existing Marshallia Ranch Golf Course by constructing up to five new links golf courses. The proposed project includes approximately 1,273 acres, which is mostly undeveloped, except for the existing 250-acre Marshallia Ranch Golf Course, various roads, and a decommissioned Titan I launch facility. Proposed land development would include constructing up to five links golf courses, practice grounds, a lodge and inn facilities, and up to 75 one- and two-bedroom cottages, among other facilities.

The USAF anticipates that the proposed project will require approximately 184 AFY of water per golf course. The current plan is to construct up to five golf courses with an estimated annual water demand of up to 921 AFY of water. Under the proposed development plan, the USAF anticipates meeting this golf course irrigation demand by pumping groundwater from its basin wells when SWP water is unavailable. The SABGSA has concerns that the withdrawing the projected volume of groundwater water from these wells will increase the annual storage deficit in the Basin, as well as adversely impact other SMCs, including creating adverse impacts to the San Antonio Creek/Barka Slough habitats and associated potential GDEs.

The SABGSA plans to encourage the VSFB to identify and implement supplemental water supply projects would allow the base to reduce its reliance on groundwater pumping from the Basin. Of particular interest is the potential for the development of a desalination facility that VSFB is considering. The development of a desalination facility could not only provide an alternative supply for VSFB water demands, including the proposed golf course development, the potential exists for excess supplies from a desalination facility to be used by other users in the Basin, in lieu of pumping groundwater.

Barka Slough Augmentation Project w/ SWP or Alternative Supplemental Water Supplies

In the future, the SABGSA may consider proceeding with the study, planning, preliminary design/engineering, and permitting phases for an augmentation project that will provide supplemental water to support the Barka Slough GDE. The source of the augmentation water will be SWP or other supplemental supplies if they become available in the future. The proximity of the Central Coast SWP pipeline to the Barka Slough is such that minimal infrastructure would be required to facilitate this project.

The reliability of the availability of the SWP and other supplemental water supplies is problematic and inconsistent. For example, the latest estimates of anticipated SWP water availability under future conditions are included in the DWR 2019 SWP Delivery Capability Report (DWR, 2020). The Delivery Capability Report anticipates approximately 59 percent of the Santa Barbara County Flood Control and Watershed Conservation District's Table A, and other contract amounts, will be available on average under anticipated future conditions. These estimates are based on outputs from the CalSim-2 Operations model (DWR, 2019). However, the availability of these SWP water supplies will be variable year by year based on hydrologic conditions. The historical delivery of annual allocations from the SWP ranges from 5 to 100 percent of the contracted amount. As of 2021, the Base has been informed that the SWP allocation will be zero percent. Given the variable availability of SWP water supplies, a MAR project would likely need to be designed to

operate sporadically, with recharge occurring during wet years to balance out lower, or non-existent delivery amounts, during dry years.

In Lieu Recharge Projects to Deliver Unused and Surplus Supplemental Water to Offset Groundwater Extractions from LACSD and Agricultural Pumpers

In the future, the SABGSA may consider proceeding with the study, planning, preliminary design/engineering, and permitting phases for direct delivery projects that would be designed to use available supplemental water supplies, such as SWP system supplies, in lieu of groundwater. This option offsets the use of groundwater, allowing the groundwater basin to recharge naturally. Direct delivery projects rely on the construction of pipelines and associated infrastructure to deliver the water to agricultural or the LACSD, as well as pump stations and storage facilities to handle supply and demand variations. Direct delivery is a highly efficient method to reduce groundwater pumping because it directly offsets the amount of water pumped from the aquifer, allowing the principal aquifer groundwater elevations to rebound through natural recharge. One of the significant drawbacks of this concept is that the delivered water must be available during the times when the users need it, which often occurs at times when competition for those water supplies are highest and are less likely to be available, especially during a dry year. As an example, the forecasted allocation of SWP water in 2021 is zero percent. The construction of storage facilities can mitigate these challenges to some extent, but this additional infrastructure results in substantially increased capital and operational costs.

SABGSA to Provide Technical Assistance and Financial Incentives for High Tunnel ("Hoop Houses") Rainwater Harvesting Projects for Supplemental Irrigation Water Supplies and/or Groundwater Recharge Projects

In the future, the SABGSA may consider the development and implementation of a program to provide technical assistance and potentially financial incentives to agricultural pumpers that use high tunnels, also referred to as "hoop houses" for crop cultivation. High tunnels are simple, plastic-covered, passive solar-heated structures in which crops are grown in the ground. High tunnels resemble greenhouses, but are less expensive to construct and maintain. Fruit, vegetable, flower, and cannabis growers use them to extend the growing season and intensify production. The impervious plastic sheeting that covers the high tunnels can yield a large volume of water with every measurable rainfall. Based on research performed by Iowa State University Cooperative Extension Service (ISU, 2012), approximately 900 gallons of water will flow from the roof of a 30 ft by 96 ft high tunnel with a half-inch rain event. This equates to approximately 0.084 AF of runoff per 1-inch of rainfall for each acre of high tunnels installed. Given that the average annual rainfall in the Basin is approximately 17 inches, the potential annual volume of rainfall that could be captured is approximately 1.43 AF per acre of high tunnels installed. By capturing the runoff from high tunnel roofs, the harvested rainwater could be used as a supply of either onsite or off-site irrigation water, in lieu of pumping groundwater, or could be diverted to DSW-MAR Basins, in which the harvested rainwater could be recharged into the groundwater basin.

Additional Projects for Potential Future Consideration by SABGSA

In the future, the SABGSA may consider investigating the feasibility of implementing the following projects and others as may be identified.

- Bedrock wells – consideration may be given to pumping and treating groundwater from bedrock formations to create an alternative water supply.
- Oilfield-produced water – consideration may be given to working with the owners of the active oil production wells surrounding the basin to evaluate the feasibility of treating and using oilfield-produced water for irrigation.

- Water exchanges – consideration may be given to funding local water projects in other regions in exchange for State Water Project allocation.

6.11.1 Relevant Measurable Objective(s) [§ 354.44(b)(1)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.

Because the SABGSA does not plan to implement the identified Tier 4 non-priority projects, they will not have any impact on the measurable objectives for the Basin. If the SABGSA determines that one or more of the projects may be required, then there will be a benefit to all the measurable objectives that are identified in this GSP.

6.11.2 Implementation Triggers [§ 354.44(b)(1)(A)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

The projects identified in this section are not deemed critical for the successful implementation of the GSP and are included in the Tier 4 implementation category as future options should they become necessary. The SABGSA does not plan to initiate any of these projects until evidence exists that the effects of the implemented (Tiers 1 through 3) management actions and priority projects are proving insufficient. Although, the SABGSA has no near-term plans to initiate construction of any specific projects, for the purposes of achieving basin sustainability, there may be interest in proceeding with the study, planning, preliminary design/engineering, and permitting phases for any number of projects that are identified by the SABGSA for potential future consideration.

6.11.3 Public Notice Process [§ 354.44(b)(1)(B)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(1) The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

No specific notice to the public or other agencies is planned regarding the identified Tier 4 non-priority projects. If the SABGSA determines that one or more of the projects may require implementation, then a comprehensive program for informing the public and other agencies will be developed and implemented.

6.11.4 Overdraft Mitigation [§ 354.44(b)(2)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

Because the SABGSA does not plan to implement the identified Tier 4 non-priority projects, they will not have any impact on the mitigation of the estimated storage deficit within the Basin. The potential effects that any specific project will have on the Basin will be addressed during the study, planning and preliminary design/engineering phases of any projects that are identified by the SABGSA for potential future consideration.

6.11.5 Permitting and Regulatory Process [§ 354.44(b)(3)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(3) A summary of the permitting and regulatory process required for each project and management action.

Each of the identified Tier 4 non-priority projects will require various permits prior to implementation and all will require compliance with applicable regulations, including CEQA. These permitting and regulatory

compliance issues for any specific project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of any project that is identified by the SABGSA for potential future consideration.

6.11.6 Implementation Timeline [§ 354.44(b)(4)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.

The projects identified in this section are not deemed critical for the successful implementation of the GSP and are included in the Tier 4 implementation category. The SABGSA has no near-term plans to initiate construction of any specific projects for the purposes of achieving basin sustainability. However, there may be interest in proceeding with the study, planning, preliminary design/engineering, and permitting phases for several projects that are identified by the SABGSA for potential future consideration.

6.11.7 Anticipated Benefits [§ 354.44(b)(5)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

Because the SABGSA does not plan to implement the identified Tier 4 non-priority projects, they will not have any direct benefit to the Basin. If the SABGSA determines that one or more of the projects may require implementation, then assessment of anticipated benefits will be characterized at that time. Anticipated benefits that any specific project will have on the Basin will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all projects that are identified by the SABGSA for potential future consideration.

6.11.8 Legal Authority [§ 354.44(b)(7)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

Legal authority for any specific project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all projects that are identified by the SABGSA for potential future consideration.

6.11.9 Cost and Funding [§ 354.44(b)(8)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

Project costs and proposed mechanisms for funding for any specific project will be addressed during the study, planning, preliminary design/engineering, and permitting phases of all projects that are identified by the SABGSA for potential future consideration. Table 6-1 provides preliminary cost ranges for the Tier 4 non-priority projects.

6.11.10 Drought Offset Measures [§ 354.44(b)(9)]

§ 354.44 Projects and Management Actions.

(b) Each Plan shall include a description of the projects and management actions that include the following:

(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

Because the SABGSA does not plan to implement the identified Tier 4 non-priority projects, they will not have any impact on mitigating chronic lowering of groundwater levels or depletion of supply during periods of drought within the Basin. The potential effects that any specific project will have on the Basin regarding offsetting the effects of drought, will be addressed during the study, planning, preliminary design/engineering, and permitting phases of any projects that are identified by the SABGSA for potential future consideration.

6.12 References and Technical Studies [§ 354.4(b)]

§ 354.4 General Information.

(b) Each Plan shall include the following general information: A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.

CIPC. 2011. Arundo Donax Distribution and Impact Report, California Invasive Plant Council.

DWR. 2016. Monitoring Networks and Identification of Data Gaps Best Management Practices, California Department of Water Resources.

DWR. 2020. The Final State Water Project Delivery Capability Report 2019, California Department of Water Resources.

ISU. 2012. Rainwater Catchment from a High Tunnel for Irrigation Use. Iowa State University Cooperative Extension. January 2012.

Santa Barbara County. 2019. 2019 Update of the Integrated Regional Water Management Plan.

Santa Barbara County. 2020. *Agricultural Commissioner, Weights and Measures Department.* Retrieved January 22, 2021, from Santa Barbara County: https://cosantabarbara.app.box.com/s/jdt95fy7gst3g8649l9t3ukrorr5xeh9/folder/109007441066. April 1, 2020.

SYRWCD. 2010. Groundwater Production Information and Instructions Pamphlet. Santa Ynez River Water Conservation District.

TNC. 2019. Identifying GDEs Under SGMA, Best Practices for Using the NC Dataset. The Nature Conservancy.

TWRI. 2001. Potential Water Savings in Irrigated Agriculture in the Lower Rio Grande Basin of Texas. Texas Water Resources Institute.

USAF. 2019. Consistency Determination for the Vandenberg Dunes Golf Courses Project, U.S. Department of the Air Force.

USGS. 2020. San Antonio Creek Valley Groundwater Basin Land Use Spatial Data. April 27, 2020.

SECTION 7: **Groundwater Sustainability Plan Implementation**

7.1 Introduction

This section provides a conceptual road map for the San Antonio Basin Groundwater Sustainability Agency's (SABGSA's) efforts to implement this San Antonio Creek Valley Groundwater Basin (Basin) Groundwater Sustainability Plan (GSP) during the first 5 years after adoption and discusses implementation efforts in accordance with Sustainable Groundwater Management Act (SGMA) regulations § 354.8(f)(2).

This implementation plan is based on the SABGSA's current understanding of conditions and anticipated administrative considerations in the Basin that affect the management actions described in Section 6. Understanding of the conditions and administrative considerations in the Basin will evolve over time, based on future refinement of the hydrogeologic setting, groundwater flow conditions, and input from basin stakeholders.

Implementation of this GSP requires robust administrative and financing structures, with adequate staff and funding to ensure compliance with SGMA. The GSP calls for SABGSA to routinely provide information to the public about GSP implementation and progress towards sustainability and the need to use groundwater efficiently. The GSP calls for a website to be maintained as a communication tool for posting data, reports, and meeting information.

Section 6 presents several management actions to be implemented by SABGSA that will address data gaps and reduce uncertainty, improve understanding of Basin conditions and how they may change over time, and actions intended to promote conservation and optimize water use in the Basin. The management actions also include development of a Water Allocation Program (Base Pumping Allocation [BPA]) and Groundwater Extraction Credit (GEC) Marketing and Trading Program. SABGSA has developed a portfolio of management actions and projects that can be implemented in phases as the conditions in the Basin dictate. The management actions and potential future projects are classified with a tiered system, with the implementation of Tier 1 elements to be initiated within 1 year of GSP adoption by SABGSA and implementation of Tier 2 elements within 3 years of GSP adoption. Tier 3 and 4 projects will be considered for implementation in the future as conditions in the Basin dictate and as the effectiveness of the lower tier initiatives (Tier 1 and Tier 2) are assessed.

Based on the results of the comprehensive multi-phased analysis that was performed in conjunction with the development of this GSP, SABGSA concluded that the Basin sustainability goals that are described in this GSP and that are required under the provisions of SGMA, can be achieved through the implementation of the management actions (Tier 1 and 2) and priority projects (Tier 3) described in Sections 6.3 through 6.10. Although a number of non-priority projects (Tier 4) were identified for potential future consideration, SABGSA does not plan to initiate the construction of any non-priority project infrastructure for the specific goal of achieving Basin sustainability until evidence exists that the effects of the implemented management actions and priority projects are proving insufficient.

This section of the GSP describes how these management actions will be implemented and includes descriptions of the following:

- Administrative Approach and Implementation Timing
- Annual Reporting
- 5-Year GSP Evaluation and Update
- Management Action Implementation
- SABGSA Annual Budget Estimates
- Funding Sources

7.2 Administrative Approach and Implementation Timing

SABGSA may hire staff, hire consultant(s), or assign staff from a cooperating agency (e.g., Cachuma Resource Conservation District) to conduct or manage the effort, and/or hire staff to implement the GSP. If consultants are hired, it is anticipated that qualified professionals will be identified and hired through a competitive selection process, although the GSA may determine that it is in its best interest to offer sole-source contracts. It is also anticipated that the lead for a particular task will keep the SABGSA informed through periodic updates to the SABGSA Board and the public. As needed, SABGSA would likely conduct specific studies and analyses necessary to improve understanding of basin conditions. SABGSA would likely then use new information on basin conditions to identify, evaluate, and/or improve management actions to achieve sustainability. This GSP calls for the actions considered by SABGSA to be vetted through a public outreach process whereby groundwater pumpers and other stakeholders will have opportunities to provide input to the decision-making process.

Using authorities outlined in California Water Code §§ 10725 to 10726.9, SABGSA will ensure the maximum degree of local control and flexibility consistent with this GSP to commence management actions. Because the amount of groundwater pumping in the Basin in recent years is more than the estimated yield of about 8,900 acre-feet per year (as discussed in Section 3.3) and groundwater levels are declining in certain areas, SABGSA will begin to implement Tier 1 management actions within 1 year after GSP adoption and Tier 2 management actions within 3 years of GSP adoption. The effectiveness of the management actions will be reviewed annually, and additional higher-tiered management actions will be implemented as necessary to avoid undesirable results. A graphical depiction of the implementation sequence is presented as Figure 7-1.

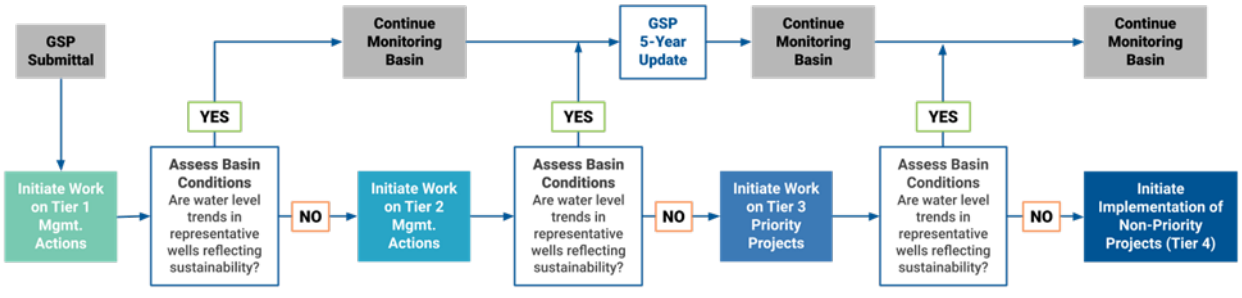


Figure 7-1. Implementation Sequence for Management Actions and Projects

7.3 Annual Reporting

The SABGSA will submit an annual report to the California Department of Water Resources (DWR) by April 1 of each year following the adoption of the GSP. The annual report will include the following components for the preceding water year as required by DWR (California Code of Regulations [CCR] § 356.2):

1. General information, including an executive summary and a location map depicting the basin covered by the report.
2. A detailed description and graphical representation of the following conditions of the basin managed in the GSP:
    a. Groundwater elevation data from monitoring wells identified in the monitoring network will be analyzed and displayed as follows:
        i. Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.
        ii. Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available.
    b. Groundwater extraction for the preceding water year. Data will be collected using the best available measurement methods and will be presented in a table that summarizes groundwater extractions by water use sector and identifies the method of measurement (direct or estimate) and accuracy of measurements, as well as a map that illustrates the general location and volume of groundwater extractions.
    c. Surface water supply used or available for use, for groundwater recharge or in lieu use will be reported based on quantitative data that describes the annual volume and sources for the preceding water year.
    d. Total water use will be collected using the best available measurement methods and will be reported in a table that summarizes total water use by water use sector and water source type and identifies the method of measurement (direct or estimate) and accuracy of measurements.
    e. Change in groundwater in storage will include the following:
        i. Change in groundwater in storage maps for each principal aquifer in the basin.
        ii. A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available.
3. A description of progress towards implementing the GSP, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.

7.4 5-Year GSP Evaluation and Update

SABGSA will evaluate the GSP at least every 5 years and whenever the GSP is amended and will provide a written assessment to DWR. The assessment will describe whether the GSP implementation—including implementation of projects and management actions—are meeting the sustainability goal in the Basin and will include the following:

1. A description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones, and minimum thresholds.
2. A description of the implementation of any projects or management actions and the effect on groundwater conditions from those projects or management actions.
3. Reconsideration and revision of elements of the GSP—including the basin setting, management areas, or the identification of undesirable results and the setting of minimum thresholds and measurable objectives—if necessary.
4. An evaluation of the basin setting in light of significant new information or changes in water use and an explanation of any significant changes. If SABGSA's evaluation shows that the Basin is experiencing chronic water level decline and reduction of groundwater in storage conditions, SABGSA will include an assessment of measures to mitigate that condition.
5. A description of the monitoring network in the Basin, including whether data gaps exist, or any areas in the Basin represented by data that do not satisfy the requirements of the GSP regulations (23 CCR §§ 352.4 and 354.34(c)). The description will include the following:
    a. An assessment of monitoring network function with an analysis of data collected to date, identification of data gaps, and the actions necessary to improve the monitoring network, consistent with the requirements of § 354.38.
    b. If the SABGSA identifies data gaps, the GSP will describe a program for the acquisition of additional data sources, including an estimate of the timing of that acquisition as well as incorporation of the newly obtained information into the GSP.
    c. The GSP will prioritize the installation of new data collection facilities and analysis of new data based on the needs of the Basin.
6. A description of significant new information that has been made available since GSP adoption or amendment or since the last 5-year assessment. The description will also include whether new information warrants changes to any aspect of the GSP, including the evaluation of the basin setting, measurable objectives, minimum thresholds, or the criteria defining undesirable results.
7. A description of relevant actions taken by the Agency, including a summary of regulations or ordinances related to the GSP.
8. Information describing any enforcement or legal actions taken by the Agency in furtherance of the sustainability goal for the Basin.
9. A description of completed or proposed GSP amendments.
10. Where appropriate, a summary of coordination that occurred between multiple GSAs in a single basin, GSAs in hydrologically connected basins, and land use agencies.
11. Other information the GSA deems appropriate, along with any information required by DWR to conduct a periodic review as required by California Water Code § 10733 (CCR § 356.4).

7.5 Management Action Implementation

Details of the proposed projects and management actions are presented in Section 6. The identified management actions and potential future projects are intended to bring the Basin into balance and achieve the sustainability goals without undesirable results within the next 20 years (by 2042). An estimate of the planning-level costs associated with the implementation of the Tier 1 and Tier 2 management actions are summarized in Table 7-1. An estimate of the planning-level costs associated with the implementation of the Tier 3 priority projects and Tier 4 non-priority projects are summarized in Table 7-2.

Table 7-1. Conceptual Planning-Level Cost Estimate for GSP Management Action Implementation

Activity	Tier	Planning-Level Estimate	
		Low	High
Address Data Gaps			
Expand Monitoring Well Network in the Basin to Increase Spatial Coverage and Well Density	1	$20,000	$200,000
Perform Reference Point Elevation and Video Surveys in Representative Wells That Currently Do Not Have Adequate Construction Records to Confirm Well Construction	1	$25,000	$75,000
Install Stream Gages at Barka Slough	1	$75,000	$125,000
LACSD Wellfield Pumping Coordination / Offsite Well Impact Mitigation	1	$15,000	$30,000
Review/Update Water Usage Factors and Crop Acreages and Update Water Budget	1	$20,000	$30,000
Survey and Investigate Potential GDEs in the Basin and Further Characterize Barka Slough	1	$50,000	$75,000
Review USGS Groundwater Model / Update Hydrologic Conceptual Model, Develop Water Budget for Barka Slough	1	$50,000	$100,000
Groundwater Pumping Fee Program	1	$100,000	$200,000
Well Registration and Well Meter Installation Programs	1	$75,000	$150,000
Water Use Efficiency Programs	1	$50,000	$125,000
Groundwater BPA Program	2	$75,000	$150,000
Groundwater Extraction Credit (GEC) Marketing and Trading Program	2	$150,000	$200,000
Voluntary Agricultural Crop Fallowing Programs	2	$75,000	$150,000
TOTAL (Tier 1 and Tier 2 Management Actions only)		**$780,000**	**$1,610,000**

Notes

Basin = San Antonio Creek Valley Groundwater Basin
BPA = Base Pumping Allocation
GDE = groundwater-dependent ecosystem
GEC = Groundwater Extraction Credit
GSP = Groundwater Sustainability Plan
LACSD = Los Alamos Community Services District
USGS = U.S. Geological Survey

Table 7-2. Conceptual Planning-Level Cost Estimate for GSP Project Implementation

Activity	Tier	Planning-Level Estimate
Priority Projects		
Non-Native / Invasive Species Eradication	3	>$200,000
Barka Slough Augmentation Project with Groundwater Supplies Using Existing Wells	3	>$200,000
Watershed Management Projects, Including Controlled Burns	3	>$200,000
Non-Priority Projects		
Distributed Storm Water Managed Aquifer Recharge (DSW-MAR) Basins (In-Channel and Off-Stream Basins)	4	>$1,000,000
LACSD Wastewater Treatment Facility Recycled Water and Reuse In Lieu of Groundwater Pumping or Indirect Potable Reuse	4	>$5,000,000
SABGSA to Become Funding Partner to Santa Barbara County Precipitation Enhancement Program	4	>$200,000
VSFB Groundwater Pumping Reduction Capital Project Participation (Desalination and/or Recharge and Recovery)	4	>$5,000,000
Barka Slough Augmentation Project with SWP or Banked Supplemental Water Supplies	4	>$1,000,000
In Lieu Recharge Projects to Deliver Unused and Surplus Imported Water to Offset Groundwater Extractions from LACSD and Agricultural Pumpers	4	>$5,000,000
SABGSA to Provide Technical Assistance and Financial Incentives for High Tunnel (“Hoop Houses”) Rainwater Harvesting Projects for Supplemental Irrigation Water Supplies and/or Groundwater Recharge Projects	4	>$200,000

Notes

GSP = Groundwater Sustainability Plan

LACSD = Los Alamos Community Services District

SABGSA = San Antonio Creek Valley Groundwater Basin Groundwater Sustainability Agency

SWP = California State Water Project

VSFB = Vandenberg Space Force Base

7.6 SABGSA Annual Budget Estimates

SABGSA will incur costs for internal management and operation of the GSA, including monitoring of the condition in the Basin and GSP implementation. The associated cost estimates are still in the development stages and will depend on the management and organizational structure that the SABGSA selects. Additional variable costs may include engineering and other consulting services, permits and fees, California Environmental Quality Act compliance, legal expenses, and other administrative costs associated with the implementation of the Tier 1 and Tier 2 management actions and Tier 3 priority projects. Additionally, SABGSA will incur costs associated with the preparation of GSP annual reports to DWR and the required 5-year evaluation and, if necessary, updates to the GSP. An estimate of the conceptual planning-level costs for SABGSA annual management and operation are summarized in Table 7-3.

Table 7-3. Conceptual Planning-Level Cost Estimate for SABGSA Annual Management and Operation

Activity	Planning-Level Estimate	
	Low	High
SABGSA Staffing	$120,000	$200,000
Consulting Services	$75,000	$100,000
Public Outreach	$15,000	$30,000
Basin Monitoring[1]	$50,000	$75,000
Legal Services	$20,000	$30,000
Insurance	$4,500	$7,500
Audit / Accounting	$7,500	$15,000
Miscellaneous Expenses	$10,000	$15,000
GSP Annual Reporting	$65,000	$95,000
TOTAL	**$367,000**	**$567,500**

Notes

[1] Responsibility for executing the Basin monitoring program has not been established.

Basin = San Antonio Creek Valley Groundwater Basin

SABGSA = San Antonio Creek Valley Groundwater Basin Groundwater Sustainability Agency

GSP = Groundwater Sustainability Plan

7.7 Funding Sources

A Groundwater Pumping Fee Program is included as a Tier 1 management action in this GSP. SABGSA may consider measures to fund GSP implementation using a combination of groundwater extraction charges, including monthly fixed charges and variable pumping fees, assessments/parcel taxes, and grants. Because of California Constitutional limitations imposed through California Propositions 13, 218, and 26, there are strict rules about what constitutes a fee as compared to a tax. Taxes and assessments require voter approval. Water rates passed under Proposition 218 are subject to mandatory noticing and a potential majority protest. Regulatory fees identified as an exemption from taxes under Proposition 26 can be passed by the vote of the governing body of the agency imposing the fee. Assessments for special benefit are also governed by Proposition 218 and can be assessed to pay for a public improvement or service if it provides a special benefit to the properties. A benefit nexus is required to determine the amount of special benefit to each property. Funds collected from individual landowners and grants from DWR have funded the majority of

the GSP costs to date and it is expected that grants available from general obligation bonds such as Proposition 68 may be available to fund GSP implementation.

Regarding potential funding opportunities, DWR has issued a Proposal Solicitation Package[54] for the implementation of GSPs. Funding for the program will be from the Sustainable Groundwater Management Grant Program Implementation Grants using funds authorized by the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018 (Proposition 68). These funds can be used for eligible projects that address drought and groundwater challenges to achieve regional sustainability for investments in groundwater recharge projects with surface water, stormwater, recycled water, and other conjunctive use projects. Eligible projects include activities associated with the implementation of an adopted GSP or approved alternative. The eligible projects must be listed in an adopted GSP or approved alternative. The Round 2 grant solicitation will provide approximately $77 million for medium- and high-priority (including critically overdrafted) basins. The funds will be available for eligible projects which are identified in the GSP. The funds will be disbursed as follows:

- At least $62 million for medium- and high-priority basins that meet the eligibility requirements outlined in the 2019 Guidelines (DWR, 2019) and those in Section III of DWR's Proposal Solicitation Package (DWR, 2020).

Only one application for funding will be accepted per basin. Applicants that apply on behalf of a GSA(s) are required to obtain and submit a letter of support from each GSA they represent. The tentative schedule is for the Round 2 Grants Solicitation to open in spring 2022 with grant awards to be announced in the fall of 2022. The minimum grant amount is $2 million per basin and the maximum grant amount is $5 million per basin. A minimum match of 25 percent of the project cost as local cost share is required. Eligible project expenses must be incurred after January 31, 2022.

Additionally, on May 14, 2021, Governor Newsom rolled out his California Comeback Plan announcing unprecedented and historic one-time funding investments. The plan comes after a year of unprecedented moments from a global pandemic, record-breaking wildfires, and increased momentum to build equity across multiple segments of society. Of particular interest to the SABGSA is potential funding for Assembly Bill 350, a bill to create a 3-year grant program to assist farmers and ranchers in critically overdrafted basins with conservation management planning. As part of this measure, the Governor is proposing $300 million in funds for implementation and planning related to SGMA.

After GSP adoption, SABGSA may perform a preliminary financing plan options evaluation. The evaluation would determine a structure to fund the proposed SABGSA activities and expected financial commitments throughout GSP implementation. Development of the funding mechanism(s) is critical to facilitate successful implementation of the GSP consistent with the requirements of SGMA. A key success factor is preparing a cost allocation that is equitable to SABGSA members and stakeholders. After the evaluation of financing plan options, a preliminary financing model may be developed to determine the revenue required to fund the operating plan, maintain reserve balances, and evaluate required adjustments to the fee structure over time as pumping ramps down to the estimated basin yield.

[54] The website for the Sustainable Groundwater Management (SGM) Grant Program's Proposition 68 Implementation Round 2 is available at https://www.grants.ca.gov/grants/sustainable-groundwater-management-sgm-grant-programs-proposition-68-implementation-round-2/. (Accessed August 19, 2021.)

7.8 References and Technical Studies [§ 354.4(b)]

§ 354.4 General Information.

(b) Each Plan shall include the following general information: A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.

DWR. 2019. SGM Grant Program 2019 Guidelines. Prepared by the California Natural Resources Agency Department of Water Resources Division of Regional Assistance (DWR). September 2019. Available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/Sustainable-Groundwater/Files/prop68_final-gl_August19_clean_ay_19.pdf. (Accessed August 19, 2021.)

DWR. 2020. Implementation Grants Proposal Solicitation Package. Prepared by the California Natural Resources Agency Department of Water Resources Division of Regional Assistance (DWR). October 2020. Available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/Sustainable-Groundwater/Files/Prop-68_psp_final_2020_ay20.pdf. (Accessed August 19, 2021.)