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Paso Robles Subbasin Groundwater Sustainability Plan
VOLUME II

Chapter 7 Monitoring Network
Chapter 8 Sustainable Management Criteria
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Prepared for:

Paso Robles Subbasin Cooperative Committee and the Groundwater Sustainability Agencies

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ABBREVIATIONS AND ACRONYMS

$/AF	dollar per acre-foot
$/AF-benefit	dollar per acre-foot of basin benefit
Act (or SGMA)	Sustainable Groundwater Management Act
AF	acre-feet
AFY	acre-feet per year
AMWC	Atascadero Mutual Water Company
Basin Plan	Water Quality Control Plan for the Central Coast Basin
BPs	Best Water Use Practices
BMPs	Best Management Practices
C&E	Communications and Engagement
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CCRWQCB	Central Coast Regional Water Quality Control Board
CGPS	Continuous GPS
CIMIS	California Irrigation Management Information System
City	City of Paso Robles
Cooperative Committee	Paso Basin Cooperative Committee
County	San Luis Obispo County
CSA16	Community Service Area 16
CSD	Community Services District
CWWCP	Countywide Water Conservation Program
DAIv2	Data Archive Interface
DDW	Division of Drinking Water
DMS	Paso Robles Subbasin Data Management System
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ET (or ETo)	evapotranspiration
ft/day	feet per day
ft2/day	square feet per day
ft msl	feet above mean sea level
GAMA	Groundwater Ambient Monitoring and Assessment
GDE	Groundwater-Dependent Ecosystem
GMP	Groundwater Management Plan
gpd/ft	gallons per day per foot
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSI	GSI Water Solutions, Inc.
GSP (or the Plan)	Groundwater Sustainability Plan
GSSI	Geoscience Support Services, Inc.

hp	horsepower
ILRP	Irrigated Lands Regulatory Program
InSAR	Interferometric Synthetic Aperture Radar
IRWMP	Integrated Regional Water Management Program
LID	Low Impact Development
LOS	Level of Severity
LUCE	Land Use and Circulation Element
MCL	Maximum Contaminant Limit (or Maximum Contaminant Levels)
MO	measurable objectives
MOA	Memorandum of Agreement
mg/L	milligram per liter
msl	mean sea level
MT	minimum thresholds
MWR	Master Water Report
NCCAG	Natural Communities Commonly Associated with Groundwater
NDMC	National Drought Mitigation Center
NHD	National Hydrology Dataset
NRCS	USGS National Resources Conservation Service
NWIS	National Water Information System
NWP	Nacimiento Water Project
O&M	operations and maintenance
OSWCR	DWR Online System for Well Completion Reports
pCi/L	picocuries per liter
PWIS	CA Water Boards Public Water Information System
RW	recycled water
SAGBI	Soil Agricultural Groundwater Banking Index
SB	Senate Bill
SGMA (or Act)	Sustainable Groundwater Management Act
SGMA Regulations	CCR Subchapter 2. Groundwater Sustainability Plans
SLO County	San Luis Obispo County
SLOFCWCD	San Luis Obispo County Flood Control and Water Conservation District
SMC	Sustainable Management Criteria
SMCL	Secondary Maximum Contaminant Limit
SMCSD	San Miguel Community Services District
SNMP	Salt and Nutrient Management Plan
SPI	Standardized Precipitation Index
SSURGO	Soil Survey Geographic Database
Subbasin	Paso Robles Area Subbasin of the Salinas Valley Groundwater Basin
SWP	State Water Project
SWRCB	State Water Resources Control Board

SWRP	San Luis Obispo Stormwater Resource Plan
TDS	total dissolved solids
TMDLs	Total Maximum Daily Load
UNAVCO	University NAVSTAR Consorium
USACE	United States Army Corps of Engineers
USGS	United States Geologic Survey
USDA	United States Department of Agriculture
UWMP	Urban Water Management Plan
Water Board	State Water Resources Control Board
WPA	Water Planning Areas
WRAC	Water Resources Advisory Committee
WY	Water Year

REGULATIONS CHECKLIST FOR GSP SUBMITTAL

GSP Regulations Section	Requirement	Description	Section Number, or other location as indicated in the GSP
Article 3. Technical and Reporting Standards			
352.2	Monitoring Protocols	Monitoring protocols adopted by the GSA for data collection and management	7.8
		Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin	Chapter 7, including Appendix F
Article 5. Plan Contents, Subarticle 1. Administrative Information			
354.4	General Information	Executive Summary	Executive Summary
		List of references and technical studies	References Cited
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		Organization and management structure	2.2
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		Existing land use designations	Figure 3-4
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354.8(c) 354.8(d) 354.8(e)	Water Resource Monitoring and Management Programs	Description of water resources monitoring and management programs	3.6, 3.7, 3.8
		Description of how the monitoring networks of those plans will be incorporated into the GSP	3.9.1
		Description of how those plans may limit operational flexibility in the basin	3.9.2
		Description of conjunctive use programs	3.9.3, not applicable
354.8(f)	Land Use Elements or Topic Categories of Applicable General Plans	Summary of general plans and other land use plans	3.10
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		Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans	10.3, 10.4
		Summary of the process for permitting new or replacement wells in the basin	2.3.1.2 and 3.8.6

		Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management	3.10.4
354.8(g)	Additional GSP Contents (optional items)	Description of Actions related to: Control of saline water intrusion	Not applicable
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		Replenishment of groundwater extractions	Not applicable
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		Addressing groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects	Not applicable
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		GSP comments and responses	Appendix M
		Decision-making process	Appendix G, including Section G.4
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		Encouraging active involvement	Appendix G, including Sections G.7, 8, 9 and Appendices H, I, and J
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		Cause of groundwater conditions that would lead to undesirable results	8.4.5.2, 8.5.4.2, 8.7.4.2, 8.8.4.2, , 8.9.4
		Criteria used to define undesirable results for each sustainability indicator	8.4.5.1, 8.5.4.1, 8.7.4.1, 8.8.4.1, , 8.9.4
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354.28	Minimum Thresholds	Description of each minimum threshold and how they were established for each sustainability indicator	8.4.4, 8.5.2, 8.7.2, 8.8.2, 8.9.2
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354.30	Measureable Objectives	Description of establishment of the measureable objectives for each sustainability indicator	8.4.3, 8.5.3, 8.7.3, 8.8.3, 8.9.3
		Description of how a reasonable margin of safety was established for each measureable objective	8.4.3, 8.5.3, 8.7.3, 8.8.3, 8.9.3
		Description of a reasonable path to achieve and maintain the sustainability goal, including a description of interim milestones	8.4.3, 8.5.3.2, 8.7.3.4, 8.8.3.2, 8.9.3
Article 5. Plan Contents, Subarticle 4. Monitoring Networks			

354.34	Monitoring Networks	Description of monitoring network	Chapter 7, including 7.2. through 7.6
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		Description of how the monitoring network provides adequate coverage of Sustainability Indicators	Chapter 7, including 7.2. through 7.6
		Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends	Chapter 7, including 7.2. through 7.6
		Scientific rational (or reason) for site selection	Chapter 7, including 7.2. through 7.6
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		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 Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies	Chapter 7, including 7.2. through 7.6
354.36	Representative Monitoring	Description of representative sites	7.7
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		Description of steps to fill data gaps	Chapter 10
		Description of monitoring frequency and density of sites	Chapter 7, including 7.2. through 7.6
Article 5. Plan Contents, Subarticle 5. Projects and Management Actions			
354.44	Projects and Management Actions	Description of projects and management actions that will help achieve the basin's sustainability goal	Chapter 9
		Measureable objective that is expected to benefit from each project and management action	
		Circumstances for implementation	
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		Permitting and regulatory process	

		Time-table for initiation and completion, and the accrual of expected benefits	
		Expected benefits and how they will be evaluated	
		How the project or management action will be accomplished. If the projects 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.	
		Legal authority required	
		Estimated costs and plans to meet those costs	
		Management of groundwater extractions and recharge	
354.44(b)(2)		Overdraft mitigation projects and management actions	
Article 8. Interagency Agreements			
357.4	Coordination Agreements - Shall be submitted to the Department together with the GSPs for the basin and, if approved, shall become part of the GSP for each participating Agency.	Coordination Agreements shall describe the following: A point of contact	Not applicable
		Responsibilities of each Agency	
		Procedures for the timely exchange of information between Agencies	
		Procedures for resolving conflicts between Agencies	
		How the Agencies have used the same data and methodologies to coordinate GSPs	
		How the GSPs implemented together satisfy the requirements of SGMA	
		Process for submitting all Plans, Plan amendments, supporting information, all monitoring data and other pertinent information, along with annual reports and periodic evaluations	
		A coordinated data management system for the basin	
		Coordination agreements shall identify adjudicated areas within the basin, and any local agencies that have adopted an Alternative that has been accepted by the Department	

DEFINITIONS

California Water Code

Sec. 10721

Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) Adjudication action means an action filed in the superior or federal district court to determine the rights to extract groundwater from a basin or store water within a basin, including, but not limited to, actions to quiet title respecting rights to extract or store groundwater or an action brought to impose a physical solution on a basin.

(b) Basin means a groundwater basin or subbasin identified and defined in Bulletin 118 or as modified pursuant to Chapter 3 (commencing with Section 10722).

(c) Bulletin 118 means the department's report entitled California's Groundwater: Bulletin 118 updated in 2003, as it may be subsequently updated or revised in accordance with Section 12924.

(d) Coordination agreement means a legal agreement adopted between two or more groundwater sustainability agencies that provides the basis for coordinating multiple agencies or groundwater sustainability plans within a basin pursuant to this part.

(e) De minimis extractor means a person who extracts, for domestic purposes, two acre-feet or less per year.

(f) Governing body means the legislative body of a groundwater sustainability agency.

(g) Groundwater means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water that flows in known and definite channels.

(h) Groundwater extraction facility means a device or method for extracting groundwater from within a basin.

(i) Groundwater recharge or recharge means the augmentation of groundwater, by natural or artificial means.

(j) Groundwater sustainability agency means one or more local agencies that implement the provisions of this part. For purposes of imposing fees pursuant to Chapter 8 (commencing with Section 10730) or taking action to enforce a groundwater sustainability plan, groundwater sustainability agency also means each local agency comprising the groundwater sustainability agency if the plan authorizes separate agency action.

(k) Groundwater sustainability plan or plan means a plan of a groundwater sustainability agency proposed or adopted pursuant to this part.

(l) Groundwater sustainability program means a coordinated and ongoing activity undertaken to benefit a basin, pursuant to a groundwater sustainability plan.

(m) In-lieu use means the use of surface water by persons that could otherwise extract groundwater in order to leave groundwater in the basin.

(n) Local agency means a local public agency that has water supply, water management, or land use responsibilities within a groundwater basin.

(o) Operator means a person operating a groundwater extraction facility. The owner of a groundwater extraction facility shall be conclusively presumed to be the operator unless a satisfactory showing is made to the governing body of the groundwater sustainability agency that the groundwater extraction facility actually is operated by some other person.

(p) Owner means a person owning a groundwater extraction facility or an interest in a groundwater extraction facility other than a lien to secure the payment of a debt or other obligation.

(q) Personal information has the same meaning as defined in Section 1798.3 of the Civil Code.

(r) Planning and implementation horizon means a 50-year time period over which a groundwater sustainability agency determines that plans and measures will be implemented in a basin to ensure that the basin is operated within its sustainable yield.

(s) Public water system has the same meaning as defined in Section 116275 of the Health and Safety Code.

(t) Recharge area means the area that supplies water to an aquifer in a groundwater basin.

(u) Sustainability goal means the existence and implementation of one or more groundwater sustainability plans that achieve sustainable groundwater management by identifying and causing the implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield.

(v) Sustainable groundwater management means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.

(w) Sustainable yield means the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus that can be withdrawn annually from a groundwater supply without causing an undesirable result.

(x) Undesirable result means one or more of the following effects caused by groundwater conditions occurring throughout the basin:

  (1) Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.

  (2) Significant and unreasonable reduction of groundwater storage.

  (3) Significant and unreasonable seawater intrusion.

  (4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.

  (5) Significant and unreasonable land subsidence that substantially interferes with surface land uses.

  (6) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

(y) Water budget means an accounting of the total groundwater and surface water entering and leaving a basin including the changes in the amount of water stored.

(z) Watermaster means a watermaster appointed by a court or pursuant to other law.

(aa) Water year means the period from October 1 through the following September 30, inclusive.

(ab) Wellhead protection area means the surface and subsurface area surrounding a water well or well field that supplies a public water system through which contaminants are reasonably likely to migrate toward the water well or well field.

Official California Code of Regulations

Title 23. Waters
Division 2. Department of Water Resources
Chapter 1.5. Groundwater Management
Subchapter 2. Groundwater Sustainability Plans
Article 2. Definitions
23 CCR § 351
§ 351. Definitions.

The definitions in the Sustainable Groundwater Management Act, Bulletin 118, and Subchapter 1 of this Chapter, shall apply to these regulations. In the event of conflicting definitions, the definitions in the Act govern the meanings in this Subchapter. In addition, the following terms used in this Subchapter have the following meanings:

(a) "Agency" refers to a groundwater sustainability agency as defined in the Act.

(b) "Agricultural water management plan" refers to a plan adopted pursuant to the Agricultural Water Management Planning Act as described in Part 2.8 of Division 6 of the Water Code, commencing with Section 10800 et seq.

(c) "Alternative" refers to an alternative to a Plan described in Water Code Section 10733.6.

(d) "Annual report" refers to the report required by Water Code Section 10728.

(e) "Baseline" or "baseline conditions" refer to historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin.

(f) "Basin" means a groundwater basin or subbasin identified and defined in Bulletin 118 or as modified pursuant to Water Code 10722 et seq.

(g) "Basin setting" refers to the information about the physical setting, characteristics, and current conditions of the basin as described by the Agency in the hydrogeologic conceptual model, the groundwater conditions, and the water budget, pursuant to Subarticle 2 of Article 5.

(h) “Best available science” refers to the use of sufficient and credible information and data, specific to the decision being made and the time frame available for making that decision, that is consistent with scientific and engineering professional standards of practice.

(i) “Best management practice” refers to a practice, or combination of practices, that are designed to achieve sustainable groundwater management and have been determined to be technologically and economically effective, practicable, and based on best available science.

(j) “Board” refers to the State Water Resources Control Board.

(k) “CASGEM” refers to the California Statewide Groundwater Elevation Monitoring Program developed by the Department pursuant to Water Code Section 10920 et seq., or as amended.

(l) “Data gap” refers to a lack of information that significantly affects the understanding of the basin setting or evaluation of the efficacy of Plan implementation, and could limit the ability to assess whether a basin is being sustainably managed.

(m) “Groundwater dependent ecosystem” refers to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.

(n) “Groundwater flow” refers to the volume and direction of groundwater movement into, out of, or throughout a basin.

(o) “Interconnected surface water” refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.

(p) “Interested parties” refers to persons and entities on the list of interested persons established by the Agency pursuant to Water Code Section 10723.4.

(q) “Interim milestone” refers to a target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan.

(r) “Management area” refers to an area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.

(s) “Measurable objectives” refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

(t) “Minimum threshold” refers to a numeric value for each sustainability indicator used to define undesirable results.

(u) “NAD83” refers to the North American Datum of 1983 computed by the National Geodetic Survey, or as modified.

(v) “NAVD88” refers to the North American Vertical Datum of 1988 computed by the National Geodetic Survey, or as modified.

(w) “Plain language” means language that the intended audience can readily understand and use because that language is concise, well-organized, uses simple vocabulary, avoids excessive acronyms and technical language, and follows other best practices of plain language writing.

(x) “Plan” refers to a groundwater sustainability plan as defined in the Act.

(y) “Plan implementation” refers to an Agency's exercise of the powers and authorities described in the Act, which commences after an Agency adopts and submits a Plan or Alternative to the Department and begins exercising such powers and authorities.

(z) “Plan manager” is an employee or authorized representative of an Agency, or Agencies, appointed through a coordination agreement or other agreement, who has been delegated management authority for submitting the Plan and serving as the point of contact between the Agency and the Department.

(aa) “Principal aquifers” refer to aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.

(ab) “Reference point” refers to a permanent, stationary and readily identifiable mark or point on a well, such as the top of casing, from which groundwater level measurements are taken, or other monitoring site.

(ac) “Representative monitoring” refers to a monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.

(ad) “Seasonal high” refers to the highest annual static groundwater elevation that is typically measured in the Spring and associated with stable aquifer conditions following a period of lowest annual groundwater demand.

(ae) “Seasonal low” refers to the lowest annual static groundwater elevation that is typically measured in the Summer or Fall, and associated with a period of stable aquifer conditions following a period of highest annual groundwater demand.

(af) “Seawater intrusion” refers to the advancement of seawater into a groundwater supply that results in degradation of water quality in the basin, and includes seawater from any source.

(ag) “Statutory deadline” refers to the date by which an Agency must be managing a basin pursuant to an adopted Plan, as described in Water Code Sections 10720.7 or 10722.4.

(ah) “Sustainability indicator” refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x).

(ai) “Uncertainty” refers to a lack of understanding of the basin setting that significantly affects an Agency's ability to develop sustainable management criteria and appropriate projects and management actions in a Plan, or to evaluate the efficacy of Plan implementation, and therefore may limit the ability to assess whether a basin is being sustainably managed.

(aj) “Urban water management plan” refers to a plan adopted pursuant to the Urban Water Management Planning Act as described in Part 2.6 of Division 6 of the Water Code, commencing with Section 10610 et seq.

(ak) “Water source type” represents the source from which water is derived to meet the applied beneficial uses, including groundwater, recycled water, reused water, and surface water sources identified as Central Valley Project, the State Water Project, the Colorado River Project, local supplies, and local imported supplies.

(al) “Water use sector” refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation.

(am) “Water year” refers to the period from October 1 through the following September 30, inclusive, as defined in the Act.

(an) “Water year type” refers to the classification provided by the Department to assess the amount of annual precipitation in a basin.

7 MONITORING NETWORKS

This chapter describes the monitoring networks that exist and improvements to the monitoring networks that will be developed in the Subbasin as part of GSP implementation. This chapter is prepared in accordance with the SGMA regulations §354.32 and §354.34 and includes monitoring objectives, monitoring protocols, and data reporting requirements.

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

7.1 Monitoring Objectives

The SGMA regulations require monitoring networks be developed to promote the collection of data of sufficient quality, frequency, and spatial distribution to characterize groundwater and related surface water conditions in the Subbasin 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 Chapter 8 - Sustainable Management Criteria.

7.1.1 Monitoring Networks

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

- Chronic lowering of groundwater levels
- Reduction in groundwater storage

- Degraded water quality
- Land subsidence
- Depletion of interconnected surface water

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

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

The approach for establishing the monitoring network for this Subbasin is to leverage existing monitoring programs and incorporate additional monitoring locations that have been made available by cooperating entities. The monitoring networks are limited to locations with data that are publicly available and not collected under confidentiality agreements; the availability of well data and restrictions of existing confidentiality agreements results in a monitoring network with relatively few wells. This chapter identifies data gaps in each monitoring network and proposes locations for filling those data gaps.

7.1.2 Management Areas

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

7.2 Groundwater Level Monitoring Network

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

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

San Luis Obispo County Flood Control and Water Conservation District (SLOFCWCD)

USGS National Water Information System (NWIS)

DWR Online System for Well Completion Reports (OSWCR)

DWR SGMA Data Viewer

DWR California Statewide Groundwater Elevation Monitoring (CASGEM)

City of Paso Robles and San Miguel CSD for public drinking water supply wells

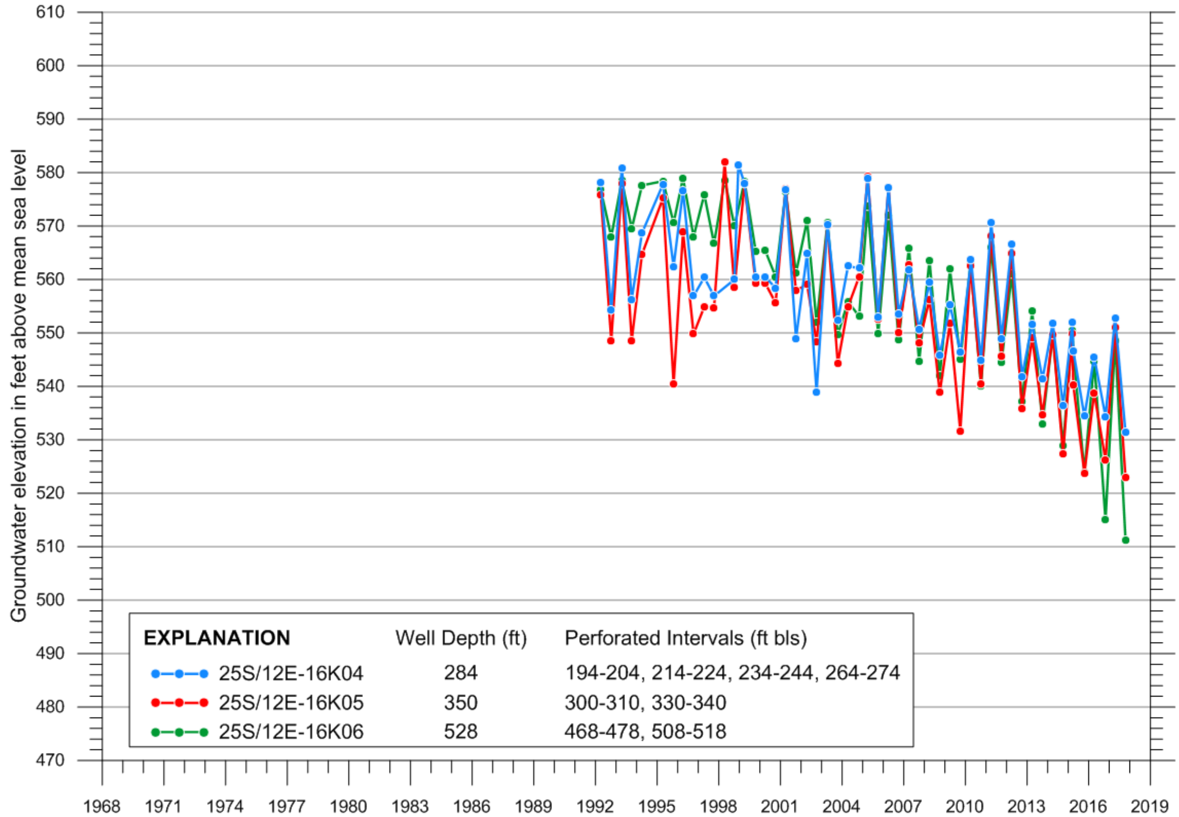
These data sources resulted in a dataset of thousands of wells. The dataset was analyzed using the following steps to assess whether individual wells could be included in the initial GSP groundwater level monitoring network:

1. **Include Only Currently Measured Wells**. To reduce the possibility of selecting a well that has not been monitored in many years or that may no longer be accessible, wells were excluded that did not have at least one groundwater level measurement from 2012 or later. All the groundwater level monitoring data available for the Subbasin that met this criterion were provided by SLOFCWCD or the USGS NWIS, which have monitored groundwater levels in approximately 130 wells since 2012.

2. **Remove Confidential Wells**. Most of the data from wells in the SLOFCWCD groundwater level monitoring network are subject to confidentiality agreements. Because monitoring data collected as part of this GSP will be publicly available, data from the wells subject to confidentiality agreements cannot be published and therefore these wells are currently excluded from the GSP monitoring network.

3. **Include Additional Wells Provided by GSAs**. The GSAs provided an additional set of wells after securing permission from well owners to be included in the monitoring network. Only wells that had measurements at least as recent at 2012, were included.

Within the group of wells that met the criteria listed above, there are two well clusters: each consisting of three wells in the same location. The wells in these two clusters are all screened in the Paso Robles Formation Aquifer at various depths. A comparison of hydrographs for each cluster indicates that water levels have been generally similar in the three wells in each cluster, as shown on Figure 7-1. Only one well was selected from each cluster for inclusion in the monitoring network because it is representative of all the wells in that cluster. The two wells selected for monitoring are wells 26S/15E-20B04 and 25S/12E-16K05.



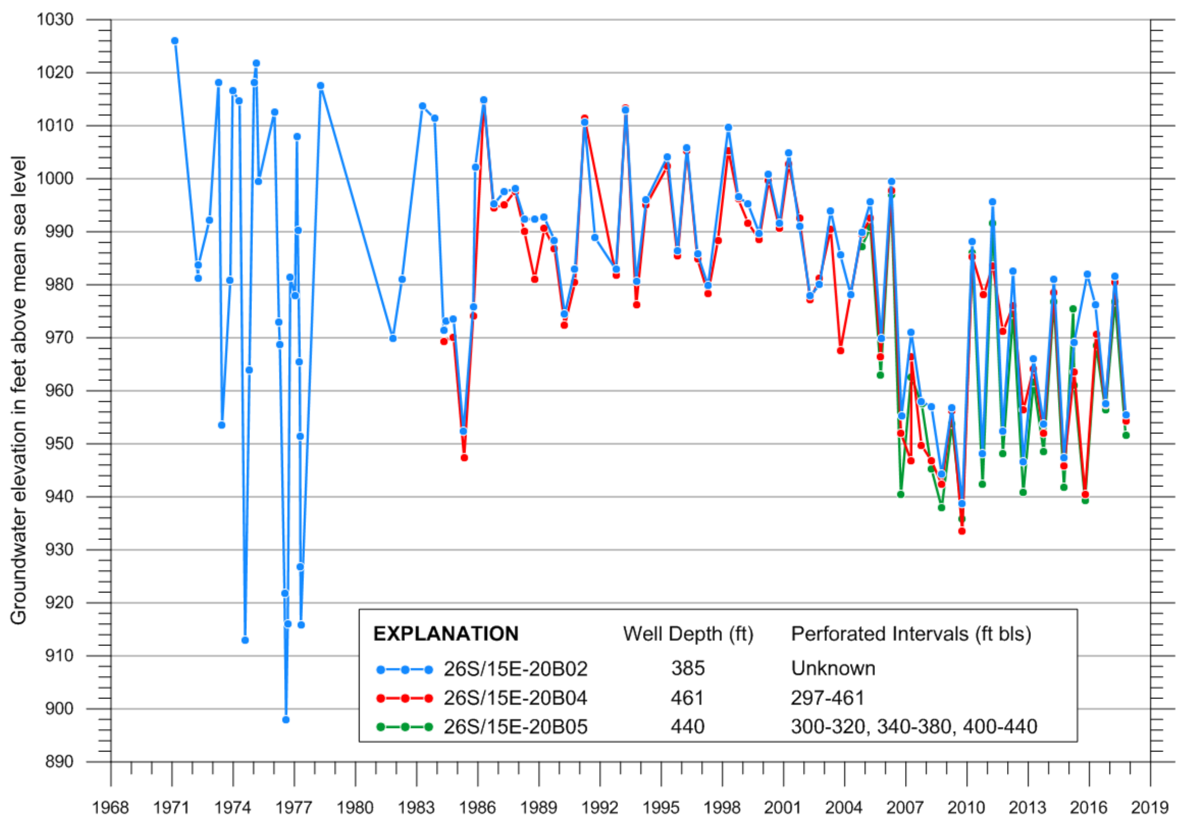


Figure 7-1. Hydrographs of Wells in Well Clusters

There are two principal aquifers in the Subbasin, as described in Chapter 4 – Hydrogeologic Conceptual Model. The Alluvial Aquifer occurs along stream channels and is generally up to about 100 feet thick. The Paso Robles Formation Aquifer occurs in thin discontinuous sand and gravel zones throughout the Subbasin. The wells in the proposed monitoring network are assigned to an aquifer according to these guidelines:

- The well location is compared to the surface geology map, Figure 4-4.
- If the well is located where the Paso Robles Formation is mapped at land surface on the surface geology map, then it is assumed to be monitoring the Paso Robles Formation Aquifer.
- If the well is located in the mapped extent of alluvium, and the screened interval or total well depth is less than 100 feet, then it was assumed to be monitoring the Alluvial Aquifer. If the top of the perforated interval is greater than 100 feet below land surface, then the well was assumed to be monitoring the Paso Robles Formation Aquifer.

The depths of several wells are unknown. Although well completion reports are available online via the State's OSWCR system, the well completion report numbers are unknown for these wells and therefore it is impossible to identify the associated well completion reports. Wells in which depth to water is greater than 100 feet below land surface on average are assumed to be monitoring the Paso Robles Formation Aquifer. Wells with depth to water less than 100 feet below land surface may be monitoring the alluvial aquifer, but their aquifer designations are unknown pending confirmation of screened interval and/or total depth. Wells for which an aquifer could not be assigned are considered potential future monitoring wells, and they will be included in the monitoring system when and if the well completion information and aquifer can be verified during GSP implementation. Likewise, there are also wells within the Alluvial Aquifer that could be included in the monitoring network when and if the data on depth and screened interval are obtained and confidentiality restrictions are lifted.

The wells in the water level monitoring network are listed in Table 7-1 and shown on Figure 7-2. There are currently 23 wells in the network, 22 wells monitor the Paso Robles Formation Aquifer and one well owned by the City of Paso Robles monitors the Alluvial Aquifer. Any of these wells that are missing well completion information will be assessed during GSP implementation to obtain well depth and/or screened interval. There are nine potential future monitoring wells listed on Table 7-2.

All 22 wells monitoring the Paso Robles Formation Aquifer are part of the SLOFCWCD monitoring network. These wells either are not subject to confidentiality agreements or the well data are located in a public database hosted by DWR and therefore are publicly available. The monitoring frequency indicates that water levels are presumably measured twice a year, in accordance with the SLOFCWCD protocol of measuring depths to water in April and October of each year. The most recent available measurement was 2016 or 2017 in all wells.

Table 7-1. Groundwater Level Monitoring Well Network

Well ID (alt ID)	Well Depth (feet)	Screen Interval(s) (feet bls)	Reference Point Elevation (feet AMSL)	First Year of Data	Last Year of Data	Years Measured (years)	Number of Measurements	Aquifer
18MW-0191[1]	50	10-50	672 (LSE)	2018	2018	<1	1	Qa
25S/12E-16K05 (PASO-0345)	350	300-310, 330-340	669.8	1992	2017	25	52	PR
25S/12E-26L01 (PASO-0205)	400	200-400	719.72	1970	2017	47	103	PR
25S/13E-08L02 (PASO-0195)	270	110-270	1,033.81	2012	2017	5	11	PR
26S/12E-14G01 (PASO-0048)	740	---	789.3	1969	2017	48	117	PR
26S/12E-14G02 (PASO-0017)	840	640-840	787	1993	2012	19	27	PR
26S/12E-14H01 (PASO-0184)	1230	180-?	790	1969	2016	47	45	PR
26S/12E-14K01 (PASO-0238)	1100	---	786	1979	2017	38	80	PR
26S/12E-26E07 (PASO-0124)	400	---	835	1958	2017	59	128	PR
26S/13E-08M01 (PASO-0164)	400	260-400	827.92	2013	2017	4	11	PR
26S/13E-16N01 (PASO-0282)	400	200-400	890.17	2012	2017	5	11	PR
26S/15E-19E01 (PASO-0073)	512	223-512	1,020	1987	2017	30	52	PR
26S/15E-20B04 (PASO-0401)	461	297-461	1,036.36	1984	2017	33	66	PR
26S/15E-29N01 (PASO-0226)	350	---	1,135	1958	2017	59	122	PR
26S/15E-29R01 (PASO-0406)	600	180-600	1,109.5	2012	2017	5	9	PR
26S/15E-30J01 (PASO-0393)	605	195-605	1,123.3	1970	2017	47	80	PR
27S/12E-13N01 (PASO-0223)	295	195-295	972.42	2012	2017	5	11	PR
27S/13E-28F01 (PASO-0243)	212	118-212	1,072	1969	2017	48	104	PR
27S/13E-30F01 (PASO-0355)	310	200-310	1,043.2	2012	2017	5	8	PR
27S/13E-30J01 (PASO-0423)	685	225-685	1,095	2012	2015	3	6	PR
27S/13E-30N01 (PASO-0086)	355	215-235, 275-355	1,086.73	2012	2016	4	6	PR
27S/14E-11R01 (PASO-0392)	630	180-630	1,160.5	1974	2017	43	69	PR
28S/13E-01B01 (PASO-0066)	254	154-254	1,099.93	2012	2016	4	9	PR

NOTES: New alluvial monitoring well information provided by City of Paso Robles; well not included in County database.
"—" = unknown; ASML – above mean sea level; PR Paso Robles Formation Aquifer; Qa Alluvial Aquifer

Table 7-2. Potential Future Groundwater Monitoring Well, Aquifer Unknown

Well ID (alt ID)	Well Depth (feet)	Screen Interval(s) (feet bls)	Reference Point Elevation (feet AMSL)	First Year of Data	Last Year of Data	Years Measured (years)	Number of Measurements	Aquifer
25S/12E-20K03 (PASO-0304)	---	---	625	1974	2017	43	82	---
26S/14E-24B01 (PASO-0302)	---	---	1001	1962	2017	55	93	---
26S/15E-33C01 (PASO-0314)	---	---	1095	1973	2017	44	75	---
26S/15E-33Q01 (PASO-0381)	---	---	1102	1973	2017	44	78	---
27S/15E-03E01 (PASO-0277)	---	---	1120.8	1968	2017	49	104	---
27S/14E-24B01 (PASO-0391)	---	---	1180.5	1973	2017	44	69	---
27S/14E-25J01 (PASO-0074)	---	---	1,225.5	1972	2017	45	67	--
27S/14E-29G01 (PASO-0041)	---	---	1201.5	1974	2017	43	73	---
27S/15E-35F01 (PASO-0053)	---	---	1230	1965	2017	52	78	---

NOTES: "—" = unknown

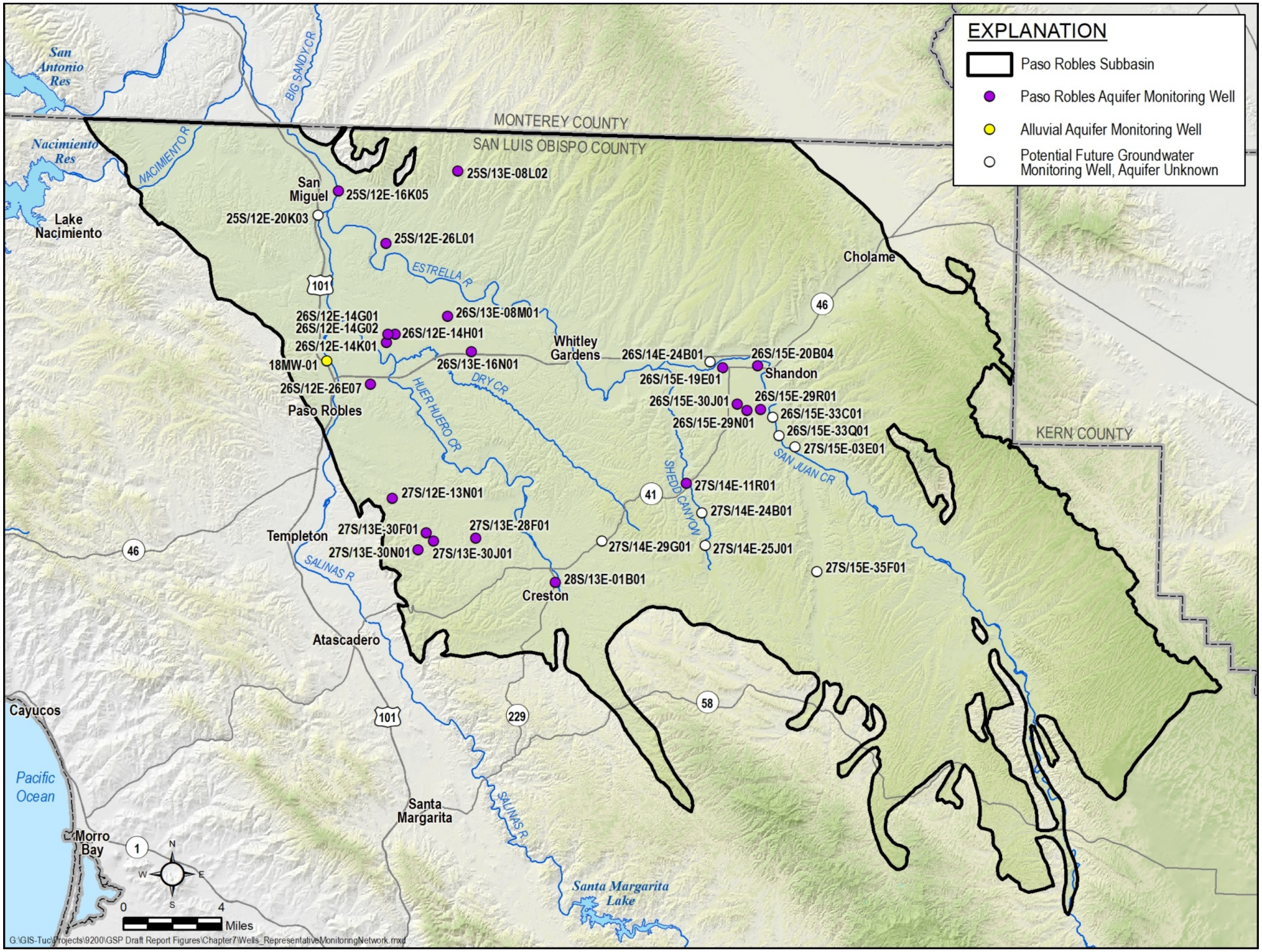


Figure 7-2. Groundwater Level Monitoring Well Network in Paso Robles Formation Aquifer

7.2.1 Groundwater Level Monitoring Network Data Gaps

The GSAs identified data gaps using guidelines in the SGMA regulations and BMPs published by DWR on monitoring networks (DWR, 2016). Table 7-3 summarizes the suggested attributes of a groundwater level monitoring network from the BMPs in comparison to the current network, and identifies data gaps.

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

While there is no definitive rule on well density, the BMP cites a range of 0.2 to 10 wells per 100 square miles, with a median of 5 wells per 100 square miles from various cited studies. The CASGEM monitoring plan includes 10 to 20 wells per 100 square miles (SLOFCWCD, 2014). The Subbasin is 684 square miles, which equates to 34 wells at a median density of 5 wells per 100 square miles. The monitoring network of 22 wells in the Paso Robles Formation Aquifer is within the recommended range cited in the BMP (1 to 68 wells), but the number of monitoring wells may be considered low given the size and complexity of the Subbasin. The single monitoring well in the Alluvial Aquifer is insufficient. This is a data gap that will be addressed during plan implementation.

A program to increase monitoring frequency will be developed to determine seasonal high and low groundwater elevations and also monitor groundwater response to recharge and other activities. One method to increase monitoring frequency is to install continuous dataloggers in existing and new monitoring wells.

Groundwater level data must be sufficient to identify changes in groundwater flow directions and gradients. Groundwater contour maps are presented in Chapter 5 for both aquifers. These maps were prepared using available monitoring data, including data collected from wells subject to confidentiality agreements. To comply with the confidentiality agreements, the data and well locations are not included on the maps. The 23 wells in the proposed Paso Robles Formation Aquifer monitoring network are insufficient to develop representative and sufficiently detailed groundwater contour maps. The lack of publicly available data for both aquifers is identified as a data gap that will be addressed early in GSP implementation.

A recent study by GSI Water Solutions, Inc. (GSI) came to similar conclusions about data gaps in the Paso Robles Formation (GSI, 2018). The data gap areas developed by GSI are shown on Figure 7-3. These are areas where existing wells that can serve as monitoring wells should be identified, or new monitoring wells should be installed in the Paso Robles Formation Aquifer. Figure 7-3 also shows locations of data gaps and potential new well locations for the Alluvial Aquifer.

The data gap areas on Figure 7-3 will be addressed in the future by either identifying an existing well in the area that meets the criteria for a valid monitoring well, or drilling a new well in the area. There are approximately 90 confidential wells in the Subbasin that have been monitored since 2012 that could be used to fill some of these data gaps if the well owners agree to sign amended confidentiality agreements. SLOFCWCD will attempt to secure such amended agreements in areas where data gaps have been identified. The GSI data gap report identifies and targets specific confidential wells for consideration as new monitoring wells in a publicly accessible monitoring system. If an existing well cannot be identified to fill a data gap, it will be necessary to drill a new monitoring well for that data gap area.

Table 7-3. Summary of Best Management Practices, Groundwater Level Monitoring Well Network, and Data Gaps

Best Management Practice (DWR, 2016a)	Current Monitoring Network	Data Gap
Groundwater level data will be collected from each principal aquifer in the basin.	23 wells total. 22 wells are completed in the Paso Robles Formation Aquifer; one well is completed in the Alluvial Aquifer.	Additional wells are needed; well depth, screen interval, well log, and aquifer designation are unknown for candidate monitoring wells; renegotiate to release confidentiality from confidential wells with water level measurement more recent than 2000 in database
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).	Confidential data from 43 wells and non-confidential data from 9 wells were used to create seasonal groundwater elevation maps for the Paso Robles Formation Aquifer (Chapter 5); Confidential data from 7 wells and data from 1 non-confidential well were used to create an annual groundwater elevation map for the Alluvial Aquifer (Chapter 5).	Some data used to prepare groundwater elevation maps in the GSP are confidential; in the future, only publicly available data will be used to develop contour maps. Additional wells are needed to develop representative contour maps.
Groundwater levels will be collected during the middle of October and March for comparative reporting purposes, although more frequent monitoring may be required (Frequency).	The 22 wells in the existing monitoring network that are screened in the Paso Robles Formation have been monitored twice a year, in spring (April) and fall (October), since at least 2012.	Seasonal monitoring is the protocol for SLOFCWCD (Appendix F); more frequent monitoring may be needed to identify actual seasonal high and low groundwater elevations and further characterize groundwater level fluctuations; instrumentation like transducers or other technology may be used in future to monitor groundwater elevations.
Data must be sufficient for mapping groundwater depressions, recharge areas, and along margins of basins where groundwater flow is known to enter or leave a basin.	Current network of 23 wells is insufficient for mapping all of these areas.	Additional monitoring wells are required in groundwater depressions, near recharge features such as rivers and streams, and along Subbasin margins; possibly install instrumentation like transducers or other technology in future monitoring wells.
Well density must be adequate to determine changes in storage.	Current network of 23 wells is insufficient for determining changes in groundwater storage.	Additional monitoring wells are required to adequately cover the Subbasin and determine changes in groundwater storage.
Data must be able to demonstrate the interconnectivity between shallow groundwater and surface water bodies, where appropriate.	One well in the existing monitoring network is confirmed to be completed in the Alluvial Aquifer. There is at least one additional well that may be completed in the Alluvial Aquifer if construction data were known.	Additional wells will be needed in the Alluvial Aquifer near reaches of interconnected surface water to characterize interconnectivity.
Data must be able to map the effects of management actions, i.e., managed aquifer recharge.	Current network of 23 wells is inadequate for mapping the effects of management actions.	Additional monitoring wells are required to map the effectiveness of management actions. This monitoring will be addressed as projects are implemented
Data must be able to demonstrate conditions near basin boundaries; agencies may consider coordinating monitoring efforts with adjacent basins to provide consistent data across basin boundaries. Agencies may consider characterization and continued impacts of internal hydraulic boundary conditions, such as faults, disconformities, or other internal boundary types.	Several wells in the existing monitoring network are used to monitor conditions on the southwestern boundary of the Subbasin.	Additional wells are likely necessary along the northern boundary with the Upper Valley Subbasin of the Salinas Valley. Additional wells may be necessary to map the structure and effect of internal faults.
Data must be able to characterize conditions and monitor adverse impacts to beneficial uses and users identified within the basin.	The current monitoring network characterizes only a portion of the Subbasin and the potential impacts.	Network will be expanded in accordance with the data gaps identified above.

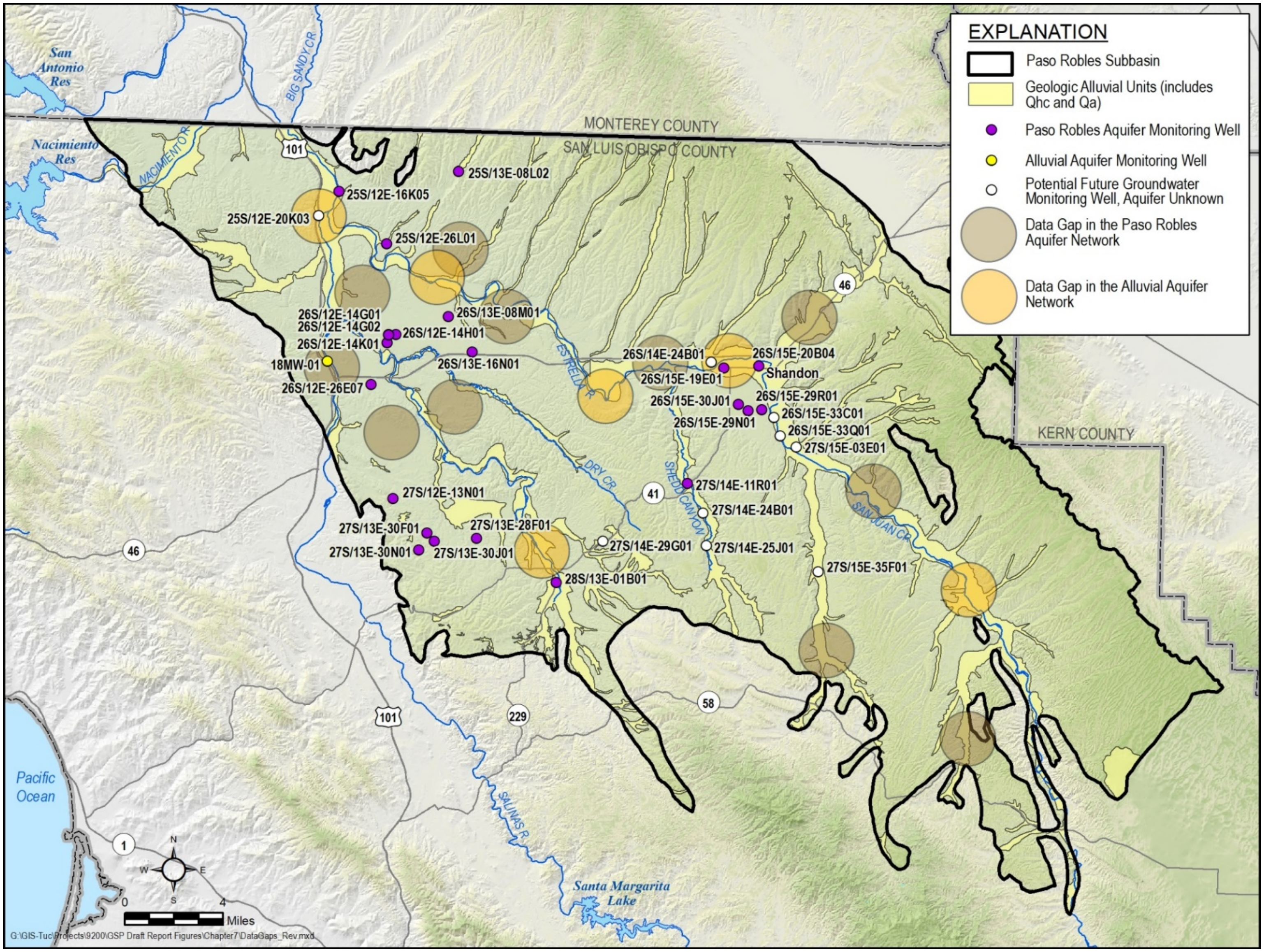


Figure 7-3. Data Gaps in the Groundwater Level Monitoring Well Network

7.2.2 Groundwater Level Monitoring Protocols

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

There are various automated groundwater level monitoring devices in operation across the Subbasin and the GSP implementation phase will incorporate automated logging of groundwater elevations. Automated water level monitoring is already used in a number of private wells in the basin; these data may be used to supplement the current water level monitoring network in the future. As automated groundwater level monitoring systems are added to the monitoring network, appropriate protocols for each automated system will be incorporated into this GSP.

Automated groundwater level monitoring systems have the advantage of supplying more frequent groundwater levels with no increase in monitoring costs. The groundwater level monitoring BMP recommends more frequent monitoring in certain areas, including shallow, unconfined aquifers, in areas of rapid recharge, in areas of greater withdrawal rates, and in areas of more variable climatic conditions. More frequent monitoring may also be required in specific places where sustainability indicators are a concern or to track impacts of specific management actions and projects. The need for more frequent monitoring will be evaluated, and a program to increase monitoring frequency will be developed during the GSP implementation phase.

7.3 Groundwater Storage Monitoring Network

This GSP adopts groundwater levels as a proxy for assessing change in groundwater storage, as described in Chapter 8, Sustainable Management Criteria. Groundwater level monitoring points that are adequate for collecting the groundwater level data are identified in Section 7.2. Therefore, the network of wells providing groundwater level data for the reduction in groundwater storage sustainability indicator is the same wells shown on Table 7-1.

7.3.1 Groundwater Storage Monitoring Data Gaps

Data gaps in the groundwater storage monitoring network are similar to the data gaps identified for the groundwater level monitoring network discussed in Section 7.2.1. Because change in groundwater storage is predominantly influenced by changes in shallow water table elevations, more shallow wells than those discussed in Section 7.2.1 may be necessary. Additional water table wells may be needed throughout the Paso Robles Formation Aquifer. The number of additional water table wells will not be known until there is an assessment of how many existing wells are screened at or near the existing water table in the Paso Robles Formation Aquifer. This is a data gap that will be addressed during GSP implementation.

7.3.2 Groundwater Storage Monitoring Protocols

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

7.4 Water Quality Monitoring Network

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

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

Existing groundwater quality monitoring programs in the Subbasin are described in Chapter 3 and groundwater quality distribution and trends are described in Chapter 5. Constituents of concern were identified in Chapter 5 based on comparison to drinking water standards and levels that could impact crop production. As described in Chapter 8, separate minimum thresholds are set for agricultural constituents of concern and public supply well constituents of concern. Therefore, although there is a single groundwater quality monitoring network, different wells in the network will be assessed for different constituents. Constituents of concern for drinking water will be assessed at public water supply wells. Constituents of concern for crop health will be assessed at agricultural supply wells.

The public water supply wells included in the monitoring network were identified by reviewing data from the State Water Resources Control Board (SWRCB) Division of Drinking Water. Wells were selected that were sampled for at least one of the constituents of concern during 2015 or more recently. These wells are listed in Table 7-4 and shown on Figure 7-4. For the 41 public supply wells in the groundwater quality monitoring network, an assumed aquifer designation was assigned based on surficial geologic maps (Figure 4-4) and well depths when available. There are 31 wells that are in the Paso Robles Formation Aquifer, seven wells in the Alluvial Aquifer, and three wells where the aquifer could not be estimated. Verifying the aquifer for these three wells is a data gap that will be addressed during plan implementation.

The agricultural supply wells included in the monitoring network were identified by reviewing data from the Irrigated Lands Regulatory Program (ILRP) that are stored in the SWRCB's Geotracker/GAMA database. Wells were selected that had detections of at least one of the agricultural constituents of concern reported from 2015 or more recently (GAMA, 2015). There are 28 ILRP properties with agricultural supply wells in the groundwater quality monitoring network. Since multiple wells of unknown depth are associated with a given IRLP ID, the aquifer monitored by these wells is unknown. These wells are listed in Table 7-4 and shown on Figure 7-4. If an IRLP property has multiple wells, the location of the well is shown at the average of these coordinates.

Table 7-4. Groundwater Quality Monitoring Well Network

Well ID	Type of Well	Well Depth[1] (feet)	Screen Interval (feet bls)	First Measurement Date	Last Measurement Date	Measurement Period (years)	Measurement Count	Assumed Aquifer
W0604000207-001	PWS	440	340-440	2002	2018	16	63	PR
W0604000210-001	PWS	117	87-117	2002	2015	13	9	---
W0604000512-001	PWS	60	30-60	2002	2015	13	13	AA
W0604000554-001	PWS	355	155-355	2002	2016	14	16	PR
W0604000554-003	PWS	237	174-237	2002	2016	14	16	PR
W0604000620-001	PWS	354	120-354	2001	2018	17	36	PR
W0604000620-002	PWS	510	310-510	2002	2018	16	41	PR
W0604000693-002	PWS	40	---	2005	2017	12	9	AA
W0604000708-001	PWS	80	80-80	2002	2018	16	10	AA
W0604000781-001	PWS	792	412-792	2002	2018	16	21	PR
W0604000781-011	PWS	670	380-670	2002	2018	16	21	PR
W0604000788-001	PWS	450	235-450	2002	2018	16	15	PR
W0604000788-005	PWS	920	400-920	2003	2018	15	14	PR
W0604000789-001	PWS	245	125-245	2002	2018	16	17	PR
W0604000790-001	PWS	175	126-175	2002	2018	16	62	---
W0604000803-001	PWS	420	100-420	2004	2018	14	10	PR
W0604000803-002	PWS	420	200-420	2004	2018	14	10	PR
W0604010007-003	PWS	400	200-400	1984	2016	32	36	PR
W0604010007-004	PWS	500	---	1984	2018	34	82	PR
W0604010007-006	PWS	344	---	1987	2018	31	34	PR
W0604010007-007	PWS	80	20-80	1984	2017	33	23	AA
W0604010007-008	PWS	80	20-80	1984	2018	34	24	AA

Well ID	Type of Well	Well Depth[1] (feet)	Screen Interval (feet bls)	First Measurement Date	Last Measurement Date	Measurement Period (years)	Measurement Count	Assumed Aquifer
W0604010007-009	PWS	---	---	1990	2018	28	8	---
W0604010007-010	PWS	600	260-600	1990	2017	27	17	PR
W0604010007-012	PWS	425	---	1984	2018	34	35	PR
W0604010007-013	PWS	317	---	1984	2018	34	34	PR
W0604010007-017	PWS	675	---	1993	2018	25	26	PR
W0604010007-018	PWS	535	---	1993	2016	23	23	PR
W0604010007-019	PWS	220	---	1995	2017	22	25	PR
W0604010007-020	PWS	610	---	1996	2017	21	22	PR
W0604010007-021	PWS	100	---	1998	2018	20	22	AA
W0604010007-038	PWS	1060	300-1060	2003	2018	15	18	PR
W0604010010-004	PWS	300	85-300	1984	2018	34	118	PR
W0604010010-005	PWS	360	162-360	1991	2018	27	105	PR
W0604010010-009	PWS	380	350-380	2007	2018	11	250	PR
W0604010028-002	PWS	342	297-342	1991	2018	27	46	PR
W0604010028-004	PWS	400	300-400	2002	2018	16	31	PR
W0604010831-001	PWS	840	640-840	1989	2016	27	24	PR
W0604010831-002	PWS	446	401-446	1989	2016	27	23	PR
W0604010831-003	PWS	475	410-475	1989	2016	27	24	PR
W0604010900-002	PWS	50	---	1999	2018	19	18	AA
AGL020000646	ILRP	660	---	2012	2017	5	---	---
AGL020000801	ILRP	---	---	2013	2017	4	---	---
AGL020001525	ILRP	---	---	2014	2017	3	---	---
AGL020001534	ILRP	---	---	2013	2017	4	---	---

Well ID	Type of Well	Well Depth[1] (feet)	Screen Interval (feet bls)	First Measurement Date	Last Measurement Date	Measurement Period (years)	Measurement Count	Assumed Aquifer
AGL020001605	ILRP	---	---	2015	2017	2	---	---
AGL020001689	ILRP	---	---	2014	2017	3	---	---
AGL020001800	ILRP	---	---	2015	2015	<1	---	---
AGL020003900	ILRP	---	---	2015	2015	<1	---	---
AGL020004014	ILRP	---	---	2014	2017	3	---	---
AGL020005173	ILRP	---	---	2015	2017	2	---	---
AGL020005268	ILRP	---	---	2015	2015	<1	---	---
AGL020007128	ILRP	---	---	2014	2017	3	---	---
AGL020007471	ILRP	---	---	2015	2015	<1	---	---
AGL020007593	ILRP	---	---	2015	2018	3	---	---
AGL020007721	ILRP	---	---	2017	2017	<1	---	---
AGL020007807	ILRP	---	---	2012	2017	5	---	---
AGL020007815	ILRP	---	---	2012	2017	5	---	---
AGL020007848	ILRP	---	---	2015	2015	<1	---	---
AGL020007872	ILRP	---	---	2015	2018	3	---	---
AGL020009803	ILRP	---	---	2014	2018	4	---	---
AGL020010282	ILRP	---	---	2012	2015	3	---	---
AGL020013814	ILRP	---	---	2015	2018	3	---	---
AGL020015242	ILRP	---	---	2015	2018	3	---	---
AGL020015302	ILRP	---	---	2013	2017	4	---	---
AGL020016382	ILRP	---	---	2015	2018	3	---	---
AGL020024742	ILRP	---	---	2016	2017	1	---	---
AGL020025402	ILRP	---	---	2015	2017	2	---	---

Well ID	Type of Well	Well Depth[1] (feet)	Screen Interval (feet bls)	First Measurement Date	Last Measurement Date	Measurement Period (years)	Measurement Count	Assumed Aquifer
AGL020028348	ILRP	---	---	2017	2017	<1	---	---

Notes
--- = Unknown
(1) = total well depth is assumed to be equivalent to bottom of perforated interval
AA = Alluvial Aquifer; PR = Paso Robles Formation Aquifer
PWS = Public water supply
ILRP = Irrigated Lands Regulatory Program

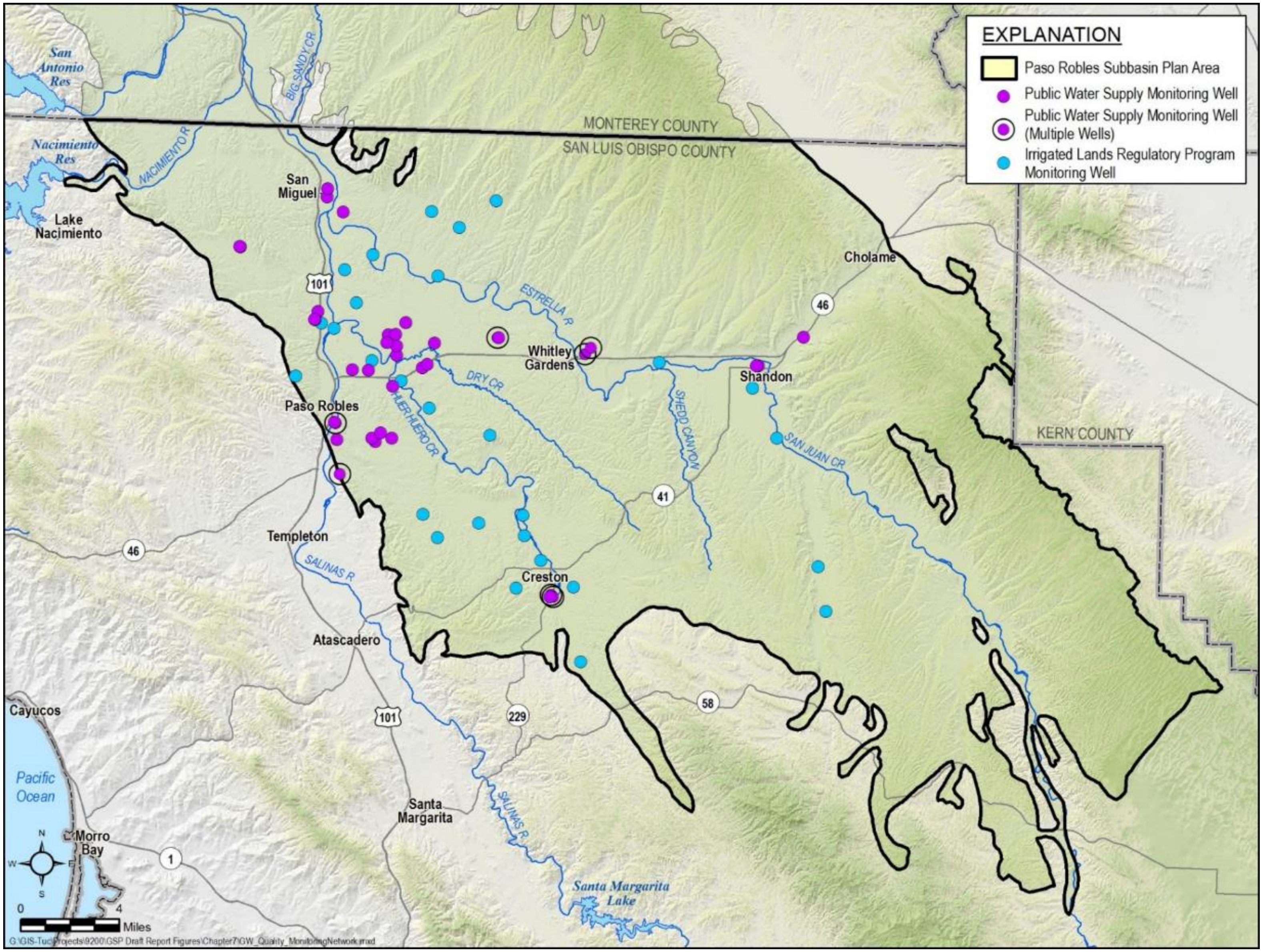


Figure 7-4. Groundwater Quality Monitoring Well Network

7.4.1 Groundwater Quality Monitoring Data Gaps

Because the groundwater quality monitoring network is based on existing supply wells, there are no spatial data gaps in the network. Table 7-5 summarizes the recommendations for groundwater quality monitoring from the BMPs, the current network, and data gaps. There is adequate spatial coverage in the network to assess impacts to beneficial uses and users. The primary data gap is that well construction info for many wells in the monitoring network is unknown. This is a data gap that will be addressed during GSP implementation.

7.4.2 Groundwater Quality Monitoring Protocols

Water quality samples are currently being collected according to SWRCB and ILRP requirements. ILRP data are currently collected under Central Coast RWQCB Ag Order 3.0. ILRP samples are collected under the Tier 1, Tier 2, or Tier 3 monitoring and reporting programs. Copies of these monitoring and reporting programs are included in Appendix F, and incorporated herein as monitoring protocols. These protocols will continue to be followed during GSP implementation for the groundwater quality monitoring.

Table 7-5. Summary of Groundwater Quality Monitoring, Best Management Practices, and Data Gaps

Best Management Practice (DWR, 2016a)	Current Network	Data Gap
Monitor groundwater quality data from each principal aquifer in the basin that is currently, or may be in the future, impacted by degraded water quality. • The spatial distribution must be adequate to map or supplement mapping of known contaminants. • Monitoring should occur based upon professional opinion, but generally correlate to the seasonal high and low groundwater level, or more frequent as appropriate.	There are 41 municipal wells and 28 IRLP wells within the plan area that have been regularly sampled since at least 2015 for groundwater quality.	None; the current monitoring network contains adequate spatial distribution to map water quality in the basin.
Collect groundwater quality data from each principal aquifer in the basin that is currently, or may be in the future, impacted by degraded water quality. • Agencies should use existing water quality monitoring data to the greatest degree possible. For example, these could include ILRP, GAMA, existing RWQCB monitoring and remediation programs, and drinking water source assessment programs.	Public databases provide adequate water quality information for degraded water quality.	Well depth and construction info for some wells in the monitoring network is unknown; however, there seems to be adequate coverage in both principal aquifers
Define the three-dimensional extent of any existing degraded water quality impact.	There are a large number of wells that are actively sampled.	Depth or construction information will need to be obtained to determine the vertical extent of contaminants
Data should be sufficient for mapping movement of degraded water quality.	There are a large number of wells that are actively sampled.	None
Data should be sufficient to assess groundwater quality impacts to beneficial uses and users.	Water quality monitoring program assesses impacts to both agricultural and municipal users.	None
Data should be adequate to evaluate whether management activities are contributing to water quality degradation.	There are a large number of wells that are actively sampled.	Projects and actions are being developed. Water quality network will be evaluated and augmented if necessary.

7.5 Land Subsidence Monitoring Network

The sustainability indicator for land subsidence is evaluated by monitoring land subsidence using InSAR data. As described in Chapter 5, land subsidence is monitored in the Subbasin by measuring ground elevation using microwave satellite imagery. This data is currently provided by DWR, covers the most recent three years of subsidence data (2015 - 2018), and is adequate to identify areas of recent subsidence. One or more GSA may opt to contract with USGS or others with expertise in subsidence to gather any additional datasets and evaluate the cause(s) of any identified subsidence. The GSAs will continue to annually assess subsidence using the DWR provided InSAR data.

7.5.1 Land Subsidence Monitoring Data Gaps

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

7.5.2 Land Subsidence Monitoring Protocols

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

7.6 Interconnected Surface Water Monitoring Network

As discussed in Chapter 5, there are no available data to establish that groundwater and surface water are connected through a continuous saturated zone in any aquifer in the Subbasin. Therefore, a monitoring network that quantifies surface water depletion from interconnected surface waters cannot be developed at this time. However, studies will be conducted after GSP adoption to verify whether or not there are interconnected surface waters in the Subbasin. The assessment of whether or not there are interconnected surface waters will be evaluated by monitoring surface water and groundwater in areas where interconnected surface water conditions may exist. Shallow monitoring well data will be collected and compared to the surveyed streambed of adjacent streams, rivers, or wetlands. In accordance with the assessment of wells discussed in Section 7.2, only one Alluvial Aquifer well was identified that meets the criteria for inclusion in the monitoring network for monitoring shallow groundwater levels adjacent to streams, rivers, or wetlands.

7.6.1 Interconnected Surface Water Monitoring Data Gaps

There are data gaps in assessing the existence of interconnected surface water bodies in the Subbasin. The initial data gap is the lack of wells that monitor the shallow groundwater table adjacent to streams and rivers. Areas of potential shallow groundwater in the Alluvial Aquifer will be targeted as areas where shallow groundwater wells are needed. In these areas of potential shallow groundwater, either existing shallow monitoring wells must be identified, or new monitoring wells must be installed.

If the shallow monitoring wells indicate interconnected surface water bodies in the Subbasin, additional analysis will be undertaken to quantify the surface water depletion and potentially relate the quantified surface water depletion rates to shallow groundwater elevations. The surface water depletion rates will be quantified with the GSP model or other appropriate means, including incorporating the existing stream gauging programs described in Chapter 3.

If the shallow monitoring wells indicate interconnected surface water bodies in the Subbasin, additional data gaps may be identified to address all of the SGMA regulations including the following:

- Establishing flow conditions including surface water discharge, surface water head, and baseflow contribution.
- Establishing the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.
- Establishing temporal change in conditions due to variations in stream discharge and regional groundwater extraction.

7.6.2 Interconnected Surface Water Monitoring Protocols

Stream gauging is currently being conducted by the USGS according to the protocol outlined in the BMP. Water level monitoring will be conducted in accordance the protocols described in the water level monitoring network section of this chapter.

7.7 Representative Monitoring Sites

Representative monitoring sites (RMS) are defined in the SGMA regulations as a subset of monitoring sites that are representative of conditions in the Subbasin. All of the monitoring sites in this chapter are considered RMS.

7.8 Data Management System and Data Reporting

The SGMA regulations provide broad requirements on data management, stating that a GSP must adhere to the following guidelines for a 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 Subbasin.

Article 5, Section 354.40: 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 Paso Robles Subbasin Data Management System (DMS) will be used for the organization, review, and uploading of data to implement the GSP. All data stored in the DMS have a unique identifier and a quality control check was performed on the data.

The Paso Robles Subbasin DMS was developed in Microsoft Access and contains the following main tables:

Well_Info - General information about a well, including identifiers used by various agencies.

Site_Info - Site information about a well, recharge site, or diversion; including location, elevation, and address information

Well_Constr - Well construction information including depth, diameter, etc.

Well_Constr_Screen- Supplements **Well_Constr** with well screen information. One well can have multiple screens.

Well_Geologic_Aquifer - Information about the aquifer parameters of the well such as pumping test information, confinement, and transmissivity.

Well_Geologic_Lithology - Lithologic information at a well site. Each well may have multiple lithologies at different depths.

Water_Level - Water level measurements for wells

Well_Pumping - Pumping measurements for wells, annual or monthly

SW_Recharge - Recharge measurements for a recharge site, annual or monthly

SW_Diversion - Diversion volume measurements for a diversion site, annual or monthly

Water_Quality - Water quality data for wells or other type of site

Data sources used to populate the Paso Robles DMS are listed on Table 7-6. Categories marked with an X indicate datasets that are publicly accessible.

Table 7-6. Data Sources Used to Populate DMS

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

Data were compiled and reviewed to comply with data quality objectives. The review included the following checks:

Identifying outliers that may have been introduced during the original data entry process by others.

Removing or flagging questionable data being uploaded in the DMS. This applies to historic water level data, water quality data, and water level over time.

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

In the future, well log information will be entered for selected wells and other information will be added as needed to satisfy the requirements of the SGMA regulations. It is anticipated that the DMS will be migrated to a web-based DMS currently being planned and developed by the County of San Luis Obispo.

8 SUSTAINABLE MANAGEMENT CRITERIA

This chapter defines the conditions that constitute sustainable groundwater management, discusses the process by which the four GSAs in the Subbasin will characterize undesirable results, and establishes minimum thresholds and measurable objectives for each sustainability indicator.

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

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

The Sustainable Management Criteria are grouped by sustainability indicator. The following sustainability indicators are applicable in the Subbasin:

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

The sixth Sustainable Management Criteria, sea water intrusion, is not applicable in the Subbasin.

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

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

As noted above, the SGMA regulations address minimum thresholds before measurable objectives. This order was used for all applicable sustainability indicators except Chronic Lowering of Groundwater Levels. For this sustainability indicator, measurable objectives are presented first, followed by the minimum thresholds – the order in which they were developed.

8.1 Definitions

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

- **Interconnected surface water** refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water.

Interconnected surface waters are parts of streams, lakes, or wetlands where the groundwater table is at or near the ground surface and there is water in the lakes, streams, or wetlands.

- **Interim milestone** refers to a target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan.

Interim milestones are targets such as groundwater elevations that will be achieved every five years to demonstrate progress towards sustainability.

- **Management area** refers to an area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors.
- **Measurable objectives** refer to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

Measurable objectives are goals that the GSP is designed to achieve.

- **Minimum thresholds** refer to numeric values for each sustainability indicator used to define undesirable results.

Minimum thresholds are established at representative monitoring sites. Minimum thresholds are indicators of where an unreasonable condition might occur. For example, current groundwater elevations might be a minimum threshold if lower groundwater elevations would result in significant and unreasonable costs.

- **Representative monitoring** refers to a monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.
- **Sustainability indicator** refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code Section 10721(x).

The five sustainability indicators relevant to the Subbasin are listed in the introductory section of Chapter 8.

- **Uncertainty** refers to a lack of understanding of the basin setting that significantly affects an Agency's ability to develop sustainable management criteria and appropriate projects and management actions in a Plan, or to evaluate the efficacy of Plan implementation, and therefore may limit the ability to assess whether a basin is being sustainably managed.

- Undesirable Result

There is no formal definition of undesirable result in the definitions section of the SGMA regulations. However, the description of undesirable result in § 354.26 of the SGMA regulations states that it should be "… a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin." An example undesirable result could be when more than a certain % of the measured groundwater levels in an area of the basin fall below the minimum thresholds. Undesirable results should not be confused with significant and unreasonable conditions. Significant and unreasonable conditions are physical conditions to be avoided; an undesirable result is a quantitative assessment based on minimum thresholds.

8.1 Sustainability Goal

Per Section §354.24 of the SGMA regulations, the sustainability goal for the Subbasin has three parts:

- A description of the sustainability goal;
- A discussion of the measures that will be implemented to ensure the Subbasin will be operated within sustainable yield, and;
- An explanation of how the sustainability goal is likely to be achieved.

The goal of this GSP is to sustainably manage the groundwater resources of the Paso Robles Subbasin for long-term community, financial, and environmental benefit of Subbasin users. This GSP outlines the approach to achieve a sustainable groundwater resource free of undesirable results within 20 years, while maintaining the unique cultural, community, and business aspects of the Subbasin. In adopting this GSP, it is the express goal of the GSAs to balance the needs of all groundwater users in the Subbasin, within the sustainable limits of the Subbasin's resources.

A number of management actions and conceptual projects are included in this GSP. Some combination of these management actions and conceptual projects will be implemented to ensure the Subbasin is operated within its sustainable yield and achieves sustainability. These management actions and conceptual projects include:

Management Actions

- Monitoring, reporting and outreach

- Promoting Best Water Use Practices
- Promoting stormwater capture
- Promoting voluntary fallowing of agricultural land
- Mandatory pumping limitations in specific areas

Conceptual Projects

- City Recycled Water Delivery
- San Miguel CSD Recycled Water Delivery
- Nacimiento Water Project (NWP) Delivery at Salinas and Estrella River Confluence
- NWP Delivery North of City of Paso Robles
- NWP Delivery East of City of Paso Robles
- Expansion of Salinas Dam

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

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

8.2 General Process for Establishing Sustainable Management Criteria

The Sustainable Management Criteria presented in this chapter were developed using information from public input, received in public surveys, public meetings, comment forms; hydrogeologic analysis; and meetings with GSA staff and Cooperative Committee members. The process built on the Paso Robles Basin's long history of interested parties - including rural residents, farmers, local cities, and the County - holding public meetings to work on protecting the groundwater resource.

The general process for establishing Sustainable Management Criteria included:

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

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

8.3 Chronic Lowering of Groundwater Levels Sustainable Management Criteria

8.3.1 Information and Methodology Used to Establish Measurable Objectives and Minimum Thresholds

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

- Information about the public definition of significant and unreasonable conditions and preferred current and future groundwater elevations, gathered from the Sustainable Management Criteria survey and public outreach meetings.
- Historical groundwater elevation data from wells monitored by the County of San Luis Obispo
- Depths and locations of existing wells
- Maps of current and historical groundwater elevation data
- Results of modeling of various scenarios of future groundwater level conditions

8.3.2 Locally Defined Significant and Unreasonable Conditions

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

- Impact the ability of existing domestic wells of average depth to produce adequate water for domestic purposes.
- Cause significant financial burden to those who rely on the groundwater basin
- Interfere with other SGMA sustainability indicators

8.3.3 Measurable Objectives

The measurable objectives for chronic lowering of groundwater levels represent target groundwater elevations that are established to achieve the sustainability goal by at least 2040. Measurable objectives are groundwater levels established at each Representative Monitoring Site (RMS). Measurable objective groundwater levels are higher than minimum threshold groundwater levels. Measurable objectives provide operational flexibility above minimum threshold levels to ensure that the Subbasin can be managed sustainably over a reasonable range of climate and hydrologic variability. Measurable objectives may change after GSP adoption as new information and hydrologic data become available.

8.3.3.1 Methodology for Setting Measurable Objectives

Initial measurable objectives were established based on historical groundwater level data; along with input and preferences on future groundwater levels from domestic groundwater users, agricultural interests, environmental interests, and other Subbasin stakeholders. The input and preferences were used to formulate a range of conceptual measurable objective scenarios. These scenarios were evaluated using the GSP model to project the effect on future Subbasin operation and to select measurable objectives for the GSP.

8.3.3.2 Paso Robles Formation Aquifer Measurable Objectives

Initial measurable objectives for each groundwater level RMS in the Paso Robles Formation Aquifer are summarized in Table 8-1. Initial measurable objectives were set at the approximate 2017 average groundwater levels unless noted differently in the table. The measurable objectives are depicted on hydrographs in Appendix H.

Table 8-1. Chronic Lowering of Groundwater Levels Measurable Objectives for Paso Robles Formation Aquifer

Well ID (alt ID)	Measurable Objective (feet NAVD88)
25S/12E-16K05 (PASO-0345)	521
25S/12E-26L01 (PASO-0205)	490
25S/13E-08L02 (PASO-0195)	916
26S/12E-14G01 (PASO-0048)	495
26S/12E-14G02 (PASO-0017)	498
26S/12E-14H01 (PASO-0184)	505
26S/12E-14K01 (PASO-0238)	497
26S/12E-26E07 (PASO-0124)	648
26S/13E-08M01 (PASO-0164)	548
26S/13E-16N01 (PASO-0282)	588
26S/15E-19E01 (PASO-0073)	929
26S/15E-20B04 (PASO-0401)	967
26S/15E-29N01 (PASO-0226)	993
26S/15E-29R01 (PASO-0406)	986
26S/15E-30J01 (PASO-0393)	959
27S/12E-13N01 (PASO-0223)	716
27S/13E-28F01 (PASO-0243)	894
27S/13E-30F01 (PASO-0355)	766
27S/13E-30J01 (PASO-0423)	806
27S/13E-30N01 (PASO-0086)	810
27S/14E-11R01 (PASO-0392)	1,028
28S/13E-01B01 (PASO-0066)	1,040

8.3.3.3 Alluvial Aquifer Measurable Objectives

Only one RMS could be established for the Alluvial Aquifer. This RMS is associated with a new monitoring well (well name 18MW-0191) installed by the City of Paso Robles in June 2018. A measurable objective was not established for this RMS because it does not have sufficient historical groundwater level data. Additional measurable objectives will be established for the Alluvial Aquifer early after GSP adoption when the RMS network is expanded by either location new candidate monitoring wells, modifying confidentiality agreements at known wells so that groundwater level data can be used, or by installing new monitoring wells.

8.3.4 Minimum Thresholds

Section §354.28(c)(1) of the SGMA regulations states that "*The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results.*"

The Sustainable Management Criteria survey (Appendix G) provided general information on stakeholders' preferences for future groundwater levels. Initial minimum thresholds were developed based on the survey and public outreach results, hydrogeologic information including contours of 2017 groundwater levels and evaluation of historical groundwater level variability at the RMS, and information about well construction.

Average 2017 non-pumping groundwater levels have been selected as measurable objectives and minimum thresholds are set below those levels. Specific conditions such as well depths at each RMS were considered when establishing the groundwater level for the initial minimum threshold. Protecting a sustainable groundwater supply for existing wells was a guiding consideration. Initial minimum thresholds were selected to allow sufficient time for the GSAs to develop a broader and publicly accessible dataset that will give clear guidance to establish a reasonable justification for any potential management actions that would be triggered by exceedances minimum thresholds.

8.3.4.1 Paso Robles Formation Aquifer Minimum Thresholds

Minimum thresholds for each groundwater level RMS in the Paso Robles Formation Aquifer are summarized on Table 8-2. Hydrographs for each RMS with well completion information, and minimum thresholds are included in Appendix H. These minimum thresholds were selected to avoid the locally defined significant and unreasonable conditions.

Table 8-2: Chronic Lowering of Groundwater Levels Minimum Thresholds for Paso Robles Formation Aquifer

Well ID (alt ID)	Minimum Threshold (feet NAVD88)
25S/12E-16K05 (PASO-0345)	491
25S/12E-26L01 (PASO-0205)	460
25S/13E-08L02 (PASO-0195)	886
26S/12E-14G01 (PASO-0048)	465
26S/12E-14G02 (PASO-0017)	468
26S/12E-14H01 (PASO-0184)	475
26S/12E-14K01 (PASO-0238)	467
26S/12E-26E07 (PASO-0124)	618
26S/13E-08M01 (PASO-0164)	518
26S/13E-16N01 (PASO-0282)	558

Well ID (alt ID)	Minimum Threshold (feet NAVD88)
26S/15E-19E01 (PASO-0073)	899
26S/15E-20B04 (PASO-0401)	937
26S/15E-29N01 (PASO-0226)	963
26S/15E-29R01 (PASO-0406)	956
26S/15E-30J01 (PASO-0393)	929
27S/12E-13N01 (PASO-0223)	686
27S/13E-28F01 (PASO-0243)	864
27S/13E-30F01 (PASO-0355)	736
27S/13E-30J01 (PASO-0423)	776
27S/13E-30N01 (PASO-0086)	780
27S/14E-11R01 (PASO-0392)	998
28S/13E-01B01 (PASO-0066)	1,010

8.3.4.2 Alluvial Aquifer Minimum Thresholds

Only one RMS could be established for the Alluvial Aquifer. This RMS is associated with a new monitoring well (well name 18MW-0191) installed by the City of Paso Robles in June 2018. A measurable objective was not established for this well; therefore, a minimum threshold is not established. A minimum threshold will be established after additional groundwater level data are available for the well. Additional minimum thresholds will be established for the Alluvial Aquifer early after GSP adoption when an expanded RMS network is developed.

8.3.4.3 Minimum Thresholds Impact on Domestic Wells

Early after GSP adoption and during efforts to expand the monitoring networks, additional analysis of the minimum thresholds for groundwater elevations will be conducted to ensure that they are protective of average domestic well operations in the Subbasin. Minimum thresholds in some areas of the Subbasin may be modified based on the results of this evaluation.

8.3.4.4 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Section 354.28 of the SGMA regulations requires that the description of all minimum thresholds include a discussion about the relationship between the minimum thresholds for each sustainability indicator. In the SMC BMP (DWR, 2017), DWR has clarified this requirement. First, the GSP must describe the relationship between each sustainability indicator's minimum threshold; in other words, describe why or how a water level minimum threshold set at a particular RMS is similar to or different to water level thresholds in nearby RMS. Second, the GSP must describe the relationship between the selected minimum threshold and minimum thresholds for other sustainability indicators; in other words, describe how a water level minimum threshold would not trigger an undesirable result for land subsidence.

Groundwater elevation minimum thresholds are derived from the measurable objectives, which are average 2017 groundwater elevations. Because the measurable objectives represent a historical and realistic groundwater elevation map, the minimum thresholds derived from these objectives likely do not conflict with each other.

Groundwater elevation minimum thresholds can influence other sustainability indicators.

- **Change in groundwater storage**. A significant and unreasonable condition for change in groundwater storage is pumping in excess of the sustainable yield for an extended period of years. Pumping at or less than the sustainable yield will maintain or raise average groundwater elevations in the Subbasin. The groundwater elevation minimum thresholds are set to maintain a constant elevation over an extended period of time, consistent with the practice of pumping at or less than the sustainable yield. Therefore, the groundwater elevation minimum thresholds will not result in long term significant or unreasonable change in groundwater storage.
- **Seawater intrusion**. This sustainability indicator is not applicable to this Subbasin
- **Degraded water quality**. Protecting groundwater quality is critically important to all who depend upon the groundwater resource, particularly for drinking water and agricultural uses. A significant and unreasonable condition for degraded water quality is exceeding regulatory limits for constituents of concern in supply wells due to actions proposed in the GSP. Water quality could be affected through two processes:
    1. Low groundwater elevations in an area could cause deeper, poor-quality groundwater to flow upward into existing supply wells. Groundwater elevation minimum thresholds are set below current levels, meaning upward flow of deep, poor-quality groundwater could occur in the future. Should groundwater quality degrade due to lower groundwater elevations, the groundwater elevation minimum thresholds will be raised to avoid this degradation.
    2. Changes in groundwater elevation due to actions implemented to achieve sustainability could change groundwater gradients, which could cause poor quality groundwater to flow towards supply wells that would not have otherwise been impacted. These groundwater gradients, however, are only dependent on differences between groundwater elevations, not on the groundwater elevations themselves. Therefore, the minimum threshold groundwater elevations do not directly lead to a significant and unreasonable degradation of groundwater quality in production wells.
- **Subsidence**. A significant and unreasonable condition for subsidence is any measurable permanent subsidence that damages existing infrastructure. Subsidence is caused by

dewatering and compaction of clay-rich sediments in response to lowering groundwater levels. Very small amounts of land surface elevation fluctuations have been reported across the Basin. The groundwater elevation minimum thresholds are set below existing groundwater elevations, which could induce additional subsidence that has not already started. Should new subsidence be observed due to lower groundwater elevations, the groundwater elevation minimum thresholds will be raised to avoid this subsidence.

- **Depletion of interconnected surface water.** Therefore, there are no current minimum thresholds or undesirable results that could be affected by the groundwater elevation minimum thresholds. Changes in groundwater elevations, however, could reconnect surface waters. If this occurs, minimum thresholds will be established for depletion of interconnected surface waters and the relationship between those new minimum thresholds and all other sustainability indicators will be reassessed.

8.3.4.5 Effect of Minimum Thresholds on Neighboring Basins

One neighboring groundwater basin is required to develop a GSP: the Upper Valley Subbasin of the Salinas Valley Basin. Additionally, the adjoining Atascadero Subbasin is currently developing a GSP under SGMA. The anticipated effect of the groundwater elevation minimum thresholds on each of the two subbasins is addressed below.

Upper Valley Subbasin of the Salinas Valley Basin. The Upper Valley Subbasin is required to develop a GSP by 2022. The Upper Valley Subbasin is hydrogeologically downgradient of the Paso Robles Subbasin: groundwater generally flows from the Paso Robles Subbasin into the Upper Valley Subbasin. Lower groundwater levels in the Paso Robles Subbasin as a result of GSP actions could reduce the amount of groundwater flowing into the Upper Valley Subbasin, affecting that Subbasin's ability to achieve sustainability. The groundwater elevation minimum thresholds are set at constant levels that are below current elevations; therefore, they could reduce groundwater flow into the adjacent Upper Valley Subbasin. If reduced groundwater flow is observed that impacts sustainability in the Upper Valley Subbasin of the Salinas Valley Basin, then minimum thresholds would be adjusted to avoid this impact.

The Paso Robles Subbasin GSAs have developed a cooperative working relationship with the Salinas Valley Basin GSA who will be developing the GSP for the Upper Valley Subbasin. The two GSAs will monitor and work together to ensure that minimum thresholds do not significantly affect each Subbasin's ability to achieve sustainability.

Atascadero Subbasin. The Paso Robles Subbasin is hydrogeologically separated from the Atascadero Subbasin by the Rinconada Fault. The fault acts as a barrier to groundwater flow in the Paso Robles Formation Aquifer as presented in Chapter 4. While minimum thresholds are set at levels below current groundwater levels, these lower levels are not expected to impact sustainability in the Atascadero Subbasin due to the limited groundwater flow between the two

Subbasins. The Paso Robles Subbasin GSAs have a cooperative working relationship with the Agencies managing the Atascadero Subbasin and will continue to work together to ensure that minimum thresholds do not significantly affect each Subbasin's ability to achieve sustainability.

8.3.4.6 Effects on Beneficial Users and Land Uses

The groundwater elevation minimum thresholds may have several effects on beneficial users and land uses in the Subbasin.

Agricultural land uses and users. The groundwater elevation minimum thresholds limit lowering of groundwater levels in the Subbasin. In the absence of other mitigating measures this has the effect of potentially limiting the amount of groundwater pumping in the Subbasin. Limiting the amount of groundwater pumping will limit the amount and type of crops that can be grown in the Subbasin, which could result in a proportional reduction in the economic viability of some properties. The groundwater elevation minimum thresholds could therefore limit expansion of the Subbasin's agricultural economy. This could have various effects on beneficial users and land uses:

- There will be an economic impact to employees and suppliers of production products and materials. Many parts of the local economy rely on a vibrant agricultural industry and they too will be hurt proportional to the losses imparted to agricultural businesses.
- Growth of city, county and state tax rolls could be slowed or reduced due to the limitations imposed on agricultural growth.

Urban land uses and users. The groundwater elevation minimum thresholds effectively limit the amount of groundwater pumping in the Subbasin. This may limit urban growth, or result in urban areas obtaining alternative sources of water. This may result in higher water costs for municipal water users.

Domestic land uses and users. The groundwater elevation minimum thresholds protect most domestic wells. Therefore, the minimum thresholds will likely have an overall beneficial effect on existing domestic land uses by protecting the ability to pump from domestic wells. However, limited water in some of the shallowest domestic wells may require owners to drill deeper wells. Additionally, the groundwater elevation minimum thresholds may limit the increase of non-*de minimis* groundwater use in order to limit future declines in groundwater levels caused by more non *de minimis* domestic pumping. Policies allowing offsets of existing use to allow new construction or bringing in new sources of water can mitigate against this effect.

Ecological land uses and users. Groundwater elevation minimum thresholds effectively protect the groundwater resource including those existing ecological habitats that rely upon it because they are set to avoid long term declines in groundwater levels in a short amount of time. As noted above, groundwater level minimum thresholds may limit increases in non-*de minimis* groundwater use. Ecological land uses and users may benefit by this reduction in non-*de minimis* groundwater use.

8.3.4.7 Relevant Federal, State, or Local Standards

No Federal, State, or local standards exist for chronic lowering of groundwater elevations.

8.3.4.8 Method for Quantitative Measurement of Minimum Thresholds

Groundwater elevation minimum thresholds will be directly measured from existing or new monitoring wells. The groundwater level monitoring will be conducted in accordance with the monitoring plan outlined in Chapter 7. Furthermore, the groundwater level monitoring will meet the requirements of the technical and reporting standards included in the SGMA regulations.

As noted in Chapter 7, the current groundwater monitoring network in the Paso Robles Formation Aquifer currently only includes 24 wells. For the Alluvial Aquifer, only one RMS was established. The GSAs will expand the monitoring network in both aquifers during GSP implementation.

8.3.4.9 Interim Milestones

Initial interim milestones were developed for the 24 RMS established for the Paso Robles Formation Aquifer based on the results of modeling conducted to evaluate management actions and select measurable objectives (Chapter 9). Because measurable objectives have not been established at RMS for the Alluvial Aquifer, interim milestones cannot be developed. Interim milestones will in the future (after GSP adoption) when the RMS network is expanded in the Alluvial Aquifer.

Conceptually, the following actions and groundwater conditions are expected to occur during implementation.

- Monitoring of Subbasin conditions using an expanded monitoring network will provide additional information to refine interim milestones
- Pumping cutbacks in some areas of the Subbasin will begin about five years after adoption of the GSP. During this five year period, current groundwater levels trends would continue to be tracked by the RMS.
- After about 5 years, groundwater levels will begin trending toward measurable objectives as a result of management actions and possibly pumping cutbacks in some area of the Subbasin.

Table 8-3 summarizes the interim milestones for the RMS in the Paso Robles Formation Aquifer.

Table 8-3: Chronic Lowering of Groundwater Levels Interim Milestones for Paso Robles Formation Aquifer

Well ID (alt ID)	Interim Milestones (feet NAVD88)		
	2025	2030	2035
25S/12E-16K05 (PASO-0345)	521	521	520
25S/12E-26L01 (PASO-0205)	499	496	492
25S/13E-08L02 (PASO-0195)	911	905	901
26S/12E-14G01 (PASO-0048)	526	532	534
26S/12E-14G02 (PASO-0017)	523	531	533
26S/12E-14H01 (PASO-0184)	513	521	524
26S/12E-14K01 (PASO-0238)	527	533	535
26S/12E-26E07 (PASO-0124)	644	644	645
26S/13E-08M01 (PASO-0164)	620	619	617
26S/13E-16N01 (PASO-0282)	595	594	593
26S/15E-19E01 (PASO-0073)	935	937	938
26S/15E-20B04 (PASO-0401)	972	976	978
26S/15E-29N01 (PASO-0226)	1,009	1,012	1,014
26S/15E-29R01 (PASO-0406)	997	1,001	1,003
26S/15E-30J01 (PASO-0393)	972	976	978
27S/12E-13N01 (PASO-0223)	711	710	709
27S/13E-28F01 (PASO-0243)	896	899	900
27S/13E-30F01 (PASO-0355)	770	768	765
27S/13E-30J01 (PASO-0423)	817	815	812
27S/13E-30N01 (PASO-0086)	804	799	794
27S/14E-11R01 (PASO-0392)	1,029	1,030	1,030
28S/13E-01B01 (PASO-0066)	1,052	1,055	1,055

Interim milestones may be revised during implementation as new data and understanding of the hydrogeologic conditions in the Subbasin become available.

8.3.5 Undesirable Results

8.3.5.1 Criteria for Defining Undesirable Results

The chronic lowering of groundwater elevation undesirable result is a quantitative combination of groundwater elevation minimum threshold exceedances. For the Paso Robles Subbasin, the groundwater elevation undesirable result is:

Over the course of two years, no more than two exceedances for the groundwater elevation minimum thresholds within a 5-mile radius or within a defined area of the Basin for any single *aquifer. A single monitoring well in exceedance for two consecutive years also represents an undesirable result for the area of the Basin represented by the monitoring well. Geographically isolated exceedances will require investigation to determine if local or Basin wide actions are required in response.*

Undesirable results provide flexibility in defining sustainability. Increasing the number of allowed minimum threshold exceedances provides more flexibility, but may lead to significant and unreasonable conditions for a number of beneficial users. Reducing the number of allowed minimum threshold exceedances ensures strict adherence to minimum thresholds, but reduces flexibility due to unanticipated hydrogeologic conditions. The undesirable result was set at to balance the interests of beneficial users with the practical aspects of groundwater management under uncertainty.

As the monitoring system is expanded, the number of exceedances allowed may be adjusted. One additional exceedance will be allowed for approximately every seven new monitoring wells. This was considered a reasonable number of exceedances given the hydrogeologic uncertainty of the basin. Close monitoring of groundwater data over the following years will allow actual numbers to be refined based on observable data. Management of the Subbasin will adapt to specific conditions and to a growing understanding of basin conditions and processes to adopt appropriate responses.

8.3.5.2 Potential Causes of Undesirable Results

An undesirable result for chronic lowering of groundwater levels does not currently exist. Conditions that may lead to an undesirable result include the following:

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

8.3.5.3 Effects on Beneficial Users and Land Uses

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

8.4 Reduction in Groundwater Storage Sustainable Management Criteria

8.4.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable conditions were assessed based on the Sustainable Management Criteria survey, public meetings, available data, and discussions with GSA staff. Significant and unreasonable changes in groundwater storage in the Subbasin are those that:

- Lead to long-term reduction in groundwater storage
- Interfere with other sustainability indicators

Responses to the Sustainable Management Criteria survey and public input suggest that most areas of the basin would like to see more groundwater in storage to help with droughts, and some areas of the basin would like to see significantly more groundwater in storage. Public input on which concessions would be acceptable to increase the amount of groundwater in storage revealed two highly ranked concessions:

1. New pumping be offset with new recharge or reduced pumping
2. Pumping be reduced in dry years

However, the concession that agricultural pumping be reduced in all years ranked relatively low. This suggests that, while stakeholders would prefer more groundwater in storage, they also would not prefer to reduce existing agricultural pumping during average years. Stakeholders also prefer that groundwater storage be increased by retaining wet year flows for local recharge and/or importing water.

8.4.2 Minimum Thresholds

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

The reduction of groundwater in storage minimum threshold is established for the Subbasin as a whole, not for individual aquifers. Therefore, one minimum threshold for groundwater in storage is established for the entire Subbasin, but any reduction in storage that would cause an undesirable result in only a limited portion of the basin shall be addressed in that area or areas where declining well levels indicate management actions or projects will be effective.

In accordance with the SGMA regulation cited above, the minimum threshold metric is a volume of pumping per year, or an annual pumping rate. Conceptually, the total volume of groundwater that can be pumped annually from the Subbasin without leading to undesirable results is equal to the estimated sustainable yield of the Subbasin. As discussed in Chapter 6, absent the addition of supplemental water, the future estimated long-term sustainable yield of the Subbasin under reasonable climate change assumptions is 61,100 AFY. This estimated sustainable yield will change in the future as additional data become available.

This GSP adopts changes in groundwater level as a proxy for the change in groundwater storage metric. As allowed in §354.36(b)(1) of the SGMA regulations, groundwater elevation data at the RMSs will be reported annually as a proxy to track changes in the amount of groundwater in storage. A quantitative relationship between water level changes and volumetric changes in storage will be developed after the RMS is expanded, new hydrogeologic data are developed, and the model is updated and recalibrated.

Using the proxy approach, the minimum threshold for change in groundwater storage are the minimum thresholds for chronic lowering of groundwater levels minimum threshold. Based on well-established hydrogeologic principles, stable groundwater elevations held above this minimum threshold will limit depletion of groundwater from storage. Therefore, the minimum threshold using groundwater elevations as a proxy is that the groundwater elevation averaged across all the wells in the groundwater level monitoring network will remain stable above the minimum threshold for chronic lowering of groundwater levels minimum threshold.

Exceedances of this minimum threshold, if limited to specific areas of the Basin, shall be addressed by management actions or projects developed where they affect those areas of exceedance. Multiple exceedances appearing across the Basin will require proportional Subbasin-wide responses.

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

The monitoring network and protocols used to measure groundwater elevations at the RMS are presented in Chapter 7, Monitoring Networks. These data will be used to monitor groundwater elevations and assess changes in groundwater storage.

8.4.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The minimum threshold for reduction in groundwater storage is a single value of average groundwater elevation over the entire Subbasin. Therefore, the concept of potential conflict between minimum thresholds at different locations in the Subbasin is not applicable.

The reduction in groundwater storage minimum threshold could influence other sustainability indicators. The reduction in groundwater storage minimum threshold was selected to avoid undesirable results for other sustainability indicators, as outlined below.

- **Chronic lowering of groundwater levels**. Because groundwater elevations will be used as a proxy for estimating groundwater pumping and changes in groundwater storage, the reduction in groundwater storage would not cause undesirable results for this sustainability indicator.
- **Seawater intrusion**. This sustainability indicator is not applicable to this Subbasin.
- **Degraded water quality**. The minimum threshold proxy of stable groundwater levels will not directly lead to a degradation of groundwater quality.
- **Subsidence**. Because future average groundwater levels will be stable, they will not induce any additional subsidence.
- **Depletion of interconnected surface waters.** Minimum thresholds and undesirable results for interconnected surface water were not developed because there are insufficient data to determine the existence of interconnected surface water at this time in the Subbasin. This is a data gap that will be filled early in GSP implementation. Therefore, the reduction in groundwater storage minimum thresholds is unrelated to interconnected surface water at this time. If surface water interconnection is identified in the future, minimum thresholds will be established for depletion of interconnected surface waters and the relationship between those new minimum thresholds and all other sustainability indicators will be reassessed.

8.4.2.3 Effect of Minimum Thresholds on Neighboring Basins

The anticipated effect of the groundwater storage minimum thresholds on each of the two neighboring subbasins is addressed below.

Upper Valley Subbasin of the Salinas Valley Basin. Removing groundwater from storage in the Paso Robles Subbasin would reduce flow into the Upper Valley Subbasin, potentially affecting the ability of that Subbasin to achieve sustainability. The reduction in storage minimum threshold is set to prevent long-term reduction in storage and therefore maintain flow into the

Upper Valley Subbasin. This minimum threshold will not prevent the Upper Valley Subbasin from achieving sustainability.

Atascadero Subbasin. The Paso Robles Subbasin is hydrogeologically separated from the Atascadero Subbasin by the Rinconada Fault. The fault acts as a partial barrier to groundwater flow as presented in Chapter 4. Removing groundwater from storage in the Paso Robles Subbasin could induce additional groundwater flow from the Atascadero Subbasin into the Paso Robles Subbasin, affecting the ability to achieve sustainability in the Atascadero Subbasin. The reduction in storage minimum threshold is set to prevent long term reduction in storage and will be monitored using groundwater elevation proxies, therefore will not induce lowering of groundwater elevations that could cause additional groundwater flows from the Atascadero Subbasin. The minimum threshold will therefore not prevent the Atascadero Subbasin from achieving sustainability.

8.4.2.4 Effect on Beneficial Uses and Users

The reduction in groundwater storage minimum threshold of maintaining stable average groundwater elevations will potentially require a reduction in the amount of groundwater pumping in the Subbasin. Reducing pumping may impact the beneficial uses and users of groundwater in the Subbasin.

Agricultural land uses and users. Reducing the amount of groundwater pumping may limit or reduce non-*de minimis* production in the Subbasin by reducing the amount of available water. Owners of agricultural lands that are currently not irrigated may be particularly impacted because the additional groundwater pumping needed to irrigate these lands could increase the Subbasin pumping beyond the sustainable yield, violating the minimum threshold.

Urban land uses and users. Reducing the amount of groundwater pumping may increase the cost of water for municipal users in the Subbasin because municipalities may need to find other, more expensive water sources.

Domestic land uses and users. Existing domestic groundwater users may generally benefit from this minimum threshold. Many domestic groundwater users are *de-minimis* users whose pumping may not be restricted by the projects and management actions adopted in this GSP. By restricting the amount of groundwater that is pumped from the Subbasin, the *de-minimis* users would be protected from overdraft that could impact their ability to pump groundwater.

Ecological land uses and users. Groundwater dependent ecosystems would generally benefit from this minimum threshold. Maintaining groundwater levels close to current levels maintains groundwater supplies similar to present levels which will continue to support groundwater dependent ecosystems.

8.4.2.5 Relation to State, Federal, or Local Standards

No federal, state, or local standards exist for reductions in groundwater storage.

8.4.2.6 Methods for Quantitative Measurement of Minimum Threshold

The quantitative metric for assessing compliance with the reduction in groundwater storage minimum threshold is monitoring groundwater elevations. The approach for quantitatively evaluating compliance with the minimum threshold for reduction in groundwater storage will be based on evaluating groundwater elevations annually. All groundwater elevations collected from the groundwater level monitoring network will be analyzed and averaged.

8.4.3 Measurable Objectives

The measurable objective for reduction in groundwater storage is the same as the minimum threshold. The measurable objective, using the groundwater level proxy, is stable average groundwater levels.

8.4.3.1 Method for Setting Measurable Objectives

As discussed in Section 8.5.1, input from stakeholders suggested that they would prefer more groundwater in storage. However, stakeholders also suggested that they would prefer not to attain this increase in groundwater storage by reducing existing pumping during years with average climate conditions. Instead, they prefer to increase groundwater storage through increasing local recharge or importing water for recharge. Therefore, the conservative approach of simply maintaining stable groundwater levels was adopted for the measurable objective.

8.4.3.2 Interim Milestones

Interim milestones for groundwater storage are the same as those established for chronic lowering of groundwater elevations. Achieving the groundwater elevation interim milestones will also eliminate long term reductions in groundwater in storage.

8.4.4 Undesirable Results

8.4.4.1 Criteria for Defining Undesirable Results

The reduction in groundwater storage undesirable result is a quantitative combination of reduction in groundwater storage minimum threshold exceedances. However, there is only one reduction in groundwater storage minimum threshold. Therefore, no minimum threshold exceedances are allowed to occur and the reduction in groundwater storage undesirable result is:

During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, there shall be no exceedances of the groundwater level proxy minimum threshold for change in groundwater storage.

8.4.4.2 Potential Causes of Undesirable Results

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

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

8.4.4.3 Effects on Beneficial Users and Land Use

The practical effect of the reduction in groundwater storage undesirable result is that it encourages no net change in groundwater elevations and storage during average hydrologic conditions and over the long-term. Therefore, during average hydrologic conditions and over the long-term, beneficial uses and users will have access to the same amount of groundwater in storage that currently exists, and the undesirable result will not have a negative effect on the beneficial users and uses of groundwater. However, pumping at the long-term sustainable yield during dry years will temporarily lower groundwater elevations and reduce the amount of groundwater in storage. Therefore, if this occurs, there could be short-term impacts from a reduction in groundwater in storage on all beneficial users and uses of groundwater. In particular, groundwater pumpers that rely on water from shallower wells may be temporarily impacted as the amount of groundwater in storage drops and water levels in their wells decline.

8.5 Seawater Intrusion Sustainable Management Criteria

The seawater intrusion sustainability indicator is not applicable to this Subbasin.

8.6 Degraded Water Quality Sustainable Management Criteria

8.6.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable conditions were assessed based on federal and state mandated drinking water and groundwater quality regulations, the Sustainable Management Criteria survey, public meetings, and discussions with GSA staff. Significant and unreasonable changes in groundwater quality in the Subbasin are increases in a chemical constituent that either:

- Result in groundwater concentrations in a public supply well above an established primary or secondary MCL, or
- Lead to reduced crop production.

8.6.2 Minimum Thresholds

Section §354.28(c)(2)of the SGMA regulations states that "*The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin*."

As stated above, the SGMA regulations allow three options for setting degraded water quality minimum thresholds. In the Subbasin, degraded water quality minimum thresholds are based on a number of supply wells that exceed concentrations of constituents determined to be of concern for the Subbasin. The purpose of the minimum thresholds for constituents of concern with a primary or secondary MCL is to avoid furthering the migration of these constituents towards municipal or other drinking water wells. Therefore, the definition of supply wells for constituents of concern that have a primary or secondary MCL are public supply wells.

The purpose of the minimum thresholds for constituents of concern that may reduce crop productivity is to avoid furthering the migration of these constituents towards agricultural supply wells. Therefore, the definition of supply wells for constituents of concern that may lead to reduced crop production are agricultural supply wells.

As noted in Section 354.28 (c)(4) of the SGMA regulations, minimum thresholds are based on a degradation of groundwater quality, not an improvement of groundwater quality. Therefore, this GSP was developed to avoid taking actions that may inadvertently move groundwater constituents that have already been identified in the Subbasin in such a way that they have a significant and unreasonable impact that would not otherwise occur. Constituents of concern must meet two criteria:

3. They must have an established level of concern such as a primary or secondary MCL or a concentration that reduces crop production
4. They must have previously been found in the Subbasin at levels above the level of concern

Based on the review of groundwater quality in Chapter 5, different constituents of concern exist for both agricultural wells and public supply wells. The constituents of concern for agricultural wells are:

- Chloride
- Boron

The constituents of concern for public supply wells are:

- Total Dissolved Solids
- Chloride
- Sulfate
- Nitrate
- Gross Alpha Radiation

As noted in Section 5.6.3, based on available information there are no mapped groundwater contamination plumes in the Subbasin. Therefore, only potential impacts of diffuse or naturally occurring constituents listed above are addressed in this GSP.

The bases for establishing minimum thresholds for each constituent of concern in the Paso Robles Formation Aquifer and Alluvial Aquifer are listed in Table 8-4. This table does not identify the number of supply wells that will exceed the level of concern, but rather identifies how many <u>additional</u> wells will be allowed to exceed the level of concern. Wells that already exceed this limit are not counted against the minimum thresholds.

The UC Cooperative Extension Guidelines state "Unlike most annual crops, tree and vine crops are generally susceptible to boron and chloride toxicity. Tolerances vary among species and rootstocks. Tolerant varieties and rootstocks restrict the uptake and accumulation of boron and chloride in leaf tissue. Boron concentrations in the irrigation water exceeding 0.5 to 0.75 mg/L can reduce plant growth and yield. Climatic effects are also important. In the cool moist coastal climates, irrigation waters with boron concentrations exceeding 1 mg/L are used successfully on tree and vine crops. Chloride moves readily with the soil water and is taken up by the roots. It is then transported to the stems and leaves. Sensitive berries and avocado rootstocks can tolerate only up to 120 ppm of chloride, while grapes can tolerate up to 700 ppm or more."

Current sample size is small (more wells will be added in the future), but known conditions in the Subbasin include these constituents. To reduce crop production to a significant and unreasonable extent would require levels of boron to exceed 0.75 mg/L in 10% more wells of total wells sampled and chloride to exceed 350 mg/L in 10% more wells of total wells sampled.

Table 8-4. Groundwater Quality Minimum Thresholds Bases

Constituent of Concern	Minimum Threshold Based on Number of Production Wells
Agricultural Wells in Monitoring Program	
Chloride	Fewer than 10% of additional agricultural production wells that are in the GSP monitoring program shall exceed 350 milligrams per liter (mg/L).
Boron	Fewer than 10% of additional agricultural production wells that are in the GSP monitoring program shall exceed 0.5 mg/L.
Municipal Wells in Monitoring Program	
Total Dissolved Solids	Fewer than 10% of additional municipal or domestic production wells that are in the GSP monitoring program shall exceed the TDS secondary MCL of 500 mg/L.
Chloride	Fewer than 10% of additional municipal or domestic production wells that are in the GSP monitoring program shall exceed the chloride secondary MCL of 250 mg/L.
Sulfate	Fewer than 10% of additional municipal or domestic production wells that are in the GSP monitoring program shall exceed the sulfate secondary MCL of 250 mg/L.
Nitrate	Fewer than 10% of additional municipal or domestic production wells that are in the GSP monitoring program shall exceed the nitrate MCL of 45 mg/L, measured as nitrate.
Gross Alpha Radiation	Fewer than 10% of additional municipal or domestic production wells that are in the GSP monitoring program shall exceed the gross alpha radiation MCL of 15 pCi/L.

8.6.2.1 Paso Robles Formation Aquifer

The minimum thresholds for degraded water quality in the Paso Robles Formation Aquifer are based on the goal of fewer than 10% of additional exceedances can occur in the future. However, some exceedances already exist in Paso Robles Formation Aquifer wells, and these exceedances will likely continue into the future. The minimum threshold for the number of allowed exceedances is therefore equal to the current number of exceedances plus 10%. In cases where incorporating the increase of 10% results in a fraction of a well less than one, one additional well exceedance was allowed. Based on the number of agricultural and municipal supply wells in the existing water quality monitoring network that is described in Chapter 7, the number of existing exceedances plus the 10% (or a minimum of one well) for each constituent is shown in Table 8-5. The exceedance numbers in this table are the minimum thresholds. This table additionally includes the percentage of existing wells that exceed the minimum thresholds for each constituent. The percentage defines the upper bound of wells that can exceed the minimum thresholds as additional wells are added to the monitoring program. Existing State, Federal, Public Health or Municipal regulations supersede this. Wells in exceedance of those Regulations will have to comply if they occur. AG Order 4.0 for Central Coast Region is under review and this GSP will comply with its findings.

Table 8-5. Minimum Thresholds for Degraded Groundwater Quality in Paso Robles Formation Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	Number of Existing Supply Wells in Monitoring Network	Minimum Threshold Based on Existing Monitoring Network	Percentage of Wells with Exceedances
Agricultural Wells			
Chloride	28	4	14%
Boron	28	10	36%
Municipal Wells			
Total Dissolved Solids	34	12	35%
Chloride	34	2	6%
Sulfate	34	2	6%
Nitrate	34	2	6%
Gross Alpha Radiation	32	0	0%

8.6.2.2 Alluvial Aquifer

The minimum thresholds for degraded water quality in the Alluvial Aquifer are similarly based on the goal of zero additional exceedances shown in Table 8-4. Following the same process as the Paso Robles Formation Aquifer, the minimum thresholds for degraded water quality in the Alluvial Aquifer are shown in Table 8-6. All agricultural supply wells are assumed to pump from the Paso Robles Formation Aquifer, and therefore there are no agricultural well minimum thresholds set in the Alluvial Aquifer. As with the Paso Robles Formation Aquifer, as additional wells are added to the monitoring program, the percentage of wells exceeding the minimum threshold will not increase.

Table 8-6. Minimum Thresholds for Degraded Groundwater Quality in Alluvial Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	Number of Existing Supply Wells in Monitoring Network	Minimum Threshold Based on Existing Monitoring Network	Percentage of Wells with Exceedances
Public Supply Wells			
Total Dissolved Solids	8	5	63%
Chloride	8	3	38%
Sulfate	8	3	38%
Nitrate	9	0	0%
Gross Alpha Radiation	7	0	0%

8.6.2.3 Information Used and Methodology for Establishing Water Quality Minimum Thresholds

The information used for establishing the degraded groundwater quality minimum thresholds included:

- Historical groundwater quality data from production wells in the Subbasin
- Federal and state drinking water quality standards
- Feedback about significant and unreasonable conditions from GSA staff members and the public

The historical groundwater quality data used to establish groundwater quality minimum thresholds are presented in Chapter 5.

Based on the review of historical and current groundwater quality data, federal and state drinking water standards, and irrigation water quality needs, GSAs agreed that these standards are appropriate to define degraded groundwater quality minimum thresholds.

8.6.2.4 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The groundwater quality minimum thresholds were set for each of six constituents that are currently found in the Subbasin above water quality standards or irrigation guidance levels. These minimum thresholds were derived from existing data measured at individual wells. There are no conflicts between the existing groundwater quality data; and therefore, the minimum thresholds represent a reasonable and realistic distribution of groundwater quality. Because the underlying groundwater quality distribution is reasonable and realistic, there is no conflict that prevents the Subbasin from simultaneously achieving all six minimum thresholds.

Because SGMA regulations do not require projects or actions to improve groundwater quality, there will be no direct actions under the GSP associated with the groundwater quality minimum thresholds. Therefore, there are no actions that directly influence other sustainability indicators. However, preventing migration of poor groundwater quality may limit activities needed to achieve minimum thresholds for other sustainability indicators.

- **Change in groundwater levels.** Groundwater quality minimum thresholds could influence groundwater level minimum thresholds by limiting the types of water that can be used for recharge to raise groundwater levels. Water used for recharge cannot exceed any of the groundwater quality minimum thresholds.
- **Change in groundwater storage**. Nothing in the groundwater quality minimum thresholds promotes pumping in excess of the sustainable yield. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the groundwater storage minimum threshold.
- **Seawater intrusion**. This sustainability indicator is not applicable to this Subbasin
- **Subsidence**. Nothing in the groundwater quality minimum thresholds promotes a condition that will lead to additional subsidence and therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable level of subsidence.
- **Depletion of interconnected surface waters.** Nothing in the groundwater quality minimum thresholds promotes additional pumping or lower groundwater elevations in areas where interconnected surface waters may exist. At this time, there are insufficient data to determine the existence in interconnected surface water in the Subbasin. This is a data gap that will be filled early in GSP implementation. Therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable depletion of interconnected surface waters.

8.6.2.5 Effect of Minimum Thresholds on Neighboring Basins

The anticipated effect of the degraded groundwater quality minimum thresholds on each of the two neighboring subbasins is addressed below.

Upper Valley Subbasin of the Salinas Valley Basin. The Upper Valley Subbasin is hydrogeologically down gradient of the Paso Robles Subbasin, thus groundwater generally flows from the Paso Robles Subbasin into the Upper Valley Subbasin. Poor groundwater quality in the Paso Robles Subbasin could flow into the Upper Valley Subbasin, affecting the ability to achieve sustainability in that Subbasin. The degraded groundwater quality minimum threshold is set to prevent unreasonable movement of poor-quality groundwater that could impact overall beneficial uses of groundwater. Therefore, it is unlikely that the groundwater quality minimum thresholds established for the Paso Robles Subbasin will prevent the Upper Valley Subbasin from achieving sustainability.

Atascadero Subbasin. Groundwater generally flows from the Atascadero Subbasin into the Paso Robles Subbasin. Therefore, poor quality groundwater in the Paso Robles Subbasin is not expected flow into the Atascadero Subbasin in the future, thus the Paso Robles Subbasin groundwater quality minimum thresholds will not likely prevent the Atascadero Subbasin from achieving sustainability.

8.6.2.6 Effect on Beneficial Uses and Users

Agricultural land uses and users. The degraded groundwater quality minimum thresholds generally benefit the agricultural water users in the Subbasin. For example, limiting the number of additional agricultural supply wells that could exceed constituent of concern concentrations that could reduce crop production ensures that a supply of usable groundwater will exist for beneficial agricultural use.

Urban land uses and users. The degraded groundwater quality minimum thresholds generally benefit the urban water users in the Subbasin. Limiting the number of additional wells where constituents of concern could exceed primary or secondary MCLs ensures an adequate supply of groundwater for municipal use.

Domestic land uses and users. The degraded groundwater quality minimum thresholds generally benefit the domestic water users in the Subbasin.

Ecological land uses and users. Although the groundwater quality minimum thresholds do not directly benefit ecological uses, it can be inferred that the degraded groundwater quality minimum thresholds generally benefit the ecological water uses in the Subbasin. Preventing constituents of concern from migrating will prevent unwanted contaminants from impacting ecological groundwater supply.

8.6.2.7 Relation to State, Federal, or Local Standards

The degraded groundwater quality minimum thresholds specifically incorporate federal and state drinking water standards.

8.6.2.8 Method for Quantitative Measurement of Minimum Thresholds

Degraded groundwater quality minimum thresholds will be directly measured from existing or new municipal or agricultural supply wells. Groundwater quality will initially be measured using existing monitoring programs.

- Exceedances of primary or secondary MCLs will be monitored by reviewing annual water quality reports submitted to the California Division of Drinking water by municipalities and small water systems.
- Exceedances of crop production minimum thresholds will be monitored as part of the ILRP as presented in Chapter 7.

8.6.3 Measurable Objectives

The measurable objectives for degraded groundwater quality represent target groundwater quality distributions in the Subbasin. Because improving groundwater quality is not a goal under SGMA, the measurable objectives were set to identical to the minimum thresholds.

8.6.3.1 Paso Robles Formation Aquifer

Based on the existing monitoring network, the measurable objectives for degraded groundwater quality in the Paso Robles Formation Aquifer are shown in Table 8-7.

Table 8-7. Measurable Objectives for Degraded Groundwater Quality in Paso Robles Formation Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	Number of Existing Supply Wells in Monitoring Network	Measurable Objective Based on Existing Monitoring Network	Percentage of Wells with Exceedances
Agricultural Wells			
Chloride	28	4	14%
Boron	28	10	36%
Municipal Wells			
Total Dissolved Solids	34	12	35%
Chloride	34	2	6%
Sulfate	34	2	6%
Nitrate	34	2	6%
Gross Alpha Radiation	32	0	0%

8.6.3.2 Alluvial Aquifer

Based on the existing monitoring network, the measurable objectives for degraded groundwater quality in the Paso Robles Formation Aquifer are shown in Table 8-8.

Table 8-8. Measurable Objectives for Degraded Groundwater Quality in Alluvial Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	Number of Existing Supply Wells in Monitoring Network	Measurable Objective Based on Existing Monitoring Network	Percentage of Wells with Exceedances
Public Supply Wells			
Total Dissolved Solids	8	5	63%
Chloride	8	3	38%
Sulfate	8	3	38%
Nitrate	9	0	0%
Gross Alpha Radiation	7	0	0%

8.6.3.3 Method for Setting Measurable Objectives

Because improving groundwater quality is not a goal under SGMA, the measurable objectives were set to identical to the minimum thresholds.

8.6.3.4 Interim Milestones

Interim milestones show how the GSAs anticipate moving from current conditions to meeting the measurable objectives. Interim milestones are set for each five-year interval following GSP adoption.

The measurable objectives for degraded groundwater quality were set at current conditions at five years after GSP adoption and the measurable objectives for 10 and 15 years after GSP adoption. The interim milestones for the constituents in the Paso Robles Formation Aquifer are shown in Table 8-9.

Table 8-9. Interim Milestone Groundwater Quality Exceedances in Paso Robles Formation Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	Five Year Number of Groundwater Quality Exceedances	Ten Year Number of Groundwater Quality Exceedances	Fifteen Year Number of Groundwater Quality Exceedances
Agricultural Supply Wells			
Chloride	3	4	4
Boron	9	10	10
Public supply wells			
Total Dissolved Solids	11	12	12
Chloride	1	2	2
Sulfate	1	2	2
Nitrate	1	2	2
Gross Alpha Radiation	0	0	0

The interim milestones for the constituents in the Alluvial Aquifer are shown in Table 8-10.

Table 8-10. Interim Milestone Groundwater Quality Exceedances in Alluvial Aquifer Supply Wells Under the Current Monitoring Network

Constituent of Concern	5-Year Number of Groundwater Quality Exceedances	10-Year Number of Groundwater Quality Exceedances	15-Year Number of Groundwater Quality Exceedances
Public supply wells			
Total Dissolved Solids	4	5	5
Chloride	2	3	3
Sulfate	2	3	3
Nitrate	0	0	0
Gross Alpha Radiation	0	0	0

8.6.4 Undesirable Results

8.6.4.1 Criteria for Defining Undesirable Results

By SGMA regulations, the degraded groundwater quality undesirable result is a quantitative combination of groundwater quality minimum threshold exceedances. For the Subbasin, groundwater quality degradation is unacceptable only as a direct result of actions taken as part of GSP implementation. Therefore, the degraded groundwater quality undesirable result is:

On average during any one year, no groundwater quality minimum threshold shall be exceeded in any aquifer as a direct result of projects or management actions taken as part of GSP implementation.

8.6.4.2 Potential Causes of Undesirable Results

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

- **Required Changes to Subbasin Pumping**. If the location and rates of groundwater pumping change as a result of projects implemented under the GSP, these changes could cause movement of one of the constituents of concern towards a supply well at concentrations that exceed relevant water quality standards.
- **Groundwater Recharge.** Active recharge of imported water or captured runoff could cause movement of one of the constituents of concern towards a supply well in concentrations that exceed relevant water quality standards.
- **Recharge of Poor-Quality Water.** Recharging the Subbasin with water that exceeds a primary or secondary MCL or concentration that reduces crop production will lead to an undesirable result.

8.6.4.3 Effects on Beneficial Users and Land Use

The practical effect of the degraded groundwater quality undesirable result is that it deters any significant changes to groundwater quality. Therefore, the undesirable result will not impact the use of groundwater and will not have a negative effect on the beneficial users and uses of groundwater.

8.7 Land Subsidence Sustainable Management Criteria

8.7.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable conditions for land subsidence were assessed based on public meetings and discussions with GSA staff. Significant and unreasonable rates of land subsidence in the Subbasin are those that lead to a permanent subsidence of land surface elevations that impact infrastructure. For clarity, this Sustainable Management Criterion adopts two related concepts:

- **Land Subsidence** is a gradual settling of the land surface caused by compaction of subsurface materials due to lowering of groundwater elevations from groundwater pumping. Land subsidence in an inelastic process, and the decline in land surface is permanent.
- **Land Surface Fluctuation** is the periodic or annual measurement of the ground surface elevation. Land surface may rise or fall in any one year. Declining land surface fluctuation may or may not indicate long-term permanent subsidence.

Currently, InSAR data provided by DWR shows that meaningful land subsidence did not occur during the period between June 2015 and June 2018 in the Paso Robles Subbasin.

8.7.2 Minimum Thresholds

Section 354.28(c)(5) of the SGMA regulations states that "*The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.*" Because it is difficult to assess a-priori where subsidence may interfere with surface land uses and where it may not, a single minimum threshold is set for the entire Subbasin.

Based on an analysis of potential errors in the InSAR data, as discussed in the following section, the subsidence minimum threshold is:

The InSAR measured subsidence between June of one year and June of the subsequent year shall be no more than 0.1 foot, resulting in zero long-term subsidence.

8.7.2.1 Information Used and Methodology for Establishing Subsidence Minimum Thresholds

Minimum thresholds were established using InSAR data available from DWR. The general minimum threshold is the absence of long-term land subsidence in the Subbasin. The InSAR data provided by DWR, however, are subject to measurement error. DWR has stated that, on a statewide level, for the total vertical displacement measurements between June 2015 and June 2018, the errors are as follows (Benjamin Brezing, personal communication,):

1. The error between InSAR data and continuous GPS data is 16 mm (0.052 feet) with a 95% confidence level

2. The measurement accuracy when converting from the raw InSAR data to the maps provided by DWR is 0.048 feet with 95% confidence level.

By simply adding errors 1 and 2, we arrive at a combined error of 0.1 foot. While this is not a robust statistical analysis, it does provide an estimate of the potential error in the InSAR maps provided by DWR. A land surface change of less than 0.1 feet is therefore within the noise of the data, and is equivalent to no subsidence in this GSP.

Additionally, the InSAR data provided by DWR reflects both elastic and inelastic subsidence. While it is difficult to compensate for elastic subsidence, visual inspection of monthly changes in ground elevations suggest that elastic subsidence is largely seasonal. Figure 8-1 shows the ground level changes at a randomly selected point in the area where InSAR data are available. This figure demonstrates the general seasonality of the elastic subsidence. To minimize the influence of elastic subsidence on our assessment of long-term, permanent subsidence, changes in ground level will only be measured annually from June of one year to June of the following year.

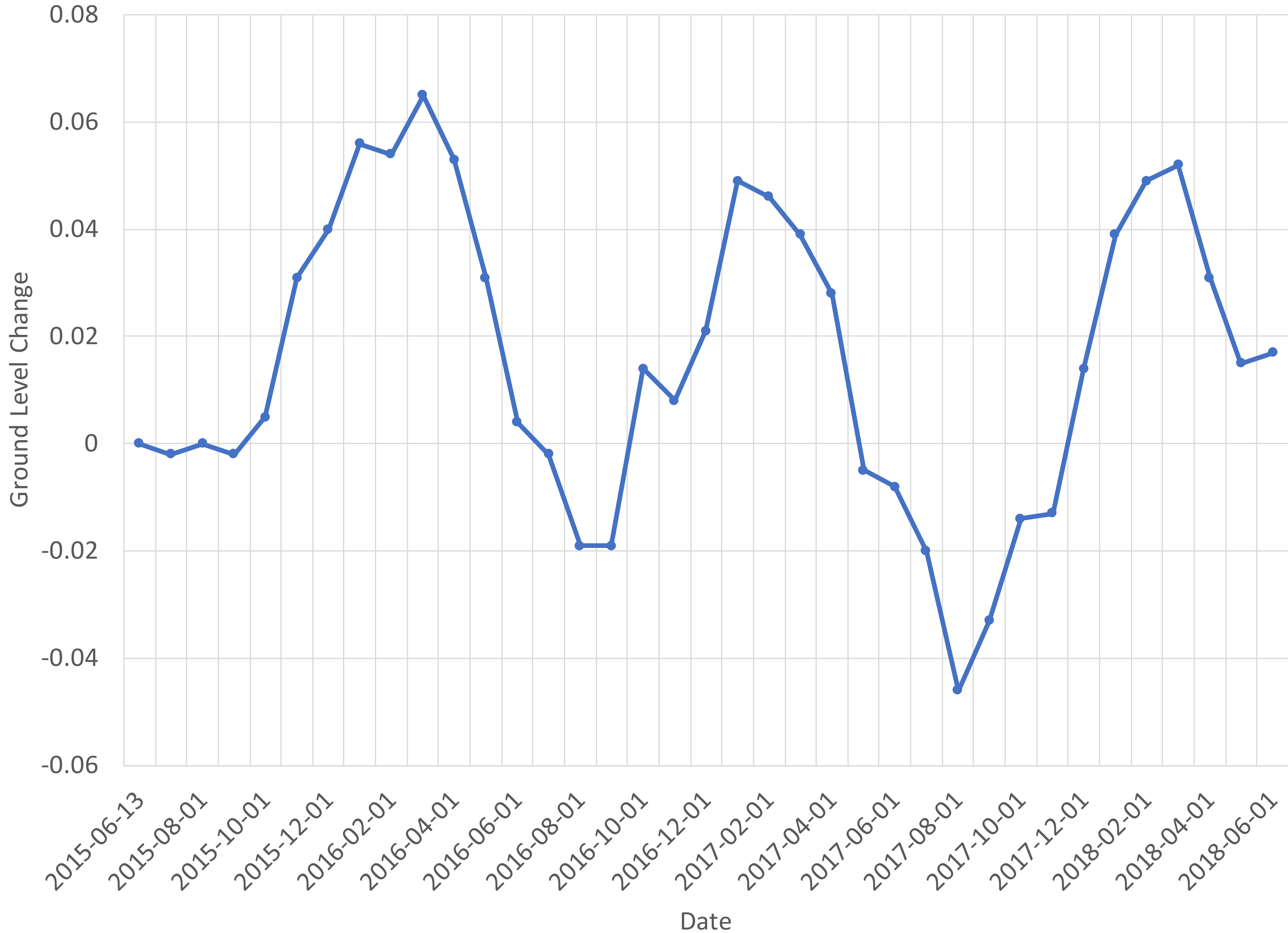


Figure 8-1: Example Seasonal Ground Surface Change

8.7.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

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

- **Chronic lowering of groundwater elevations.** Subsidence minimum thresholds will not result in significant or unreasonable groundwater elevations.
- **Change in groundwater storage**. The subsidence minimum thresholds will not change the amount of pumping, and will not result in a significant or unreasonable change in groundwater storage.
- **Seawater intrusion**. This sustainability indicator is not applicable in the Paso Robles Subbasin.
- **Degraded water quality**. The subsidence minimum thresholds will not change the groundwater flow directions or rates, and therefore and will not result in a significant or unreasonable change in groundwater quality.
- **Depletion of interconnected surface waters.** The ground level subsidence minimum thresholds will not change the amount or location of pumping and will not result in a significant or unreasonable depletion of interconnected surface waters.

8.7.2.3 Effect of Minimum Thresholds on Neighboring Basins

The anticipated effect of the subsidence minimum thresholds on each of the two neighboring subbasins is addressed below.

- **Upper Valley Subbasin of the Salinas Valley Basin**. The ground surface subsidence minimum thresholds are set to prevent any long-term subsidence that could harm infrastructure. Therefore, the subsidence minimum thresholds will not prevent the Upper Valley Subbasin from achieving sustainability.
- **Atascadero Subbasin**. The subsidence minimum thresholds are set to prevent any long-term subsidence that could harm infrastructure. Therefore, the subsidence minimum thresholds will not prevent the Atascadero Subbasin from achieving sustainability.

8.7.2.4 Effects on Beneficial Uses and Users

The subsidence minimum thresholds are set to prevent subsidence that could harm infrastructure. Available data indicate that there is currently no subsidence occurring in the Subbasin that affects infrastructure, and reductions in pumping are already required by the reduction in groundwater storage sustainability indicator. Therefore, the subsidence minimum thresholds do not require any additional reductions in pumping and there is no negative impact on any beneficial user.

8.7.2.5 Relation to State, Federal, or Local Standards

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

8.7.2.6 Method for Quantitative Measurement of Minimum Threshold

Minimum thresholds will be assessed using DWR supplied InSAR data.

8.7.3 Measurable Objectives

The measurable objectives for subsidence represent target subsidence rates in the Subbasin. Because the minimum thresholds of less than 0.1 foot net long-term subsidence are the best achievable outcome, the measurable objectives are identical to the minimum thresholds.

8.7.3.1 Method for Setting Measurable Objectives

The measurable objectives are set based on DWR-supplied InSAR data.

8.7.3.2 Interim Milestones

Interim milestones show how the GSAs anticipate moving from current conditions to meeting the measurable objectives. Interim milestones are set for each five-year interval following GSP adoption.

Subsidence measurable objectives are set at current conditions of no long-term subsidence. Therefore, there is no change between current conditions and sustainable conditions. Therefore, the interim milestones are identical to the minimum thresholds and measurable objectives.

8.7.4 Undesirable Results

8.7.4.1 Criteria for Defining Undesirable Results

By regulation, the ground surface subsidence undesirable result is a quantitative combination of subsidence minimum threshold exceedances. For the Subbasin, no long-term subsidence that impacts infrastructure is acceptable. Therefore, the ground surface subsided undesirable result is:

In any one year, there will be zero exceedances of the minimum thresholds for subsidence.

Should potential subsidence be observed, the GSAs will first assess whether the subsidence may be due to elastic subsidence. If the subsidence is not elastic, the GSAs will undertake a program to correlate the observed subsidence with measured groundwater levels.

8.7.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include a shift in pumping locations, which could lead to a substantial decline in groundwater levels. Shifting a significant amount of pumping and causing groundwater levels to fall in an area that is susceptible to subsidence could trigger subsidence in excess of the minimum thresholds.

8.7.4.3 Effects on Beneficial Users and Land Use

The undesirable result for subsidence does not allow any subsidence to occur in the Subbasin. If groundwater levels drop below historic lows and subsequent subsidence is measured, then localized subsidence could impact beneficial users by impacting infrastructure.

8.8 Depletion of Interconnected Surface Water SMC

8.8.1 Locally Defined Significant and Unreasonable Conditions

As described in Chapter 4, Hydrogeologic Conceptual Model and Chapter 5, Groundwater Conditions, there are insufficient data to determine whether surface water and groundwater are interconnected in the Subbasin. As described in Chapter 7, Monitoring Networks, a more expansive monitoring network will be developed during GSP implementation to improve understanding of interconnection between surface water and groundwater in the Subbasin. If in the future, data indicate that surface water and groundwater are interconnected, locally defined significant and unreasonable conditions will be assessed for those interconnected areas.

8.8.2 Minimum Thresholds

Section 354.28(c)(6) of the SGMA regulations states that "*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*."

Data are insufficient to determine the existence of interconnected surface water and groundwater. Therefore, minimum thresholds were not developed for the GSP. If in the future, data from a more comprehensive monitoring program indicate that surface water and groundwater are interconnected, minimum thresholds will be developed for areas of interconnection. Since minimum thresholds were not developed for the GSP, information about the methods used to develop minimum thresholds, the quantitative metrics to track compliance with minimum thresholds, and their impact on other sustainability indicators, other Subbasins, and beneficial use and users of groundwater is not presented in this section like it was for the other sustainability indicators.

8.8.3 Measurable Objectives

Similar to minimum thresholds, measurable objectives were not developed for the GSP. If in the future, data from a more comprehensive monitoring program indicate that surface water and groundwater are interconnected, measurable objectives will be developed for areas of interconnection. Since measurable objectives were not developed for the GSP, information about the methods used to develop measurable objectives and interim milestones is not presented in this section like it was for the other sustainability indicators.

8.8.4 Undesirable Results

Because there are insufficient data to determine if there is an interconnection between surface water and groundwater in the Subbasin at this time, undesirable results, including impacts to beneficial uses and users of groundwater, related to interconnected surface water and groundwater are not expected to occur. If in the future, data from a more comprehensive monitoring program indicate that surface water and groundwater are interconnected, undesirable results related to interconnected surface water and groundwater will be assessed.

8.9 Management Areas

Management areas have not been established in the Subbasin. For planning purposes, the concepts for future management areas are provided below.

8.9.1 Future Management Area Concept

Management areas may be developed in the future based on the existence of a geologic and geographic divide in the Subbasin. The Subbasin is dominated by two main watersheds and many smaller watersheds that drain into and recharge the Subbasin. The western portion of the Subbasin is fed by the Salinas watershed, including the Huer Huero watershed. The eastern portion of the Subbasin is fed by the Estrella River watershed, including Cholame Creek and San Juan Creek watersheds. These two watersheds have different geologic and climatic conditions. Both watersheds drain to the confluence of the Estrella and Salinas Rivers near San Miguel in the northern end of the Subbasin. A distinct geologic ridge divides the Huer Huero portion of the Salinas River watershed from the Shed Canyon portion of the Estrella River watershed. This uplifted ridge bisects the Subbasin and the Estrella River cuts through this ridge near Whitley Gardens. The Subbasin may be divided into western and eastern management areas along the uplifted ridge in the future.

The nature of this divide and the underlying geology within the Subbasin needs to be better understood before the GSAs can delineate and justify any management area. The GSAs will initiate and support electromagnetic resonance surveys to help delineate local geology. Reports from well owners throughout the Subbasin suggest that some areas of the Subbasin are distinctly isolated from neighboring areas. Analysis of static groundwater levels from as many wells as possible will help to define areas where groundwater conditions appear to be hydrologically connected and areas where these conditions seem to be hydrologically isolated. This will help form the basis of defining the management area. This effort will also assist in defining where future monitoring wells should be located. The GSAs in the proposed management areas may undertake distinct management approaches which would be appropriately designed to protect the local groundwater resource without adversely impacting other areas of the Subbasin or neighboring Subbasins.

Each area of the Subbasin will be managed in conjunction with all other areas using the same set of undesirable results and minimum thresholds, tied to specific RMSs as described in this chapter. The Subbasin wide monitoring networks will be used to assure compliance with the GSP. Using management areas to assure long-term sustainability protects all beneficial uses and users in all parts of the Subbasin.

8.9.2 Minimum Thresholds and Measurable Objectives

The minimum thresholds that will be established in potential management areas will use the same process and criteria described above in this chapter. The minimum thresholds and measurable objectives will be developed to ensure groundwater levels remain above historical water levels in each management area, and to maintain historical groundwater flow conditions to downstream portions of the Subbasin and other downstream basins. By managing groundwater sustainably in each management area, the groundwater resource remains available for beneficial uses and users. Groundwater quality will not be degraded due to poor quality water moving into productive aquifers.

8.9.3 Monitoring

Because of the large size and distinctly separate drainages of the watersheds draining into each of management area, there is a need for a robust network of monitoring wells that provide data representative of specific portions of each management area. Initially, existing wells with known depths and known perforated intervals will be selected and used. Where needed, dedicated new monitoring wells may be added to improve the monitoring network.

8.9.4 How Management Areas Will Avoid Undesirable Results

The undesirable results described in the sections above are applicable in each management area. As long as minimum thresholds and measurable objectives continue to be met within each management area, beneficial uses and users of the groundwater resource will be assured of continued access to a sustainable groundwater resource. The projects and management actions in each management area will be proportional to the need to maintain those minimum thresholds and measurable objectives.

8.9.5 Management

The establishment and implementation of Management Areas would follow the agreement among the four GSAs (see GSP Chapter 12).

9 MANAGEMENT ACTIONS AND PROJECTS

9.1 Introduction

This chapter describes the management actions that will be developed and implemented in the Subbasin to attain sustainability in accordance with §354.42 and §354.44 of the SGMA regulations. Management actions described herein are non-structural programs or policies that are intended to reduce or optimize local groundwater use. Consistent with SGMA regulations §354.44, this chapter also describes projects in process and conceptual projects involving new or improved infrastructure to make new water supplies available to the Subbasin that may be implemented by willing project participants to offset pumping and lessen the degree to which the management actions would be needed. The concept projects referenced are based on previous publicly vetted feasibility studies[1]. The need for management actions (and projects if implemented) is based on the following Subbasin conditions that were described in previous chapters.

- Groundwater levels are declining in many parts of the Subbasin, indicating that the amount of groundwater pumping is more than the natural recharge (Chapter 5)
- Water budgets (Chapter 6) indicate that amount of groundwater in storage will continue to decline in the future at an estimated rate of nearly 14,000 acre-feet per year (AFY), which assumes no net increase in pumping demand on the basin. If there is a net increase in demand due to e.g. the development of currently undeveloped properties in a way that requires the use of additional groundwater, the deficit would be greater.

To stop persistent declines in groundwater levels, achieve the sustainability goal before 2040, and avoid undesirable results as required by SMGA regulations, groundwater pumping limitations will be needed. A reduction in groundwater pumping will occur as a result of management actions, except where a new water supply becomes available and is used in lieu of pumping groundwater.

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

[1] Paso Robles Groundwater Basin Supplemental Supply Options Feasibility Study, January 2017

- Relevant regulatory and permitting considerations
- Implementation schedules
- Legal authority required to take the actions
- Estimated costs

The groundwater management actions are intended to stabilize groundwater elevations, meet the estimated groundwater storage deficit described in Chapter 6, and address all other sustainability indicators described in Chapter 8. Management actions to directly reduce groundwater pumping will be implemented where necessary. If groundwater levels are stabilized and/or sustained, many of the associated undesirable results described in Chapter 8 will be avoided.

The management actions (and projects if implemented) identified in this GSP will achieve groundwater sustainability by avoiding Subbasin-specific undesirable results.

***De Minimis* Groundwater Users**

While the number of *de minimis* groundwater users in the basin is significant, they are not currently regulated under this GSP. Growth of *de minimis* groundwater extractors could warrant regulated use in this GSP in the future. Growth will be monitored and reevaluated periodically.

9.2 Implementation Approach and Criteria for Management Actions

Using authorities outlined in Sections 10725 to 10726.9 of the California Water Code, the GSAs would 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 Subbasin is more than the estimated sustainable yield of about 61,000 AFY (see Chapter 6) and groundwater levels are persistently declining in certain areas, the GSAs will begin to implement management actions as early as possible after GSP adoption. The effect of the management actions will be reviewed annually, and additional management actions will be implemented as necessary to avoid undesirable results. Management actions fall into two categories, basin-wide and area specific, as described in more detail in the subsequent sections. Appendix L describes other programs that individual GSAs, pumpers and/or other entities may choose to fund and implement if they have the authority to do so.

In general, basin-wide management actions will apply to all Subbasin areas and reflect basic GSP implementation requirements such as monitoring, reporting and outreach, including necessary studies and early planning work, monitoring and filling data gaps with additional monitoring sites, annual reports and GSP updates, and promoting voluntary limitations in groundwater pumping aimed at both keeping groundwater levels stable and avoiding undesirable results.

Area specific management actions will also be implemented in areas experiencing persistent declines after the development of an appropriate regulation. Because developing and adopting the regulation will require substantial negotiations between the GSAs, public hearings, environmental review (CEQA) and legal risks that need to be addressed, efforts to define and gain approvals for the scope and detail associated with a regulation for area specific management actions will begin soon after GSP adoption. There is a strong need for adequate information to justify area specific management actions and considering that information will be a critical part of initial GSP implementation. Regulations adopted by GSAs related to identifying the specific areas for pumping limitations would need to be substantially identical to assure a consistent methodology for identifying those areas across the Subbasin. Individual pumpers in those areas will then need to choose how to comply with the necessary pumping limitations in those areas.

Figure 9-1 shows a flowchart of the conceptual GSP implementation approach. Public meetings and hearings will be held during the process of determining when and where in the Subbasin management actions are needed. 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.

At a time in the future when the effects of management actions have stabilized groundwater levels, the GSAs will reassess the need for continuing these actions. At a minimum, the reassessment process would be done as part of the 5-year review and report to the regulatory agencies.

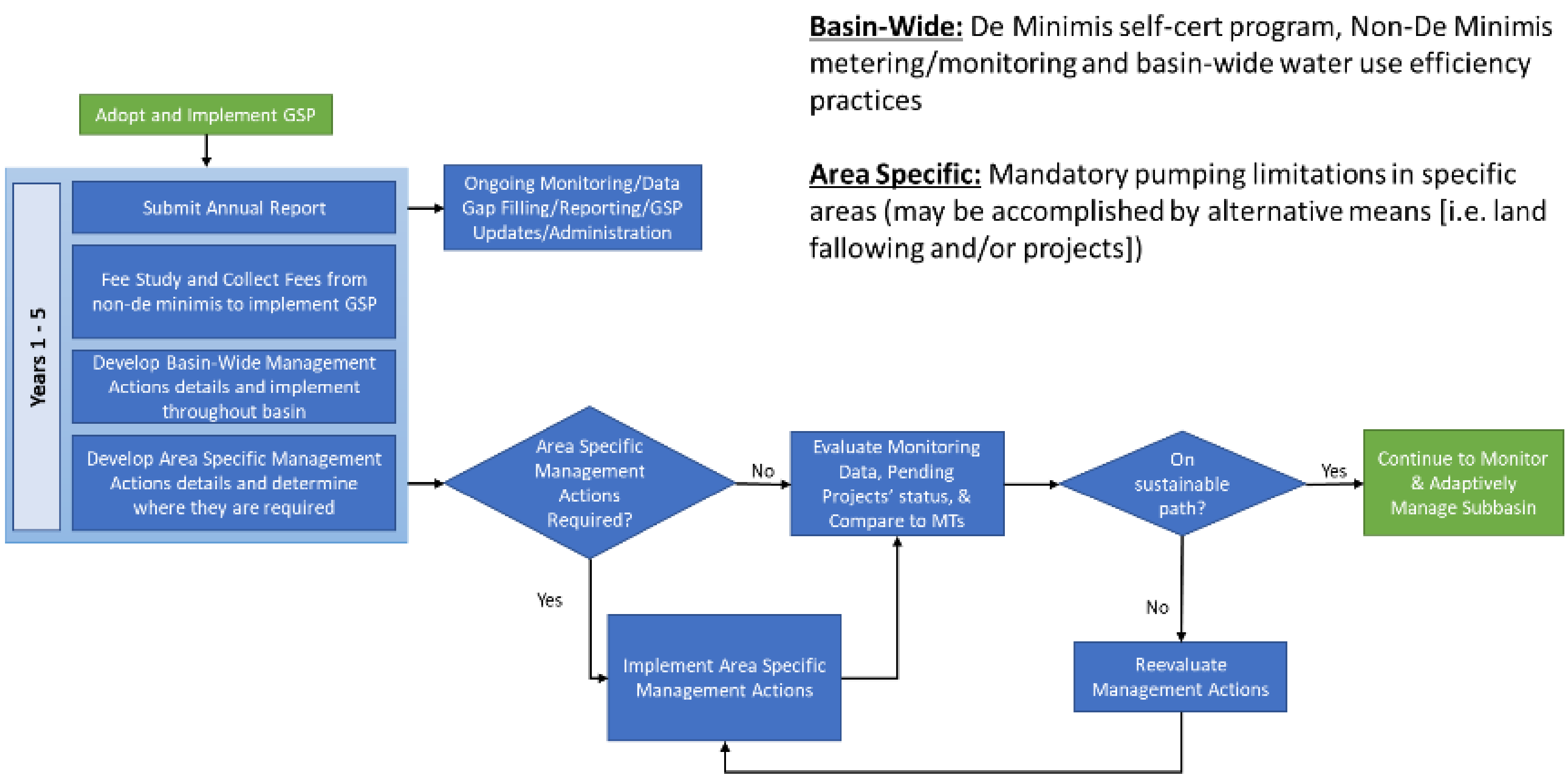


Figure 9-1: Conceptual Implementation Approach for Management Actions and Projects

9.3 Basin-Wide Management Actions

The following subsections outline the various basin-wide management actions. Basin-wide management actions will be implemented using input from stakeholders and in a data-driven process.

Basin-wide management actions include:

- Monitoring, reporting and outreach
- Promoting best water use practices
- Promoting stormwater capture
- Promoting voluntary fallowing of irrigated crop land

Sections required by SGMA regulations §354.44 follow the description of each management action below.

9.3.1 Monitoring, Reporting and Outreach

Monitoring, reporting and outreach reflects the core functions that the GSAs need to provide to comply with SGMA regulations. The GSAs will direct the monitoring programs outlined in Chapter 7 to track Subbasin conditions related to the five applicable sustainability indicators. Data from the monitoring programs will be routinely evaluated to ensure progress is being made toward sustainability or to identify whether undesirable results are occurring. Data will be maintained in the Data Management System (DMS). Data from the monitoring program will be used by the GSAs to guide decisions on management actions and to prepare annual reports to Subbasin stakeholders and DWR and by individual entities to guide decisions on projects. SGMA regulations require that the reports comply with DWR forms and submittal requirements that will be published by DWR, and that all transmittals are signed by an authorized party. Data will be organized and available to the public to document Subbasin conditions relative to Sustainability Management Criteria (Chapter 8).

9.3.1.1 De Minimis Self Certification

A system for De Minimis basin extractors to self-certify that they extract, for domestic purposes, two acre-feet or less per year will be developed in order to differentiate extractors for the purposes of implementing the GSP.

9.3.1.2 Non-De Minimis Metering and Reporting Program

This GSP calls for a program that will require all non-*de minimis* extractors to report extractions annually and use a water-measuring method satisfactory to the GSAs in accordance with Water Code Section 10725.8. It is anticipated that the GSAs will develop and adopt a regulation to implement this program, which is expected to include a system for reporting and accounting for land fallowing, stormwater capture projects, or other activities that individual pumpers implement. The information collected will be used to account for pumping that would have otherwise occurred, for analyzing projected Subbasin conditions and completing annual reports and five-year GSP assessment reports.

9.3.1.3 Annual Reports (SGMA Regulation §356.2)

Annual reports will be submitted to DWR starting on April 1, 2020. The purpose of the report is to provide monitoring and total groundwater use data to DWR, compare monitoring data to the sustainable management criteria, to report on management actions and projects implemented to achieve sustainability, and to promote best water use practices, stormwater capture and voluntary irrigated land fallowing. Annual reports will be available to Subbasin stakeholders.

9.3.1.4 5-Year GSP Updates and Amendments (SGMA Regulation §356.2)

In accordance with SGMA regulatory requirements (§356.4), five-year GSP assessment reports will be provided to DWR starting in 2025. The GSAs shall evaluate the GSP at least every five years to assess whether it is achieving the sustainability goal in the Subbasin. The assessment will include a description of significant new information that has been made available since GSP adoption or amendment and whether the new information or understanding warrants changes to any aspect of the plan.

Although not required by SGMA regulations, the GSAs anticipate that an amendment to the GSP will be prepared within the first five years to integrate new information. Updates may include incorporating additional monitoring data, updating the sustainable management criteria, documenting any projects that are being implemented and facilitating adaptive management of management actions.

9.3.1.5 Data Gaps

SGMA regulations require identification of data gaps and a plan for filling them (§ 354.38). Monitoring data will be collected and reported for each of the five sustainability indicators that are relevant to the Subbasin: chronic lowering of groundwater levels, reduction in groundwater storage, degraded water quality, land subsidence, and depletion of interconnected surface water. As noted in Chapter 7, the approach for establishing the monitoring networks was to leverage existing monitoring programs and, where data gaps existed, incorporate additional monitoring locations that have been made available by cooperating entities or that have been established by the GSAs. Appendix L identifies the plan for addressing data gaps in each monitoring network and the computer model of the Subbasin.

9.3.1.6 Relevant Measurable Objectives

Monitoring, Reporting, and Outreach would benefit all measurable objectives by keeping basin users informed about Subbasin conditions and the need to avoid undesirable results.

9.3.1.7 Expected Benefits and Evaluation of Benefits

The primary benefit from Monitoring, Reporting and Outreach is public education and associated changes in behavior that would improve the chances of achieving sustainability. Because it is unknown how much behavior will change as a result of Monitoring, Reporting and Outreach, it is difficult to quantify the expected benefits at this time.

Reductions in groundwater pumping will be measured directly through the metering and reporting program and recorded in the Data Management System (DMS). Changes in groundwater elevation will be measured with the groundwater level monitoring program. Subsidence will be measured with the InSAR network. Changes in groundwater storage will be estimated using the groundwater level proxy. Information about the monitoring programs is provided in Chapter 7. Isolating the effect of Monitoring, Reporting and Outreach on groundwater levels will be challenging because they are only one of several management actions that may be implemented concurrently in the Subbasin.

9.3.1.8 Circumstances for Implementation

Monitoring, Reporting and Outreach will begin upon adoption of the GSP. No other triggers are necessary or required.

9.3.1.9 Public Noticing

Public meetings will be held to inform the groundwater pumpers and other stakeholders about Subbasin conditions and the need for behavior changes. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how the Monitoring, Reporting and Outreach are being implemented in the Subbasin. Information on Monitoring, Reporting and Outreach will also be provided through annual GSP reports and links to relevant information on GSA websites.

9.3.1.10 Permitting and Regulatory Process

It is anticipated that the GSAs will adopt a regulation governing the metering and reporting program.

9.3.1.11 Implementation Schedule

Monitoring, Reporting and Outreach efforts will begin upon GSP adoption.

9.3.1.12 Legal Authority

The legal authority to conduct Monitoring, Reporting and Outreach is included in SGMA. For example, Water Code § 10725.8 authorizes GSAs to require through their GSPs that the use of every groundwater extraction facility (except those operated by *de minimis* extractors) be measured.

9.3.1.13 Estimated Cost

The total estimated cost for Monitoring, Reporting, and Outreach is $1,150,000.

9.3.2 Promoting Best Water Use Practices

This GSP calls for the GSAs to encourage pumpers to implement the most effective water use efficiency methods applicable, often referred to as Best Management Practices (BMPs). Effective BMPs could result in:

- Efficient irrigation practices.
- A better accounting of annual precipitation and its contribution to soil moisture in all irrigation decisions and delay commencing irrigation until soil moisture levels require replenishment.
- Optimization of irrigation needs for frost control if sprinklers are used.
- More optimal irrigation practices by monitoring crop water use with soil and plant monitoring devices and tie monitoring data to evapotranspiration (ET) estimates.
- Conversion from high water demand crops to lower water demand crops.

Many growers already use BMPs, but improvements can be made. A goal of promoting BMPs is to broaden their use to more growers in the Subbasin. *De minimis* groundwater users will be encouraged to use BMPs as well. Promoting BMPs will include broad outreach to groundwater pumpers in the Subbasin to emphasize the importance of utilizing BMPs and understanding their positive benefits for mitigating declining groundwater levels and forestalling mandated limitations in groundwater extraction on their property.

9.3.2.1 Relevant Measurable Objectives

BMPs would benefit the groundwater elevation, groundwater storage, and land subsidence measurable objectives.

9.3.2.2 Expected Benefits and Evaluation of Benefits

The primary benefit from initiating BMPs is reduced Subbasin pumping. A connected secondary benefit is mitigating the decline, or raising, groundwater elevations. An ancillary benefit from stable or rising groundwater levels may include avoiding pumping induced subsidence. Because it is unknown how much pumping will be reduced from promoting BMPs, it is difficult to quantify the expected benefits at this time.

Reductions in groundwater pumping will be measured directly through the metering and reporting program and recorded in the Data Management System (DMS). Changes in groundwater elevation will be measured with the groundwater level monitoring program. Subsidence will be measured with the InSAR network. Changes in groundwater storage will be estimated using the groundwater level proxy. Information about the monitoring programs is provided in Chapter 7. Isolating the effect of BMPs on groundwater levels will be challenging because they are only one of several management actions that may be implemented concurrently in the Subbasin.

9.3.2.3 Circumstances for Implementation

BMPs and related outreach will be promoted soon after adoption of the GSP. No other triggers are necessary or required.

9.3.2.4 Public Noticing

Public meetings will be held to inform the groundwater pumpers and other stakeholders about Subbasin conditions and the need for BMPs. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how the BMPs are being implemented in the Subbasin. The BMPs will also be promoted through annual GSP reports and links to relevant information on GSA websites.

9.3.2.5 Permitting and Regulatory Process

No permitting or regulatory process is needed for promoting BMPs.

9.3.2.6 Implementation Schedule

The GSAs envision that BMPs will be promoted within a year of GSP adoption.

9.3.2.7 Legal Authority

No legal authority is needed to promote BMPs.

9.3.2.8 Estimated Cost

The estimated cost for promoting BMPs and understanding the extent to which they are being implemented in the Subbasin is included in the cost of the metering and reporting program and developing annual reports.

9.3.3 Promote Stormwater Capture

Stormwater and dry weather runoff capture projects, including Low Impact Development (LID) standards for new or retrofitted construction, will be promoted as priority projects to be implemented as described in the San Luis Obispo County Stormwater Resource Plan (SWRP). The SWRP outlines an implementation strategy to ensure valuable, high-priority projects with multiple benefits. While the benefits are not easily quantified, the State is very supportive of such efforts. Stormwater capture projects in several areas of the Basin, including reaches of the Huer Huero, San Juan and Estrella drainages are likely to be pursued.

This management action covers two types of stormwater capture activities. The first stormwater capture activity involves retaining and recharging onsite runoff. Examples of this type of activity include LID and on-farm recharge of local runoff. The second stormwater capture activity involves recharge of unallocated storm flows. These actions require temporary diversions of storm flows from streams, and transport of those flows to recharge locations.

9.3.3.1 Relevant Measurable Objectives

Stormwater capture would benefit the groundwater elevation, groundwater storage, and land subsidence measurable objectives.

9.3.3.2 Expected Benefits and Evaluation of Benefits

The primary benefit from promoting stormwater capture is to mitigate the decline of, or possibly raise, groundwater elevations through additional recharge. An ancillary benefit from stable or rising groundwater elevations may include avoiding pumping induced subsidence. Because the amount of recharge that could be accomplished from the program is unknown at this time, it is difficult to quantify the expected benefits.

Changes in groundwater elevation will be measured with the groundwater level monitoring program. Subsidence will be measured with the InSAR network. Changes in groundwater storage will be estimated using the groundwater level proxy. Information about the monitoring programs is provided in Chapter 7. Isolating the effect of the stormwater capture on groundwater levels will be challenging because it will be only one of several management actions that may be implemented concurrently in the Subbasin.

9.3.3.3 Circumstances for Implementation

Stormwater capture will be promoted as soon as possible after adoption of the GSP.

9.3.3.4 Public Noticing

Public meetings will be held to inform the groundwater pumpers and other stakeholders about Subbasin conditions and the need for stormwater capture. Groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how stormwater capture projects are being implemented in the Subbasin. Stormwater capture will also be promoted through annual GSP reports and links to relevant information on GSA websites.

9.3.3.5 Permitting and Regulatory Process

Recharge of stormwater by retaining and recharging onsite runoff does not require permits. Recharge of unallocated storm flows is currently subject to the SWRCB's existing temporary permit for groundwater recharge program. The SWRCB is currently developing five-year permits for capturing high flow events. Recharge of unallocated storm flows will be subject to the terms of these five-year permits if and when they are enacted. Stormwater capture may also be subject to CEQA permitting. A regulation will need to be adopted by the GSAs to account for projects that recharge unallocated storm flows as a part of the metering and reporting program. Regulations are subject to CEQA.

9.3.3.6 Implementation Schedule

The GSAs envision that stormwater capture will be promoted within two years of GSP adoption.

9.3.3.7 Legal Authority

Other than acquiring required permits and the right to divert stormwater, there are no other legal authorities required to implement stormwater capture.

9.3.3.8 Estimated Cost

The estimated cost for promoting stormwater capture and understanding the extent to which it is being implemented in the Subbasin is included in the cost of the metering and reporting program and developing annual reports.

9.3.4 Promote Voluntary Fallowing of Agricultural Land

This GSP calls for the GSAs to promote voluntary fallowing of crop land to reduce overall groundwater demand. For example, the GSAs could develop a Subbasin-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 "place holder" for their ability to pump under regulations adopted by the GSAs, 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. A regulation would need to be adopted by the GSAs for the metering and reporting program, and the program could include provisions related to land fallowing.

9.3.4.1 Relevant Measurable Objectives

The voluntary fallowing of irrigated land would benefit the groundwater elevation, groundwater storage, and land subsidence measurable objectives.

9.3.4.2 Expected Benefits and Evaluation of Benefits

The primary benefit of voluntary fallowing would be reduced Subbasin pumping. A connected secondary benefit is mitigating the decline of, or raising, groundwater elevations from the reduced pumping. An ancillary benefit from stable or rising groundwater elevations may include avoiding pumping induced subsidence. Because it is unknown how many landowners will willingly fallow their land, it is difficult to quantify the expected benefits at this time.

Reductions in groundwater pumping will be measured directly through the metering and reporting program and recorded in the DMS. Changes in groundwater elevation will be measured with the groundwater level monitoring program. Subsidence will be measured with the InSAR network. Changes in groundwater storage will be estimated using the groundwater level proxy. Information about the monitoring programs is provided in Chapter 7. Isolating the effect of voluntary fallowing on sustainability metrics will be challenging because it will be only one of several management actions that may be implemented concurrently in the Subbasin.

9.3.4.3 Circumstances for Implementation

The GSAs envision that voluntary fallowing of land will be promoted as soon as possible after GSP adoption.

9.3.4.4 Public Noticing

Public meetings will be held to inform the groundwater pumpers and other stakeholders about Subbasin conditions and the need for voluntary fallowing. Landowners, groundwater pumpers and interested stakeholders will have the opportunity at these meetings to provide input and comments on how voluntary fallowing is being implemented in the Subbasin. Voluntary fallowing will also be promoted through annual GSP reports and links to relevant information on GSA websites.

9.3.4.5 Permitting and Regulatory Process

Regulations are subject to CEQA.

9.3.4.6 Implementation Schedule

The GSAs envision that voluntary fallowing will be promoted within two years of GSP adoption.

9.3.4.7 Legal Authority

California Water Code §10726.3(c) provides GSAs the authorities to provide for a program of voluntary land fallowing.

9.3.4.8 Estimated Cost

The estimated cost for promoting and accounting for land fallowing is included in the cost of the metering and reporting program and developing annual reports.

9.4 Area Specific Management Actions

Implementation of area specific management actions may be necessary to address areas of persistent groundwater level decline (Figure 9-1). Through a regulatory program, GSAs will conduct extensive data analysis to delineate where pumping needs to be limited to stabilize levels. With this information, affected pumpers will need to decide how to achieve these limitations. This may include land fallowing/retirement or paying for projects and/or programs that can be effectively implemented proportional to the recognized volume of groundwater necessary to avoid undesirable results in each area of the basin. Sections required by SGMA regulations §354.44 follow the description of each management action below.

9.4.1 Mandatory pumping limitations in specific areas

The GSAs will establish a regulatory program to identify and enforce required pumping limitation as necessary to arrest persistent groundwater level declines in specific areas. The amount of mandatory pumping limitations is uncertain, and will depend on the effectiveness and timeliness of voluntary actions by pumpers to limit pumping as well as the extent of the specific areas identified for mandatory limitations. The water budget presented in Chapter 6 suggests that a reduction in total pumping across the Subbasin of approximately 18%[2] will be needed to reduce pumping to the sustainable yield. Larger pumping reductions will likely be necessary in specific areas to arrest groundwater level declines. The actual pumping limitations mandated by the GSAs will be determined after assessing groundwater level trend and pumping data, and identifying specific areas for pumping limitations. After GSP adoption, developing the program would likely require the following steps:

1. Establishing a methodology for determining baseline pumping in specific areas considering:
    a. Groundwater level trends in areas of decline and estimated yield in that area
    b. Land uses and corresponding irrigation requirements
2. Establishing a methodology to determine whose use must be limited and by how much considering, though not limited to, water rights and evaluation of anticipated benefits from projects bringing in supplemental water or other relevant actions individual pumpers take.
3. A timeline for limitations on pumping (“ramp down”) in specific areas as required to avoid undesirable results
4. Approving a formal regulation to enact the program

Determination of baseline pumping in specific areas will need to be established and 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, may be helpful. Baseline pumping would be ramped down to meet water use targets in specific areas until it is projected that levels will stabilize. Analyses will be updated periodically as new data are developed. The ramp down schedule would be developed during program development; the rate of ramp down would depend on when the program starts and projections of how long lower pumping rates are required in specific areas in order to avoid undesirable results. The specific ramp down amounts and timing would be reassessed periodically by the GSAs as needed to achieve sustainability. These adjustments would occur when additional data and analyses are available.

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[2] (Pumping – Sustainable Yield)/Pumping = 18%

9.4.1.1 Relevant Measurable Objectives

Mandatory limitations to groundwater pumping in specific areas would benefit the groundwater elevation, groundwater storage, and land subsidence measurable objectives in those areas.

9.4.1.2 Expected Benefits and Evaluation of Benefits

The primary benefit from the mandatory pumping limitations is mitigating the decline through reduced overall pumping. An ancillary benefit from stable or increasing groundwater elevations may include avoiding pumping induced subsidence. The program is designed to ramp down overall pumping to the sustainable yield; therefore, the quantifiable benefit is to maintain pumping within the sustainable yield.

Limitations on groundwater pumping will be measured directly through the metering and reporting program and recorded in the DMS. Changes in groundwater elevation are an important metric for the mandatory pumping limitation program and will be measured with the groundwater level monitoring program. Subsidence will be measured with the InSAR network. Changes in groundwater storage will be estimated using the groundwater level proxy. Information about the monitoring programs is provided in Chapter 7. Isolating the effect of the mandatory pumping limitation program on sustainability metrics will be challenging because it will be only one of several management actions that may be implemented concurrently in the Subbasin. However, as the pumping ramp down is initiated, the correlation between reduced pumping and higher groundwater levels may become more apparent.

9.4.1.3 Circumstances for Implementation

Because there are areas where groundwater levels are persistently declining, the mandatory pumping limitation program will be implemented after the GSAs adopt the regulation governing the program.

9.4.1.4 Public Noticing

Public meetings will be held to inform groundwater pumpers and other stakeholders that the mandatory pumping limitation program is being developed. The mandatory pumping limitation program will be developed in an open and transparent process. Landowners, groundwater pumpers and other stakeholders will have the opportunity at these meetings to provide input and comments on the process and the program elements.

9.4.1.5 Permitting and Regulatory Process

The mandatory pumping limitation program is subject to CEQA. The mandatory pumping limitation program would be developed in accordance with all applicable groundwater laws and respect all groundwater rights.

9.4.1.6 Implementation Schedule

Developing the mandatory pumping limitation program and adopting the regulation would likely take up to five years. Once the regulation is adopted, the program will be implemented.

9.4.1.7 Legal Authority

California Water Code §10726.4 (a)(2) provides GSAs the authorities to control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate.

9.4.1.8 Estimated Cost

The cost to develop and implement the mandatory pumping limitation program is estimated to be $350,000. This does not include the cost of the CEQA permitting or any ongoing program oversight.

9.5 Projects

Projects involve new or improved infrastructure to make new water supplies available to the Subbasin. Several potential projects are described in this GSP that may be implemented by willing entities to offset pumping and lessen the degree to which the management actions would be needed. The implementation of projects depends on willing participants and/or successful funding votes.

There are six potential sources of water for projects:

1. Tertiary treated wastewater supplied and sold by City of Paso Robles and the San Miguel CSD to private groundwater extractors to use in lieu of groundwater. This water is commonly referred to as recycled water (RW).
2. State Water Project (SWP) water
3. Nacimiento Water Project (NWP) water
4. Salinas Dam/Santa Margarita Reservoir water
5. Local recycled water

6. Flood flows/stormwater from local rivers and streams

These six water sources are described in more detail in Appendix I. Of these six sources, only RW, SWP, NWP, and Salinas Dam currently have sufficiently reliable volumes of unused water to justify the expense of new infrastructure to be used on a regular basis for supplementing water supplies in the Subbasin. Since there are uncertainties associated with securing agreements to utilize SWP and related infrastructure, descriptions of concept projects associated with the use of this water supply are included in Appendix L. Capturing flood flows/stormwater from streams in permitted projects will be pursued, but because they provide an unknown volume of new supplies on an intermittent basis, the use of Salinas Dam to capture flood flows/stormwater is the only concept project included. In summary, the initial focus of new supply is on developing RW, NWP, and Salinas Dam projects in the Subbasin.

9.5.1 General Project Provisions

Many of the priority projects listed below are subject to similar requirements. These general provisions that are applicable to all projects include certain permitting and regulatory requirements, public notice requirements, and the legal authority to initiate and complete the projects. This section assumes the development of projects are led by one or more GSAs in order to complete the sections below that are required by SGMA regulations §354.44.

9.5.1.1 Summary of Permitting and Regulatory Processes

Projects of this magnitude will require an environmental review process via CEQA. Projects will require either an Environmental Impact Report, and Negative Declaration, or a Mitigated Negative Declaration.

There will be a number of local, county and state permits, right of ways, and easements required depending on pipeline alignments, stream crossings, and project type.

Projects must adhere to the Salt/Nutrient Management Plan for the Paso Robles Groundwater Basin (RMC 2015).

9.5.1.2 Public Noticing

All projects are subject to the public noticing requirements per CEQA.

9.5.1.3 Legal Authority Required for Projects and Basis for That Authority within the Agency

California Water Code §10726.2 provides GSAs the authority to purchase, among other things, land, water rights, and privileges. Additionally, an assessment of the legal rights to acquire and use various water sources is included in Appendix I.

9.5.2 Conceptual Projects

Six projects are included in this GSP as conceptual projects and have been identified after extensive public meetings and studies over the last decade and are currently being developed. All six specific design scenarios for the projects will not necessarily be implemented, but they represent six reasonable scenarios that could help achieve sustainability throughout the Subbasin. Conceptual projects were developed throughout different regions in the basin to address localized declines in groundwater elevations. Projects were sized based on the locations of available supplies and pumping demands in different areas of the Paso Robles Basin. Actual projects will be highly dependent on the ability of the GSAs and/or individual entities to negotiate with water suppliers and purchase the surface waters described in Appendix I and with landowners. Four other conceptual projects that are not being developed currently are included in Appendix L for future consideration.

Table 9-1. Conceptual Projects

Project Name	Water Supply	Project Type	Approximate Location	Average Volume (AFY)
City Recycled Water Delivery	RW	Direct Delivery	Near City of Paso Robles	2,200
San Miguel Recycled Water Delivery	RW	Direct Delivery	Near San Miguel	200 [a]
NWP Delivery at Salinas and Estrella River Confluence	NWP	Direct Delivery	Near the confluence of the Salinas and Estrella Rivers	2,800
NWP Delivery North of City of Paso Robles	NWP	Direct Delivery	North of Huer Huero Creek, due west of the airport	1,000
NWP Delivery East of City of Paso Robles	NWP	Direct Delivery	East of the City of Paso Robles	2,000
Expansion of Salinas Dam	Salinas River	River Recharge	Along the Salinas River	1,000

Notes: (a) Average volume amounts may be updated in final GSA based on more recent information
(b) Approximate locations are assumed to establish the benefit calculations required by SGMA

Short descriptions of each concept project are included below, along with a map showing general project locations. Sections required by SGMA regulations §354.44 follow the description of each project. Generalized costs are also included for planning purposes. Components of these projects including facility locations, pipeline routes, recharge mechanisms, and other details may change in future analyses. Therefore, each of the projects listed below should be treated as a generalized project that represents a number of potential detailed projects.

9.5.2.1 Assumptions Used in Developing Projects

Assumptions that were used to develop projects and cost estimates are provided in Appendix J. Assumptions and issues for each project need to be carefully reviewed and revised during the pre-design phase of each project. Project designs, and therefore costs, could change considerably as more information is gathered.

The cost estimates included below are class 5, order of magnitude estimates. These estimates were made with little to no detailed engineering data. The expected accuracy range for such an estimate is within +50 percent or –30 percent. The cost estimates are based on the engineering assessment of current conditions at the project location. They reflect a professional opinion of costs at this time and are subject to change as project designs mature.

Capital costs include major infrastructure including pipelines, pump stations, customer connections, turnouts and storage tanks. Capital costs also include 30% contingency for plumbing appurtenances, 15% increase for general conditions, 15% for contractor overhead and profit, and 8% for sales tax. Engineering, legal, administrative, and project contingencies was assumed as 30% of the total construction cost and included within the capital cost. Land acquisition at $30,000/acre was also included within capital costs.

Annual operations and maintenance (O&M) fees include the costs to operate and maintain new project infrastructure. O&M costs also include any pumping costs associated with new infrastructure. O&M costs do not include O&M or pumping costs associated with existing infrastructure, such as existing NWP O&M costs because these are assumed to be part of water purchase costs. Water purchase costs were assumed to include repayment of loans for existing infrastructure; however, these purchase costs will need to be negotiated. The terms of such a negotiation could vary widely.

Capital costs were annualized over thirty years and added with annual O&M costs and water purchase costs to determine an annualized dollar per acre-foot ($/AF) cost for each project. This $/AF value might not always represent the $/AF of basin benefit ($/AF-benefit).

9.5.2.2 Preferred Project 1: City Recycled Water Delivery

This project will use up to 2,200 AFY of disinfected tertiary effluent for in-lieu recharge in the central portion of the basin near and inside the City of Paso Robles. Water that is not used for recycled water purposes will be discharged to Huer Huero Creek with the potential for additional recharge benefits. The general layout of this project and relevant monitoring wells are shown on Figure 9-2. Infrastructure includes upgraded wastewater treatment plant and pump station, 5.8 miles of pipeline, a storage tank, numerous turnouts, and a discharge to Huer Huero Creek. Additional length of pipeline will also be constructed as part of this project – a private pipeline to the north of the main line which will deliver recycled water to a larger geographical area. The private pipeline is not shown on Figure 9-2 and is not included in the cost estimate. The cost to upgrade the wastewater treatment plant is also not included in the cost estimate, since the upgrades were required per the NPDES permit regardless of use for recycled water. Since this project is already in the predesign phase, the predesign project cost estimate is provided for this GSP.

9.5.2.2.1 Relevant Measurable Objectives

The measurable objectives benefiting from this groundwater project include:

- Groundwater elevation measurable objectives in the central portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the central portion of the Subbasin

9.5.2.2.2 Expected Benefits and Evaluation of Benefits

The primary benefit from the Paso Robles RW project is higher groundwater elevations in the Central portion of the Subbasin due to in-lieu recharge from the direct use of the RW and recharge through Huer Huero Creek. Ancillary benefits of shallower groundwater elevations may include an increase in groundwater storage, improved groundwater quality from recharge of high-quality water, and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project. Figure 9-3 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-3 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-3 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

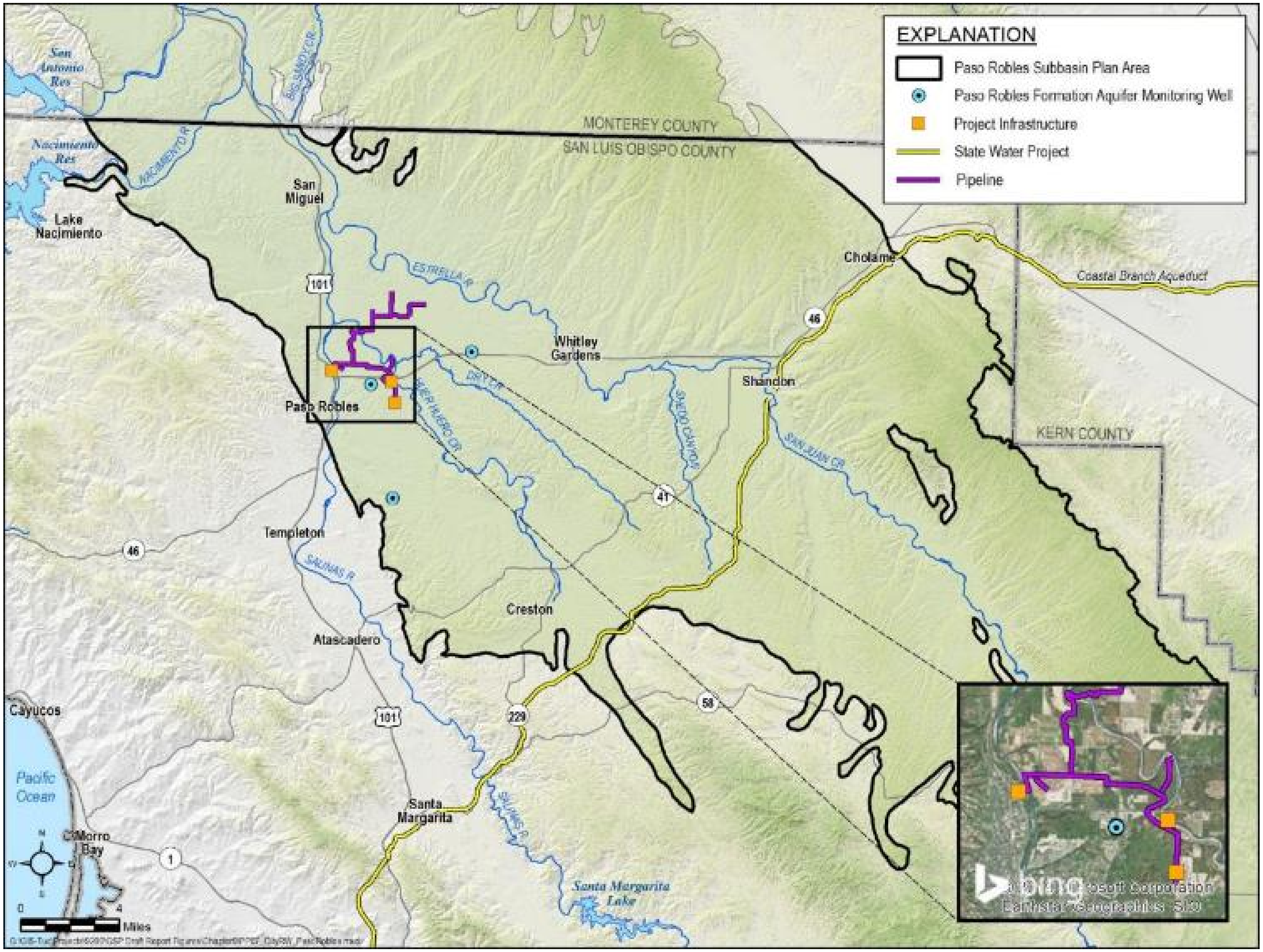

Figure 9-2. Paso Robles RW Project Layout

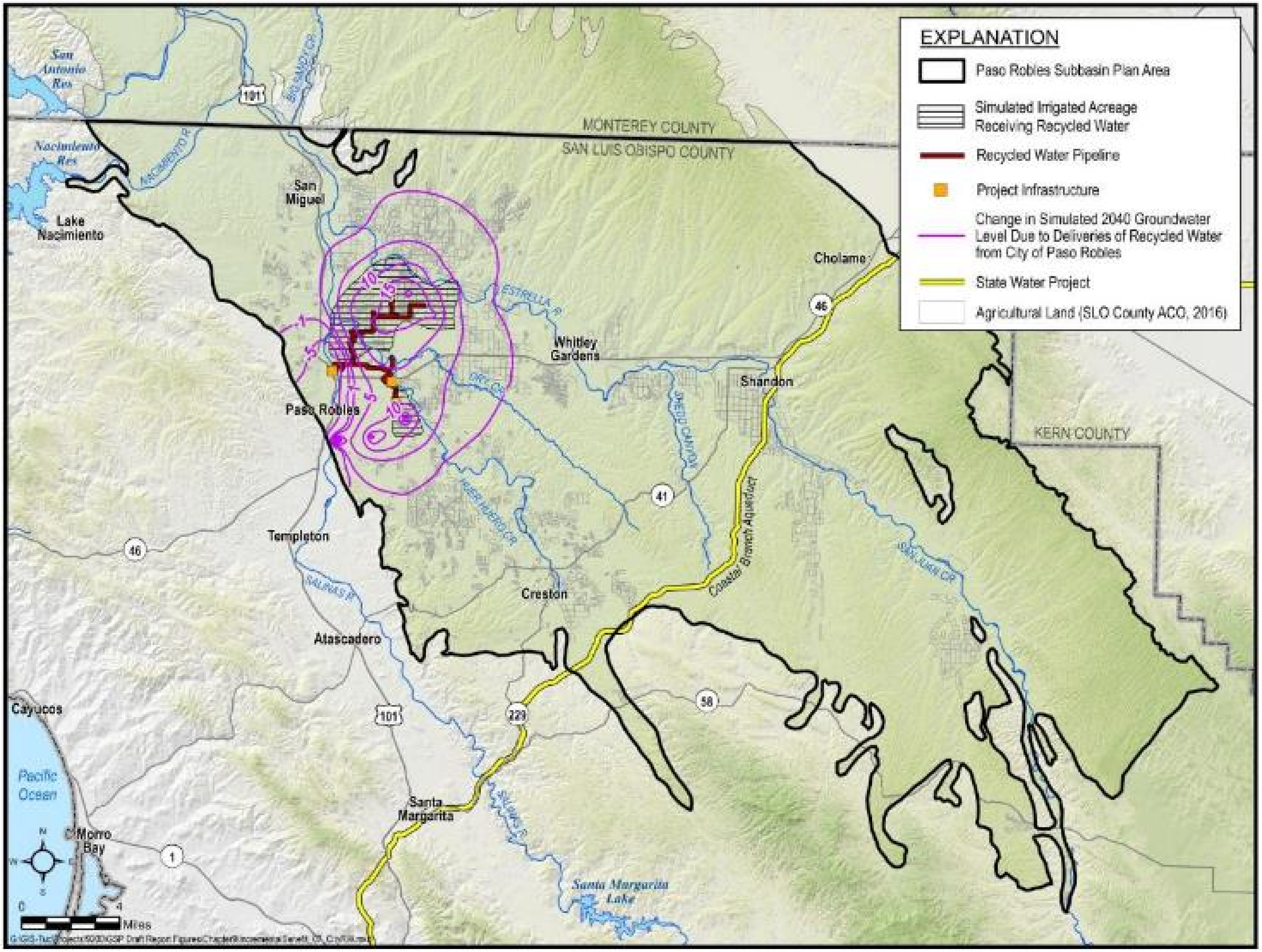

Figure 9-3. Groundwater Level Benefit of Paso Robles RW Project in Central Subbasin

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured with the InSAR network detailed in Chapter 7. A direct correlation between the Paso Robles RW project and changes in groundwater levels may not be possible because this is only one among many management actions and projects that might be implemented in the Subbasin.

9.5.2.2.3 Circumstances for Implementation

This project is already being implemented by the City of Paso Robles. The monitoring wells 26S/12E-26E07, 26S/13E-16N01, and 27S/12E-13N01 will likely be positively impacted by this project.

9.5.2.2.4 Implementation Schedule

The project is underway. The phase design is expected to be complete by 2019 and construction complete by 2021. The implementation schedule is presented on Figure 9-4.

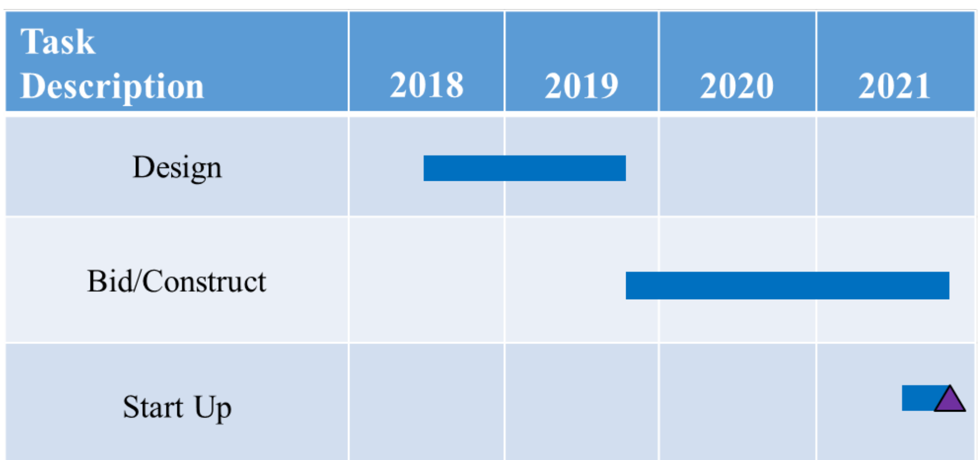

Figure 9-4. Implementation Schedule for Paso Robles RW in Central Subbasin

9.5.2.2.5 Estimated Cost

The estimated total project cost for this project is $22M. The cost and financing for the project is being determined by the City of Paso Robles. Annual O&M costs are not provided in this GSP. The cost ($/AF) of this water will be set by the City of Paso Robles and is not included in this GSP.

9.5.2.3 Preferred Project 2: San Miguel CSD Recycled Water Delivery

The San Miguel RW project is currently in the planning phases; therefore, the project concepts presented herein are preliminary.

This project is a planned project that involves the upgrade of San Miguel Community Services District (CSD) wastewater treatment plant to meet California Code of Regulations (CCR) Title 22 criteria for disinfected secondary recycled water for irrigation use by vineyards. Potential customers include one on the east side of the Salinas River, and a group of customers northwest of the wastewater treatment plant. The project might include the utilization of process discharge from a nearby processing facility for additional water recycling. The project could provide between 200 and 450 AFY of additional water supplies. The general layout of this project and relevant monitoring wells are shown on Figure 9-5. The infrastructure shown here includes a treatment plant upgrade, and two pipelines delivering water to customers. The actual project size and infrastructure will be determined based on project feasibility and negotiations with suppliers and customers. For more information on technical assumptions and cost assumptions, refer to Appendix J.

9.5.2.3.1 Relevant Measurable Objectives

The measurable objectives benefiting from this groundwater project include:

- Groundwater elevation measurable objectives in the northern portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the northern portion of the Subbasin

9.5.2.3.2 Expected Benefits and Evaluation of Benefits

The primary benefit from RW use for irrigation is higher groundwater elevations in the northern portion of the Subbasin due to in-lieu recharge from the direct use of the RW. Ancillary benefits may include an increase in groundwater storage and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project. Figure 9-6 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-6 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-6 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

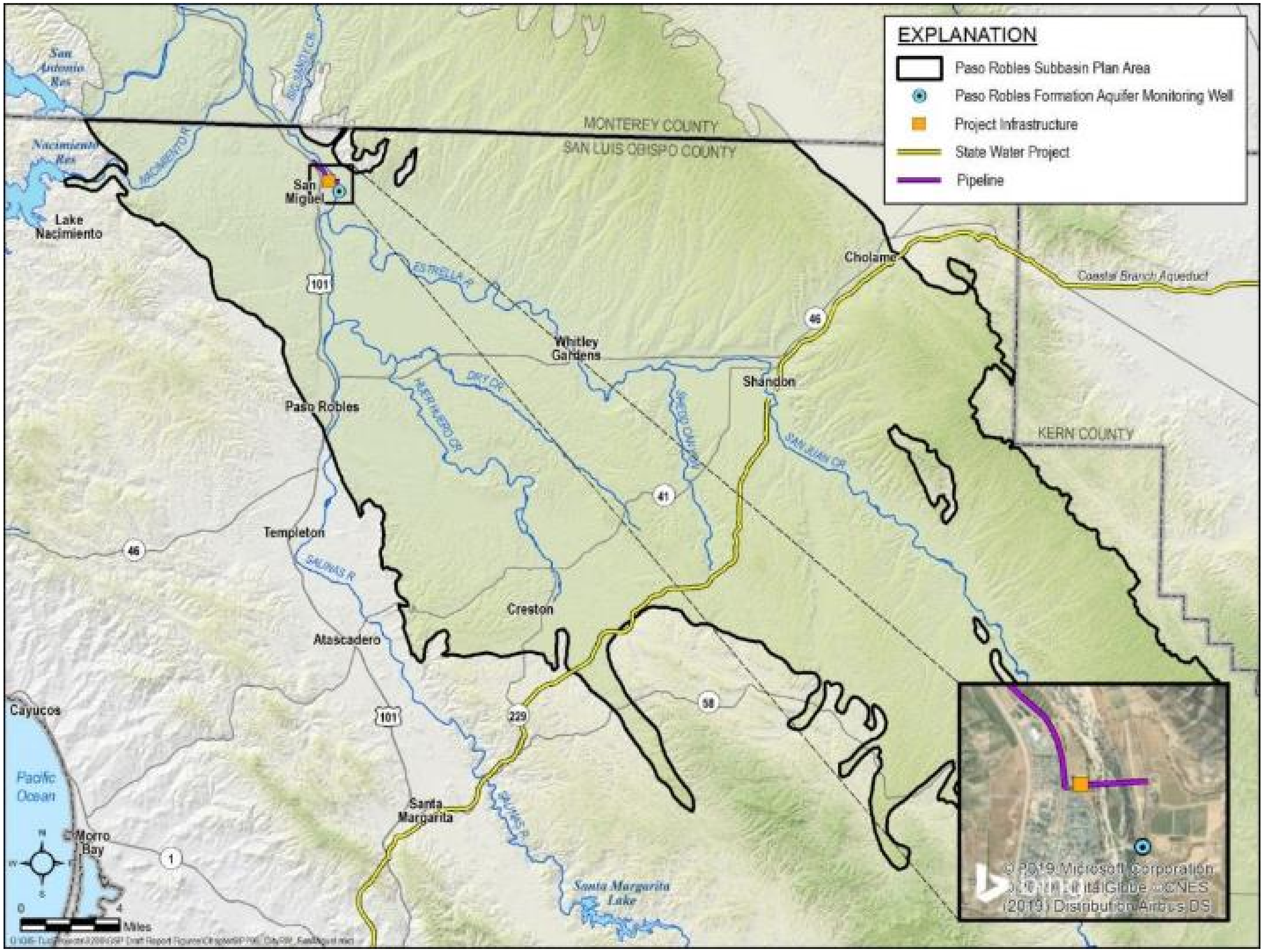

Figure 9-5. Conceptual San Miguel CSD RW Project Layout

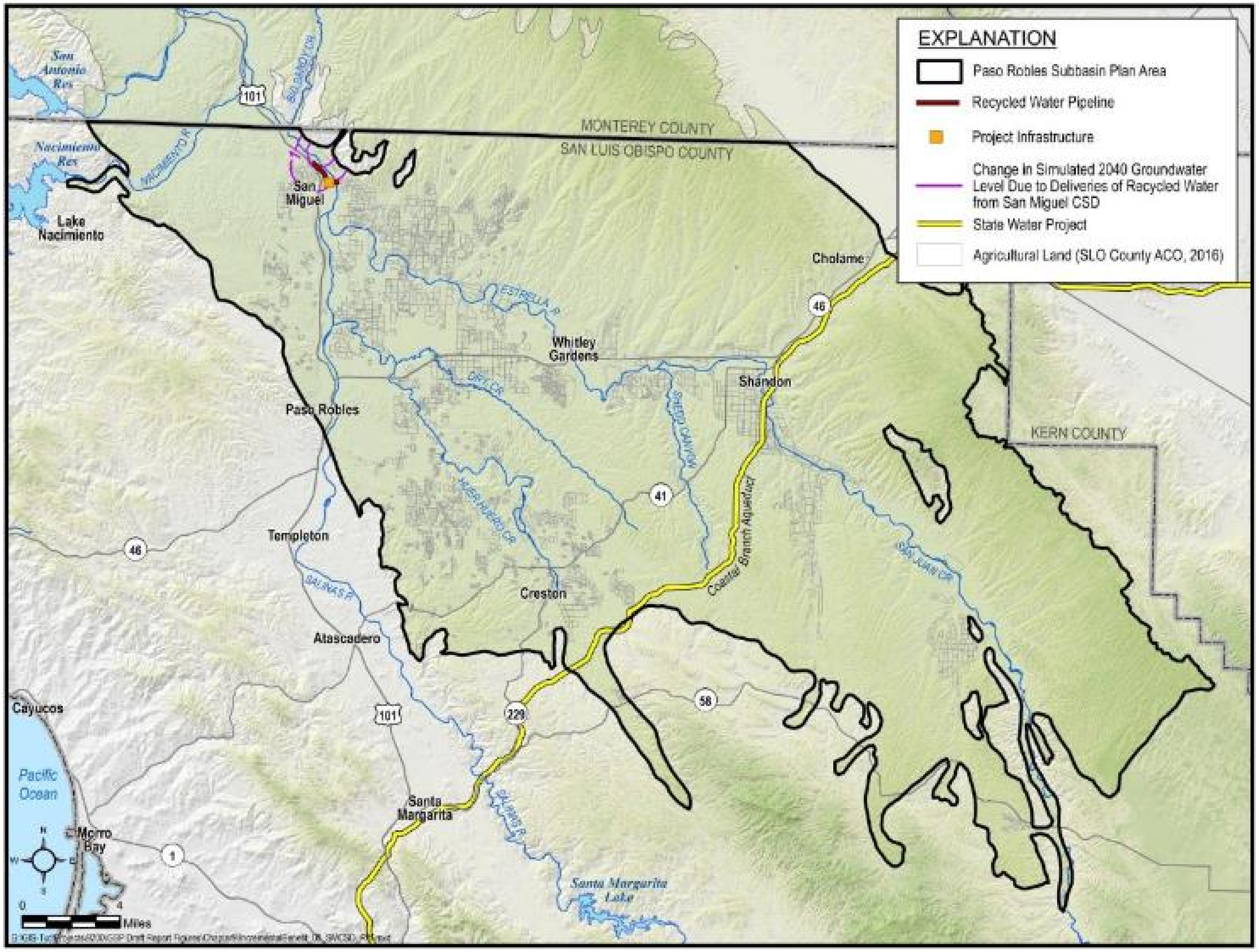

Figure 9-6. Groundwater Level Benefit of San Miguel CSD RW Project

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured with the InSAR network detailed in Chapter 7. A direct correlation between the San Miguel CSD RW Project and changes in groundwater levels may not be possible because this is only one among many management actions and projects that might be implemented in the Subbasin.

9.5.2.3.3 Circumstances for Implementation

Most projects are implemented on an as-needed basis. The primary approach to attaining sustainability relies on pumping reductions in response to management actions. If pumping reductions are inadequate for achieving sustainability, funds raised by a water charge framework will be used to initiate projects throughout the Subbasin. The San Miguel CSD RW Project will be initiated if, after five years, groundwater levels in the northern portion of the monitoring network continue to decline at unsustainable rates. In particular, continued unsustainable groundwater level declines in monitoring well 25S/12E-16K05 will trigger implementation of this project. Additional triggers will be added as the monitoring well network expands.

This project is a planned project being undertaken by San Miguel CSD and may be implemented regardless of the triggered implementation scheme presented herein.

9.5.2.3.4 Implementation Schedule

The implementation schedule is presented on Figure 9-7. The project will take 4 to 6 years to implement. The actual project start date is to be determined on an as-needed basis or by San Miguel CSD.

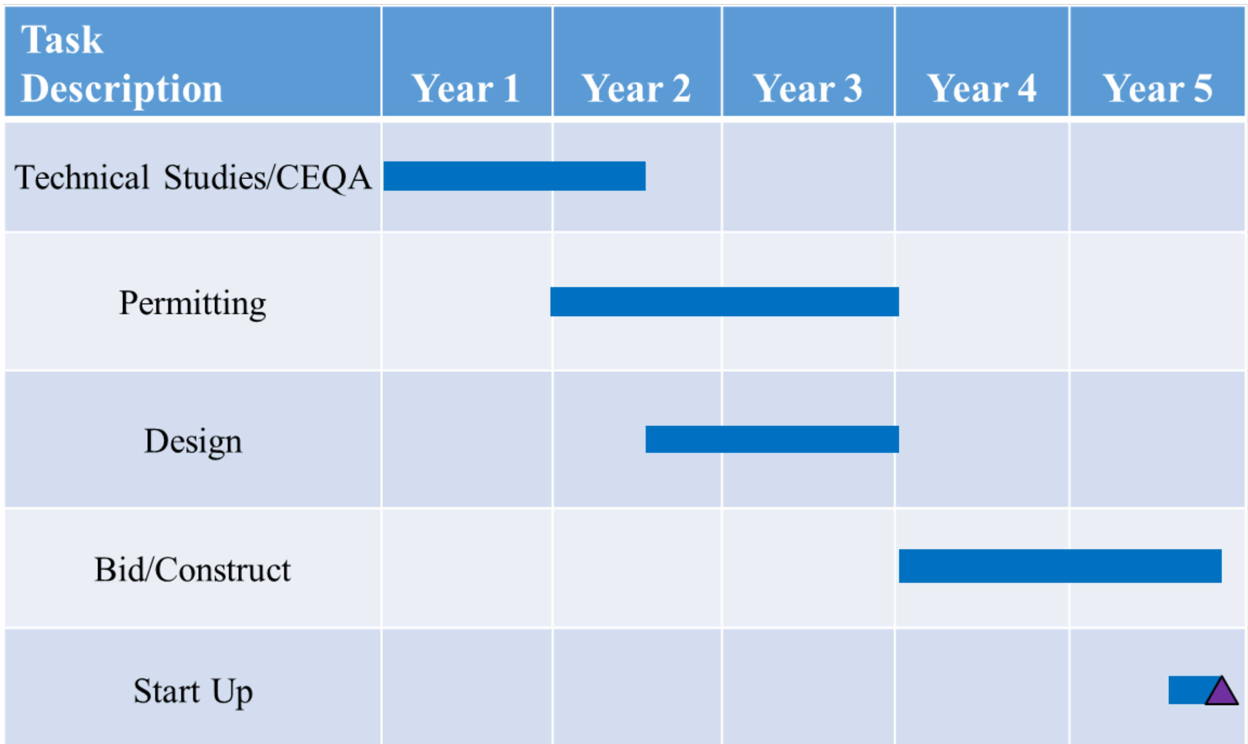

Figure 9-7. Implementation Schedule for San Miguel RW

9.5.2.3.5 *Estimated Cost*

This project is currently in the planning phases, and the San Miguel RW project presented herein might not accurately reflect the most current design concept. The cost of the potential project that is described herein was estimated for the purposes of the GSP. The estimated total project cost for this project is $15M, not including wastewater treatment plant upgrades. Cost can be covered by the bonding capacity developed through the groundwater conservation program. Annual O&M costs are estimated at $340,000. O&M costs would be covered by the overproduction surcharges. Based on a 30-year loan at a 5% interest rate, the cost of water for this project would be approximately $2,900/AF. Additional details regarding how costs were developed are included in Appendix J.

9.5.2.4 Preferred Project 3: NWP Delivery at Salinas and Estrella River Confluence

This project directly delivers up to 3,500 AFY of NWP water to agricultural water users near the confluence of the Salinas and Estrella Rivers, and an area north of the Estrella River. On average, this project will provide 2,800 AFY of water for use in lieu of groundwater pumping in the region.

The general layout of this project and relevant monitoring wells are shown on Figure 9-8. Infrastructure includes a new NWP turnout, 13 miles of pipeline, a 700 horsepower (hp) pump station, and two river crossings: one crossing of the Salinas River and one crossing of the Estrella River. For more information on technical assumptions and cost assumptions, refer to Appendix J.

9.5.2.4.1 Relevant Measurable Objectives

The measurable objectives benefiting from this project include:

- Groundwater elevation measurable objectives in the central portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the central portion of the Subbasin

9.5.2.4.2 Expected Benefits and Evaluation of Benefits

The primary benefit from in-lieu recharge using NWP water is higher groundwater elevations in the central portion of the Subbasin. Ancillary benefits of shallower groundwater elevations may include an increase in groundwater storage and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project. Figure 9-9 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-9 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-9 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

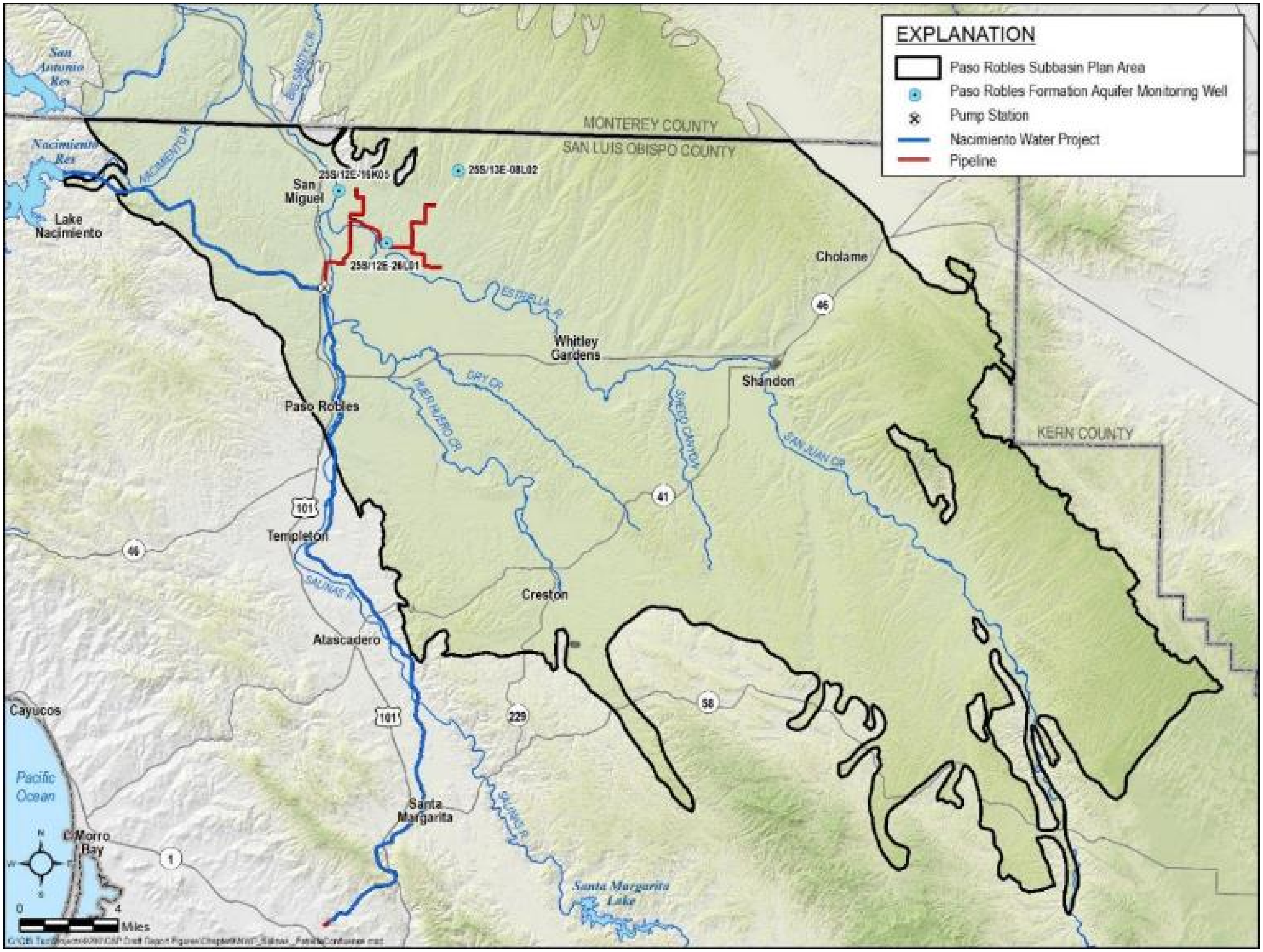

Figure 9-8. Conceptual NWP Delivery at Salinas and Estrella River Confluence Project Layout

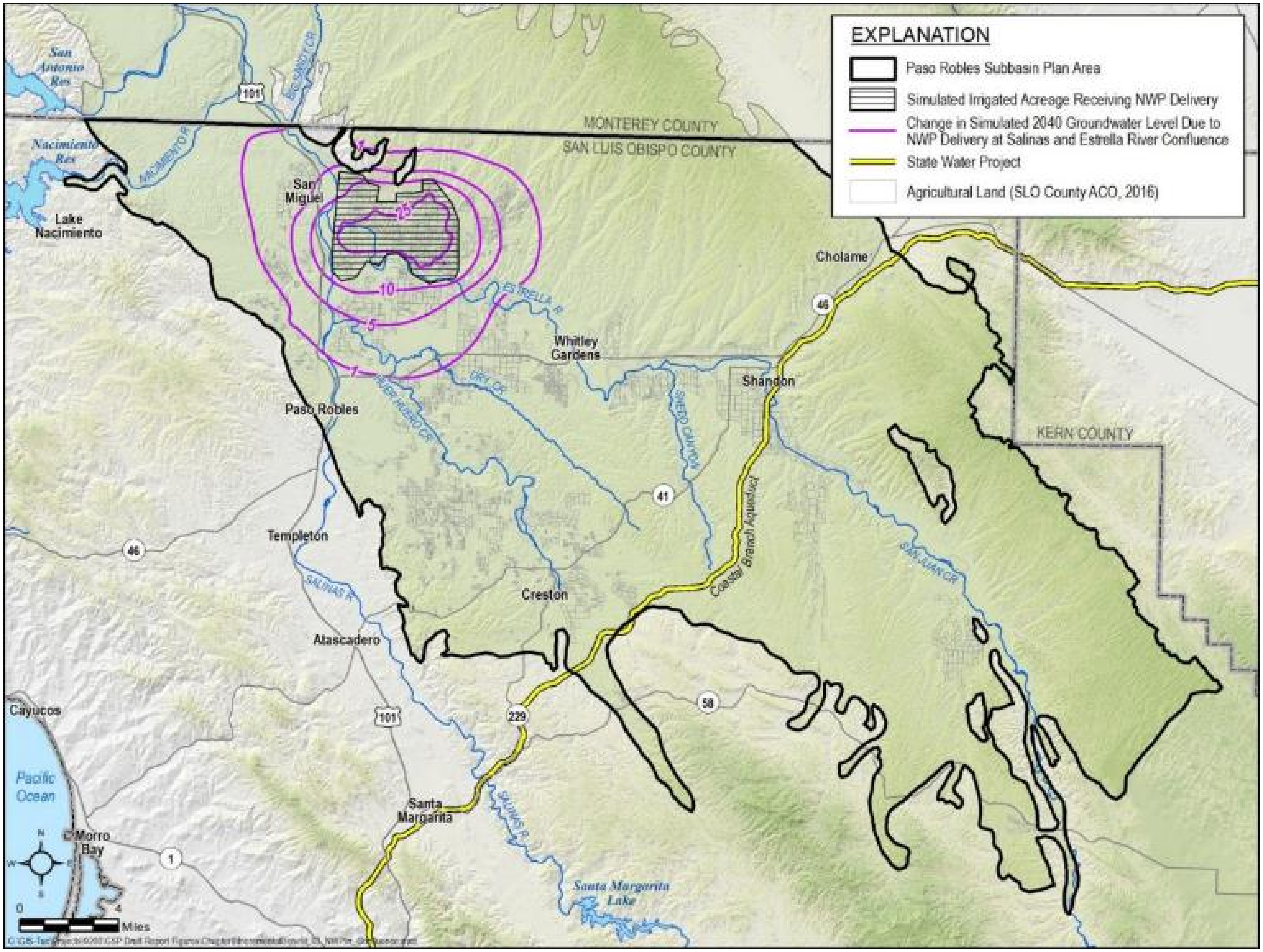

Figure 9-9. Groundwater Level Benefit of NWP Delivery at Salinas and Estrella River Confluence

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured with the InSAR network detailed in Chapter 7. A direct correlation between in-lieu recharge and changes in groundwater levels may not be possible because this is only one among many management actions and projects that may be implemented in the Subbasin.

9.5.2.4.3 Circumstances for Implementation

All projects are implemented on an as-needed basis. The primary approach to attaining sustainability relies on pumping limitations in response to the water charges framework. If pumping limitations are inadequate for achieving sustainability, the funds raised by the water charge framework will be used to initiate projects throughout the Subbasin. The project to deliver water for in-lieu recharge near the Salinas and Estrella confluence will be initiated if, after five years, groundwater levels in the northern portion of the monitoring network continue to decline at unsustainable rates. In particular, continued unsustainable groundwater level declines in monitoring wells 25S/12E-16K05, 25S/12E-26L01, and 25S/13E-08L02 will trigger implementation of this project. Additional triggers will be added as the monitoring well network expands.

9.5.2.4.4 Implementation Schedule

The implementation schedule is presented on Figure 9-10. The project will take 4 to 6 years to implement depending on the time required to negotiate procurement of NWP water.

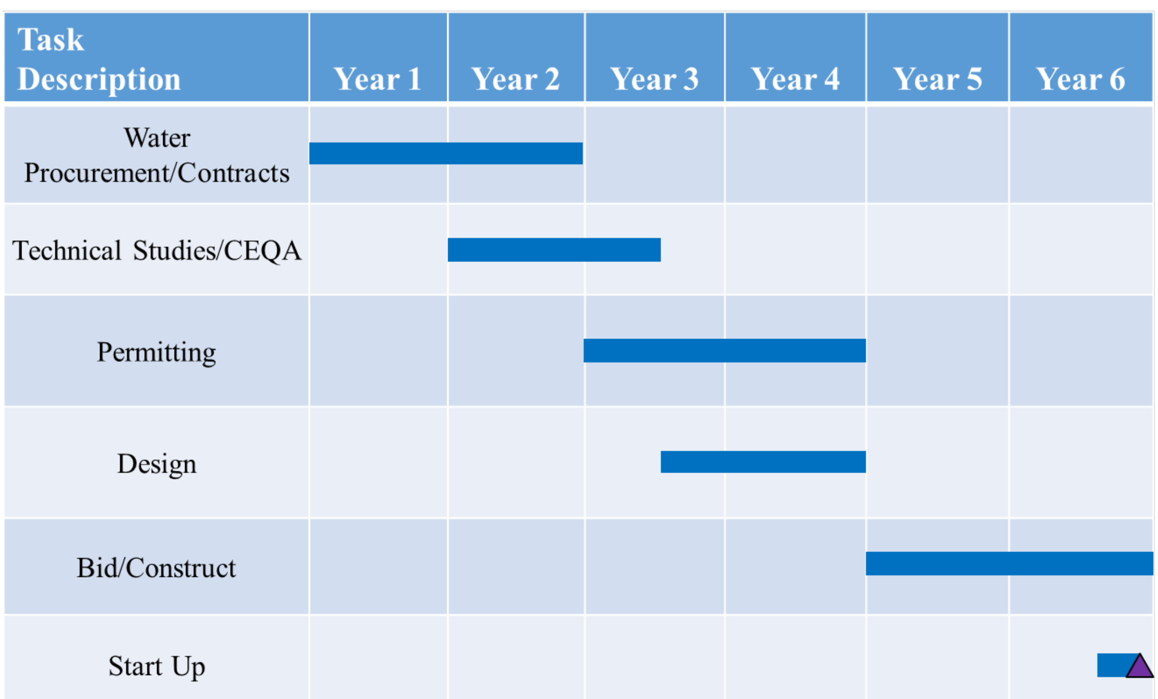

Figure 9-8. Implementation Schedule for NWP Delivery at Salinas and Estrella River Confluence

9.5.2.4.5 Estimated Cost

The estimated total project cost for this project is $50M. The project cost will be covered by the bonding capacity developed through the water charges framework. Annual O&M costs are estimated at $740,000. The average annual cost of NWP purchased water is estimated at $2.4M based on an average year delivery of 2,800 AFY. However, the unit price would need to be negotiated, and the actual amount of water available will vary year to year thereby affecting the actual annual purchase cost. O&M and water purchase costs would be covered by the overproduction surcharges. Based on a 30-year loan at a 5% interest rate, the cost of water for this project would be approximately $3,200/AF. Additional details regarding how costs were developed are included in Appendix J.

9.5.2.5 Preferred Project 4: NWP Delivery North of City of Paso Robles

This project provides up to 1,250 AFY of NWP water for direct delivery to agricultural water users north of the Paso Robles airport. On average, this project will provide 1,000 AFY of water for use in lieu of groundwater pumping in the region.

The general layout of this project and relevant monitoring wells are shown on Figure 9-11. Infrastructure includes a new NWP turnout, 5.6 miles of pipeline, a 130 hp pump station, and one river crossing for the Salinas River. For more information on technical assumptions and cost assumptions, refer to Appendix J.

9.5.2.5.1 Relevant Measurable Objectives

The measurable objectives benefiting from this project include:

- Groundwater elevation measurable objectives in the central portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the central portion of the Subbasin

9.5.2.5.2 Expected Benefits and Evaluation of Benefits

The primary benefit from in-lieu recharge using NWP water is higher groundwater elevations in the central portion of the Subbasin. Ancillary benefits of shallower groundwater elevations may include an increase in groundwater storage and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project. Figure 9-12 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-12 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-12 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

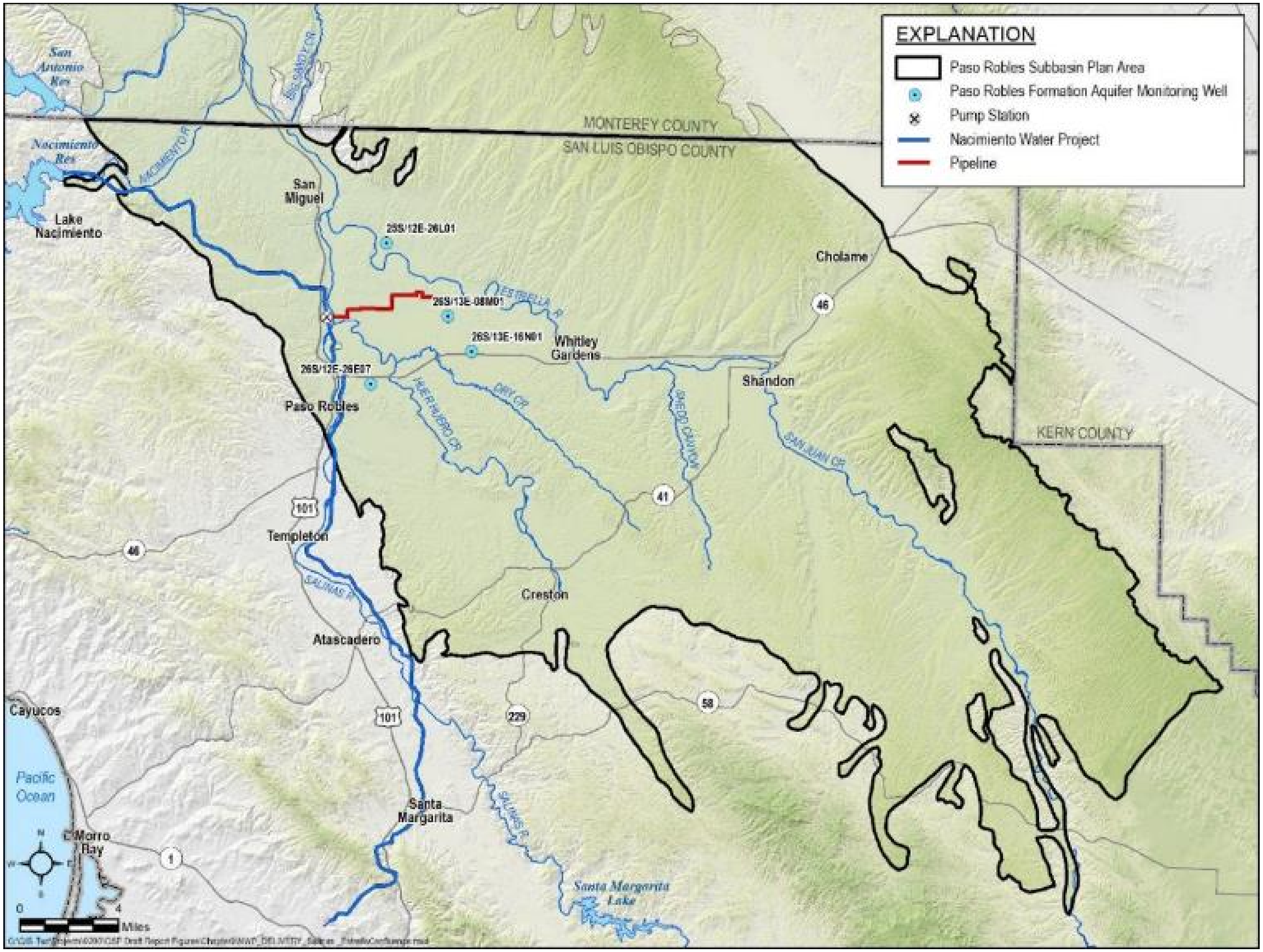

Figure 9-9. Conceptual NWP Delivery North of City of Paso Robles Project Layout

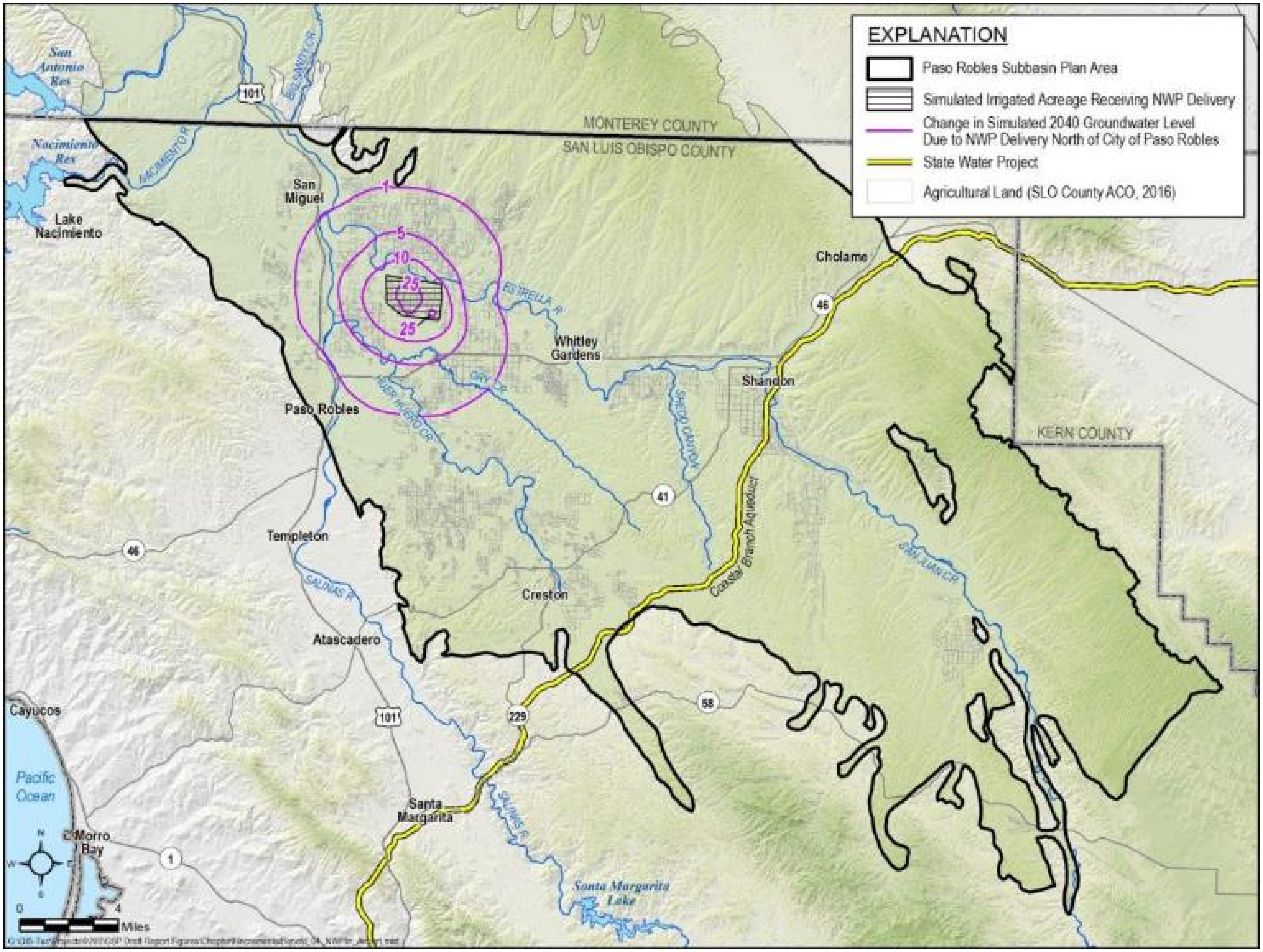

Figure 9-10. Groundwater Level Benefit from NWP Delivery North of City of Paso Robles

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured with the InSAR network detailed in Chapter 7. A direct correlation between in-lieu recharge and changes in groundwater levels may not be possible because this is only one among many management actions and projects that may be implemented in the Subbasin.

9.5.2.5.3 Circumstances for Implementation

All projects are implemented on an as-needed basis. The primary approach to attaining sustainability relies on pumping reductions in response to management actions. If pumping reductions are inadequate for achieving sustainability, funds raised by a water charge framework will be used to initiate projects throughout the Subbasin. The project to deliver water for in-lieu recharge north of the airport will be initiated if, after five years, groundwater levels in the northern portion of the monitoring network continue to decline at unsustainable rates. In particular, continued unsustainable groundwater level declines in monitoring wells 26S/13E-08M01, 26S/13E-16N01, 25S/12E-26L01, and 26S/12E-26E07 will trigger implementation of this project. Additional triggers will be added as the monitoring well network expands.

9.5.2.5.4 Implementation Schedule

The implementation schedule is presented on Figure 9-13. The project will take 4 to 6 years to implement depending on the time required to negotiate procurement of NWP water.

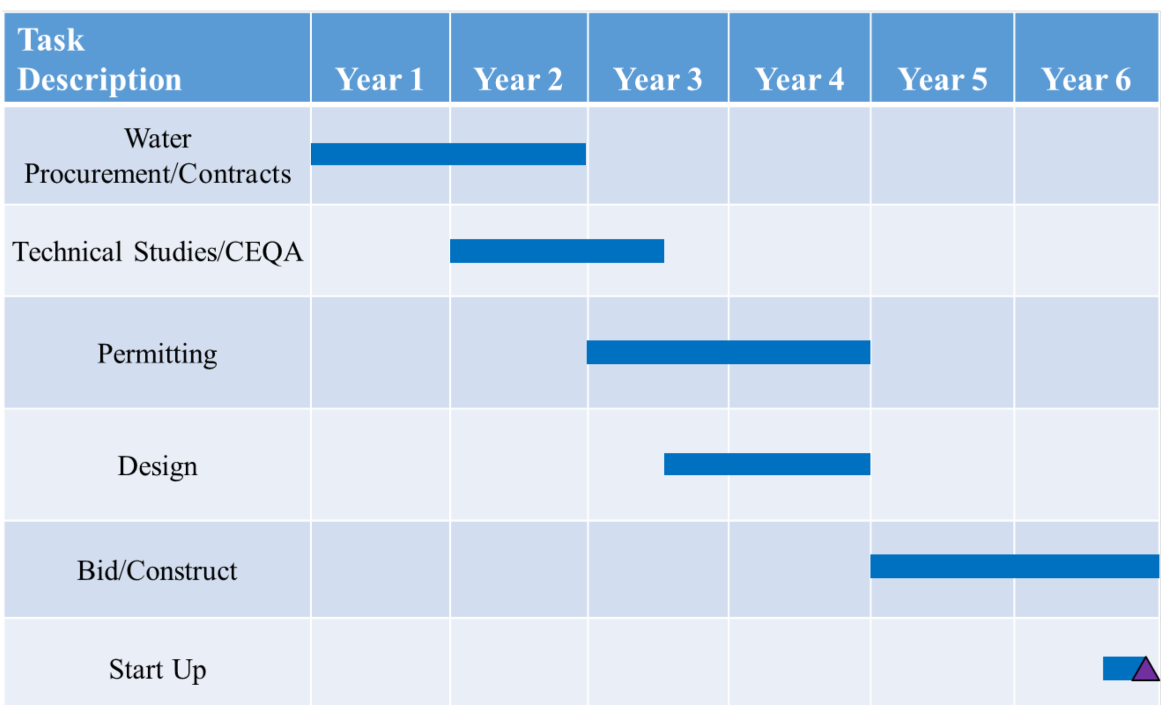

Figure 9-11. Implementation Schedule for NWP Delivery North of City of Paso Robles

9.5.2.5.5 Estimated Cost

The estimated total project cost for this project is $22M. The project cost will be covered by the bonding capacity developed through the water charges framework. Annual O&M costs are estimated at $150,000. The average annual cost of NWP purchased water is estimated at $1.2M based on an average year delivery of 1,000 AFY. However, the unit price would need to be negotiated, and the actual amount of water available will vary year to year thereby affecting the actual annual purchase cost. O&M and water purchase costs would be covered by the overproduction surcharges. Based on a 30-year loan at a 5% interest rate, the cost of water for this project would be approximately $2,800/AF. Additional details regarding how costs were developed are included in Appendix J.

9.5.2.6 Preferred Project 5: NWP Delivery East of City of Paso Robles

This project provides up to 2,500 AFY of NWP water to for direct delivery to agricultural water users east of the City of Paso Robles. On average, this project will provide 2,000 AFY of water for use in lieu of groundwater pumping in the region.

The general layout of this project and relevant monitoring wells are shown on Figure 9-14. Infrastructure includes a new NWP turnout, 5.6 miles of pipeline, a 130 hp pump station, and two river crossings one crossing of the Estrella River and one crossing of a tributary to the Estrella River. For more information on technical assumptions and cost assumptions, refer to Appendix J.

9.5.2.6.1 Relevant Measurable Objectives

The measurable objectives benefiting from this project include:

- Groundwater elevation measurable objectives in the central portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the central portion of the Subbasin

9.5.2.6.2 Expected Benefits and Evaluation of Benefits

The primary benefit from in-lieu recharge using NWP water is higher groundwater elevations in the central portion of the Subbasin. Ancillary benefits of shallower groundwater elevations may include an increase in groundwater storage and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project. Figure 9-15 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-15 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-15 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

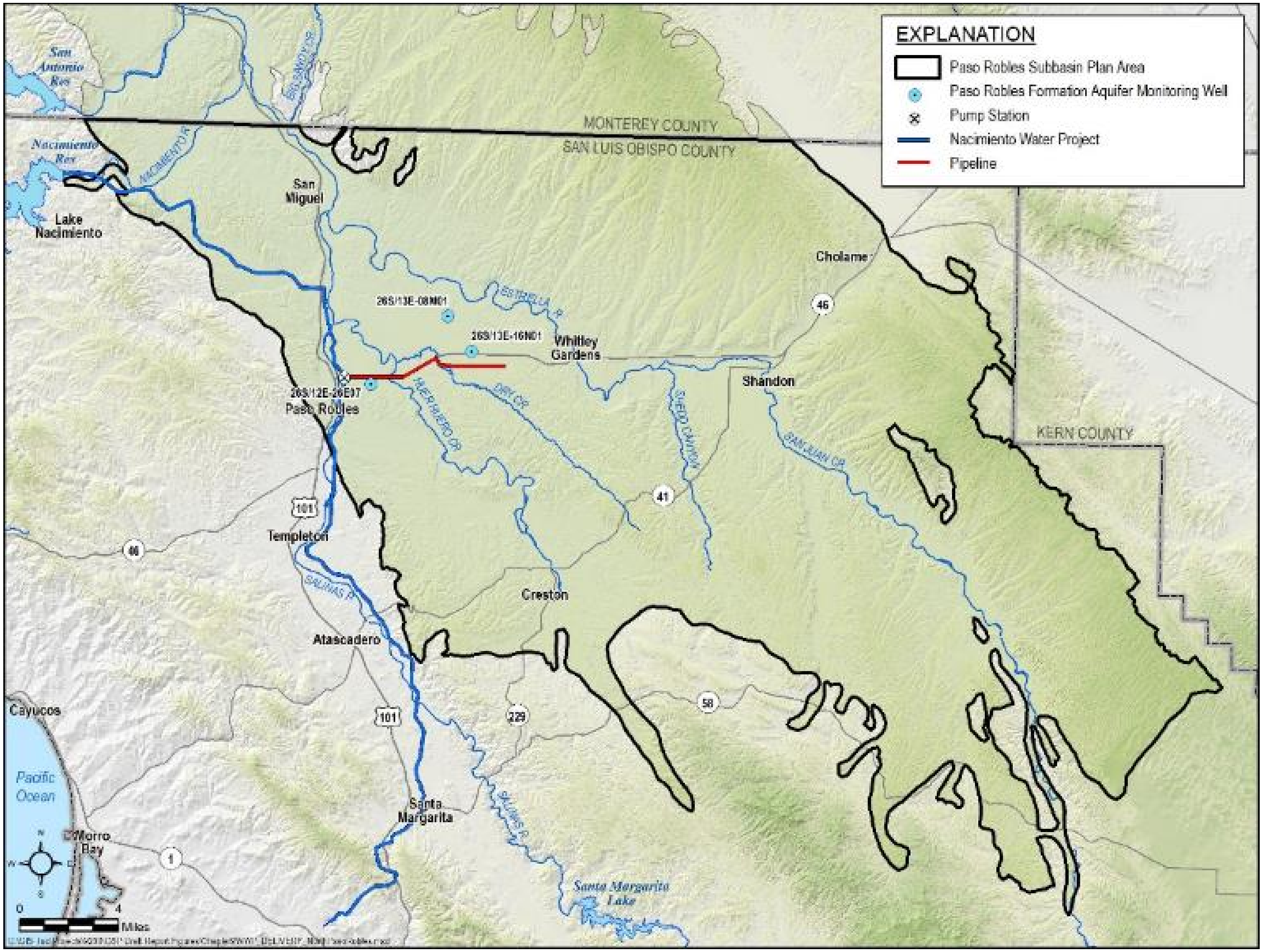

Figure 9-14. Conceptual NWP Delivery East of City of Paso Robles Project Layout

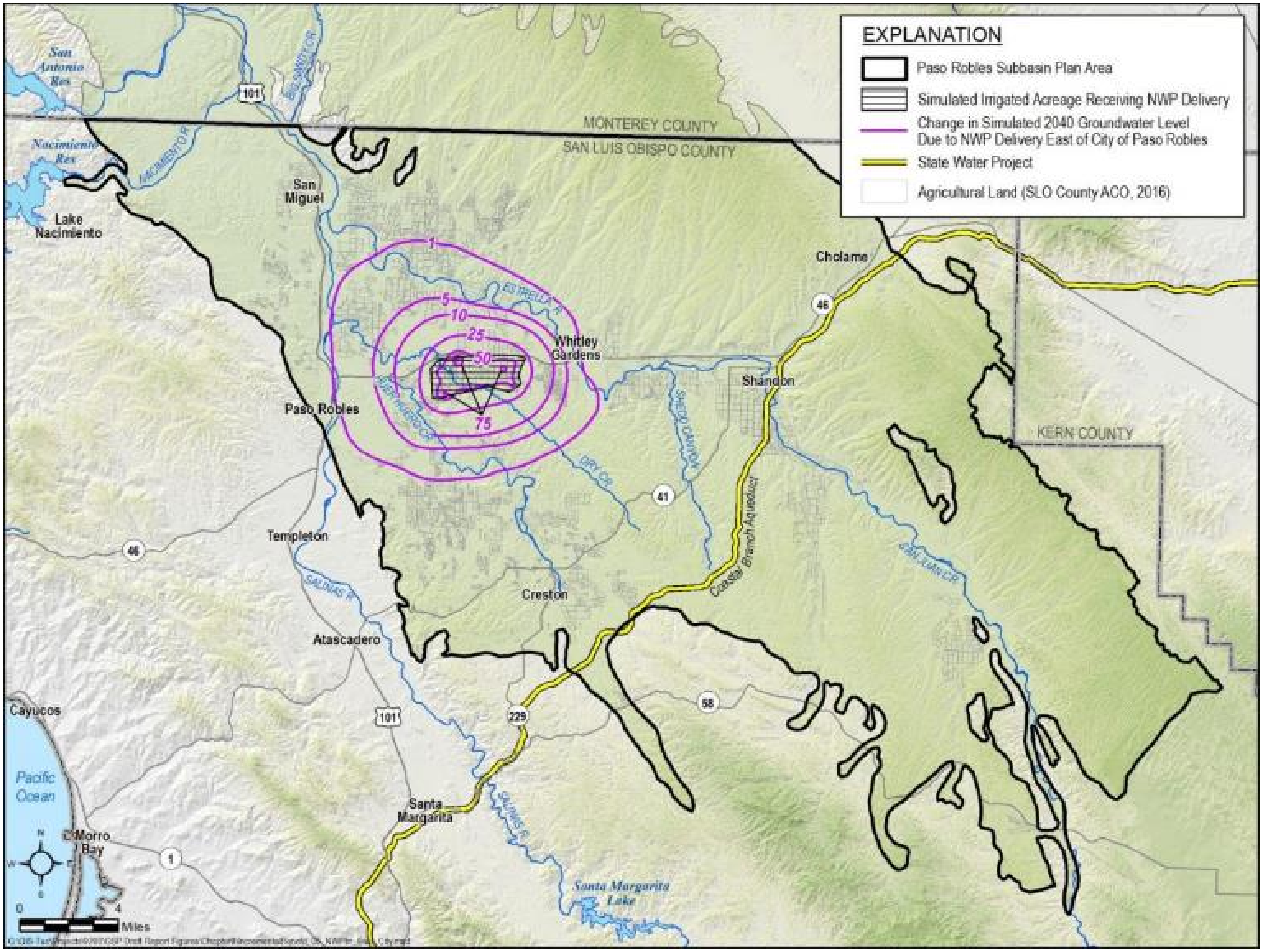

Figure 9-15. Groundwater Level Benefit from NWP Delivery East of City of Paso Robles

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured with the InSAR network detailed in Chapter 7. A direct correlation between in-lieu recharge and changes in groundwater levels may not be possible because this is only one among many management actions and projects that may be implemented in the Subbasin.

9.5.2.6.3 Circumstances for Implementation

All projects are implemented on an as-needed basis. The primary approach to attaining sustainability relies on pumping limitations in response to the water charges framework. If pumping limitations are inadequate for achieving sustainability, the funds raised by the water charge framework will be used to initiate projects throughout the Subbasin. The project to deliver water for in-lieu recharge east of the City of Paso Robles will be initiated if, after five years, groundwater levels in the central portion of the monitoring network continue to decline at unsustainable rates. In particular, continued unsustainable groundwater level declines in monitoring wells 26S/13E-16N01, 26S/13E-08M01 and 26S/12E-26E07 will trigger implementation of this project. Additional triggers will be added as the monitoring well network expands.

9.5.2.6.4 Implementation Schedule

The implementation schedule is presented on Figure 9-16. The project will take 4 to 6 years to implement depending on the time required to negotiate procurement of NWP water.

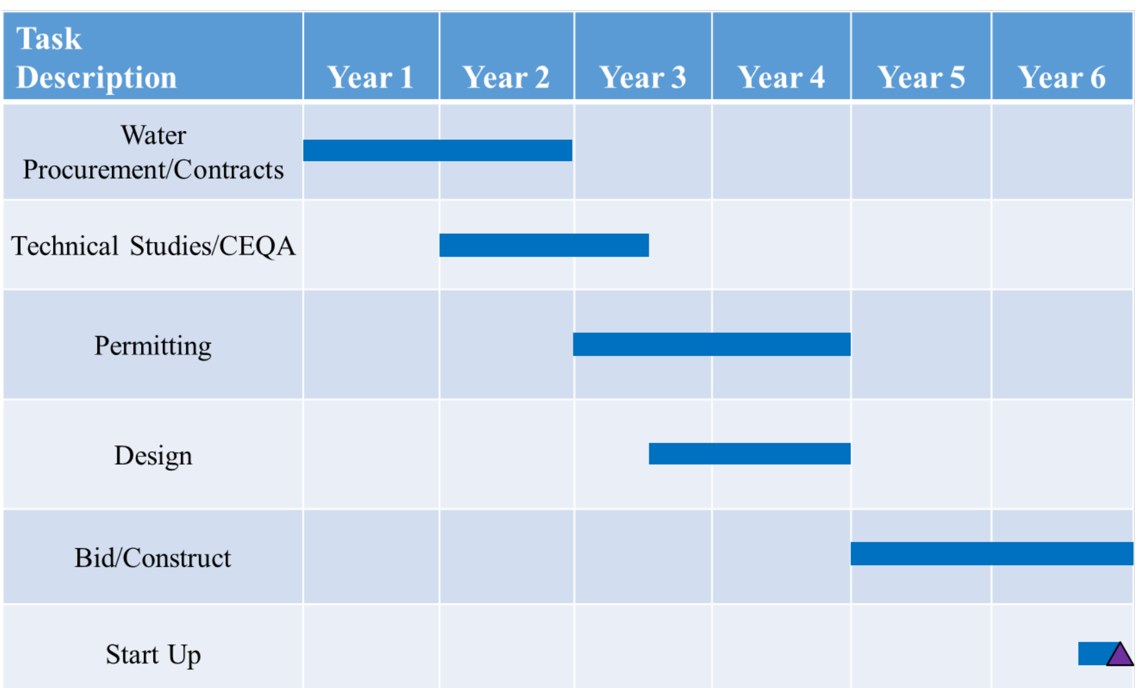

Figure 9-16. Implementation Schedule for NWP Delivery East of City of Paso Robles

9.5.2.6.5 Estimated Cost

The estimated total project cost for this project is $32M. The project cost will be covered by the bonding capacity developed through the water charges framework. Annual O&M costs are estimated at $380,000. The average annual cost of NWP purchased water is estimated at $2.4M based on an average year delivery of 2,000 AFY. However, the unit price would need to be negotiated, and the actual amount of water available will vary year to year thereby affecting the actual annual purchase cost. O&M and water purchase costs would be covered by the overproduction surcharges. Based on a 30-year loan at a 5% interest rate, the cost of water for this project would be approximately $2,400/AF. Additional details regarding how costs were developed are included in Appendix J.

9.5.2.7 Preferred Project 6: Expansion of Salinas Dam

SLOCFCWCD operates the Salinas Dam to provide water to the City of San Luis Obispo. The storage capacity of the lake is 23,843 AF; however, the City has existing water rights of 45,000 AF of storage. It is anticipated that funding would be sought to help the cost of retrofitting the dam and expanding the storage capacity by installing gates along the spillway in order to retain flood flow/stormwater for beneficial use. A risk assessment for the Dam is scheduled for the summer of 2019.

There may be opportunities to use the water from the expanded reservoir storage to benefit the Subbasin. One possibility would be to schedule summer releases from the storage to the Salinas River, which would benefit the Subbasin by recharging the basin through the Salinas River. Another way this project might indirectly benefit the Subbasin is if the City of San Luis Obispo were to use more of their Salinas River water allocation, thereby freeing up the NWP water for purchase by the GSAs.

9.5.2.7.1 Relevant Measurable Objectives

The measurable objectives benefiting from this project include:

- Groundwater elevation measurable objectives in the central portion of the Subbasin
- The groundwater storage measurable objective
- Land subsidence measurable objectives in the central portion of the Subbasin

9.5.2.7.2 Expected Benefits and Evaluation of Benefits

The primary benefit from releasing additional water to the Salinas River during the summer is higher groundwater elevations along the Salinas River. Ancillary benefits of shallower groundwater elevations may include an increase in groundwater storage and avoiding pumping induced subsidence. The GSP model was used to quantify the expected benefit from this project.

Figure 9-17 shows the expected groundwater level benefit predicted by the GSP model after 10 years of project operation. Figure 9-17 expresses the benefit as feet of groundwater. The groundwater level benefit shown on Figure 9-17 is a measure of how much higher groundwater elevations are expected to be with the project rather than without the project.

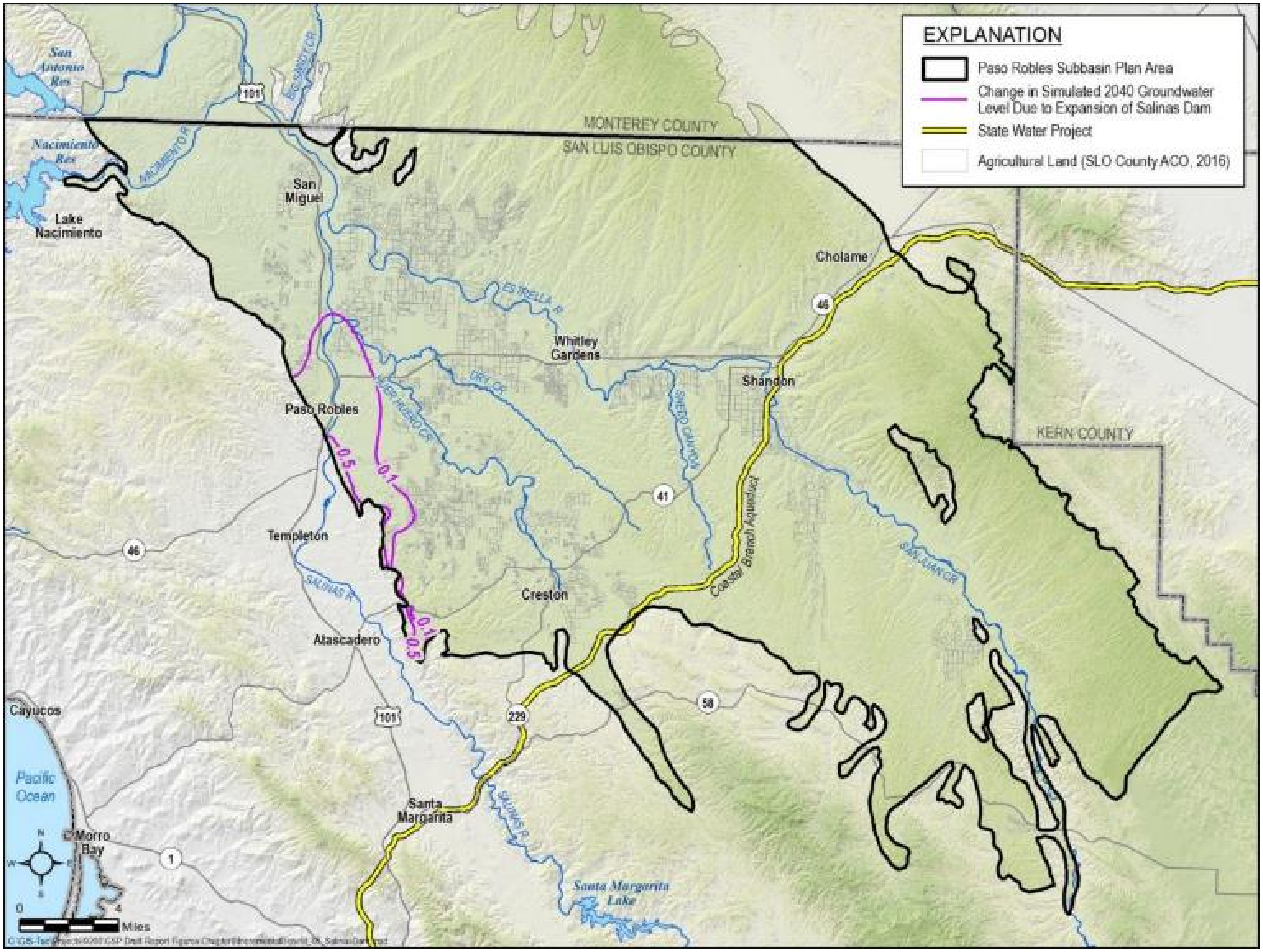

Figure 9-17. Groundwater Level Benefit from Salinas River Summer Releases

9.5.2.7.3 Circumstances for Implementation

All projects are implemented on an as-needed basis. The project to release Salinas River water during the summer will be initiated if, after two years, groundwater levels near the Salinas River continue to decline at unsustainable rates. In particular, continued unsustainable groundwater level declines in monitoring wells 25S/12E-16K05, 26S/13E-16N01, 27S/12E-13N01 and 27S/13E-30N01 will trigger implementation of this project. Additional triggers will be added as the monitoring well network expands.

9.5.2.7.4 Implementation Schedule

The implementation schedule is presented on Figure 9-18. The project will take 4 to 5 years to implement.

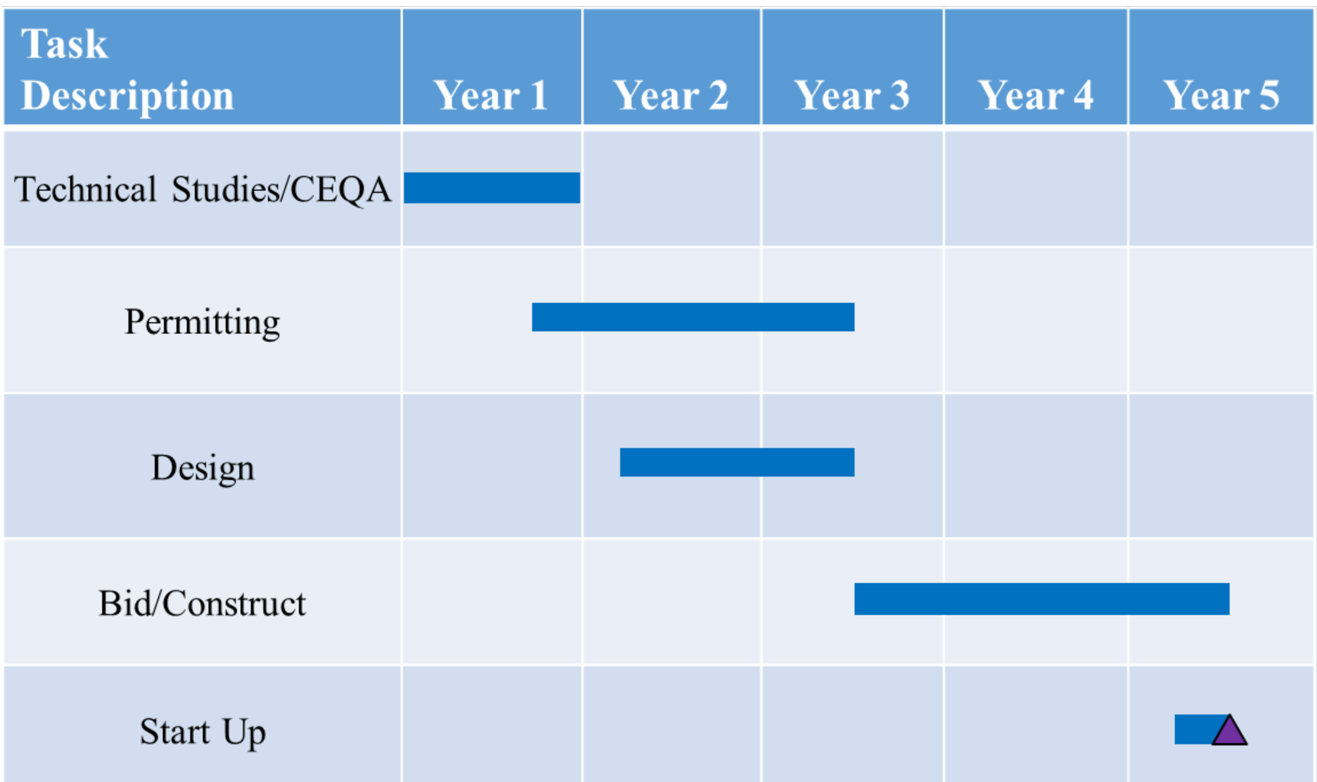

Figure 9-18. Implementation Schedule for Expansion of Salinas Dam

9.5.2.7.5 Estimated Cost

The cost to increase the storage capacity behind the Salinas Dam has been estimated at between $30M and $50M. O&M costs have not been estimated at this time. Some of these costs may be available from federal sources. No additional capital cost would be required to release water to the Salinas River for recharge during the summer months.

9.6 Other Groundwater Management Activities

Although not specifically funded or managed as part of implementing this GSP, a number of associated groundwater management activities will be promoted and encouraged by the GSAs as part of general good groundwater management practices.

9.6.1 Continue Urban and Rural Residential Conservation

Existing water conservation measures should be continued, and new water conservation measures promoted for residential users. Conservation measures may include the use of low flow toilet fixtures, or laundry-to-landscape greywater reuse systems. Conservation projects can reduce demand for groundwater pumping, thereby acting as in-lieu recharge.

9.6.2 Watershed Protection and Management

Watershed restoration and management can reduce stormwater runoff and improving stormwater recharge into the groundwater basin. While not easily quantified and therefore not included as projects in this document, watershed management activities may be worthwhile and benefit the basin.

9.6.3 Retain and Enforce the Existing Water Export Ordinance

This GSP recommends that San Luis Obispo County's existing groundwater export ordinance should be enforced and retained. With limited exception, the ordinance requires a permit for the movement of groundwater across the county or Subbasin line. To obtain a permit, the movement of groundwater cannot negatively impact a nearby overlier, result in seawater intrusion, or result in a cone of depression greater than the landowner's property line. This ordinance will continue to protect the county's water supplies.

9.7 Demonstrated Ability to Attain Sustainability

To demonstrate the ability to attain sustainability, a groundwater management scenario that included both projects and management actions was modeled. The scenario included all of the conceptual projects listed in Section 9.5.3. In addition to the conceptual projects, pumping was reduced to bring groundwater elevations to the measurable objectives before 2040 and maintain the same groundwater elevations through 2070.

The GSP model was adapted to simulate the scenario described above over the GSP implementation period from 2020 through 2040. The ability to achieve sustainability was quantified by comparing 2040 simulated groundwater levels under each of the two scenarios against the Measurable Objective surface – as described in Chapter 8 – for both the Paso Robles formation aquifer and the Alluvial aquifer.

Individual hydrographs comparing the predicted groundwater elevations to the measurable objectives at each representative monitoring site are included in Appendix K.

9.8 Management of Groundwater Extractions and Recharge and Mitigation of Overdraft

This GSP is specifically designed to mitigate the decline in groundwater storage and persistent groundwater level declines in certain areas with a combined program of management actions designed to promote voluntary reductions in pumping and provide authority for mandatory pumping limitations where necessary. Individual GSAs are also proceeding on projects designed to use recycled water, any available Nacimiento Project water and flood flow/stormwater in the Salinas River to use in lieu of pumping groundwater and/or to supplement groundwater supplies.

10 GROUNDWATER SUSTAINABILITY PLAN IMPLEMENTATION

This chapter is intended to serve as a conceptual roadmap for efforts to start implementing the GSP over the first five years and discusses implementation effects in accordance with SGMA regulations sections 354.8(f)(2) and (3). A general schedule showing the major tasks and estimated timeline is provided in Figure 1. Specific regulations guiding the content of this chapter were not developed by DWR.

The implementation plan provided in this chapter is based on current understanding of Subbasin conditions and anticipated administrative considerations that affect the management actions described in Chapter 9. Understanding of Subbasin conditions and administrative considerations will evolve over time based on future refinement of the hydrogeologic setting, groundwater flow conditions, and input from Subbasin stakeholders.

Implementation of the GSP requires robust administrative and financing structures, with adequate staff and funding to ensure compliance with SGMA. The GSP calls for GSAs 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. The website may also include forms for on-line reporting of information needed by the GSAs (e.g., annual pumping amounts) and an interactive mapping function for viewing Subbasin features and monitoring information.

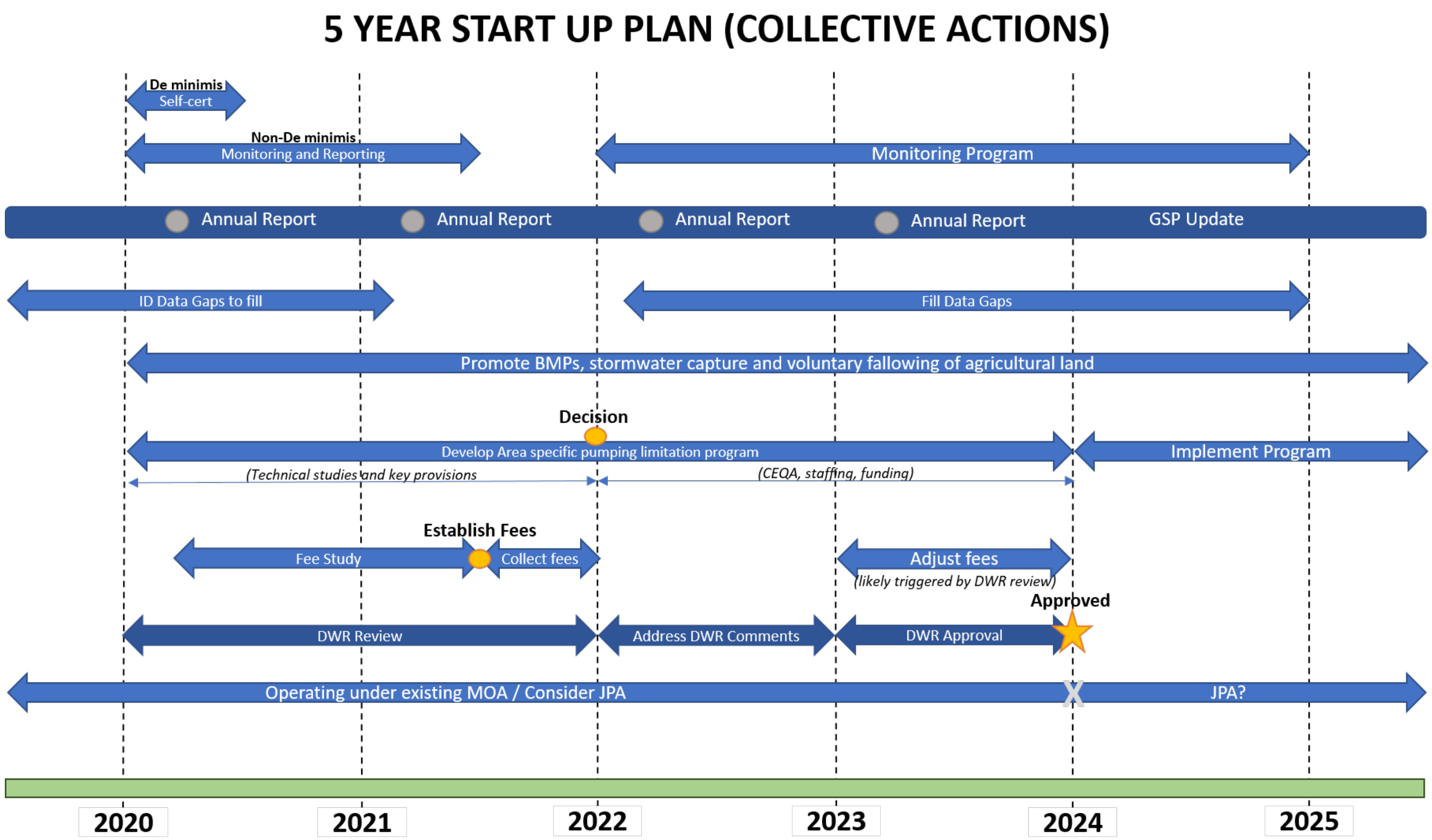

Figure 10-1. General Schedule of 5-Year Start-Up Plan

10.1 Administrative Approach

GSAs will likely either individually hire consultant(s) or hire staff to implement the GSP after deciding which GSA will lead each task. If consultants are hired, it is anticipated that qualified professionals will be identified and hired through a competitive selection process. It is also anticipated that the lead GSA for a particular task will keep the other GSAs informed via periodic updates to the Cooperative Committee and the public. As needed, the GSAs would likely coordinate on the specific studies and analyses necessary to improve understanding of Subbasin conditions. The GSAs would likely then use new information on Subbasin conditions and projects to identify, evaluate, and/or improve management actions to achieve sustainability. This GSP calls for actions considered by the GSAs 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.

10.2 Funding GSP Implementation

As summarized in Table 10-1, a conceptual planning-level cost of about $7,800,000 was estimated for planned activities during the first five years of implementation, or an estimated cost of $1,560,000 per year. This cost estimate reflects routine administrative operations, public outreach, and the basin wide and area specific management actions outlined in Chapter 9.

The GSP calls for implementation to be covered under the terms of the existing MOA (see Chapter 12) between the four GSAs until DWR approves the GSP and a new or renewed GSA cooperative agreement is established. Consistent with current practice under the MOA, it is anticipated that an annual operating budget will be established that is considered for approval by each GSA. This budget information and management action details would be used to conduct a fee study for purposes of developing a groundwater pumping fee to cover the costs of implementing the regulatory program described in the GSP including, but not limited to, costs related to monitoring and reporting, hydrogeologic studies, pumping reduction enforcement where necessary, and public outreach.

The GSAs plan to conduct focused public outreach and hold meetings to educate and solicit input on the proposed fee structure and plan to begin developing the fee structure as soon as administratively feasible after GSP adoption. . Establishing a funding structure is estimated to cost $250,000.

California Water Code Sections 10730 and 10730.2 provide GSAs with the authority to impose certain fees, including fees on groundwater pumping. Any imposition of fees, taxes or other charges would need to follow the applicable protocols outlined in the above sections and all applicable Constitutional requirements based on the nature of the fee.. Such protocols would likely include public outreach, notification of all property owners, and at least one public hearing where the opinions and concerns of all parties are heard and considered before the GSAs make a determination to proceed with a fee or other charge. It is assumed that any fee structure adopted by the individual GSAs would be adopted by resolution or ordinance and would be identical in all material respects, i.e. with respect to levels and classes of uses. As part of or in conjunction with the feasibility study and in order to reduce the risk of a legal challenge, the GSAs plan to obtain the legal advice necessary to ensure that the proposed fee is consistent with all applicable legal requirements and rights.

With respect to those pumpers that are not anticipated to be subject to the fee, the GSAs plan to develop a program pursuant to which such pumpers will be required to self-certify that they only pump for domestic purposes and use less than 2 AFY.

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Table 10-1. Estimated Planning-Level Costs for First Five Years of Implementation

GSP Implementation Activity	Description	Estimated Costs	Cost Unit	Anticipated Timeframe	Estimated Costs During Startup (2020-2025)
Administration and Finance					
Administration development	Update agreements; hire staff (GSP manager and staff); update website; conduct public outreach and meeting protocols	$ 100,000	lump sum	Quarters 1-2, 2020	$ 100,000
Ongoing GSP implementation administration	Routine operating costs (salaries, office space, equipment, etc.)	$ 500,000	annual	Starting in 2020	$ 2,500,000
Fee study for GSP implementation	Study to develop and justify funding mechanism for GSP implementation	$ 250,000	lump Sum	Quarter 2, 2020 through Quarter 2, 2021	$ 250,000
Basin-wide Management Actions					
Monitoring, reporting & outreach					
De minimis self certification	Evaluate existing programs; develop new program for GSP	$ 30,000	lump sum	Quarters 1-2, 2020	$ 30,000
Non-de minimis metering & reporting program	Develop new metering and reporting program, land fallowing/project accounting	$ 100,000	lump sum	Quarters 1-2, 2020	$ 100,000
Annual reports	Collect and analyze groundwater level data; apply groundwater lelvel - storage proxy, evaluate water quality data, download and evaluate land subsidence data; update data management system (DMS); maintain monitoring network infrastructure; prepare and submit annual report to DWR	$ 250,000	annual	Starting in 2020	$ 1,250,000
Data gaps					
Supplemental hydrogeologic study	Refine hydrologeologic conceptual model; address data gaps	$ 300,000	lump sum	2020 to 2024	$ 300,000
Monitoring networks - groundwater levels					
Verify network	Verify proposed network	$ 30,000	lump sum	Quarters 1-2, 2020	$ 30,000
Expand network - add existing wells	Identify/inspect wells, video-logging, access agreements	$ 100,000	lump sum	Quarters 1-2, 2020	$ 100,000
Expand network - drill new wells	Add new wells in key data gap areas	$ 100,000	per well	Quarters 1-2, 2020	$ 500,000
Monitoring networks - groundwater storage					
Develop groundwater level - storage proxy	Quantiative relationship between changes in groundwater level, changes in storage, and amount of groundwater pumping	$ 50,000	lump sum	Quarters 3-4, 2020	$ 50,000
Monitoring networks - water quality					
Verify network	Verify proposed network	$ 20,000	lump sum	2020 to 2024	$ 20,000
Monitoring networks - land subsidence					
Verify network	Verify proposed network	$ 20,000	lump sum	2020 to 2024	$ 20,000
Monitoring networks - interconnected surface water					
Conduct surface water/groundwater investigation	Focused surface and groundwater investigations in areas of ptentailly interconnectivity; conduct monitoring; cost depends on avaailabiltiy of existing wells and number of new wells needed; cost assumes 5 new wells needed	$ 400,000	lump sum	2020 to 2024	$ 400,000
5-year GSP updates & amendments					
GSP assessment and reporting	Prepare report/amend GSP	$ 300,000	lump sum	2023 to 2024	$ 300,000
Groundwater modeling	Refine, update, and recalibrate groundwater model	$ 250,000	lump sum	2023	$ 250,000
Promoting					
Best water use practices	Costs included in monitoring, reporting and outreach for ongoing GSP implementation				
Stormwater capture					
Voluntary fallowing of agricultural land					
Area Specific Management Actions					
Mandatory pumping limitations in specific areas					
Baseline pumping determination	Develop structure; public outreach; meetings; legal fees	$ 350,000	lump sum	2020 to 2022	$ 350,000
Pumping limitations determination					
Timeline established for pumping limitations					
Pumping limitations regulations approval process					
Regulation implementation	Oversight and enforcement	$ 250,000	annual	Starting in 2020	$ 1,250,000
				Total Estimated Costs during Startup (2020-2025)	**$ 7,800,000**
				Average Annual Estimated Costs during Startup (2020-2025)	**$ 1,560,000**

10.3 Plan Implementation Effects on Existing Land Use

Given that implementation of the GSP will likely result in the adoption of regulations limiting or suspending extractions pursuant to the authority granted by SGMA, implementation of the GSP is likely to have an impact on land uses. However, all such regulations will need to be consistent with the applicable statutory constraints, including those described in Water Code Section 10726.4(a)(2) which provides that such regulations shall be consistent with the applicable elements of the city or county general plan, unless there is insufficient sustainable yield in the basin to serve a land use designated in the city or county general plan and Water Code Section 10726.8(f) which states that nothing contained in SGMA or in a GSP shall be interpreted as superseding the land use authority of cities and counties.

10.4 Plan Implementation Effects on Water Supply

Plan implementation will not significantly alter the existing water supply of the Subbasin. If entities opt to develop optional water supply projects as outlined in Chapter 9, the Subbasin's water supply could increase.

10.5 Plan Implementation Effects on Local and Regional Economy

Plan implementation will potentially limit economic growth due to pumping reductions outlined in Chapter 9. Pumping reductions could limit or reduce agricultural output, thereby reducing regional income.

11 NOTICE AND COMMUNICATION

This chapter and the Communications and Engagement (C&E) Plan in Appendix M describe the notification and communication with interested parties and stakeholders in the Subbasin regarding the GSP. The information presented is prepared in accordance with the SGMA Regulations §354.10 to provide a description of beneficial uses, a list of public meetings, and comments and a summary of responses. It also contains a communication section with an explanation of the decision-making process, identification of opportunities for public engagement, a description of outreach to diverse populations, and the method for keeping the public updated about the plan and related activities. These requirements are met by the Communications and Engagement (C&E) Plan that is included in Appendix M. Public comments received and provided by the GSAs are listed in Appendix N. Table 11-1 lists the specific regulatory and statutory requirements for notice and communication and refers to sections of the C&E Plan.

The plan was written early in the process of GSP development as a stand-alone document to guide notice and communication throughout GSP development. The C&E Plan was presented to and accepted as “receive and file” by the Cooperative Committee on July 25, 2018. Table 11-2 lists public meetings that were held after July 2018.

Table 11-1. Requirements of Statutes and Regulations Pertaining to Notice and Communications

Legislative / Regulatory Requirement	Legislative / Regulatory Section Reference	C&E Plan Section
Publish public notices and conduct public meetings when establishing a GSA, adopting or amending a GSP, or imposing or increasing a fee.	SGMA Sections 10723(b), 10728.4, and 10730(b)(1).	**7.0**
Maintain a list of, and communicate directly with, interested parties.	SGMA Sections 10723.4, 10730(b)(2), and 10723.8(a)	**4.0**
Consider the interests of all beneficial uses and users of groundwater.	SGMA Section 10723.2	**4.0**
Provide a written statement describing how interested parties may participate in plan [GSP] development and implementation, as well as a list of interested parties, at the time of GSA formation.	SGMA Sections 10723.8(a) and 10727.8(a)	**4.0**
Encourage active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin.	SGMA Section 10727.8(a)	**7.0**
Understand that any federally recognized Indian Tribe may voluntarily agree to participate in the planning, financing, and management of groundwater basins – refer to DWR's Engagement with Tribal Governments Guidance Document for Tribal recommended communication procedures.	SGMA 10720.3(c)	**7.0**
Description of beneficial uses and users of groundwater in the basin	GSP Regulations §354.10	**3.0**
List of public meetings at which the Plan [GSP] was discussed or considered	GSP Regulations §354.10	**Table 11-2**
Comments regarding the Plan [GSP] received by the Agency and a summary of responses	GSP Regulations §354.10	**N/A at time of publication**
A communication section that includes the following:	GSP Regulations §354.10	
Explanation of the Agency's decision-making process	GSP Regulations §354.10	**4.0**
Identification of opportunities for public engagement and discussion of how public input and response will be used	GSP Regulations §354.10	**7.0**
Description of how the Agency encourages active involvement of diverse social, cultural, and economic elements of the population within the basin	GSP Regulations §354.10	**7.0**
The method the Agency will follow to inform the public about progress implementing the Plan [GSP], including the status of projects and actions	**GSP Regulations §354.10**	**7.0**

Table 11-2. Public Meetings Held After July 2018 at Which the GSP Was Discussed

Type of Meeting	Location	Date
Cooperative Committee Special Meeting	Paso Robles City Hall	**Sept. 12, 2018**
Public Workshop: Sustainable Management Criteria	Kermit King Elementary School	**Oct. 4, 2018**
Public Workshop: Sustainable Management Criteria	Creston Elementary School	**Oct. 8, 2018**
Cooperative Committee Regular Meeting	Paso Robles City Hall	**Oct. 17, 2018**
Cooperative Committee Special Meeting	Paso Robles City Hall	**Mar. 6, 2019**
Cooperative Committee Regular Meeting	Paso Robles City Hall	**Apr. 24, 2019**
Cooperative Committee Special Meeting	Paso Robles City Hall	**May 22, 2019**
Cooperative Committee Regular Meeting	**Paso Robles City Hall**	**July 24, 2019**

12 MEMORANDUM OF AGREEMENT

The GSAs will operate under the existing MOA until DWR approves the GSP. The existing MOA is included in Appendix A. During DWR's review process, the GSAs will consider developing a refined governance structure to implement the GSP. The governance structure would be established in a new agreement between the GSAs. The agreement would outline details and responsibilities for GSP administration among the participating entities, and may include provisions to establish a new governing body to oversee GSP implementation.

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