

SOUTH KINGS GROUNDWATER SUSTAINABILITY
AGENCY JOINT POWERS AUTHORITY
BOARD OF DIRECTORS
SPECIAL MEETING AGENDA

Wednesday, July 13, 2022

5:30 PM

VIA TELECONFERENCE PURSUANT TO EXECUTIVE ORDER N-29-20 ISSUED BY GOVERNOR GAVIN NEWSOM. THE COUNCIL CHAMBER WILL BE CLOSED TO THE PUBLIC. PUBLIC CAN PARTICIPATE IN THIS MEETING AND PROVIDE COMMENTS ON AGENDA ITEMS VIA THE FOLLOWING:

<https://us06web.zoom.us/j/95002614921?pwd=bjIVZnZOTDZHWlImMkRFcXFFeG5zQT09>

Meeting ID: 950 0261 4921

Passcode: 389469

Please contact Annika Romo at (559) 299-1544 for any questions regarding the Zoom meeting.

ITEMS:

1. Call to Order and roll call
2. Public Comment on Items not on Agenda

The first 15 minutes of each regular session is set aside for members of the public to comment on any item within the jurisdiction of the Board of Directors, but not appearing on the agenda. For items appearing on the agenda, the public is invited to comment at the time the item is called for consideration by the Board. Any person addressing the Board under public comment will be limited to a 3-minute presentation to ensure that all interested parties have an opportunity to speak. Please submit any handouts to the Secretary via email prior to the meeting at dpeters@peters-engineering.com.

3. Consent Calendar

Unless a member of the Board of Directors requests that an item be removed from the Consent Calendar, all items will be acted upon as a whole and by one vote. Items removed from the Consent Calendar will be acted upon separately.

- 3.1 Approve Minutes of May 11, 2022 meeting.

4. Committee Reports

4.1 Technical Advisory Committee – Report by Josh Rogers, Chair

4.2 Administrative Committee – Report by David Peters, Secretary

5. General Items

5.1 Review DWR comments and approve Groundwater Sustainability Plan revisions – Oral Report by J. Rogers

5.2 Approve letter to DWR regarding well mitigation program - Oral Report by J. Rogers

5.3 Approve Reimbursement Policy – Oral Report by D. Peters

5.4 Approve Fowler Recharge Basin Agreement Amendment – Oral Report by D. Peters

5.5 Approve Continuation of Virtual meetings – Oral Report by Michael Linden

6. Secretary's Report

6.1 Time and place for next meeting – August 10, 2022 at 5:30pm

7. Board Member Comments

8. Adjournment

SKJPA BOARD OF DIRECTORS
MEETING MINUTES

TELECONFERENCE

Wednesday, May 11, 2022

5:30 PM

Chairman Kazarian called the meeting to order at 5:31 pm.

Board Members Present: Chairman Kazarian, E. Hurtado, D. Ramirez, T. Pimentel

Board Members Absent: J. Hurtado

Staff Present: David Peters, Josh Rogers, Michael Linden

PUBLIC PRESENTATIONS

None

CONSENT CALENDAR

3.1 *Approve minutes of April 14, 2022 meeting.*

Motion by member E. Hurtado, second by member T. Pimentel. Motion passes unanimously via voice roll call.

COMMITTEE REPORTS

4.1 *Technical Advisory Committee Meeting*

Advisory Committees scheduled to receive comments next Friday at next Kings Basin meeting.

4.1 *Administrative Committee Meeting*

No report. Administrative Committee did not meet.

GENERAL ITEMS

5.1 *Adopt 2022-23 FY Budget – Oral Report by David Peters*

Draft budget was reviewed at last meeting. Budget was updated today to include current pumping numbers from prior pumping year. Slight changes in member agency contribution percentages, but nothing significant. Current fund balance of \$500,000 (\$370,000 will be expended to complete the purchase of basin in Fowler). Member T. Pimentel would like a fund balance at each meeting.

After no public comment, member T. Pimentel makes a motion, second by member E. Hurtado. Motion passes unanimously via voice roll call.

5.2 *Continuation of Virtual Meetings – Oral Report by Michael Linden*

E. Hurtado raises a question about the length of continuing the virtual meetings. Mr. Linden says the meetings will continue to be virtual for at least the next few months, unless the legislature changes the law. Member D. Ramirez points out that the virtual meetings are very convenient. Chairman Kazarian states that once the State of Emergency is lifted, the meetings will need to return to in-person.

After no public comment, member T. Pimentel makes a motion, second by member E. Hurtado. Motion passes unanimously via voice roll call.

SECRETARY REPORT

Time & Place for next meeting: June 8, 2022 at 5:30pm via teleconference.

BOARD MEMBER COMMENTS

Member D. Ramirez raises a question about the current drought conditions. Mr. Rogers states that we are currently in a drastic dry period, but it is expected to turn around at some point.

ADJOURNMENT

Having no further business Chairman Kazarian adjourned the meeting at 5:45pm.

Acknowledgements

The South Kings Groundwater Sustainability Agency would like to thank the following members of the Technical Subcommittee and others who made significant contributions to this Groundwater Sustainability Plan:

Bruce Blayney, City of Kingsburg
Daniel Ramirez, Del Rey CSD
Dave Peters, Peters Engineering
Frank Gonzalez, City of Sanger
Gavin O'Leary, Provost & Pritchard Consulting Group
Heather Bashian, Provost & Pritchard Consulting Group
Josh Rogers, Yamabe & Horn Engineering, Inc.
Karnig Kazarian, City of Fowler
Ken Schmidt, Ken D. Schmidt & Associates
Mark Reitz, AECOM
Owen Kubit, Provost & Pritchard Consulting Group
Philip Desatoff, Consolidated Irrigation District
Philip Romero, Yamabe & Horn Engineering, Inc.
Ronald Samuelian, Provost & Pritchard Consulting Group
Shawn Vaughn, Provost & Pritchard Consulting Group
Shay Overton, Provost & Pritchard Consulting Group
Trinidad Pimentel, City of Parlier

LIMITATION

In preparation of this Groundwater Sustainability Plan (Plan), the professional services of Provost & Pritchard Consulting Group were consistent with generally accepted engineering principles and practices in California at the time the services were performed.

Section 3 of this Plan, Basin Setting, was prepared in general conformance with section 354.12 of the water code either by and /or under the direct supervision of the appropriate professional as indicated herein.

Per Regulation Requirements:

§354.12 Introduction to Basin Setting

This Subarticle describes the information about the physical setting and characteristics of the basin and current conditions of the basin that shall be part of each Plan, including the identification of data gaps and levels of uncertainty, which comprise the basin setting that serves as the basis for defining and assessing reasonable sustainable management criteria and projects and management actions. Information provided pursuant to this Subarticle shall be prepared by or under the direction of a professional geologist or professional engineer.

Note: Authority cited: Section 10733.2, Water Code.

Reference: Section 10733.2, Water Code.



DATE SIGNED _____

This Plan is a work product of the South Kings Groundwater Sustainability Agency (SKGSA) members and associated stakeholders. Judgments leading to conclusions and recommendations were made based on the best available information but are made without a complete knowledge of subsurface geological and hydrogeological conditions. This Plan is intended to provide information from readily available published or public sources. We understand that the interpretations and recommendations are for use by the MAGSA in assisting the GSA in making decisions related to potential water supplies and groundwater management activities in light of California's new and evolving Sustainable Groundwater Management Act (SGMA) regulations.

Subsurface conditions or variations cannot be known, or entirely accounted for, in spite of significant study and evaluation. Future surface water and groundwater quantity, quality, and availability cannot be known. Trends have been estimated and projected based upon past historical data and events and are used for planning purposes. It should be noted that historic trends may not be indicative of future outcomes. Historic hydrology has been used to identify averages and potential extremes that may be experienced in future years; however, it will be important for the GSA to continually evaluate all the parameters that make up the agency water budget. Additionally, the rapidly changing regulatory environment surrounding the SGMA and State regulatory agencies may render any or all recommendations invalid in the future if not implemented and necessary approvals, permits, or rights obtained in a timely manner. Information contained in this GSP should not be regarded as a guarantee that only the conditions reported and discussed are present within the SKGSA or that other conditions may exist which could have a significant effect on groundwater availability.

In developing methods, conclusions, and recommendations this Plan has relied on information that was prepared or provided by others. It is assumed that this information is accurate and correct, unless noted. Changes in existing conditions due to time lapse, natural causes including climate change, operations in adjoining GSAs or subbasins, or future management actions taken by a GSA may deem the conclusions and recommendations inappropriate. No guarantee or warranty, expressed or implied, is made.

Prepared by:



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Abbreviations

| | |
|-----------|---|
| AF | Acre-Foot |
| AFAD | Acre-Feet Per Acre Per Day |
| AFY | Acre-Foot Per Year |
| bgs | Below Ground Surface |
| CASGEM | California Statewide Groundwater Elevation Monitoring |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| cfs | Cubic Feet Per Second |
| CID | Consolidated Irrigation District |
| CKGSA | Central Kings Groundwater Sustainability Agency |
| Coalition | Kings River Water Quality Coalition |
| CSD | Community Service District |
| CVP | Central Valley Project |
| CV-SALTS | Central Valley Salinity Alternatives for Long Term Sustainability |
| CWC | California Water Code |
| DAC | Disadvantaged Community |
| DBCP | 1,2-Dibromo-3-chloropropane |
| DDW | Division of Drinking Water |
| Del Rey | Del Rey Community Service District |
| DMS | Data Management System |
| DQO | Data Quality Objective |
| DTSC | Department of Toxic Substance Control |
| DWR | (California) Department of Water Resources |
| E-Clay | Corcoran Clay |
| EDB | Ethylene-Dibromide |
| EPA | Environmental Protection Agency |
| ET | Evapotranspiration |
| FCEHD | Fresno County Environmental Health Department |
| FID | Fresno Irrigation District |
| FMFCD | Fresno Metropolitan Flood Control District |
| Fowler | City of Fowler |
| GAC | Granular Activated Carbon |
| GAMA | Groundwater Ambient Monitoring and Assessment |
| GC | Government Code |

| | |
|------------------------|---|
| GDE | Groundwater Dependent Ecosystem |
| GPD/FT | Gallons Per Day Per Foot |
| GPS | Global Positioning System |
| GSA..... | Groundwater Sustainability Agency |
| GSP | Groundwater Sustainability Plan |
| HCM | Hydrogeological Conceptual Model |
| ILRP..... | Irrigated Lands Regulatory Program |
| InSAR | Interferometric Synthetic Aperture Radar |
| IRWMP..... | Integrated Regional Water Management Plan |
| JPA | Joint Powers Agreement |
| KDSA | Kenneth D. Schmitt & Associates |
| Kings Subbasin..... | Kings Groundwater Subbasin |
| Kingsburg..... | City of Kingsburg |
| KRCD..... | Kings River Conservation District |
| KRI..... | Kings River for Irrigation |
| KRWA | Kings River Water Association |
| LSA..... | Lake and Streambed Alteration |
| M&I..... | Municipal & Industrial |
| MCL..... | Maximum Contaminant Level |
| µg/L..... | Micrograms Per Liter |
| mg/L..... | Milligrams Per Liter |
| MGD..... | Million-Gallon-Per-Day |
| MSL..... | Mean Sea Level |
| MTBE..... | Methyl-Tert-Butyl-Ether |
| NASA..... | National Aeronautics and Space Administration |
| NC Dataset Viewer..... | Nature Conservancy’s Natural Communities Dataset Viewer |
| NGS | National Geodetic Survey |
| NRCS..... | Natural Resource Conservation Service |
| Parlier..... | City of Parlier |
| pCi/L | Picocuries/Liter |
| PG&E..... | Pacific Gas & Electric Company |
| Program | Kings River Fisheries Management Program |
| pTu..... | Basement Complex |
| Qb..... | Quaternary Flood-Basin Deposits |
| Qoao | Quaternary Older Alluvium |

| | |
|-------------|--|
| Qsd..... | Quaternary Sand Dunes |
| QTc..... | Quaternary and Tertiary Age Continental Deposits |
| Qya..... | Quaternary Younger Alluvium |
| RWQCB..... | Regional Water Quality Control Board |
| SAGBI..... | Soil Agricultural Groundwater Banking Index |
| Sanger..... | City of Sanger |
| SGMA..... | Sustainable Groundwater Management |
| SJRRP..... | San Joaquin River Restoration Project |
| SKF..... | Selma-Kingsburg-Fowler |
| SKGSA..... | South Kings Groundwater Sustainability Agency |
| SWRCB..... | State of California Water Resources Control Board |
| TCP..... | 1,2,3-Trichloropropane |
| TDS..... | Total Dissolved Solids |
| USACE..... | US Army Corps of Engineers |
| USBR..... | United States Bureau of Reclamation |
| USGS..... | United States Geological Survey |
| UWMP..... | Urban Water Management Plan |
| WHPA..... | Wellhead Protection Area |
| WSIP..... | California Water Commission's Water Storage Investment Program |
| WWTP..... | Wastewater Treatment Plant |

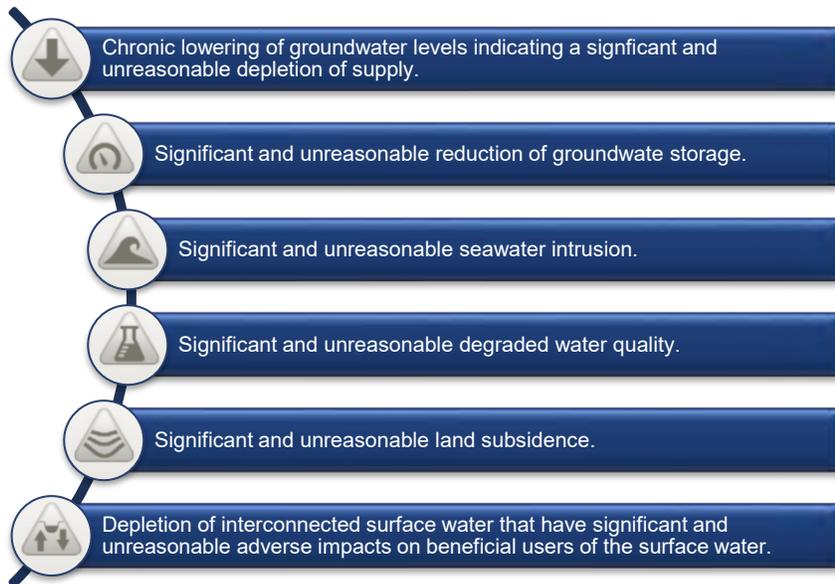
Executive Summary

Section 1 Introduction

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act of 2014 (SGMA), which is codified in Section 10720 et seq. of the California Water Code. This legislation created a statutory framework for groundwater management in California that can be sustained during the planning and implementation horizon without causing undesirable results in the six categories shown to the left.

The location of the South Kings GSA (SKGSA) area is more than 100 miles from the ocean, therefore seawater intrusion or use (as a supply) is not anticipated or feasible, respectively; therefore, seawater intrusion is not discussed significantly in the rest of this GSP.

SGMA requires governments and water agencies of high and medium priority basins to halt groundwater overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, including the Kings Subbasin, the deadline for achieving sustainability is 2040.



The SKGSA is a Joint Powers Authority (JPA) formed for the purpose of developing and implementing the Groundwater Sustainability Plan (GSP). The members include the cities of Fowler, Kingsburg, Parlier and Sanger and the Del Rey Community Services District. The SKGSA is governed by a five-member Board of Directors where the Directors are typically elected or appointed officials from the member agencies.

The sustainability goal of the Kings Basin and the SKGSA is to ensure that, by 2040, the basin is being managed in a sustainable manner to maintain a reliable water supply for current and future beneficial uses without experiencing undesirable results.

Section 2 Plan Area

The Kings Groundwater Subbasin (Kings Subbasin) is in the southern part of the San Joaquin Valley with most of the subbasin surface water being supplied from the Kings and San Joaquin Rivers. The Kings Subbasin boundary is defined in the Department of Water Resources (DWR) Bulletin 118 as DWR Subbasin No. 5-22.08.

The SKGSA boundary encompasses the city and district limits of the member agencies, on the San Joaquin Valley floor in the County of Fresno. The location of the SKGSA and the other GSAs within the Kings

Subbasin are shown in **Figure ES-1**. The SKGSA area boundaries are coterminous with the city and district boundaries but do not encompass their individual spheres of influence. There is no overlap among the seven GSA boundaries and there are no adjudicated areas in the groundwater basin.

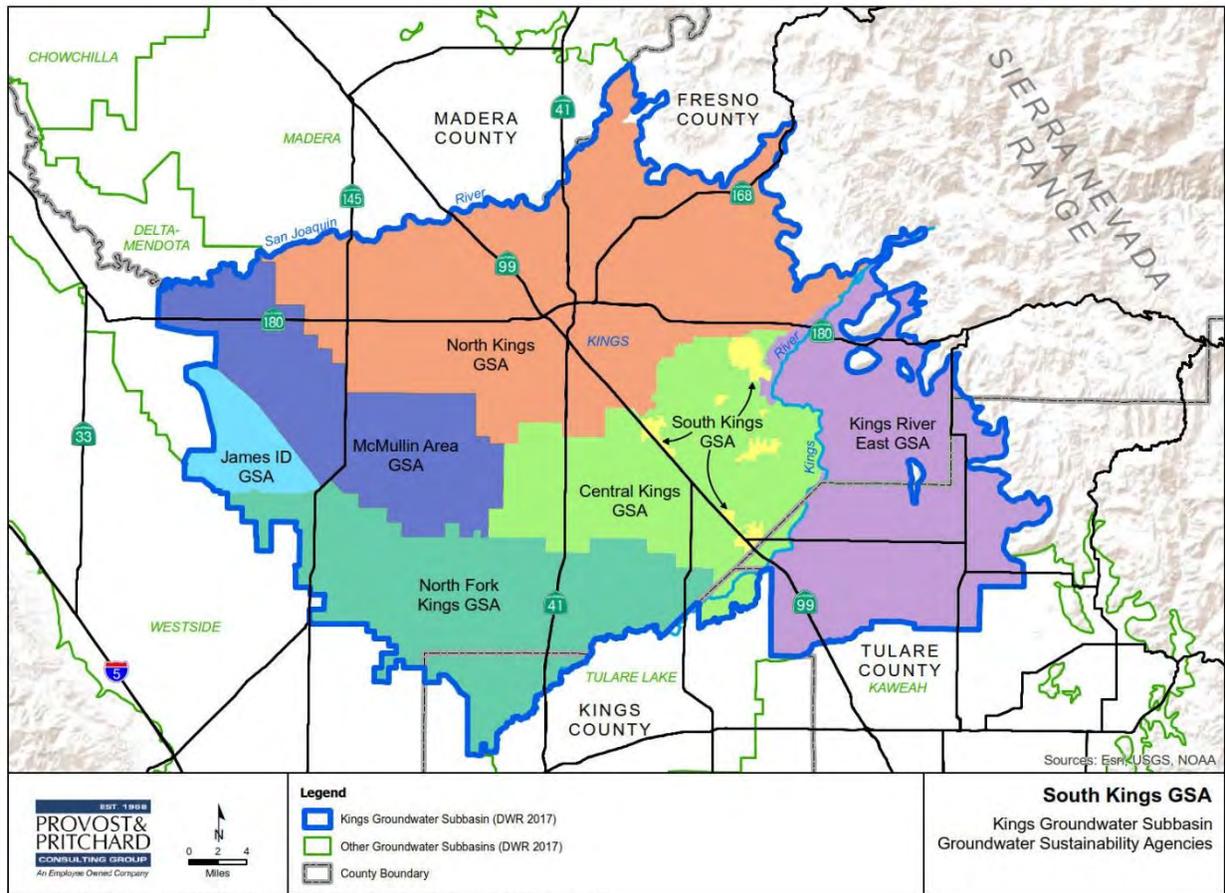


Figure ES-1: Kings Subbasin Groundwater Sustainability Agencies

Figure ES-1 also shows the five Groundwater Subbasins bordering the Kings Subbasin including the Madera Subbasin, Kaweah Subbasin, Tulare Lake Subbasin, Westside Subbasin, and Delta-Mendota Subbasin. The easterly boundary of the Kings Subbasin is the contact with the foothills—generally the 300-ft elevation-- of the Sierra Nevada mountain range.

The South Kings Groundwater Sustainability Plan has the same area as the South Kings Groundwater Sustainability Agency, as shown in **Figure ES-1**. The Plan area boundary is coterminous with the city limits of the four cities (Kingsburg, Fowler, Parlier, Sanger) and the district boundary of the Del Rey Community Service District within the eastern portion of the Kings Subbasin. Six other GSAs together with SKGSA form the boundary of the Kings Subbasin. The SKGSA Plan area is approximately 9,635 acres. The agencies within the GSP do not own surface water facilities but are instead connected, in some portions, to the surface water facilities of the Central Kings Groundwater Sustainability Agency (CKGSA), specifically Consolidated Irrigation District. The agencies do own and operate municipal or quasi-municipal community water facilities throughout their boundaries and several private wells are used in the rural and semi-rural areas throughout the GSA.

The majority of the SKGSA’s acreage are utilized by residential or commercial uses, with only 1,012 acres operating in agricultural production. The five agencies rely on groundwater for their water supply and will acquire surface water supplies to recharge the underlying groundwater basin to offset their extraction impacts.

The SKGSA has executed an agreement with the CID for firm surface water deliveries to be utilized for recharge activities; the agreement provisions for annual deliveries with a five-year rolling average of the firm water supply to account for possible dry years. Some of those activities may utilize existing or future CID facilities; however, the SKGSA agencies will be pursuing their own recharge facilities, as discussed in more detail in **Section 6**. The soils that underlie the GSA boundary generally consist of sands and gravels and are conducive to intentional recharge activities.

Section 3 Basin Setting

Hydrogeologic Conceptual Model

The purpose of a Hydrogeologic Conceptual Model (HCM) is to provide an easy to understand description of the general physical characteristics of the regional hydrology, land use, geology, geologic structure, water quality, principal aquifers, and principle aquitards in the basin setting. Once developed, an HCM is useful in providing the context to develop water budgets, monitoring networks, and identification of data gaps. An HCM is not a numerical groundwater model or a water budget model. An HCM is rather a written and graphical description of the hydrologic and hydrogeologic conditions that lay the foundation for future water budget models. In addition, this HCM supports and provides the hydrogeologic setting to support the Groundwater Conditions and Water Budget of this GSP. The narrative HCM description provided in this chapter is accompanied by graphical representations of the South Kings GSA portion of the Kings River basin that have attempted to clearly portray the geographic setting, regional geology, basin geometry, and general water quality. This HCM has been prepared utilizing published studies and resources and will be periodically updated as data gaps are addressed, and new information becomes available.

The Kings Subbasin is an alluvial basin bounded north and south by the San Joaquin and Kings Rivers, respectively. To the east, the subbasin is bounded by the Sierra Nevada foothills and the Delta Mendota and Westside Subbasins to the west.

As shown in **Figure ES-1**, the SKGSA area is located to the east of the center of the Kings Subbasin, which is located in the approximate center of the San Joaquin Valley. The Kings Subbasin is bounded by the foothills of the Sierra Nevada mountains on the east, which define the eastern boundary of the alluvial groundwater aquifer system, by the San Joaquin River on the north, and by the Kings River on the south. The major features that affect groundwater flow are the San Joaquin and Kings Rivers and the basement complex of the Sierra Nevada Mountains (i.e., bedrock). While not known certainly, it is believed minimal amounts of groundwater flow into the SKGSA through fractures in bedrock.

The basement complex of the Sierra Nevada and the seepage loss along the San Joaquin and Kings rivers under natural conditions affect the direction of flow in the region as groundwater flows away from these features. The groundwater flows to the southwest away from the Sierra Nevada Mountains towards the axial trough of the valley. Additionally, seepage from the San Joaquin River, and the recharge ridge associated with seepage loss from the river, induce groundwater to flow away from the river to the south and southwest. Numerous groundwater depressions have also developed as aquifer usage has increased over time, which can cause the direction of groundwater flow to vary locally, but the dominant direction of groundwater flow in the region remains southwest.

Soils within the Kings Subbasin can vary significantly. In general, coarser grained soils are found along the eastern portions of the subbasin and adjacent to the San Joaquin River and Kings River, as well as areas associated with recent alluvial deposition along intermittent streams. Finer grained soils are typically found in the area of the compound fan created by intermittent streams in the east and are also found in the western areas of the Subbasin near the Fresno Slough. In general the dominant topsoil textural class in the SKGSA area is moderately coarse (**Figure ES-2**). The map was prepared using soil textural classes from the Natural Resource Conservation Service (NRCS). Patches of coarse soils that regionally trend southwest-northeast are present in

much of the GSA area and represent recent alluvial deposits along the area’s streams and rivers. Pockets of medium-grained have been mapped in Sanger and Del Rey, while areas of coarse-grained soils have been mapped in Fowler and Kingsburg.

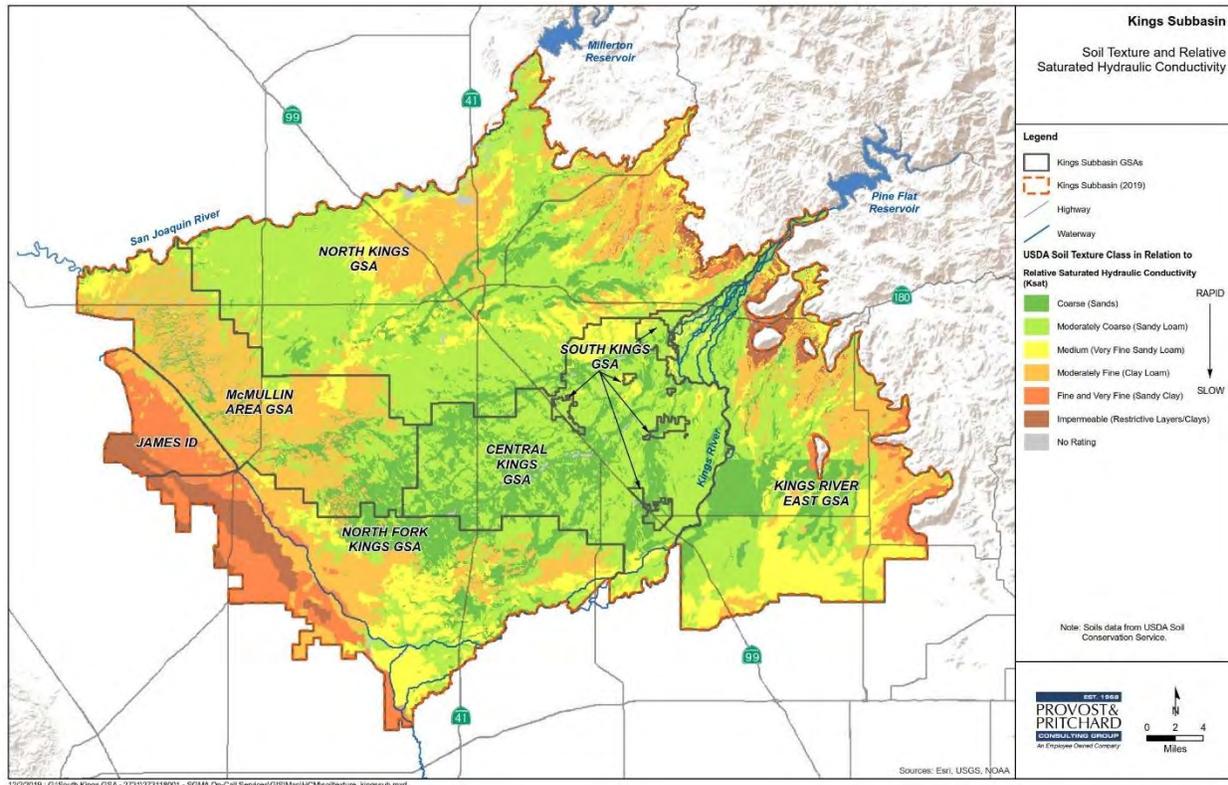


Figure ES-2: Kings Basin Soil Texture and Saturated Hydraulic Conductivity

In this figure, soil textural classes have additionally been related to Saturated Hydraulic Conductivity (Ksat or hydraulic conductivity) based on NRCS general categories. For the SKGSA area, the NRCS has generally described soils to depths of 5 to 7 feet. The hydraulic conductivity values shown on the map are expressed in general terms ranging from relatively rapid for coarse grained topsoils to relatively slow for moderately fine-grained topsoil. Duripan soil horizons (i.e., hardpan), have, for the purposes of this document, been assumed to have largely been broken up through deep tillage related to historical agricultural operations throughout the area.

Groundwater Conditions

Unconfined groundwater conditions extend across essentially the entire Kings Subbasin. Within the western portions of the subbasin, lacustrine and marsh deposits including the well-known regional clays, interbed with more coarse-grained alluvium. Historically, confined groundwater conditions existed below these regional clays, which have been identified as the A, C, and E clays. Currently, confined groundwater conditions still exist below the E and C clays. Groundwater below the A clay no longer appears to be confined. These clays are highly impermeable and restrict the vertical movement of water between more permeable beds wherever they occur. The most extensive and hydrologically important of these aquitards is the E-clay, commonly known as the Corcoran Clay, which is present beneath the approximate western third of the Kings Subbasin, where the depth to the top of the Corcoran Clay ranges from approximately 350 to 550 feet.

Figure ES-3 shows the Spring 2017 groundwater surface elevation contours and general direction of unconfined groundwater flow in the Kings Subbasin for the seasonal high condition. In general, groundwater

flow is to the southwest within nearly the entire subbasin with a few notable exceptions where municipal and irrigation pumping in parts of the Kings Subbasin have influenced the direction of groundwater flow or the influence of recharge from basins and the major rivers can be seen.

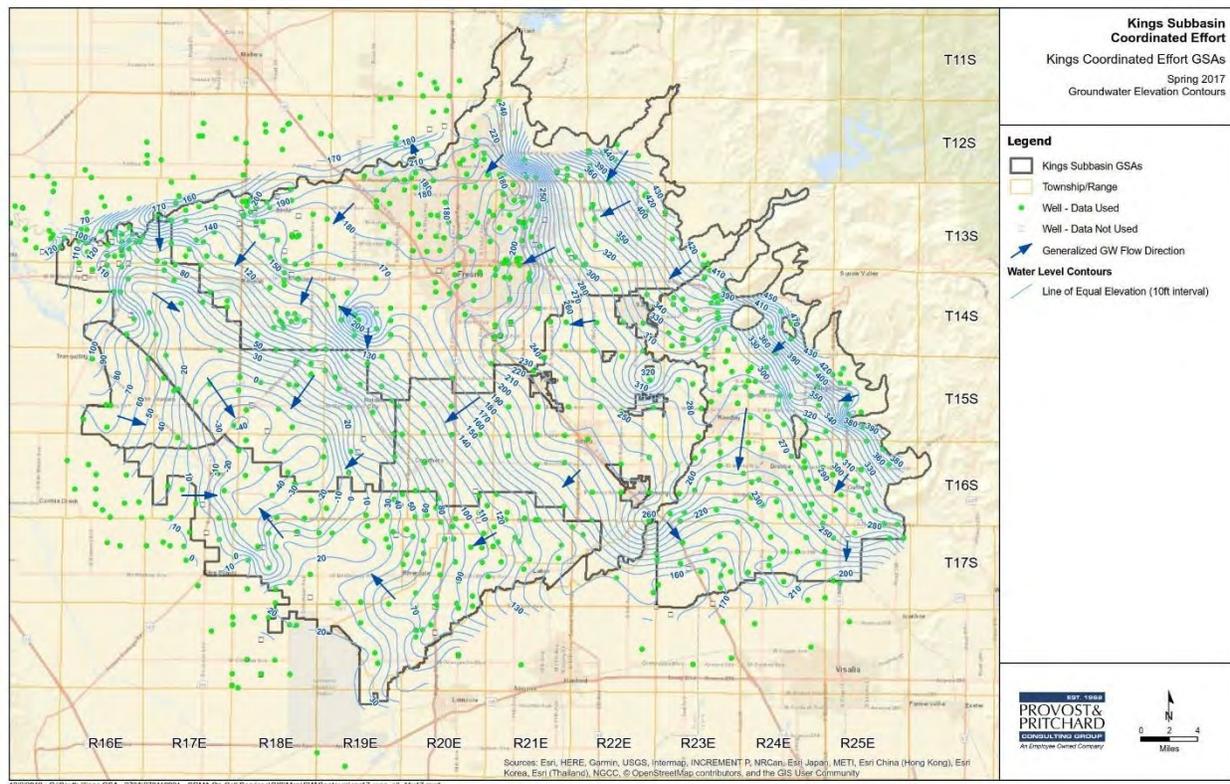


Figure ES-3: Groundwater Surface Elevation Contour Map (Spring, 2017)

In the Fresno-Clovis metropolitan area, an urban cone of depression is located north-northeast of the intersection of Highways 180 and 41 and has caused changes in the generally southwesterly groundwater flow direction as groundwater now moves toward the cone of depression under the urban area. There is also a general increase in groundwater gradient apparently associated with the finer grained deposits of the compound fan of intermittent streams south of the Kings River in the eastern portion of the Kings River East GSA.

In the west-southwest part of the subbasin, the lack of surface water supply combined with decades of agricultural pumping has influenced the natural direction of groundwater flow and created a cone of depression through the middle portion of McMullin GSA and the central portions of North Kings River GSA. The cone of depression has caused changes in the general flow direction and gradients as unconfined groundwater now moves toward the cone of depression from adjacent areas west of the Subbasin and southeast through McMullin GSA. Groundwater east of the Kings River in the Kings River East GSA flows southwesterly near the mountains and to the south-southeast near the Kings River.

Under natural flow conditions, the dominant flow direction in the Kings Subbasin was southwest, roughly perpendicular to the Sierra Nevada and towards the trough of the valley. The San Joaquin and Kings Rivers were historically locations of groundwater discharge and within about 2 to 4 miles of them groundwater flow deviated from the regional southwest direction and flowed towards them. The rivers and Fresno Slough being areas of groundwater discharge were thus gaining streams. Once pumping lowered water levels sufficiently, the San Joaquin and Kings Rivers, for the most part, became losing streams and groundwater started flowing away them.

Groundwater Levels

Depth to groundwater in the northeast side of the SKGSA is approximately 60 feet below ground and gets as low as about 75 feet below ground on the southwest side of Fowler. Higher water levels in Sanger are likely due to its proximity to the Kings River, which recharges the groundwater system through seepage.

The SKGSA used the same wells discussed in **Section 4** for groundwater level monitoring to track and report groundwater depth trends. The periods of record for these wells extend from the 1960s to 2019. One well near each city within SKGSA was chosen to represent groundwater levels for the respective areas. Long term rate of decline for each of the wells ranged from 0.15 feet per year to 0.40 feet per year, with an average rate of decline at 0.30 feet per year for SKGSA. Each of the Spring measurements for the five wells were averaged to create an average depth to water hydrograph for SKGSA, presented as **Figure ES-4**.

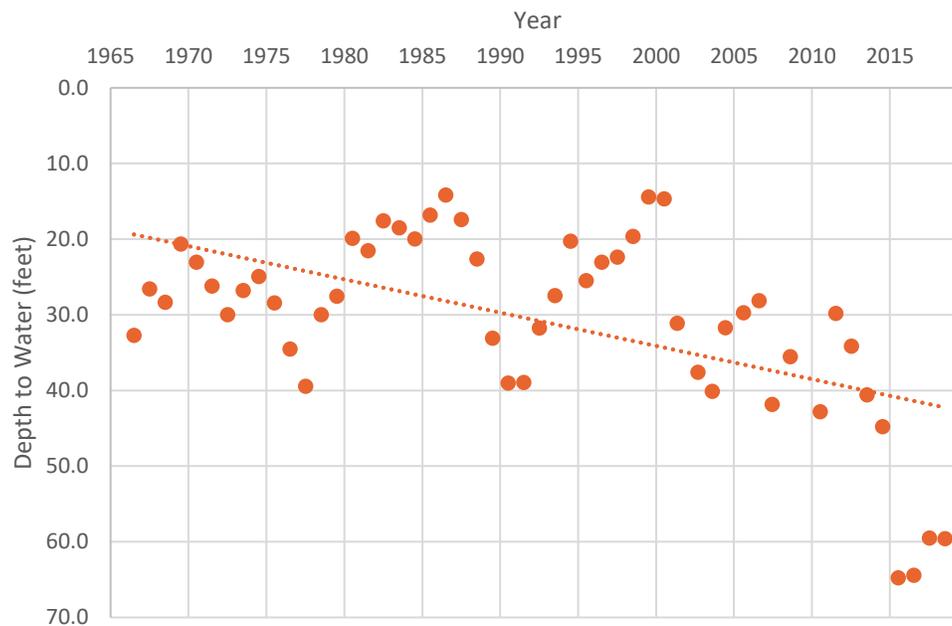


Figure ES-4: Average Depth to Water Measurements (Spring)

Groundwater Quality

Groundwater quality in SKGSA is generally suited for irrigation and domestic use, although there are a few groundwater issues for drinking water that exist. The water is generally described as being a calcium bicarbonate-type water but can also include magnesium, and sodium as the dominant cation. Typical water quality concerns throughout the basin include Nitrate, Arsenic, total dissolved solids (TDS), Dibromochloropropane (DBCP), 1,2,3-Trichloropropane (TCP), Methyl-Tert-Butyl-Ether (MTBE), and Uranium. While some of these constituents are caused by humans, several are naturally occurring.

Land Subsidence

One category of land subsidence occurs when groundwater levels decline due to excessive withdrawals of groundwater. There are two types of within this category of subsidence: elastic and inelastic. Elastic subsidence is recoverable if water levels later rise while inelastic subsidence is permanent. Although there are several causes of inelastic land subsidence, the compression of clay because of groundwater extraction from confined aquifers is the cause of the vast majority of subsidence documented in the San Joaquin Valley, west of the SKGSA. This results in compaction of fine-grained confining beds (clays) above and within the confined aquifer system as water is removed from pores between the sediment grains. Most of the permanent subsidence in the San Joaquin Valley has historically been correlated to overdraft in the confined aquifer below the Corcoran Clay.

However, with increased reliance on groundwater to meet demands, land subsidence is currently occurring in areas outside of the Corcoran clay. Even though subsidence is now occurring in areas outside of the Corcoran clay, the relative amount is less than the historical subsidence in areas underlain by the Corcoran Clay.

Land subsidence was first monitored from the 1920s to 1970s when there was less access to surface water. Subsidence monitoring decreased after the 1970s when there was more access to surface water due to the canals and water storage projects built in California and less reliance on groundwater to meet demands. Monitoring land subsidence increased again in the 2000s. Data from 2013 to 2017 was used to evaluate the land subsidence in the SKGSA area. Data sources include KRCD and NASA InSAR (Interferometric Synthetic Aperture Radar) data provided by DWR. **Figure ES-5** shows NASA InSAR data provided by DWR from May 2015 to April 2017. The legend shows the change in ground surface elevation and provides the most thorough aerial extent coverage of the GSA. There is minimal subsidence shown in the SKGSA area during this period. According to NASA InSAR data, the majority of the GSA has experienced zero to one inch of subsidence over the two years.

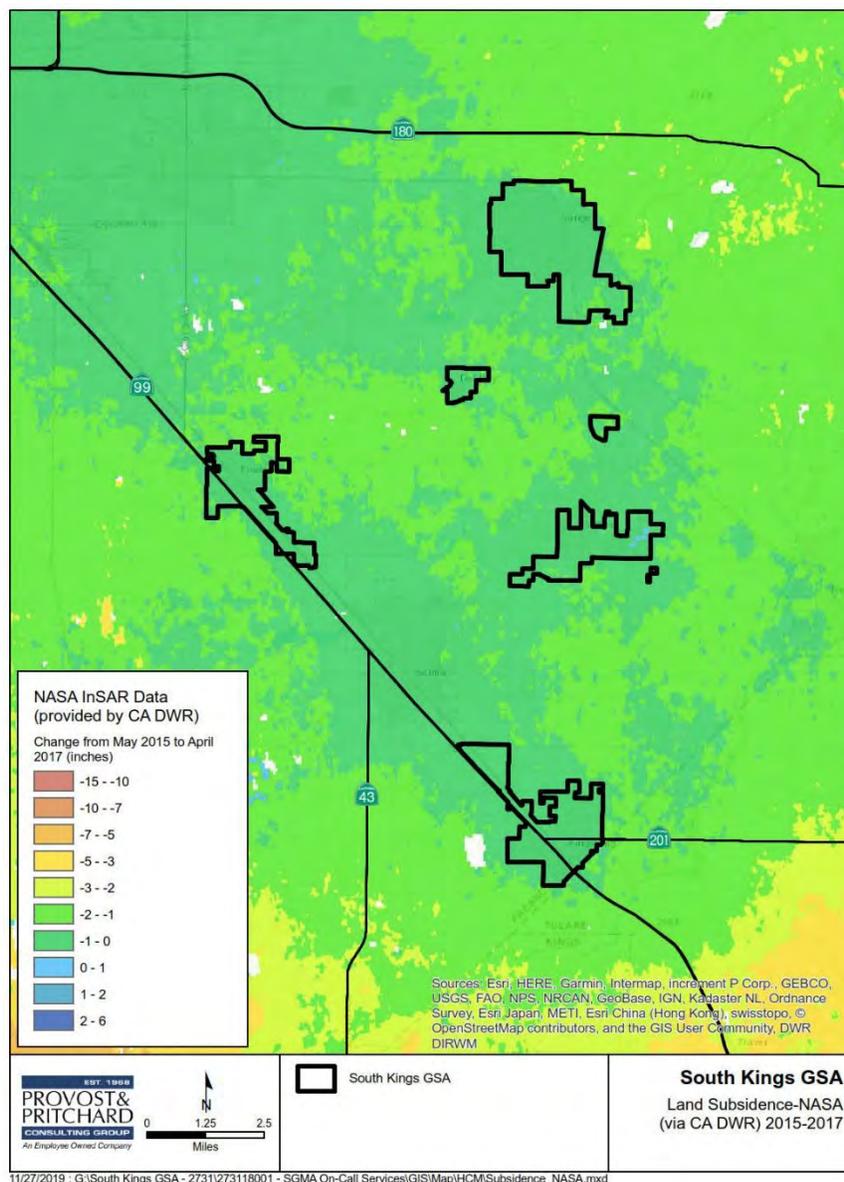


Figure ES-5: Land Subsidence for South Kings 2015 to 2017 (NASA)

Water Budget

A water budget is an accounting of all the water that flows into and out of a specified area and describes the various components of the hydrologic cycle. A water budget includes all the water supplies, demands, modes of groundwater recharge, and non-recoverable losses, making it possible to identify how much water is stored in a system and changes in groundwater storage during a given period. Aggregated water budgets have been prepared for the entire Kings Subbasin as well as detailed water budgets for the SKGSA and CKGSA combined. The water budgets for SKGSA and CKGSA were prepared in a combined manner due to the geographic positioning of the SKGSA being wholly within the CKGSA.

Water budgets were prepared for a historic period (1997-2011), current period (2016-2017) and future periods (2040 and 2070). The current water budget shows that the combined SKGSA/CKGSA is nearly, but not quite sustainable without an additional 1,100 acre-feet per year (AFY) in additional recharge; further, the combined area will require approximately 15,100 AFY by 2040 to remain sustainable. SKGSA and CKGSA determined the overdraft responsibility for each of the GSAs by estimating their Groundwater Impact, which is essentially their groundwater pumping minus any natural and artificial forms of recharge. Based on these discussions, an agreement was executed for SKGSA to account for approximately 42 percent of their groundwater extraction in recharge projects or through purchasing water from CKGSA. The SKGSA anticipates recharging an annual average of approximately 8,000 AF, based on population projections through 2040. As the member agencies grow and water use changes, that number may change and will potentially increase after 2040. Future water budgets beyond 2040 are based on assumption likely to require modifications as time progresses including population changes, conservation measures, boundary flows and climate change. With these and other uncertainties in the water budgets, they should be treated as approximations that will be updated as more concrete information is understood in the future.

Section 4 Sustainable Management Criteria

The SGMA defines Sustainable Groundwater Management as “*the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.*” The avoidance of undesirable results is important to the success of the GSP. Several requirements from GSP regulations have been grouped together under the heading of sustainable management criteria, including a sustainability goal, undesirable results, minimum thresholds, and measurable objectives for various indicators of groundwater conditions.

The sustainability goal of the Kings Basin and the SKGSA is to ensure that by 2040 the basin is being operated to maintain a reliable water supply for current and future beneficial uses without experiencing undesirable results. This goal will be met by balancing water demand with available water supply to stabilize declining groundwater levels without significantly and unreasonably impacting water quality, land subsidence or interconnected surface water. The goal of the Basin is to correct and end the long-term trend of a declining water table understanding that water levels will fluctuate based on the season, hydrologic cycle and changing groundwater demands within the basin and its proximity.

The conditions with the basin and this GSA will be considered sustainable when:

- The basin is continuously operated within its sustainable yield.
- The current rate of decline of the groundwater table within the basin monitoring network indicator wells has been corrected and the multi-year trend of water elevations in these wells has been stabilized.
- Groundwater management activities prevent Undesirable Results to groundwater levels, groundwater storage, groundwater quality, land subsidence and interconnected surface water.

The seven GSAs within the Kings Basin have been coordinating within the basin for several years on how to reach and maintain sustainability within the Basin. As described in **Section 3**, the Kings Basin includes significantly varied geologic conditions, water supplies and land uses that lead to different conditions and

obligations within each GSA. The basin setting describes the trend of declining groundwater levels within the basin and the SKGSA. The degree of decline varies by location based primarily on land use and available surface water supplies. The Basin setting information, including historic groundwater conditions, surface supplies, groundwater flows, land use and other information were used to establish the water budget, estimates of overdraft within each GSA and sustainable yield. The coordination efforts between the GSAs have resulted in agreed to initial quantities for each GSA to correct in order to correct current and future conditions. These quantities and each GSAs respective obligation will continue to be monitored and evaluated as additional information is gathered.

Each GSA in the Kings Basin is responsible for implementing projects and management actions required to reach sustainability and meet their initial mitigation requirements for overdraft. The measures that will be implemented to ensure the basin will be operated within the sustainable yield are identified in detail in **Section 6** of the GSP. Collectively, these projects and programs have been identified to ensure the basin reaches sustainability by 2040. The projects and programs include technical data and estimates of project benefit, and the total of these benefits within the basin meet the initial estimates for reaching sustainability within the basin.

The basin has agreed to a phased approach of increasing mitigation to achieve sustainability. The proposed mitigation schedule is shown in the table below.

Table ES-1: Overdraft Mitigation Schedule

| Period | Percent of Overdraft Mitigated | Cumulative Mitigation |
|-----------|--------------------------------|-----------------------|
| 2020-2025 | 10% | 10% |
| 2025-2030 | 20% | 30% |
| 2030-2035 | 30% | 60% |
| 2035-2040 | 40% | 100% |

Groundwater Levels

The GSAs within the Kings Basin have defined the Undesirable Result for groundwater levels as a result that would cause significant and undesirable reduction in the long-term viability of domestic, agricultural, municipal or environmental uses over the planning and implementation period of this GSP. Groundwater levels will continue to decline until the basin can reach sustainability. Figure ES-6 shows a typical well hydrograph and the planned incremental overdraft mitigation to reach the Measurable Objective and sustainability in 2040. The Measurable Objective is the elevation at an Indicator Well that will be stabilized and maintained over time. This is the elevation at each Indicator Well that the GSAs will be managing the basin to maintain. A Minimum Threshold is the groundwater elevation at an Indicator Well that when exceeded in combination with minimum thresholds at other Indicator Wells, may cause an undesirable result in the basin. The Minimum Threshold elevations have been set based on 5-year drought conditions. The GSAs in the basin acknowledge that some shallow wells will go dry, so the GSAs will develop a shallow well mitigation program to help address the impacts to wells that are shallower than the minimum thresholds within the basin. A more detailed description of the proposed shallow well mitigation program is included in Chapter 6.

~~The GSAs within the Kings Basin have defined the Undesirable Result for groundwater levels to be significant and unreasonable when either the water level has declined to a depth that a new productive well cannot be constructed, or when the water level has declined to a depth that water quality cannot be treated for beneficial use.~~

~~The following figure (Figure ES-6), shows a typical hydrograph of a monitoring well used to track groundwater levels in the SKGSA. The minimum thresholds established are based on implementation of incremental correction of the historic decline starting immediately and reaching stabilization by 2040. The measurable~~

~~objective will include the extension of a current stabilizing trendline and the minimum threshold is a projection of the groundwater depth if another 5-year drought were to occur, based on the rate of decline of the last historic drought.~~

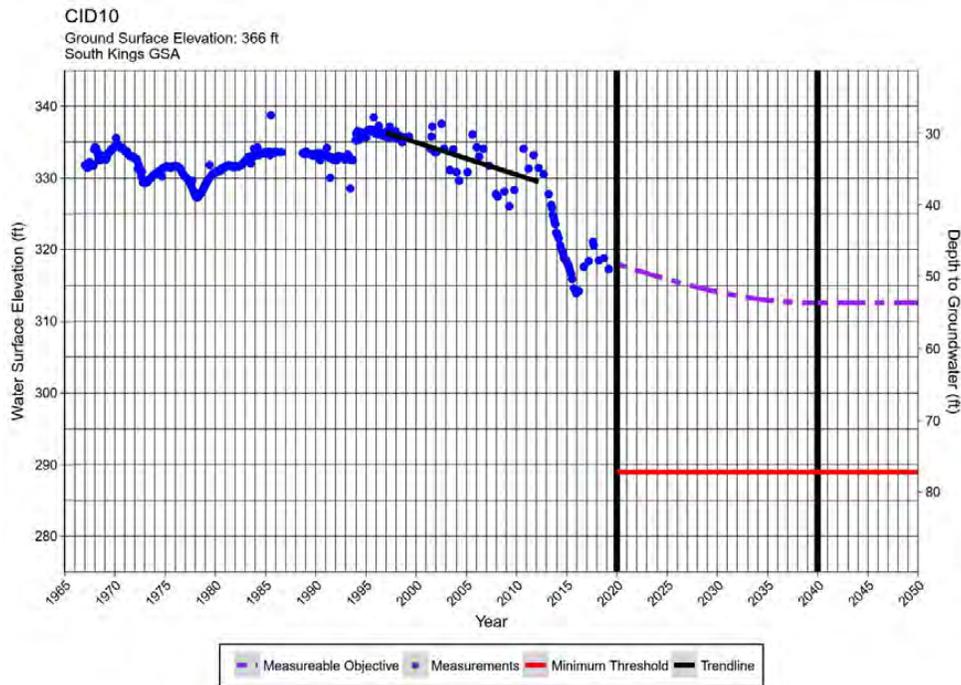


Figure ES-6: SKGSA Monitoring Well Hydrograph

Groundwater Storage

Groundwater storage is directly linked to groundwater levels, and the measurable objective and minimum threshold for groundwater levels dictate the amount of groundwater in storage and available for cyclic use once. A common method was utilized to estimate change in groundwater storage for the entire subbasin and within each GSA as part of the coordination efforts within the Kings Subbasin. Storage change was estimated for the Kings Subbasin to be approximately -1.8 million acre-feet during the hydrologic average base period from spring 1997 to spring 2012, or about -122,000 AFY. Estimated storage change in the lower confined aquifer is not possible at this time due to limited or no data from confined wells in the area. Additionally, vertical leakage in the unconfined aquifer through wells and aquitards captures storage change in the confined aquifer. The goal, by 2040, is to stabilize changes in groundwater storage, prevent groundwater storage from falling below the overall storage shown in the measurable objectives, and to prevent the groundwater storage from fluctuating below the minimum thresholds.

Seawater Intrusion

As the SKGSA is more than 100 miles from the nearest seawater, seawater intrusion is not anticipated to effect the GSA and is not discussed further in this GSP.

Groundwater Quality

Groundwater monitoring and reporting by community water systems is a requirement of California Code of Regulations (CCR) Title 22. Community and other public supply wells within the SKGSA monitoring network are already being routinely monitored for a wide range of contaminants, including the chemicals of concern, by the water purveyors under Title 22. The SKGSA will only have authority related to groundwater pumping policies, however the SKGSA will review and analyze publicly available routine groundwater monitoring data,

as it becomes available, in order to monitor if groundwater pumping may be exacerbating groundwater quality concerns and where to enforce pumping restrictions should it become necessary.

Within the Kings Basin, the measurable objective shall be to maintain water quality at potable water standards, or in other words, below MCLs for the chemicals of concern. In areas where chemical concentrations are initially above MCLs, the measurable objective shall be to maintain stable or improving groundwater quality trends.

Land Subsidence

~~The sustainability goal for the basin with 20 years of Plan implementation is to eliminate land subsidence that is caused by actions within the GSA's control. The measurable objective for annual land subsidence will be 1 inch/year, to allow for the error of the InSAR data. A cumulative subsidence amount of 3 feet was identified as the minimum threshold, however to address subsidence before reaching the minimum threshold, subsidence of one foot within a 36 square mile area in the GSA would trigger management actions. As discussed above, NASA InSAR data shows that subsidence in most of the SKGSA area was between 0 and 1 inch over a two-year period. This amount of subsidence is considered very minimal and has had no visual impacts on structures or wells. Furthermore, most inelastic subsidence occurs when there is heavy pumping from below a confining layer such as the E clay; however, this layer does not extend to the SKGSA area, thus subsidence is not anticipated to be an issue. Lastly, as groundwater levels are stabilized over the implementation of this plan, the minimal subsidence is expected to do the same. Therefore, no criteria needs be established for sustainable management criteria. It is planned that there will be periodic checkups to identify if this assertion continues to be true. If trends do not behave as expected, criteria may be established in the future as needed~~

Interconnected Surface Water and Groundwater

Interconnected surface water has been defined in the California Code of Regulations Title 23, Division 2, Chapter 1.5, Subchapter 2 as 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.

~~Most of the wells in SKGSA are a few miles from the Kings River and may not impact surface water flows. The only place that SKGSA may be close enough to affect river flows is in the south east corner of Sanger; however, most of the wells for municipal use are located closer to the center of town, away from the river. The only other surface water in the SKGSA area are a couple of Consolidated ID canals that run through the cities, but groundwater depth throughout the rest of the GSA ranges from 40 to 80 feet, indicating a lack of connection. Due to the current lack of undesirable results and the unlikely event that undesirable results will occur caused by SKGSA pumping, sustainable management criteria will not be evaluated for interconnected surface water.~~

Existing data shows that the Kings River is likely interconnected in some reaches but unconnected in others. More information is needed to fully understand the interconnection between surface water and groundwater in the SKGSA. As a result, a detailed data gap study will be performed to identify interconnected sections, evaluate if wells are impacting surface water, and whether those impacts require development of sustainable management criteria. In addition, well setback requirements will be researched and potentially enacted to avoid impacts to the Kings River

Section 5 Monitoring Network

This chapter identifies the monitoring network being developed by the SKGSA that collects sufficient data to determine short-term, seasonal, and long-term trends in groundwater and related surface conditions and will

yield information necessary to support the implementation of this Plan, evaluation of the effectiveness of this Plan, and decision making by the SKGSA management.

The following figure illustrates the monitoring well network for the SKGSA. The SKGSA will continue to evaluate potential new monitoring well sites, the efficacy of existing monitoring wells, and opportunities to more fully understand the regional data by reviewing nearby well data. Separate monitoring wells are identified to monitor water quality, otherwise all criteria will be evaluated utilizing the remaining wells.

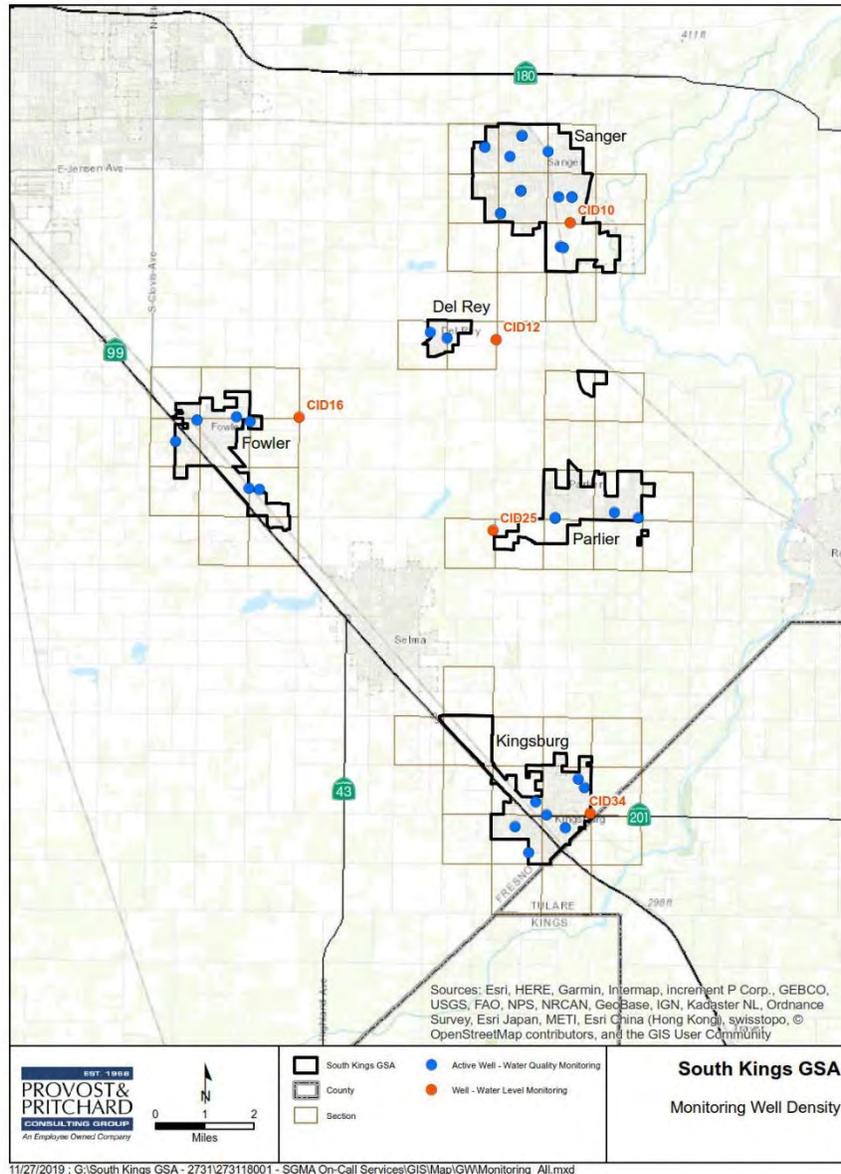


Figure ES-7: SKGSA Monitoring Wells

Chapter 6 Projects and Management Actions to Achieve Sustainability

GSA's have two primary types of tools which may be used to achieve sustainable groundwater management: potential Projects and Management Actions. The SKGSA will reach sustainability if it implements both projects and management actions to mitigate impact of groundwater extraction. The SKGSA efforts focus primarily on

recharge of groundwater supplies within the GSA and reduction of groundwater demand and increase of data collection including education and outreach, regulatory policies, incentive-based programs, and enforcement actions.

The SKGSA has identified nineteen potential Projects which may be undertaken by the GSA or individual member agencies to aid in achieving sustainability. Each of the projects are a recharge basin and would allow the member agency the ability to recharge surface water supplies. The recharge basins allow for surface water to be diverted and recharged to replenish the aquifer. If the rain/snowmelt patterns change and more surface water is available outside the normal crop irrigation demand season, these proposed facilities may allow each member agency to take advantage of the timing of the surface water availability and may make more surface water available for recharge.

The SKGSA has identified nine Management Actions which may be undertaken by the GSA or individual member agencies to aid in achieving sustainability. The identified potential Management Actions discussed in Section 6 may be implemented in any order or not at all if determined unnecessary based on sustainability achievement through other methods. The Management Actions may be further refined or revised based on stakeholder input and/or updated available information and/or science. The Management Actions identified include: Education and Outreach, Wellhead Requirements, and Groundwater Pumping Restrictions.

Between the potential Projects and Management Actions, the GSA has identified at least 7,848 AFY of mitigation against groundwater extraction by 2040, which achieves the goals set forth in this GSP. This mitigation amount does not include estimates of benefits from potential Management Actions. The GSA understands the Projects and Management Actions are uncertain, may take longer to implement and may yield varying levels of benefits from those discussed in this GSP. The GSA is equipped to modify and expand, as necessary, to achieve its sustainability goals. Modifications to these Projects and Management Actions will be included in subsequent updates to the GSP.

Chapter 7 Plan Implementation

The adoption of the GSP will be the official start of the Plan Implementation. The GSA will continue its efforts to engage the public and secure the necessary funding to successfully monitor and manage groundwater resources within the Plan Area in a sustainable manner. While the GSP is being reviewed by DWR, the GSA will coordinate with various stakeholders and beneficial users to improve the monitoring network and begin the implementation of projects and management actions. The plan will be implemented under the existing authorities of both the GSA and the member agencies, and, through coordinated activities, the groundwater resources of the region will now be managed.

Section 7 includes estimates of costs of implementing the GSP, including Projects and Management Actions; administration costs will be spread proportionally across the member agencies.

Successful implementation of this GSP will be an ongoing effort through 2040 and beyond. The GSA is committed to meeting their sustainability goals and will continue to modify and adjust its approach, when necessary. Those efforts will include engaging stakeholders and the public, monitoring and evaluating groundwater and environmental data pertaining to the GSP sustainability indicators, and overall basin operation and coordination with the other GSAs in the Kings Subbasin.

The GSA will include updates to changes to the GSP or policy changes in its annual report and submit to that report to DWR. Certain components of the GSP may be re-evaluated more frequently than every five years, if deemed necessary. This may occur, for example, if sustainability goals are not being met, additional data is acquired, or priorities change. Those results will be incorporated into the GSP when it is resubmitted to DWR every five years.

4 Sustainable Management Criteria

Regulation Requirements:

§354.22 This Subarticle describes criteria by which an Agency defines conditions in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.

The SGMA defines Sustainable Groundwater Management as “the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.” The avoidance of undesirable results is important to the success of the GSP. Several requirements from GSP regulations have been grouped together under the heading of sustainable management criteria, including a sustainability goal, undesirable results, minimum thresholds, and measurable objectives for various indicators of groundwater conditions. These terms are provided in the table below:

Table 4-1: Sustainability Criteria Definitions

| Term | Definition |
|----------------------|--|
| Sustainability Goal | A succinct qualitative statement including objectives and desired conditions of the groundwater basin, how the basin will get to that desired condition, and why the measures planned will lead to success. |
| Measurable Objective | Quantitative goals that reflect the basin’s desired groundwater conditions and allow the GSA to achieve the sustainability goal within 20 years. |
| Minimum Threshold | The quantitative value that represents the groundwater conditions at a monitoring site that, when exceeded individually or in combination with minimum thresholds at other monitoring sites, may cause undesirable result(s) in the basin. |
| Undesirable Result | A situation that occurs when conditions related to any of the six sustainability indicators become significant and unreasonable. |

Indicators for the sustainable management of groundwater were identified in the SGMA legislation based on what is important to the health and general well-being of the public. The six indicators that must be monitored throughout the planning and implementation period of the GSP are shown below:



Figure 4-14-1: Sustainability Indicators

This section will describe each indicator, explain why they are significant, and define the management thresholds. Development of these Sustainable Management Criteria is dependent on basin information developed and presented in the hydrogeologic conceptual model, groundwater conditions, and water budget sections of this GSP.

4.1 Sustainability Goal

Regulation Requirements:

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

The sustainability goal of the Kings Basin and this GSA is to ensure that by 2040 the basin is being operated to maintain a reliable water supply for current and future beneficial uses without experiencing undesirable results. This goal will be met by balancing water demand with available water supply to stabilize declining groundwater levels without significantly and unreasonably impacting water quality, land subsidence or interconnected surface water. The goal of the Basin is to correct and end the long-term trend of a declining water table understanding that water levels will fluctuate based on the season, hydrologic cycle and changing groundwater demands within the basin and its proximity.

The conditions with the basin and this GSA will be considered sustainable when:

- The basin is continuously operated within its sustainable yield.
- The current rate of decline of the groundwater table within the basin monitoring network indicator wells has been corrected and the multi-year trend of water elevations in these wells has been stabilized.
- Groundwater management activities prevent Undesirable Results to groundwater levels, groundwater storage, groundwater quality, land subsidence and interconnected surface water.

The seven GSAs within the Kings Basin have been coordinating within the basin for several years on how to reach and maintain sustainability within the Basin. As described in **Section 3**, the Kings Basin includes significantly varied geologic conditions, water supplies and land uses that lead to different conditions and obligations within each GSA. The basin setting describes the trend of declining groundwater levels within the basin and this GSA. The degree of decline varies by location based primarily on land use and available surface water supplies. The Basin setting information, including historic groundwater conditions, surface supplies, groundwater flows, land use and other information were used to establish the water budget, estimates of overdraft within each GSA and sustainable yield. The coordination efforts between the GSAs have resulted in agreed to initial quantities for each GSA to correct in order to correct current and future conditions. These quantities and each GSAs respective obligation will continue to be monitored and evaluated as additional information is gathered.

Each GSA in the Kings Basin is responsible for implementing projects and management actions required to reach sustainability and meet their initial mitigation requirements for overdraft. The measures that will be implemented to ensure the basin will be operated within the sustainable yield are identified in detail in **Section 6** of the GSP for each GSA in the basin. Collectively, these projects and programs have been identified to ensure the basin reaches sustainability by 2040. The projects and programs include technical data and estimates of project benefit, and the total of these benefits within the basin meet the initial estimates for reaching sustainability within the basin.

The basin has agreed to a phased approach of increasing mitigation to achieve sustainability. The proposed mitigation schedule is shown in the table below.

Table 4-2: Overdraft Mitigation Schedule

| Period | Percent of Overdraft Mitigated | Cumulative Mitigation |
|-----------|--------------------------------|-----------------------|
| 2020-2025 | 10% | 10% |
| 2025-2030 | 20% | 30% |
| 2030-2035 | 30% | 60% |
| 2035-2040 | 40% | 100% |

Note these are minimum goals and progress may be faster than described. A phased approach with gradually increasing progress was selected since time will be necessary to secure funding, plan, design and build projects, and finalize water transfer deals. Furthermore, if recharge or banking projects are developed, a wet period will be needed before projects are realized. Consequently, efforts will be consistent throughout the 20-year period, but many benefits will not be seen until the latter years. Each GSA in the basin is planning to implement projects and management actions in accordance with the agreed mitigation targets. The GSAs will continue to meet regularly to review data to ensure all GSAs are meeting their milestones and progress is being made toward sustainability.

4.2 Groundwater Levels

4.2.1 Undesirable Results

4.2.1.1 Criteria to Define Undesirable Results

Regulation Requirements:

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

The SGMA regulations define Undesirable Results for groundwater levels as:

“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.” [CWC §10721(x)(1)]

The undesirable result for chronic lowering of groundwater levels is a result that would cause significant and undesirable reduction in the long-term viability of domestic, agricultural, municipal or environmental uses over the planning and implementation period of this GSP. The terms “significant and unreasonable” are not defined by regulations, rather the conditions leading to this classification are determined by the GSA, beneficial users, and the basin they are a part of. The process used to develop criteria for determining undesirable results began with discussions with stakeholders and landowners. Primary concerns related to Undesirable Results for groundwater levels were:

- Groundwater levels declining in dry periods to a point that they will not likely recover during normal/wet periods
- A significant and unreasonable number of shallow domestic wells going dry

Identification of Undesirable Results is based on the monitoring network of Indicator Wells described in Section 5. The GSAs in the Kings Basin have defined the Undesirable Result as occurring when 15% of the

Indicator Wells have exceeded the Minimum Threshold during a single monitoring event. This value was chosen to provide a balance between unanticipated hydrology, potentially erroneous data, and coverage of a significant area within the GSA. Exceedance of a Minimum Threshold at a single Indicator Well is not necessarily sufficient to indicate GSA-wide conditions are causing undesirable results.

The sustainability goal and the undesirable results provide the qualitative basis for the quantitative sustainable management criteria described below:

- **Measurable Objective** is the quantitative goal that will allow the basin to achieve its sustainability goal within the 20-year planning period. More specifically, the measurable objective is the elevation at an Indicator Well that will be stabilized and maintained over time. The measurable objective has been set such that there is a reasonable margin of operational flexibility that will accommodate droughts, climate change, and conjunctive use operations. The GSAs in the basin will manage the basin to the measurable objectives using adaptive management and implementing the projects and management actions described in Section 6 when needed to ensure sustainability will be achieved.

The basin is currently not in a sustainable condition, and GSAs recognize that it will take several years to reach sustainability. The measurable objective was set based on the decline in each Indicator Well within the monitoring network during a recent period of average surface water deliveries within the basin from 1997 to 2012, and an incremental mitigation correction planned to reach sustainable water levels during the planning period. Hence, the Measurable Objective is based on what is considered a reasonable level of continued decline, since halting the overdraft before 2040 would not be practical or even feasible given the current and anticipated future water supply conditions. A more detailed description of the measurable objective is included later in this section.

- **Interim Milestones** are 5-year target groundwater levels at each Indicator Well that have been set for the basin to reach sustainability over the 20-year planning period. The interim milestones have been set based on the long-term average hydrologic conditions and the planned projects and management actions the GSAs will use to make incremental improvement toward sustainability over the 20-year planning period. The GSAs will manage the basin to these Interim Milestones during the planning period by comparing hydrologic conditions to historic average conditions and implementing management actions if needed to maintain a path to sustainability.
- **Minimum Threshold** is the groundwater elevation at an Indicator Well that when exceeded in combination with minimum thresholds at other Indicator Wells, may cause an undesirable result in the basin. More specifically for groundwater levels, the minimum threshold is the groundwater elevation below which significant and unreasonable impacts to beneficial users occurs. As noted previously, the primary concerns for groundwater users and uses were groundwater levels declining to a point that would not recover to sustainable levels, or declining to levels that would cause a significant and unreasonable number of shallow wells to go dry. Although the undesirable result (as defined) may not occur until water levels are below the minimum threshold, the basin will use the 5-year milestones and minimum threshold levels as trigger for operational change.

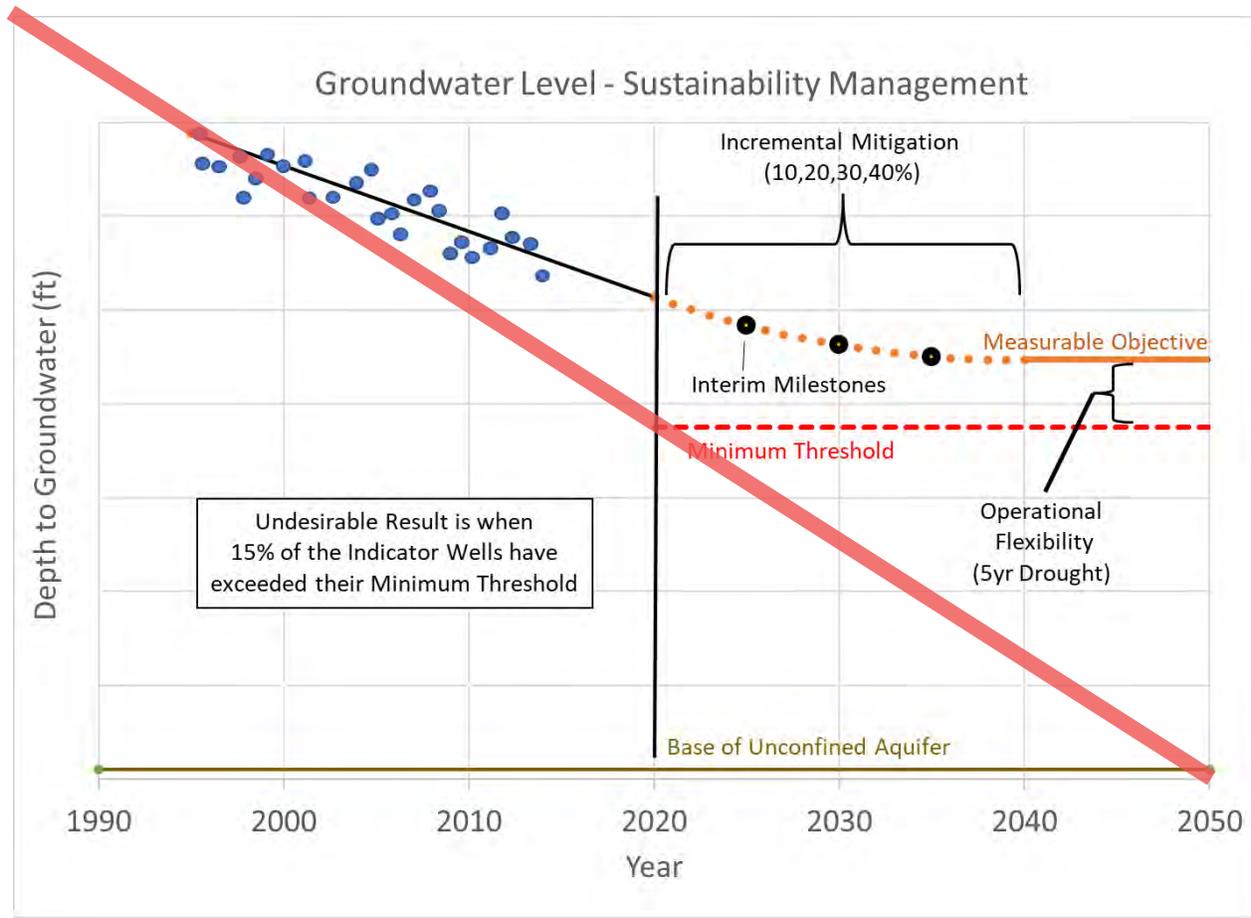
The Kings Basin GSAs recognize that some wells will go dry, and the GSAs have indicated that it is not significant and unreasonable impacts if less than 15% of the shallow wells in the basin go dry. However, DWR has indicated through public comment and direct consultation with the basin that GSAs need to demonstrate how an impact to even just one single well is not significant and unreasonable. The shallowest wells in the basin are typically private domestic wells. Using the shallowest wells within the basin as a control to maintain water levels is impractical considering well construction has varied significantly and many wells may have been constructed too shallow, not considering or having been approved for sustainable or planned groundwater elevations.

Agricultural uses are the largest groundwater user within the basin and agriculture production is the primary economic driver for the region. Setting minimum thresholds to maintain water levels to the shallowest well in an area would cause a significant and unreasonable economic impact to the basin's varied groundwater users, including agriculture users and the many communities that are solely groundwater dependent because of the significant demand reduction it would require for all users. This is especially true when considering that suitable wells can be constructed deeper within the basin. The Kings Basin has a very large aquifer with existing water levels well above the base of the unconfined aquifer, and as shown in Chapter 2 – Basin Setting, recent water levels are several hundred feet above the base of the aquifer in much of the basin. Because the aquifer is so significant and of such good quality in most of the basin, a productive well of suitable quality can still be constructed as water levels continue to decline until sustainability is reached.

Considering the economic, social and environmental impacts to domestic, agricultural, municipal and other groundwater users as well as the correlation to other sustainable management criteria, the basin plans to have groundwater levels continue to decline until sustainability can be reached within the planning period, but develop a program to address shallow well impacts. The Minimum Thresholds have been set below the measurable objective based on the needed operational flexibility to accommodate dry hydrologic conditions. Operational flexibility is the elevation difference between the Measurable Objective and the Minimum Threshold. During dry periods, more groundwater pumping will occur causing groundwater levels to decline below measurable objective levels. This Operational Flexibility is based on a five-year drought period. This amount of Operational Flexibility is consistent with other GSPs in the State that were approved. A more detailed description of the minimum threshold is included later in this chapter.

The GSAs in the basin acknowledge that some shallow wells will go dry, so the GSAs will develop a shallow well mitigation program to help address the impacts to wells that are shallower than the minimum thresholds within the basin. A more detailed description of the proposed shallow well mitigation program is included in Chapter 6. At the time of the initial GSP submittal in January of 2020, not all of the GSPs in the Kings Basin included an analysis of the potential shallow well impacts. Each GSA now includes an analysis of the potential number of shallow wells impacted by the Minimum Thresholds.

These terms are illustrated in Figure 4-2.



The GSAs within the Kings Basin have defined the Undesirable Result for groundwater levels to be significant and unreasonable when either the water level has declined to a depth that a new productive well cannot be constructed, or when the water level has declined to a depth that water quality cannot be treated for beneficial use.

As defined by the Basin, the Undesirable Result in much of the Basin is actually below the elevation of the Minimum Threshold. The Kings Basin has a very large unconfined aquifer with existing water levels well above the base of the unconfined aquifer. Much of the basin has a significant amount of water available above a level where an Undesirable Result would occur. Because the aquifer is so significant and of such good quality in most of the Basin, the requirement to stabilize water levels by 2040 becomes the controlling condition for setting target water levels. The water level elevation at the point of stabilization is the Measurable Objective. The measurable objective was set based on the historic decline in each Indicator Well within the monitoring network, and an incremental mitigation used to determine the future water levels. A more detailed description of the measurable objective is included later in this section.

The minimum threshold was set at an elevation to allow operational flexibility of the anticipated water level decline during a 5 year drought. The actual decline during the historic 2012-2016 drought was determined and the minimum thresholds were set by adding that distance below the measurable objective for each Indicator Well in the network. A more detailed description is provided later in this section.

Therefore, for much of the basin there will still be a significant aquifer of suitable quality below the levels set as the minimum threshold. Meaning a productive well of suitable water quality could still be constructed if the water level drops below the minimum threshold. The figure below illustrates this idea that for much of the

basin, the minimum threshold is actually set at a level above the level of Undesirable Result (where there is no longer adequate water supply of suitable water quality).

Although the undesirable result (as defined) may not occur until water levels are well below the minimum threshold, the requirement to operate at the basin at the Measurable Objective will control and the basin will use the milestone and minimum threshold levels as the indicator level for the need for operational change. Therefore, unless otherwise defined for a portion of a GSA, the basin will use the Minimum Threshold level as the point at which the effects of the groundwater decline become significant and unreasonable.

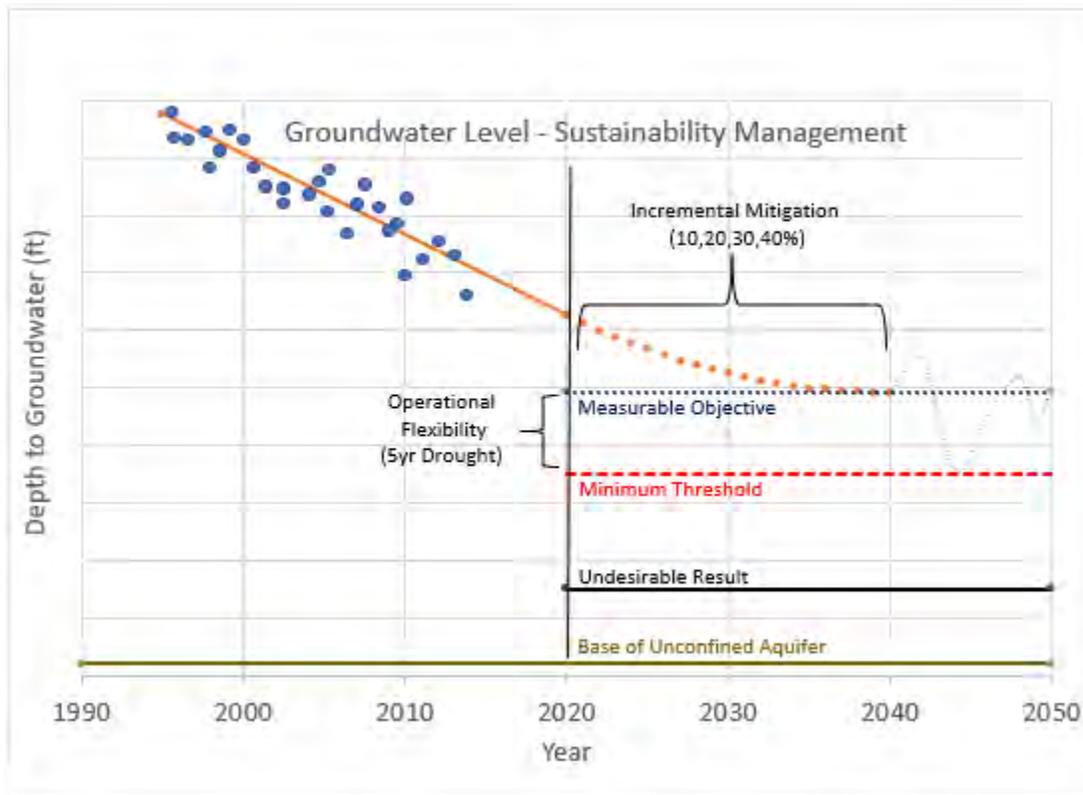


Figure 4-2: Groundwater Level – Sustainability Management

The GSAs in the basin recognize that water levels will continue to decline until the overdraft within the basin, and the impact of pumping from neighboring basins has been corrected. The GSAs also recognize that during this time, the water level may decline below the depth of some wells within the basin. Well construction has varied over the years and wells have been constructed at varying depths, and the construction depth of all wells in the basin is not known at this time. Some wells, even recently constructed wells, may have been poorly constructed or constructed too shallow for long term operation. SGMA does not require the GSA to maintain current water levels or prevent any wells from going dry. Rather, the GSA is required to stabilize and correct groundwater decline. Until water levels have been stabilized and the basin has reached sustainability, the GSA does not view a well going dry as an undesirable result.

Within each GSA there may be exceptions or additional considerations for the groundwater level undesirable result described within each GSA's GSP. The SKGSA has no exceptions or additions to this definition.

4.2.1.2 Causes of Groundwater Conditions That Could Lead to Undesirable Results

Regulation Requirements:

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

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

Each Indicator Well has a unique Minimum Threshold elevation, so the elevation at which an undesirable result occurs varies throughout the basin and each GSA. The continued decline of water levels below the minimum threshold would be the undesirable result. The decline of the water table below minimum threshold levels could be caused by:

- GSAs not correcting the overdraft at the basin-agreed incremental mitigation rates described later in this section.
- Hydrologic cycle significantly drier than historic average conditions.
- Extended or worse drought conditions than the historic 2012-16 drought.
- Neighboring GSAs and Basins not correcting boundary flow losses to the Kings Basin and its GSAs.
- Increased demand and pumping beyond what are planned for in the water budget
- Reduction of long-standing surface water supplies as a result of State or Federal regulations leading to the need for increased groundwater pumping in the Kings Basin or neighboring basins

As noted above, for much of the basin there will still be a significant amount of suitable water supply well below the minimum threshold and above the point at which a productive well of suitable water quality could no longer be constructed.

Regulation Requirements:

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

(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

The GSAs in the Kings Basin have defined the Undesirable Result as occurring when 15% of the Indicator Wells in a GSA have exceeded the Minimum Threshold during a single monitoring event (spring or fall). For the South Kings GSA, that is 1 of the 5 Indicator Wells listed in the monitoring network discussion. The 15% was chosen to provide a balance between unanticipated hydrology, potentially erroneous data, and coverage of a significant area within the GSA. ~~Water level declining below the minimum threshold in one of the GSA's indicator wells in the monitoring network will be considered significant. The regulations and DWR BMP for chronic lowering of groundwater levels recommend significant and unreasonable being considered when some percentage of wells have dropped below minimum thresholds. However, with the monitoring network having indicator wells represent large areas, the exceedance of the minimum threshold at just one well location is significant based on how the basin has determined the minimum thresholds described later in this section. The water level decline to this point would potentially be significant to the stakeholders in the proximity of this indicator well and warrant further evaluation by the GSA and potential action. Therefore, the exceedance of one minimum threshold will trigger further action by the GSA.~~

Regulation Requirements:

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

(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

The primary effect of the chronic lowering of the groundwater table has caused wells to be drilled deeper and deeper to maintain productivity. Without correcting the basin to sustainability and stabilizing the water table, the decades long trend of drilling deeper and deeper wells would continue causing increased financial burden on stakeholders. In some areas of the basin, bedrock is shallow and the availability of supply above the bedrock could be diminished such that productive wells could not be constructed if water levels are not stabilized above these levels. In some portions of the basin, as water levels decline, the water quality changes significant enough

to require additional treatment. Stabilizing the water table will reduce the changing conditions and provide for more sustainable long-term conditions within the basin. [The development of shallow well mitigation program described in Chapter 6 will help to address some of the potential effects to shallow well owners.](#)

4.2.1.3 Evaluation of Multiple Minimum Thresholds

Regulation Requirements:

§354.26 (c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

The GSA, in coordination with the other GSAs in the basin will utilize multiple wells to monitor and manage the GSA and basin. Indicator wells of approximately two per township (with more where necessary and available) have been identified, and Measurable Objectives and Minimum Thresholds will be set at each of these wells. [As described previously, the exceedance of the minimum threshold at 15% of the Indicator Wells in the GSA is significant and will trigger further investigation and action by the GSA.](#) A detailed description of the GSA's monitoring network is included in **Section 5** of this GSP.

4.2.2 Minimum Thresholds

Regulation Requirements:

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

The GSA, in coordination with the other GSAs in the basin, has established a monitoring network with multiple indicator wells. A measurable objective and minimum threshold for groundwater levels have been determined at each of these indicator wells for the unconfined aquifer. The minimum threshold was set at an elevation to allow operational flexibility of the anticipated water level decline during a 5-year drought. [For most Indicator Wells in the network, the operational flexibility below the measurable objective was set based on the actual decline during the historic 2012-2016 drought and increased by 20% to estimate the impacts of a five-year droughts. The Operational Flexibility was used because of changing hydrologic conditions and concerns for extended periods of drought in the future. This amount of Operational Flexibility is consistent with methods used in other GSPs approved by the State.](#) ~~was determined and the~~ The minimum thresholds were set by adding that distance below the measurable objective for each indicator well in the network. [As additional data and understanding is gained during the planning period, it is recognized that the Minimum Threshold elevations may be updated.](#) A more detailed description is provided later in this section.

Regulation Requirements:

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

Groundwater elevation will of course be used as the indicator for the chronic lowering of groundwater levels. The minimum thresholds used for groundwater levels will set the overall groundwater storage volume desired to be maintained below the groundwater levels. Water levels will not be used as proxy for the other sustainability indicators and there are separate discussions on each indicator later in this section.

4.2.2.1 Criteria to Define Minimum Thresholds

Regulation Requirements:

§354.28

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

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

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

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

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

As required by the regulation, the Minimum Thresholds for chronic lowering of groundwater levels were established based on the rate of groundwater elevation decline considering historic trends, water year types and projected water use in the basin. As mentioned previously, the minimum thresholds have been set below the shallowest wells in the basin in some areas, but the GSAs are planning a shallow well mitigation program to help address these impacts.

As shown in Figure 4-2 above, the minimum threshold is the elevation below the measurable objective that provides the operational flexibility to allow for periods of increased groundwater pumping during dry periods. As mentioned, the minimum threshold was set at an elevation to allow operational flexibility of the anticipated water level decline during a 5-year drought. For most Indicator Wells in the network, the actual decline during the historic 2012-2016 drought was determined at each Indicator Well in the monitoring network and increased by 20%. That amount of decline ~~during the historic drought~~ was then used to determine the Minimum Threshold by deducting that amount from the elevation set for the Measurable Objective at that Indicator Well. At some of the Indicator wells, there is incomplete or inconsistent water level readings during the drought period. For those wells, the average rate of decline was multiplied by 15 (three times the standard rate of decline for 5 years) to determine the total depth of decline for operational flexibility. The rate of decline during the 2012-2016 drought was observed to be roughly three times the average rate of decline.

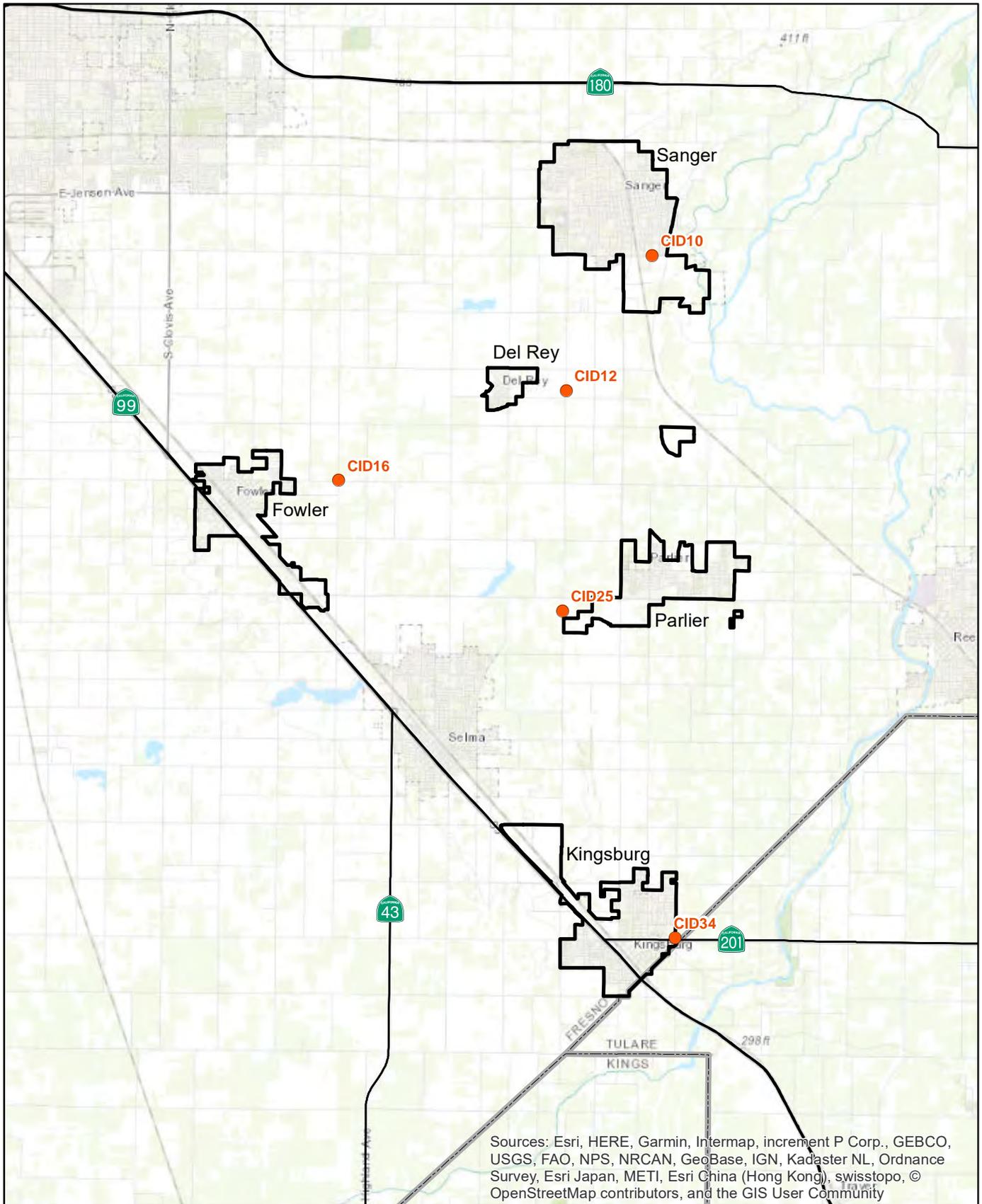
The establishment of the minimum threshold was based on actual water level readings at each of the wells chosen to be Indicator Wells in the Monitoring Network. A hydrograph was generated for each well and the historic rate of decline identified for each well individually. The trendline was developed using the recent water level reading from the 1990s to the end of the Basin base period (2012). This considers recent base period conditions for the basin which factors in recent land use changes, different water year types and the water use within the basin. The amount of decline during the recent drought (2012-2016) was also determined. Figure 4-3 shows the indicator wells for all SMCs except Water Quality, which is discussed further in this chapter Section 0.

A table listing the minimum threshold for each Indicator Well is included as Table 4-3 and a hydrograph for each Indicator Well showing the Minimum Threshold is included as Figure 4-4 through Figure 4-8. In addition to the Minimum Thresholds, the hydrographs include the rate of decline of each specific well, and the Measurable Objective elevation based on the incremental rate of mitigation. As with all sustainable management criteria, it is recognized that future data may allow for refinement of these thresholds.

Table 4-3: Summary of SMCs for Groundwater Levels

| Well ID | CID10 | CID12 | CID16 | CID25 | CID34 |
|---|------------------|------------------|------------------|------------------|------------------|
| Nearest Member Agency | Sanger | Del Rey | Fowler | Parlier | Kingsburg |
| Rate of Decline (ft/yr) | -0.45 | -2.21 | -1.08 | -1.25 | -1.04 |
| Well Elevation (ft) | 366.2 | 341.0 | 318.8 | 327.3 | 296.8 |
| Last Water Surface Elevation Measured (ft) | 317.3 | 286.3 | 246.8 | 261.6 | 240 |
| Last Measured Depth (ft) | 48.9 | 54.7 | 72.0 | 65.7 | 56.8 |
| 2025 Interim Milestone | 50.3 | 61.6 | 75.4 | 69.6 | 60.1 |

| | | | | | |
|---|-------|-------|-------|-------|-------|
| 2030 Interim Milestone | 51.7 | 68.6 | 78.8 | 73.6 | 63.3 |
| 2035 Interim Milestone | 53.1 | 75.5 | 82.1 | 77.5 | 66.6 |
| 2040 Interim Milestone | 54.5 | 82.4 | 85.5 | 81.4 | 69.8 |
| Measurable Objective Depth (ft) | 54.5 | 82.4 | 85.5 | 81.4 | 69.8 |
| Proposed MO Elevation | 311.7 | 258.6 | 233.3 | 245.9 | 227.0 |
| Minimum Threshold Depth (ft) | 78.2 | 118.2 | 101.6 | 123.1 | 102.4 |
| Proposed MT Elevation | 288.0 | 222.8 | 217.2 | 204.2 | 194.4 |



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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 Miles

- South Kings GSA
- County
- Well - Water Level Monitoring

South Kings GSA
 Water Level Indicator Wells
Figure 4-3

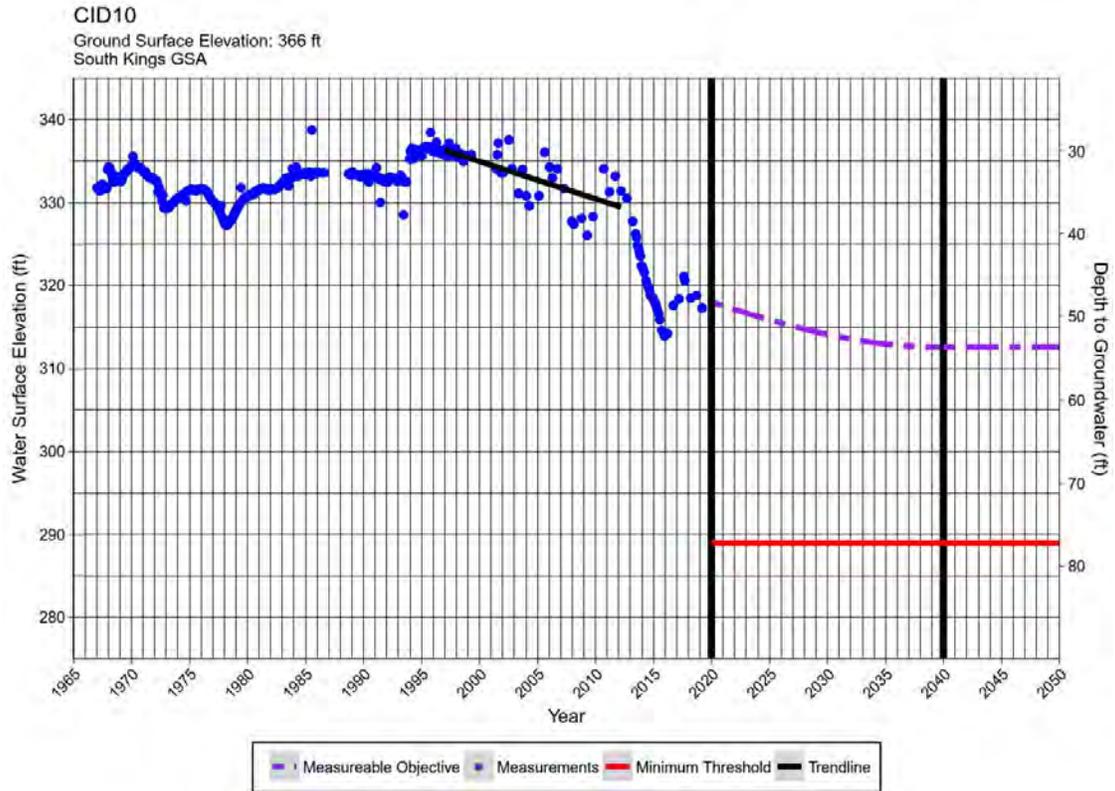


Figure 4-4: Well CID10 Hydrograph

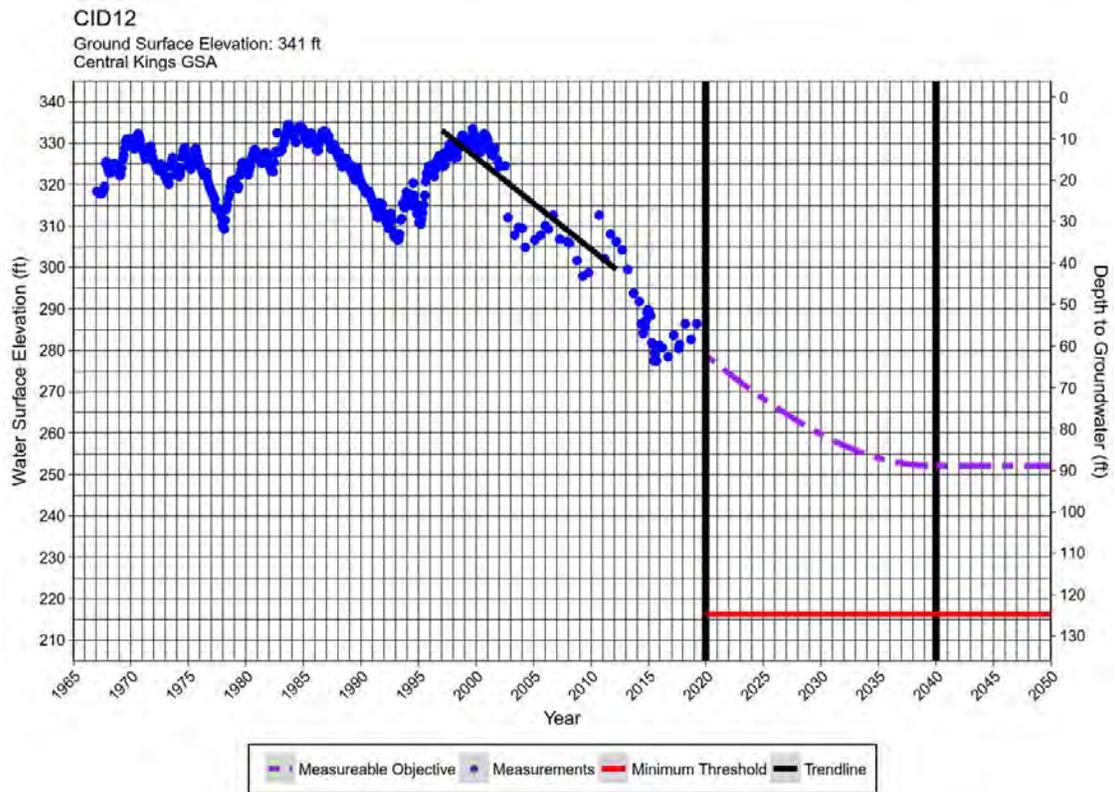


Figure 4-5: Well CID12 Hydrograph

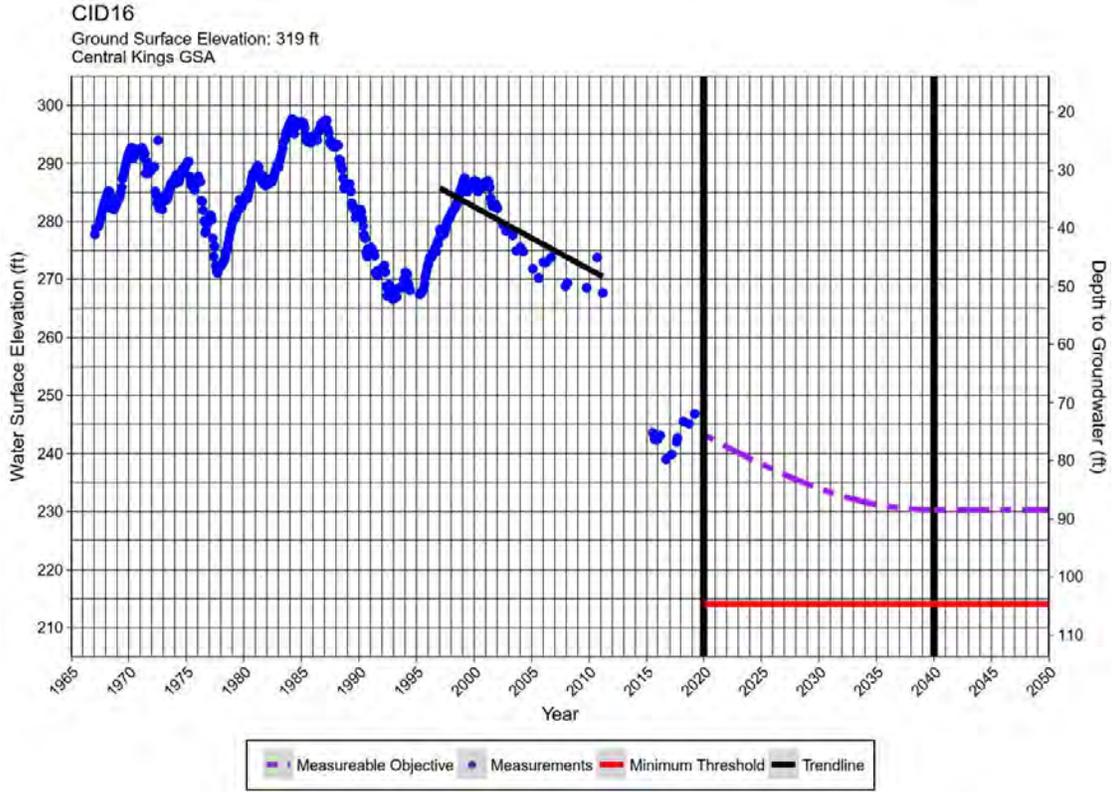


Figure 4-6: Well CID16 Hydrograph

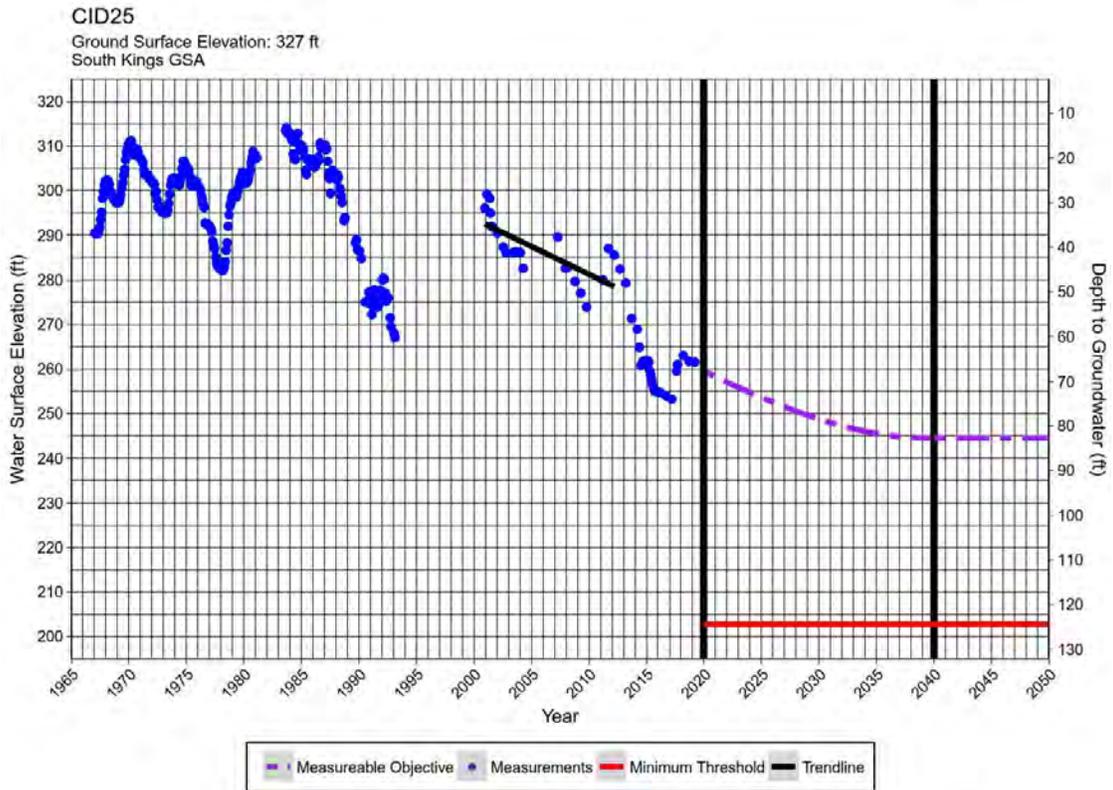


Figure 4-7: Well CID25 Hydrograph

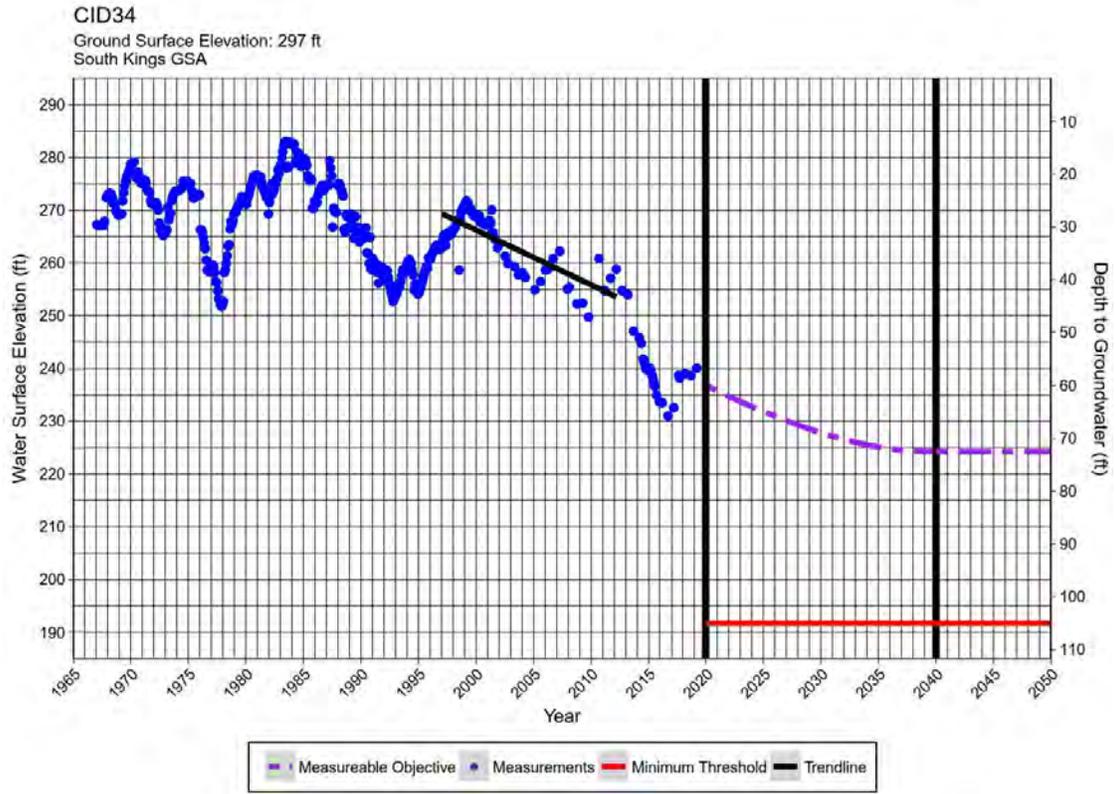


Figure 4-8: Well CID34 Hydrograph

4.2.2.2 Relationships Between Minimum Thresholds and Sustainability Indicators

Regulation Requirements:

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

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

The following provides an explanation of the relationship between the water level minimum thresholds and the other sustainability indicators and how the GSA determined that the minimum thresholds will avoid undesirable results for each Indicator:

- **Groundwater Storage.** The minimum thresholds used for groundwater levels will set the overall groundwater storage volume desired to be maintained below the minimum threshold groundwater levels. As mentioned in much of the GSA and the basin, there will remain a very significant amount of groundwater below the minimum threshold elevations. In areas of shallow bedrock, the minimum thresholds were compared to elevations of the top of bedrock in effort to restrict decline of water table below alluvial material. The SMC section on Groundwater Storage describes this further.
- **Groundwater Quality.** Changing groundwater levels can affect groundwater contaminant concentrations positively and negatively. The minimum thresholds were compared with known contaminants of concern where data and quality information by elevation was available. Groundwater levels are not used as proxy for groundwater quality conditions. GSA has set separate groundwater quality Sustainable Management Criteria and will monitor water quality condition changes as water levels change and reach sustainability.
- **Land Subsidence.** The GSA has experienced small amounts of subsidence and has limited area with soil conditions for land subsidence. Water levels, and primarily pumping from beneath clay layers, can cause land subsidence. The majority of pumping in the GSA is from others above or outside of clay layer areas encountering subsidence. The water level minimum thresholds have been established based on historic rates of decline that have not caused land subsidence of significance. The SMC section on Land Subsidence describes this further.
- **Interconnected Surface Water.** [The GSAs of the basin have identified Interconnected Surface Water as a data gap and will be investigating this further over the next few years.](#) ~~This indicator is not applicable to this GSA.~~
- **Sea Water Intrusion.** This indicator is not applicable to this basin.

4.2.2.3 Minimum Thresholds in Relation to Adjacent Basins

Regulation Requirements:

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

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

The minimum thresholds established are based on implementation of incremental correction of the historic decline starting immediately and reaching stabilization by 2040. This approach is believed to be conservative and correct the trend of existing groundwater decline. The SKGSA does not have direct surface water rights but has negotiated purchase of surface water from CID which has significant surface water rights and has experienced minimal impacts compared to other basins. The Kings Basin is ~~primarily negatively~~ impacted by surrounding basin pumping as adjacent basins with limited surface water supplies have caused declining groundwater conditions that negatively impact the Kings basin by increasing groundwater flows across basin boundaries. As described in **Section 2**, these flows have increased overtime. Groundwater pumping in the confined aquifer in adjacent basins has also impacted the Kings Basin as the confined aquifer is primarily fed by the groundwater upgradient in the Kings Basin.

As a basin, the various Kings GSAs have met with their neighboring GSAs outside of the Kings Basin to discuss how thresholds have been established and potential impacts. At the time of the preparation of this GSP, criteria from the neighboring basin was not available. However, it is understood that minimum threshold elevations along the boundaries will not match exactly as the basins and GSAs have likely taken different approaches to establishing thresholds. [Basin representatives have met with other basin representatives to begin discussions on inter-basin concerns, but additional discussion and determinations are needed.](#) Once the neighboring basin GSP ~~revisions are~~ completed, the SKGSA will evaluate the potential differences between thresholds and work to coordinate needed resolutions and clarifications.

4.2.2.4 Impact of Minimum Thresholds on Beneficial Uses and Users

Regulation Requirements:

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

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

~~The minimum thresholds have been established based on historic rate of decline, the proposed mitigation rate and enough operational flexibility to maintain delivery during a 5-yr drought. The minimum thresholds have been determined based on the plan to correct the existing overdraft with an incremental approach intended to result in stabilized groundwater levels by 2040.~~ Stabilizing the groundwater levels will provide more certainty of the long-term availability of groundwater supply for all beneficial uses and users. Property values have always been influenced by the presence and depth of a useable well. Minimum Thresholds may affect those property values with existing wells with depths shallower than the Minimum Threshold. [The GSAs in the basin recognize that water levels will continue to decline until the overdraft within the basin, and the impact of pumping from neighboring basins, has been corrected.](#)

[Well construction has varied over the years and wells have been constructed at varying depths, and the construction depth of all wells in the basin is not known at this time. Some wells, even recently constructed wells, may have been poorly constructed or constructed too shallow for long-term operation. SGMA does not require the GSA to maintain current water levels or prevent any wells from going dry. Rather, the GSA is required to stabilize and correct groundwater decline.](#)

~~The Kings Subbasin~~ [Kings Basin has a very large aquifer with existing water levels well above the base of the unconfined aquifer. As shown in Chapter 2 – Basin Setting, recent water levels are several hundred feet above the base of the aquifer in much of the subbasin. Much of the subbasin has a significant amount of water available below the Measurable Objective and even below the Minimum Threshold levels.](#)

[The GSA recognizes that some shallow wells will likely go dry until water levels have been stabilized. Without SGMA and the proposed incremental mitigation by the GSA, the shallow wells would have gone dry sooner, requiring the landowners to deepen these existing wells. However, the GSAs will develop a well mitigation program to help address impacts to shallow wells that may go dry above the minimum threshold. A more detailed description of the minimum threshold is included later in this chapter, and a description the proposed mitigation program is included in Chapter 6.](#)

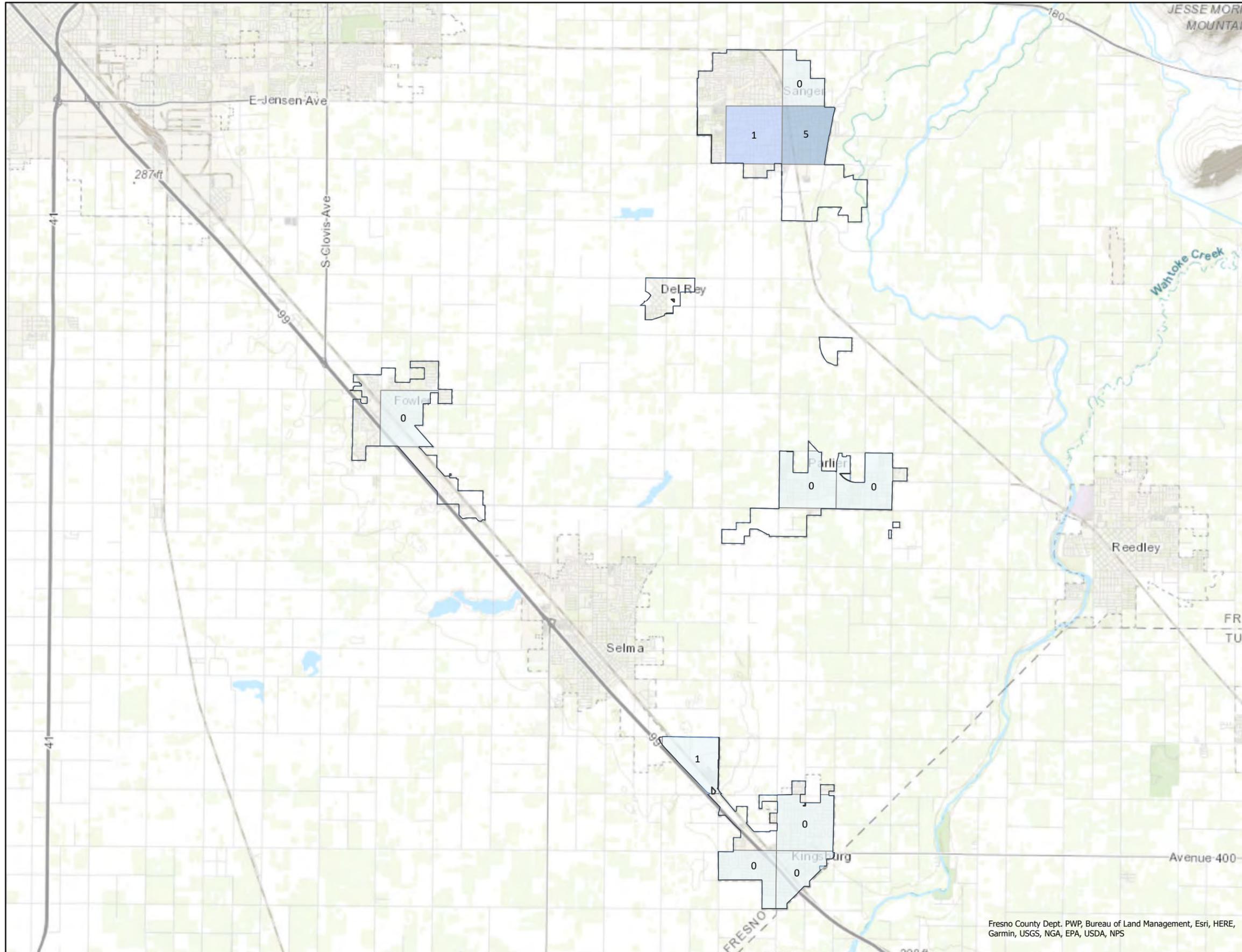
~~Future modifications to reduce demands may be required to mitigate for future impacts to maintain water levels above the minimum thresholds. The GSA recognizes that some shallow wells will likely go dry until water levels have been stabilized. Without SGMA and the proposed incremental mitigation by the GSA, these wells would have gone dry sooner, requiring the landowner to deepen existing wells. The minimum thresholds have been established to allow for continued beneficial use within the GSA and provide improved long-term certainty of groundwater levels within the GSA.~~

[The South Kings GSA is nearly entirely served by community well systems, however to be consistent with analysis performed throughout the basin, an analysis was performed to estimate the number of domestic wells that may potentially go dry at the minimum threshold elevations. Utilizing the minimum threshold elevation](#)

at each of the water level monitoring well sites, a groundwater level contour surface was generated for the entire GSA utilizing GIS software. From this surface, the estimated average depth to groundwater in each Section (one-square mile) was obtained which provides an estimate of the depth to groundwater at the minimum threshold. The depth to water at the minimum threshold in each section was compared to the well completion report records available from DWR. DWR's well completion reports are grouped by section, but locations within each section are not known. It is important to note the inaccuracies of the well record data, including inaccurate locations and construction information, no consideration of abandoned or inactive wells, no consideration of well modifications, and may not include all recent well information. For this comparison, all domestic wells were selected from the DWR records. The perforation interval of the well was considered if included in the well completion report, otherwise the total depth of the well was considered. For every domestic well in each section in the GSA, the minimum threshold depth was compared to ten feet above the bottom of perforation interval (if known) or ten feet above the total depth of the well. Sections that are entirely contained within the boundaries of a community water system were removed from the comparison, but if only a portion of the section was within the water system service area or within the GSA's exterior boundary, all of the wells in the section were included in the analysis since the exact location of the wells in a section is not included in the available data. In an effort to remove wells that have been abandoned or already gone dry, wells with depths or perforations shallower than the fall 2017 groundwater surface contours were removed for this analysis.

Since the first comparison to minimum thresholds included all wells regardless of age, and many of those wells have likely been abandoned or failed, a second comparison was performed for wells constructed after 1990. 1990 was chosen as a comparison to provide a range of the estimated impact to wells that will be up to 50 years old in 2040. Using this period for the analysis is also consistent with SWRCB comments and studies performed by UC Davis. The results of this analysis are shown in Figure 4-9 and showing the number of wells in each section that may be impacted.

The number of domestic wells shallower than the minimum threshold were totaled and compared to the total number of domestic well records. As mentioned previously, the total number of domestic wells used in these calculations is based on DWR records, and may include abandoned, destroyed, or inactive wells. Utilizing all well data and all wells in a section that is only partially outside a community water system is very conservative considering the data includes many wells that are no longer active or are nearing the end of their usable life. For these reasons, it is anticipated that the number of impacted wells is lower than what is shown. These numbers may be refined as the GSP is implemented and more information becomes available.



Kings Subbasin Coordinated Effort

Per Section
Review of DWR WCR Data
Domestic Wells, Post 1990

South Kings GSA

Figure 4-9

- Community Water Systems
- Domestic Wells Where
MT is Deeper than 10'
Above the Total Depth or
Bottom of Perforation
- 0
- 1 - 3
- 4 - 7
- 8 - 10
- 11 - 15
- No SMC Depth For This
Section
- No Wells Constructed Post
1990



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Fresno County Dept. PWP, Bureau of Land Management, Esri, HERE,
Garmin, USGS, NGA, EPA, USDA, NPS

4.2.2.5 Current Standards Relevant to Sustainability Indicator

Regulation Requirements:

§354.28 (b) The description of minimum thresholds shall include the following:
 (5) How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.

There are no known standards, state, federal or local, for establishment of minimum thresholds for groundwater levels. [This GSP will become the basis for local regulatory standards.](#)

4.2.2.6 Measurement of Minimum Thresholds

Regulation Requirements:

§354.28 (b) The description of minimum thresholds shall include the following:
 (6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

Groundwater level readings will be made at Indicator Wells in accordance with water level measurement protocols described in **Section 5** of this GSP.

4.2.3 Measurable Objectives

4.2.3.1 Description of Measurable Objectives

Regulation Requirements:

§354.30 (a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin with 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.
 (b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

[The Measurable Objective is the quantitative goal that will allow the basin to achieve its sustainability goal within the 20-year planning period. More specifically, the measurable objective is the elevation at an Indicator Well that will be stabilized and maintained over time. The measurable objective has been set such that there is a reasonable margin of operational flexibility that will accommodate droughts, climate change, and conjunctive use operations. The GSAs in the basin will manage the basin to the measurable objectives using the projects and management actions described in Section 6.](#)

The establishment of the Measurable Objective was based on actual water level readings at each of the wells chosen to be Indicator Wells in the Monitoring Network. The Monitoring Network is described in detail in **Section 5** of this GSP. A hydrograph was generated for each well and the historic rate of decline identified for each well individually. The trendline was developed using the recent water level reading from the 1990s to the end of the recent average base period for the basin period (through 2012). Use of this historic data considers recent base period conditions for the basin which factors in recent land use changes, different water year types and the water use within the basin. The rate of decline was projected through 2020 for each well. The basin wide agreed incremental mitigation rate for correction (shown in **Table 4-2**) was applied to each well's hydrograph. The incremental correction provides the calculation of the anticipated water level at 2040. A table listing the minimum threshold for each Indicator Well is included as Table 4-4 and a hydrograph for each Indicator Well showing the Measurable Objective is included as Figure 4-4 through Figure 4-8. In addition to the Measurable Objective, the hydrographs include the rate of decline of each specific well, and

the Minimum Threshold elevation based on the desired Operational Flexibility to maintain during a 5-year drought.

The incremental mitigation for correction was selected based on the understanding that correcting decades of overdraft will take many years and implementation is dependent on many factors, including development of funding, project development, environmental and permit compliance, correction by neighboring GSAs and basins that impact the Kings Basin.

4.2.3.2 Operational Flexibility

Regulation Requirements:

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

[A margin of operational flexibility, or margin of safety, allows for variation in groundwater levels due to historical water budgets, seasonal and yearly variations, and drought and also takes into consideration levels of uncertainty. Drought years may cause pumping to increase, but wet years may provide enough opportunity for surface water recharge to offset drought years. The operational flexibility for each well in the GSA will vary based on current groundwater levels and rate of decline.](#) As shown in Figure 4-2, the Operational Flexibility is the change in groundwater levels between the Measurable Objective and Minimum Threshold and represents the amount of allowable decline in groundwater levels below the Measurable Objective. The Measurable Objective was established using the basin base period which represents recent average hydrologic conditions and water uses with recent land uses and demands. As mentioned, the Minimum Threshold was set at an elevation to allow operational flexibility of the anticipated water level decline during a 5-year drought and was based on the recent historic drought of 2012-2016.

4.2.3.3 Representative Monitoring

Regulation Requirements:

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

The GSA is not proposing to use representative Measurable Objectives.

4.2.3.4 Path to Achieve Measurable Objectives

Regulation Requirements:

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

The SKGSA and the other GSAs in the basin will implement projects and programs to correct the declining groundwater levels and reach sustainability. The SKGSA projects and programs are described in **Section 6** of this GSP and implementation discussed in **Section 7** of the GSP. The interim milestones for water level correction are unique to each well and are shown on the hydrographs in **Appendix E**. The measurable objective water levels have been used to determine the estimated volume of overdraft correction that is required within this GSA and the entire basin.

[Although the undesirable result \(as defined\) may not occur until water levels are below the minimum threshold, the basin will use the 5-year milestones and minimum threshold levels as trigger for operational change. The GSAs will manage the basin to these Interim Milestones during the planning period by comparing hydrologic](#)

[conditions to historic average conditions and implementing management actions if needed to maintain a path to sustainability.](#)

The SKGSA has identified the schedule for implementation of each project as well as that project’s anticipated benefit or yield. The combined benefit of each project at each milestone shows that the GSA has identified projects to correct the total overdraft by 2040. Future projects are included in the anticipated reduction in demand and overdraft.

4.3 Groundwater Storage

Groundwater storage is directly linked to groundwater levels, and the measurable objective and minimum threshold for groundwater levels dictate the amount of groundwater in storage and available for cyclic use once the basin reaches sustainability. The criteria used to determine water level undesirable results, measurable objectives and minimum thresholds dictate groundwater storage items. As described in Section 3.2.3, the calculation of the amount of groundwater in storage is dependent on water level elevations from multiple wells and the depth of groundwater multiplied by specific yield values at various depths down to the base of the aquifer. The amount of groundwater in storage (or change over time) is estimated from these contoured surfaces down to the base of the unconfined aquifer. Once the subbasin reaches sustainability, the estimated volume of groundwater between the measurable objective and the minimum threshold levels provides the operational flexibility. The calculations of this volume are included in **Table 4-4**.

Table 4-4: Estimate of Groundwater in Storage between MO and MT

| GSA | Volume (Acre-Feet) |
|---------------------------|--------------------|
| Central Kings | 680,000 |
| James ID | 110,000 |
| Kings River East | 620,000 |
| McMullin Area | 570,000 |
| North Fork Kings | 940,000 |
| North Kings | 1,070,000 |
| South Kings | 42,000 |
| Total for Subbasin | 4,032,000 |

No Edits in this Section

Since the water level measurable objectives are lower than current water levels, the amount of groundwater in storage between current water levels and the minimum thresholds is considerably more than the estimate of groundwater in storage between the ultimate measurable objectives and minimum thresholds, however once the subbasin reaches sustainability, the long-term volume of groundwater in storage between the measurable objective and minimum threshold levels is the critical storage volume.

Storage change in the confined aquifer was not estimated since actual changes are small to negligible as long as the aquifer remains fully saturated. Changes in the potentiometric surface only impact the compressibility of the mineral skeleton and pore water, which have a very small impact on the total volume of water. Furthermore, when pumping occurs from the confined aquifer, it ultimately impacts the unconfined aquifer by inducing groundwater flows into the confined aquifer or seepage through the confining layer.

4.3.1 Undesirable Results

4.3.1.1 Criteria to Define Undesirable Results

Regulation Requirements:

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

Appendix F . Hydrographs included in **Appendix E** graphically display the available water level data, historic trendlines, measurable objective, operational flexibility, and minimum threshold for each indicator well.

4.3.3.2 Operational Flexibility

Regulation Requirements:

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

The amount of groundwater in storage between the measurable objective and minimum threshold provides the operational flexibility. The volumes are shown in **Table 4-5**.

4.3.3.3 Representative Monitoring

Regulation Requirements:

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

The GSA is not proposing to use representative Measurable Objectives.

4.3.3.4 Path to Achieve Measurable Objectives

Regulation Requirements:

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

The SKGSA and the other GSAs in the basin will implement projects and programs to correct the declining groundwater levels and reach sustainability. The GSA's projects and programs are described in **Section 6** of this GSP and the Plan implementation discussed in **Section 7** of the GSP. The groundwater storage interim milestones are calculated based on the basin wide agreed incremental mitigation rate to reach water level measurable objectives. The GSA has identified the schedule for implementation of each project and management action (when required) as well as that project's anticipated benefit or yield. The combined benefit of each project, at each milestone shows that the GSA has identified projects to correct the total overdraft by 2040.

4.4 Seawater Intrusion

Regulation Requirements:

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

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

No edits in this section

The SKGSA is not hydrologically located near the ocean nor near saline sinks. Therefore, no criteria need to be established for undesirable results.

4.5 Groundwater Quality

Regulation Requirements:

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

Most of SKGSA is comprised of urban areas with municipal water users on public water systems. As discussed in previous sections, groundwater quality in the SKGSA is generally well suited for irrigation and domestic use, although groundwater issues for drinking water exist in localized areas Plan Area. While some of these chemical concerns are caused by humans, several are natural occurring. Groundwater quality concerns within the SKGSA have been identified in this GSP's Groundwater Conditions Section (**Section 3.2**). Groundwater monitoring and reporting by community water systems is a requirement of California Code of Regulations (CCR) Title 22. Community and other public supply wells within the SKGSA monitoring network are already being routinely monitored for a wide range of contaminants, including the chemicals of concern, by the water purveyors under Title 22.

Groundwater pollution characterization and mitigation are typically enforced by local agencies and state level programs. The SKGSA will only have authority related to groundwater pumping policies, however the SKGSA will review and analyze publicly available routine groundwater monitoring data in order to monitor if groundwater pumping may be exacerbating groundwater quality concerns and where to enforce pumping restrictions or other mitigation measures should it become necessary. The minimum thresholds will be set at the screening levels protective of human health as applicable for the respective chemicals of concern identified and discussed in this GSP's Groundwater Conditions Section (**Section 3.2**).

The following constituents are groundwater quality concerns in the SKGSA. Some of these are significant concerns while others are minor or geographically limited. Additional discussion on groundwater quality is presented in **Section 3.2**. The MCLs for each are listed in Table 4-6.

Arsenic

Arsenic occurs in natural deposits. Arsenic has not been noted at concentrations above the MCL in any member agency of the SKGSA.

Dibromo-Chloropropane (DBCP)

DBCP was used as a fumigant to kill nematodes in soil before planting and was widely used in California until 1977. DBCP was used in vineyards and deciduous orchards where sandy soils were present. In general, within the SKGSA concentrations of DBCP above the MCL value have been detected in Fowler, Parlier, and Sanger. DBCP concentration levels and the extent of DBCP has decreased over time due to the degradation process and dilution due to recharge.

Hexavalent Chromium

Hexavalent chromium [Cr(VI)] is one of the valence states (+6) of the element chromium. Hexavalent chromium can be produced by industrial processes but sometimes is also naturally occurring. Inhalation and ingestion of Cr(VI) is known to cause cancer. Hexavalent chromium has been found at low concentrations in Fowler, Kingsburg, Parlier, and Sanger.

Nitrates

Nitrate is commonly found in groundwater as a result of application of nitrogen fertilizers in irrigated agricultural and landscaped areas, seepage from feedlots/dairies, wastewater and food processing waste ponds, winery waste, sewage effluent, and leachate from septic system drain fields. Elevated concentrations have been found in Parlier and Sanger, but only above the MCL in Parlier.

Methyl Tert-Butyl Ether (MTBE)

MTBE is a flammable liquid that has been used as an additive for unleaded gasoline since the 1980s but is now banned in California. MTBE is also used in small amounts as a laboratory solvent and for some medical applications. The primary MCL is 13 µg/L for health concerns and 5 µg/L for taste and odor concerns.

1,2,3-Trichloropropane (TCP)

TCP is used industrially (paint and varnish remover as a cleaning and degreasing agent) and chemically (solvent and intermediate for pesticides). TCP has been detected in shallow groundwater in rural areas, along Highway 99, and in Del Rey, Fowler, Kingsburg, Parlier, and Sanger’s public supply wells.

Uranium

Uranium occurs naturally in groundwater in parts of the GSA. Uranium is derived from Sierra Nevada granitics and will preferentially adhere to clays. Uranium has been found in municipal wells in the Del Rey CSD and Sanger.

4.5.1 Undesirable Results

Groundwater quality in the Kings Basin is generally suited for irrigation and domestic use, although groundwater issues for drinking water exist in some areas within the Kings Basin. An undesirable result would be the significant and unreasonable reduction in groundwater quality such that the groundwater is no longer generally suitable for agricultural irrigation and domestic use.

The SKGSA will only have authority related to groundwater pumping policies, however the SKGSA will review and analyze publicly available routine groundwater monitoring data, as it becomes available, in order to monitor if groundwater pumping may be exacerbating groundwater quality concerns and where to enforce pumping restrictions should it become necessary. **Section 5** of this GSP describes the SKGSA monitoring well network.

4.5.1.1 Criteria to Define Undesirable Results

Regulation Requirements:

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

Within the Kings Basin the criteria that will be relied upon to define water quality undesirable results will generally be based on Maximum Contaminant Levels (MCLs) set in California Title 22 Code of Regulations.

The intent of SGMA is for the GSAs to be responsible for groundwater aspects related to pumping only. Other existing agencies and programs are generally responsible for tracking and remediation of groundwater quality. As described in the Plan Area section, these other agencies and programs include IUR+P, CV-SALTS, RWQCB, and DTSC.

While there are several existing groundwater monitoring programs, they do not monitor all contaminants of concern within the SKGSA and may not provide depth-specific water quality data. Water quality of private domestic wells is largely unknown as testing of the wells is not required. Due to these limitations, the data from these programs will not be relied on to set sustainable management criteria at this time.

Groundwater monitoring and reporting by community water systems is a requirement of California Title 22 Code of Regulations. Monitoring and reporting schedule requirements can vary based on the service population size, geographic area and population type (i.e., transient vs. non-transient). Under California Domestic Water Quality and Monitoring Regulations, community water systems must distribute, to each customer, an annual water quality report on the water purveyed. This consumer confidence rule requires public water suppliers that serve the same customers throughout the year (community water systems) to provide consumer confidence

reports to their customers. These reports are also known as annual water quality reports or drinking water quality reports. These reports are generally publicly available from the water suppliers or through an online data base such as the State Safe Drinking Water Information System (<https://sdwis.waterboards.ca.gov/PDWWW/>). Generally speaking, California Domestic Water Quality and Monitoring Regulations do not require all chemicals and contaminants to be tested at public supply wells, rather the intent is to test for chemicals and contaminants that are known or likely to occur in the area. Therefore, not all chemicals of concern will be tested in every well and the monitoring frequency for individual chemicals can vary from once every 3 to 6 years to once every 1 to 12 months depending on well history and well location relative to known groundwater impacts. Groundwater monitoring results from the wells within the SKGSA monitoring network will be reviewed annually and the analytical results for the chemicals of concern specific to the individual well locations will be compared against the respective MCL values for the chemicals of concern. The State MCL values for the chemicals of concern that have been identified in **Section 3.2** will be relied upon heavily as the criteria for defining undesirable results. Chemical of concern within the SKGSA along with their respective MCL values are listed below in Table 4-6.

Undesirable results determinations will be based on the aggregate effect of: 1) the degradation of water quality to excess of MCLs (i.e., California potable water standards) where concentrations of chemicals of concern were recent historically below MCLs; and 2) for wells that have had recent historic concentrations of Chemicals of Concern above MCLs, the degradation of water quality to a level in excess of 20% greater than the recent historically high concentration of the Chemical of Concern in the well. ~~a significant increase in groundwater degradation where concentrations of chemicals of concern were recent historically above MCLs.~~ The occurrence of an undesirable result will be defined as 15% of the representative monitoring wells having reached either of these two criteria for two consecutive years when shown to be altered by groundwater pumping or recharge activities.

Table 4-6: Water Quality MCLs

| Constituent of Concern | California Primary MCL* (mg/L unless otherwise noted) |
|--|--|
| Arsenic (Ar) | 0.010 |
| Dibromo-Chloropropane (DBCP) | 0.0002 |
| Hexavalent Chromium [Cr(VI)]** | 0.05 |
| Methyl Tert-Butyl Ether (MTBE) | 0.013 |
| Nitrate (NO ₃) | 45 |
| Nitrate as Nitrogen (NO ₃ -N) | 10 |
| Tetrachloroethene (PCE) | 0.005 |
| Trichloroethylene (TCE) | 0.005 |
| 1,2,3-Trichloroprpane (TCP) | 0.005µg/L |
| Uranium (Ur) | 20 pCi/L |

Notes:

Mg/L = milligrams per liter

µg/L = micrograms per liter

pCi/L = picocuries per liter

* As of June 2019

** Regulated under the total Chromium MCL

4.5.1.2 Causes of Groundwater Conditions That Could Lead to Undesirable Results

Regulation Requirements:

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

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

There are several potential causes of groundwater quality degradation that could lead to undesirable results. These include:

- The accumulated effects of fertilizer nutrient application and other farming practices leading to accumulation of chemicals of concern in groundwater, such as nitrates;
- DBCP, EDB, and TCE are legacy contaminants and thus no future degradation from them is foreseen, rather efforts include managing current contamination plumes;
- One-time releases from sources of chemical contamination such as from fuel storage tanks or cleaning solvent tanks leading to petroleum hydrocarbon, MTBE, or solvent contaminant plumes; [and](#)
- [The accumulated effects of regulated and unregulated waste discharge streams from wastewater treatment facilities, septic systems, industry, and food processors.](#)

[The following are causes of groundwater quality degradation that could lead to undesirable results which fall under the GSA's management responsibility:](#)

- Declining groundwater levels can cause pumped groundwater to have higher concentrations of some naturally occurring chemicals which may be either health concerns or aesthetic concerns, such as arsenic or uranium; and
- Groundwater pumping mobilizing groundwater contaminant plumes.

Regulation Requirements:

§354.26 (b) The description of undesirable results shall include the following:
 (2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

The State MCL values for the chemicals of concern that have been identified in **Section 3.2** will be relied upon primarily as the criteria for defining undesirable results. Groundwater quality data from selected public supply wells within the GSA will be reviewed annually and compared against MCLs or historic groundwater quality data.

Undesirable results determinations will be based on the aggerated effect of: 1) the degradation of water quality to excess of MCLs (i.e., California potable water standards) where concentrations of chemicals of concern were recent historically below MCLs; and 2) [for wells that have had recent historic concentrations of Chemicals of Concern above MCLs, the degradation of water quality to a level in excess of 20% greater than the recent historically high concentration of the Chemical of Concern in the well.](#) ~~a significant increase in groundwater degradation where concentrations of chemicals of concern were recent historically above MCLs.~~ The occurrence of an undesirable result will be defined as 15% of the representative monitoring wells having reached either of these two criteria for two consecutive years [when shown to be altered by groundwater pumping or recharge activities.](#)

Regulation Requirements:

§354.26 (b) The description of undesirable results shall include the following:
 (3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

Groundwater quality degradation has potential effects to urban area and rural residential drinking water quality. Within the SKGSA there are 5 urban agencies operating numerous community groundwater wells. Under California law, agencies that provide drinking water are required to routinely sample groundwater from their wells and compare the results to potable water standards (MCL), as appropriate for the individual chemicals. These results are reported by the water purveyors in Consumer Confidence Reports and are publicly available. Degraded groundwater quality can make drinking water treatment more difficult and expensive.

Residential structures not located within the service areas of the 5 SKGSA urban agencies will typically have private domestic groundwater wells. Such wells are not monitored routinely and groundwater quality from those wells is unknown unless the landowner has initiated testing and shared the data. Degraded water quality could potentially lead to rural residential use of groundwater not meeting potable water standards or the need for installation of new domestic wells to deeper depths to reach groundwater of better quality.

4.5.1.3 Evaluation of Multiple Minimum Thresholds

Regulation Requirements:

§354.26 (c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

It is not practical for a single exceedance to lead to an undesirable result for the entire GSA; therefore, an undesirable result determination will be based on multiple monitoring locations within the GSA over consecutive years.

4.5.2 Minimum Thresholds

Regulation Requirements:

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

Groundwater quality in the SKGSA is generally suited for irrigation and domestic use, although groundwater issues for drinking water exist in some areas within the SKGSA. The minimum thresholds have been set consistent with State and local water quality standards to be protective of water uses and users and are intended to be protective of human health (Title 22 of the CCR). ~~The publicly available groundwater quality data from the selected representative wells will be obtained annually and either compared against MCL values, if recent historical data has indicated chemicals of concern were initially below MCLs, or evaluated for groundwater quality trends with respect to the chemicals of concern if recent historical data has indicated chemicals of concern were initially above MCLs. MCLs for the chemicals of concern are listed in Table 4-6.~~

Minimum Threshold values have been established by two different methods, as follows:

- Numeric values for MCLs (i.e. California potable water standards) as identified in Table 4-6, where concentrations of chemicals of concern were recently below MCLs; or
- For wells that have had recent concentrations of Chemicals of Concern above MCLs, the degradation of water quality to a level in excess of 20% greater than the recent historically high concentration of the Chemical of Concern in the well. The 20% increase was selected as a criterion to provide a reasonable balance between natural fluctuations and uncertainty in the data with the desire to minimize further degradation.

Based on available data, Table 4-7 shows the historical maximum concentration of Chemicals of Concern and where MCL exceedances have occurred. Minimum Threshold numeric values in these instances will be set at a 20% increase to the indicated table values. Note that there are two wells within the monitoring network for which groundwater quality data was not available at the time of writing. This represents a data gap, however the SKGSA will strive to remedy this data gap over the first years of GSP implementation. Water quality degradation will be evaluated against the appropriate standards as more data becomes available in these instances. If water quality sampling indicates a Minimum Threshold exceedance, then an evaluation will need to occur to determine if the exceedance is a result of groundwater management activities.

Table 4-7 Chemicals of Concern with Historic Exceedances of MCLs (2015 to 2021)

| Well ID | Well Type | Ar (mg/L) | DBCP (mg/L) | Cr(VI) (mg/L)** | MTBE (mg/L) | NO ₃ -N (mg/L) | PCE (mg/L) | TCE (mg/L) | TCP (µg/L) | Ur (pCi/L) |
|------------------------|---------------|--------------|-------------------|-----------------|--------------|---------------------------|--------------|--------------|-----------------|------------|
| 1010035-006 | Public Supply | 0.0023 | ND | NA | ND | 1.20 | ND | ND | 0.016 (0.019) | NA |
| 1010035-007 | Public Supply | ND | ND | NA | ND | 0.84 | ND | ND | 0.043 (0.052) | NA |
| 1010006-007 | Public Supply | ND | 0.000029 | NA | ND | 2.6 | ND | ND | 0.006 (0.007) | NA |
| 1010006-008 | Public Supply | ND | 0.0002 (0.00024) | NA | ND | 4.1 | ND | ND | 0.024 (0.029) | NA |
| 1010025-010 | Public Supply | ND | 0.000086 | NA | ND | 14 (16.8) | ND | ND | 0.33 (0.40) | NA |
| 1010025-012 | Public Supply | 0.0034 | 0.000049 | NA | ND | 4.4 | ND | ND | 0.049 (0.59) | NA |
| 1010029-003 | Public Supply | 0.0011 | 0.00034 (0.0041) | NA | ND | 6.1 | 0.0011 | ND | ND | 3.9 |
| 1010029-022 | Public Supply | 0.0033 | 0.00028 (0.00034) | NA | ND | 3.6 | ND | ND | 0.0095 (0.0114) | NA |
| California MCLs | | 0.010 | 0.0002 | 0.05 | 0.013 | 10 | 0.005 | 0.005 | 0.005 | 20 |

Notes:

** = Regulated under the total Chromium MCL

NA = Not analyzed

ND = Not detected

Cells highlighted when max concentration is greater than the MCL. Minimum Threshold numeric values set at a 20% increase to the indicated max concentration value. Minimum Threshold actual values in parenthesis.

Regulation Requirements:

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

Declining water levels can potentially lead to increased concentrations of some chemicals that reside in larger proportions in deeper aquifer zones, such as arsenic or uranium. Conversely rising water levels can also lead to increased concentrations of some chemicals of concern, for example nitrates, that may reside in unsaturated soils at shallower depths. Groundwater levels will not be used as a proxy for water quality due to a lack of clear correlation between groundwater levels and changes in water quality.

4.5.2.1 Criteria to Define Minimum Thresholds

Regulation Requirements:

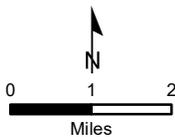
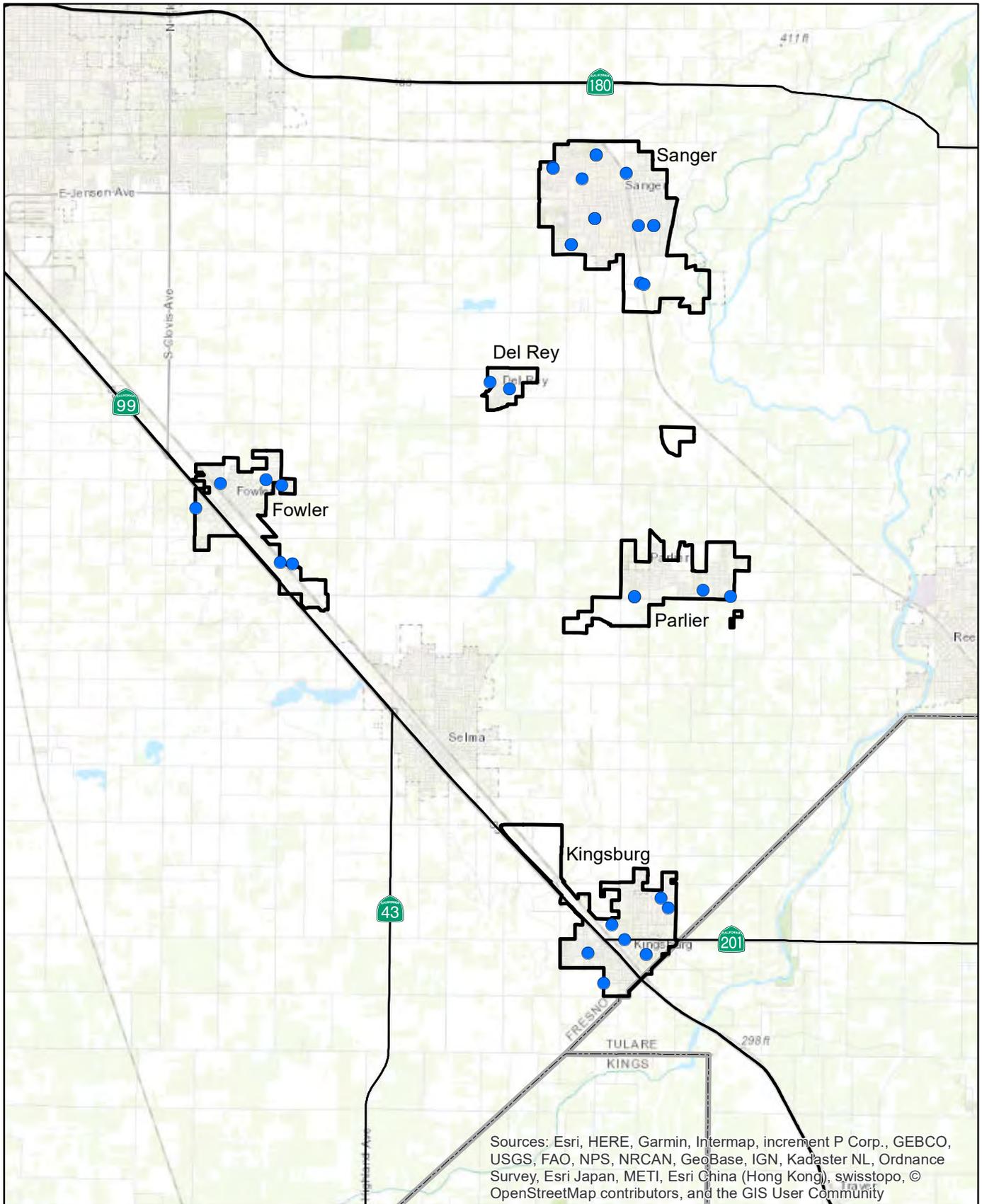
§354.28 (b) The description of minimum thresholds shall include the following:

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

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

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

The criteria to define minimum thresholds will be based on the MCL values of the chemicals of concern discussed in **Section 3.2** of this GSP. The publicly available groundwater quality data from the selected representative wells will be obtained annually and ~~either compared against the Minimum Threshold-MCL values as discussed above, if recent historical data has indicated chemicals of concern were initially below MCLs, or evaluated for groundwater quality trends with respect to the chemicals of concern if recent historical data has indicated chemicals of concern were initially above MCLs.~~ New emerging contaminants of concern and MCLs will be addressed in subsequent GSP updates.



-  South Kings GSA
-  County
-  Active Well - Water Quality Monitoring

South Kings GSA
 Water Quality Indicator Wells
Figure 4-10

4.5.2.2 Relationships Between Minimum Thresholds and Sustainability Indicators

Regulation Requirements:

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

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

Changes to groundwater quality can be related to significant changes in groundwater levels and groundwater storage sustainability indicators. Declining water levels, which relate directly with a reduction of groundwater storage, can potentially lead to increased concentrations of chemical of concern for those that reside in larger proportions in deeper aquifer zones, such as arsenic or uranium. Conversely, rising water levels, which relate directly with an increase in groundwater storage, can also lead to increased concentrations of some chemicals of concern, for example nitrates, that may reside in unsaturated soils at shallower depths. Groundwater quality cannot be used to predict responses of other sustainability indicators; however, groundwater quality can potentially be affected by changes in groundwater levels and reduction of groundwater storage indicators. Based on this relationship, groundwater quality minimum thresholds should be established separately from other indicators.

4.5.2.3 Minimum Thresholds in Relation to Adjacent Basins

Regulation Requirements:

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

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

The minimum threshold for groundwater quality is protective of water uses and users and will prevent causing undesirable results in adjacent basins and will not affect the ability of adjacent basins to achieve sustainability goals.

4.5.2.4 Impact of Minimum Thresholds on Beneficial Uses and Users

Regulation Requirements:

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

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

The minimum thresholds for groundwater quality will be protective of water uses and users from degradation of groundwater quality by known chemicals of concern to concentrations detrimental to human health. The minimum threshold for degraded water quality maintains existing and potential future beneficial uses of land and property interests.

4.5.2.5 Current Standards Relevant to Sustainability Indicator

Regulation Requirements:

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

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

The minimum thresholds for water quality are protective of human health and intended beneficial use and are based around MCLs found in Title 22 of the California Code of Regulations. The intent of SGMA is for the GSAs is to be responsible for groundwater aspects related to pumping only. Other existing agencies and programs are generally responsible for groundwater quality remediation. Minimum thresholds may differ from MCLs in locations where recent historically groundwater quality data indicates that MCLs have already been exceeded.

4.5.2.6 Measurement of Minimum Thresholds

Regulation Requirements:

§354.28 (b) The description of minimum thresholds shall include the following:
(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

Groundwater monitoring and reporting by community water systems and non-community public supply wells is a requirement of California Code of Regulations (CCR) Title 22. Community and other public supply wells within the SKGSA area are already being monitored for a wide range of contaminants, including the chemicals of concern, by the water purveyors under Title 22. The publicly available groundwater quality data from selected representative wells will be obtained annually and compared against the Minimum Threshold values as discussed above. ~~The publicly available groundwater quality data from selected representative wells will be obtained annually and either compared against MCL values, if recent historical data has indicated chemicals of concern were initially below MCLs, or evaluated for groundwater quality trends with respect to the chemicals of concern utilizing appropriate statistical methods, such as the Mann-Kendall trend test. The Mann-Kendall trend test is a nonparametric test used to identify a trend in a series, even if there is a seasonal component to the series.~~

Selected public supply wells that will form the basis of the representative monitoring wells for groundwater quality are shown on ~~Table 4-7~~ Table 4-8. The density of groundwater quality representative monitoring wells is approximately two wells per township. Locations were selected to be representative of large and small communities dependent on groundwater and to spatially cover the GSA. The chemicals of concern that the individual wells are routinely monitored for are summarized in Table 4-8. The representative groundwater quality monitoring network will be evaluated and revised if needed in subsequent GSP 5-year revisions.

Table 4-78: Selected Representative Wells and Monitored Chemicals of Concern

| Community Name | State Well ID No. | Township | Constituents of Concern Tested for | | | | | | |
|-------------------|-------------------|-----------|------------------------------------|-----|-----|------|------|----------------------------|----|
| | | | Ar | TCP | Cr6 | DBCP | MTBE | Nitrate as NO ₃ | Ur |
| Del Rey CSD | 1010035-006 | T15S/R22E | X | X | -- | X | X | X | -- |
| | 1010035-007 | T15S/R22E | X | X | -- | X | X | X | -- |
| City of Fowler | 1010006-007 | T15S/R21E | X | X | -- | X | X | X | -- |
| | 1010006-008 | T15S/R21E | X | X | -- | X | X | X | -- |
| City of Kingsburg | 1010019-015 | T16S/R22E | X | X | -- | X | X | X | -- |
| | 1010019-016 | T16S/R22E | X | X | -- | X | X | X | -- |
| City of Parlier | 1010025-010 | T15S/R22E | X | X | -- | X | X | X | -- |
| | 1010025-012 | T15S/R22E | X | X | -- | X | X | X | -- |
| City of Sanger | 1010029-003 | T14S/R22E | X | X | -- | X | X | X | -- |
| | 1010029-022 | T14S/R22E | X | X | -- | X | X | X | -- |

Notes: 1010035 = Del Rey CSD, 1010006 = City of Fowler, 1010019 = City of Kingsburg, 1010025 = City of Parlier, 1010029 = City of Sanger

4.5.3 Measurable Objectives

Within the Kings Basin, the measurable objective shall be to maintain water quality at potable water standards, or in other words, below MCLs for the chemicals of concern. In areas where chemical concentrations are initially above MCLs, the measurable objective shall be to maintain stable or improving groundwater quality trends.

4.5.3.1 Description of Measurable Objectives

Regulation Requirements:

§354.30 (a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin with 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.
(b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

Groundwater within the SKGSA is generally used beneficially for municipal/domestic consumption or agriculture. Groundwater quality standards are typically higher than those required for agriculture. The minimum threshold for degraded water quality has been set at values that are protective of human health and intended beneficial use and users of groundwater resources (i.e., CCR Title 22).

For wells within the monitoring network (either existing or future wells), where concentrations of the chemicals of concern are recent historically below MCLs, the measurable objective is to maintain water quality at potable water standards, or in other words, below MCLs for the chemicals of concern. In situations where monitoring network wells (either existing or future wells) have recent historically concentrations above MCLs for contaminants of concern, the measurable objective is for the wells to maintain stable or improving groundwater quality trends in regard to the identified chemicals of concern.

4.5.3.2 Operational Flexibility

Regulation Requirements:

§354.30 (c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.
§354.30 (g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for finding of inadequacy of the Plan.

For wells within the monitoring network (either existing or future wells), where concentrations of the chemicals of concern are recent historically below MCLs, the operational flexibility is the difference between the MCL and recent historic concentration of the chemical of concern. No operation flexibility will be set at this time for situations where monitoring network wells (either existing or future wells) have ~~recent~~ historically concentrations above MCLs for contaminants of concern.

4.5.3.3 Representative Monitoring

Regulation Requirements:

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

Groundwater levels will not be used as a proxy for water quality due to a lack of clear correlation between groundwater levels and changes in water quality.

4.5.3.4 Path to Achieve Measurable Objectives

Regulation Requirements:

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

Groundwater pollution characterization and remediation are enforced by local agencies and state level programs. The GSA will only have authority related to groundwater pumping policies, however the GSA will

review and analyze publicly available routine groundwater monitoring data reported by the community and non-community public supply wells in order to understand how and if groundwater pumping is exacerbating groundwater quality concerns and when and where to enforce pumping restrictions or other mitigation measures should it become necessary. Management of groundwater pumping will occur over the lifetime of the planning and implementation horizon. No interim milestones have been set for the water quality indicator.

If a Minimum Threshold exceedance occurs, a site-specific investigation will be conducted to try to determine if GSA actions have contributed to the groundwater quality degradation. The investigation may include, but will not be limited to the following:

- Verification of groundwater gradient and flow direction in the area in question;
- Changes in the historic cropping record in the area compared against historic groundwater quality data;
- Groundwater quality compared against groundwater level changes in the area;
- Available groundwater pumping records for wells in the area will be reviewed and compared against groundwater quality trends;
- Available groundwater recharge records for recharge sites in the area will be reviewed and compared against groundwater quality data;
- A Phase I Environmental Site Assessment (Phase I ESA) could potentially be performed in order to assess the possibility of degradation resulting from third party activities.

Should investigations indicate GSA actions have contributed to groundwater quality degradation, then management actions described in Chapter 6 will be implemented in the area where the water quality has changed.

~~If an undesirable result occurs with regards to groundwater quality, actions may include:~~

- ~~• Increased frequency of monitoring well sampling~~
- ~~• Additional data analysis~~
- ~~• Increased groundwater recharge in the area(s) of concern~~
- ~~• Increased use of surface water in the area(s) of concern~~
- ~~• Working collaboratively with state and local groundwater quality protection agencies and programs~~

4.5.3.5 Measurable Objectives for Additional Plan Elements

Regulation Requirements:

§354.30 (f) Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.

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

SKGSA will not be setting measurable objectives or interim milestones for additional plan elements described in Water Code Section 10727.4.

4.6 Land Subsidence

Regulation Requirements:

~~§354.26 (d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.~~

~~As described in Section 3.2.6, land subsidence within the Kings Basin primarily occurs in the western one-third of the basin from pumping below the Corcoran Clay and southern portion of the basin that overlies the Corcoran Clay. The eastern extent of the Corcoran Clay is along the western and southern portions of the basin and does not impact the South Kings GSA. Some pumping below the Corcoran Clay does occur within the Kings subbasin, but a significant amount of the land subsidence within the Kings is believed to be attributable to pumping from below the Corcoran Clay that occurs outside of the Kings Subbasin. Although subsidence is not of significant concern within the SKGSA, sustainable management criteria have been set to be consistent with the other GSAs within the basin.~~

~~DWR staff has indicated that the intent of SGMA was that land subsidence be avoided or minimized based to the extent within the GSAs control. Once groundwater levels have stabilized within the basin, land subsidence should be minimized. Measurable objectives for land subsidence were set based on this requirement.~~

~~As seen in the Groundwater Conditions section of the Basin Setting section (Section 3.2.6), NASA InSAR data shows that subsidence in most of the SKGSA area was between 0 and 1 inch over a two year period (see Figure 4-10). This amount of subsidence is considered very minimal and has had no visual impacts on structures or wells. Furthermore, most inelastic subsidence occurs when there is heavy pumping from below a confining layer such as the E clay; however, this layer does not extend to the SKGSA area, thus subsidence is not anticipated to be an issue. Lastly, as groundwater levels are stabilized over the implementation of this plan, the minimal subsidence is expected to do the same. Therefore, no criteria needs be established for sustainable management criteria. It is planned that there will be periodic checkups to identify if this assertion continues to be true. If trends do not behave as expected, criteria may be established in the future as needed.~~

4.6.1 Undesirable Results

~~SKGSA has minimal subsidence as described in detail in Section 3.2.6, and there have been no known significant impacts from land subsidence within the SKGSA. SGMA defines an undesirable result for land subsidence as that which causes significant and unreasonable interference with surface land uses. The terms “significant and unreasonable” are not defined by regulations, rather the conditions leading to this classification are determined by the local GSA, beneficial users, and the basin they are a part of. The primary concern related to interference with surface land uses in the Kings Basin is subsidence reducing the capacity of gravity flow water conveyance facilities such as canals or river channels. Subsidence within a portion of a river channel or canal could prevent conveyance of flood water in river channels increasing the risk of flooding adjacent land, or the subsidence within sections of an irrigation canal could restrict or prevent delivery of irrigation water to agricultural land. Existing surface water conveyance infrastructure includes CID canals and structures that traverse the GSA~~

~~The GSAs within the basin have defined the Undesirable Result of land subsidence as significant and unreasonable if loss of conveyance capacity of the Kings River or existing irrigation canals has occurred as a result of land subsidence.~~

4.6.1.1 Criteria to Define Undesirable Results

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

The process used to develop the criteria for Undesirable Results began with a review of KRCD, USGS, DWR, NASA In-SAR, and USBR land subsidence data, and through discussions with stakeholders and landowners regarding locally observed conditions. The conveyance capacity of the Kings River channel is critical for both the conveyance of flood water and delivery of surface water for irrigation supplies. During flood periods, the conveyance capacity of the Kings River is necessary to route water through portions of the basin without causing flooding of lands adjacent to the river. During the irrigation season, the conveyance of surface water for irrigation from the Kings River and through irrigation canals is needed to maintain agricultural practices within the basin. These conveyance facilities are gravity flow systems, relying on open channel hydraulic pressure to convey water through the existing channels. Subsidence that lowers the canal or channel at the headworks or within a section of channel may prevent the channel from maintaining the water levels needed to convey the needed capacity of the channel, thereby restricting deliveries unless mitigated. Defining the Undesirable Result was based on the criteria to maintain adequate channel capacity within the river system and irrigation canals to continue historic surface water deliveries.

From discussions with stakeholders and landowners, there have been no known undesirable results within SKGSA.

4.6.1.2 Causes of Groundwater Conditions That Could Lead to Undesirable Results

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

As described in 3.2.6, there are five types of subsidence in California. Excessive pumping below the Corcoran Clay that occurs within the basin and outside the basin could cause the Undesirable Result of subsiding portions of a gravity flow channel or canal that reduces the conveyance capacity of that facility.

Excessive groundwater pumping can contribute to deep subsidence across a broad area, resulting in aquifer compaction, loss of storage capacity, and adverse effects to surface features, such as bridges, canals, flood control systems, and water supply pipelines that rely on gravity flow.

SGMA only applies to land subsidence from groundwater pumping. There are two general types of subsidence: elastic and inelastic. Elastic subsidence is recoverable if water levels later rise while inelastic subsidence is permanent. Elastic subsidence generally occurs in the coarse-grained portions of the aquifer where the materials compact. Although there are several causes of inelastic land subsidence, the compression of clay as a result of groundwater extraction from confined aquifers is the cause of the vast majority of subsidence documented in the San Joaquin Valley. This results in compaction of fine-grained confining beds (clays) above and within the confined aquifer system as water is removed from pores between the sediment grains. Once water is squeezed out of the compressible clay, the clay compacts resulting in the lowering of the overlying land surface. The compressed clays, in which the clay particles have been re-arranged more compactly, can no longer re-absorb water, thus the subsidence in these areas cannot be reversed. This process is known as aquifer system compaction.

In the Central Valley, aquifer system compaction primarily occurs within the Corcoran Clay layer and less so in the overlying “A” and “C” clays. The Corcoran Clay layer within the Kings basin is shown in **Figure 4-11**. Since the Corcoran Clay is a confining layer, land subsidence would occur when water is pumped from the confined aquifer below the Corcoran Clay. Areas prone to subsidence, soil textures, clay mineralogy, and other geologic and geochemical properties were intensely studied by the USGS in a series of Professional Papers in the 1960s, 1970s and 1980s. Regionally, the areas prone to subsidence were underlain by deposits where the clayey deposits are dominated by the clay mineral montmorillonite (USGS 497-C, Meade 1967). Most of the

permanent subsidence in the San Joaquin Valley has historically been correlated to overdraft in the confined aquifer below the Corcoran Clay. However, with increased reliance on groundwater to meet demands, land subsidence is currently occurring in some isolated areas outside of the Corcoran Clay. In these areas subsidence is typically less than the historical subsidence in areas underlain by the Corcoran Clay.

The Corcoran Clay is located west and south of the SKGSA as shown in **Figure 4-11**.

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

(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

The criteria to define when and where the effects of subsidence cause an Undesirable Result is based on the combination of exceedances of the minimum threshold. The proposed subsidence monitoring network will measure the annual rate and cumulative subsidence to verify those variables have not exceeded the minimum threshold. The exceedance of the minimum threshold within a 36 square-mile area (roughly a Township) is significant based on how the basin has determined the minimum thresholds described later in this section. The exceedance of the annual rate or cumulative subsidence minimum threshold would potentially be significant to the stakeholders in the proximity of the subsidence area, and potentially downstream. A minimum threshold exceedance would warrant further evaluation by the GSA and potential action.

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

(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

The potential effects of land subsidence include those on manmade structures and those on natural features. In the San Joaquin Valley, the main concerns related to land subsidence are the impacts to gravity driven water conveyance structures such as canals or river channels.

Within the SKGSA, the gravity flow systems are really limited to the CID canals that traverse the SKGSA in some locations. The beneficial uses and users could potentially be affected by:

- Flooding ~~over~~ caused by overtopping the river levees if subsidence lowers a section of channel, decreasing capacity and hindering the ability to convey flood flows or irrigation water.
- Reduced conveyance capacity in irrigation canals caused by subsidence in a section of irrigation canal preventing delivery of surface water needed for crop irrigation or groundwater recharge to downstream water users.
- Roadways or bridges needing to be reconstructed to accommodate the raising of canal/channel banks that have been impacted by subsidence. These improvements can require additional road right of way requirements to raise channel crossings as well as transportation impacts during construction.

4.6.1.3 Evaluation of Multiple Minimum Thresholds

§354.26 (c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

Monitoring for land subsidence will be done by evaluating data released from NASA InSAR and, as a cross-check, the GSA gathers subsidence data from sites historically monitored by KRCD. The San Joaquin River and Kings River levees are monitored annually by KRCD for subsidence. Therefore minimum thresholds have been set GSA-wide based on loss of conveyance capacity and will be evaluated by mapping the subsidence over

the area. Monitoring sites for these programs extend beyond the Kings Subbasin boundaries which is adequate for covering the GSA's using contouring and interpolation techniques. The determination that undesirable results are occurring shall depend upon measurements from multiple monitoring sites within each GSA and InSAR mapping over the entire Subbasin. The exceedance of the minimum threshold over a 36 square-mile area may be considered significant based on how the basin has determined the minimum thresholds.

4.6.2 Minimum Thresholds

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

SKGSA is not currently experiencing any known significant subsidence related issues along conveyance facilities, major highways or other infrastructure. The amount of historic subsidence is nominal and not believed to cause a continued concern, however SKGSA has set a minimum threshold as a precaution and to be consistent with other GSAs within the basin. The minimum threshold has been set based on the amount of subsidence critical river channel and canal infrastructure can typically tolerate. The most vulnerable facilities in the GSA are irrigation canals due to their reliance on gravity flow. Irrigation canals in the GSA generally have about 3 feet of freeboard, which is the distance from the top of water surface to top of canal bank. Freeboard allows for operational flexibility so the water does not overtop the canal or channel. Hence, subsidence causing an elevation change of up to three feet difference between the head of a canal and the canal terminus can be tolerated before there is a loss of operational capacity. However, uniform subsidence along a canal reach would not impact the canal gradient or freeboard, so the spatial distribution of subsidence will be important in determining how specific facilities are impacted. The minimum threshold was set at 3 feet of subsidence. The Kings River Levees have more than three feet of freeboard and can therefore tolerate this amount of subsidence before capacity is impacted.

Although an exact correlation between the groundwater level minimum thresholds and the anticipated amount of subsidence cannot be made, it is important to understand that subsidence will likely continue to occur during the planning period (2020-2040) until water levels are stabilized at the water level measurable objective in the Kings Subbasin as well as neighboring subbasins. It is anticipated that some subsidence would continue when hydrologic conditions cause the operational flexibility to be used and water levels drop below the Measurable Objective (potentially all the way to the Minimum Threshold level during a 5-year drought), but subsidence would stop after the water level reaches its lowest point and then is raised back up to the sustainable Measurable Objective level. Once water levels are stabilized at the measurable objective level then the minimum threshold for subsidence allows for water levels to drop to the minimum threshold level.

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

Groundwater levels will not be used as a proxy for land subsidence due to a lack of quality data on the confined aquifer potentiometric surface. Land subsidence occurs in areas that are underlain by clayey deposits dominated by the clay mineral montmorillonite. In the Central Valley, this is usually the Corcoran Clay layer including the confined aquifer below. The Corcoran Clay layer barely extends into the southwest edge of. Since the Corcoran Clay is a confining layer, land subsidence would occur when water is pumped from the confined aquifer below the Corcoran Clay. To monitor land subsidence based on water level, the well would have to be perforated below the Corcoran clay, and not be composite (i.e., constructed across multiple aquifers).

In the western portion of the basin, the groundwater level and pumping from the confined aquifer are considered a data gap and the GSAs in that portion of the basin have included a project to fill those data gaps in their GSPs. The data gap project will include estimating groundwater pumping from the confined aquifer and identifying more confined aquifer wells to be able to develop a potentiometric surface.

4.6.2.1 Criteria to Define Minimum Thresholds

§354.28 (b) The description of minimum thresholds shall include the following:
(1) The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting.
(c) Minimum thresholds for each sustainability indicator shall be defined as follows:
(5) Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:
(A) Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.
(B) Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.

Most subsidence in the San Joaquin Valley is occurring south and west of SKGSA area over the axial trough of the Valley, in an area west and south of the Kings Subbasin. Refer to section 3.2.6 of the Basin Setting for more information on land subsidence conditions. Areas prone to subsidence, soil textures, clay mineralogy, and other geologic and geochemical properties were intensely studied by the USGS in a series of Professional Papers in the 1960s, 1970s and 1980s. Regionally, the areas prone to subsidence were underlain by deposits dominated by the clay mineral montmorillonite (USGS 497-C, Meade 1967). The recent subsidence map, Figure 4-11, both show that generally subsidence increases westerly and southwesterly of SKGSA, indicating that deeper groundwater is likely increasingly confined to the west and there is likely a higher percentage of montmorillonite in the finer-grained sediments near the axis of the valley. The maps and summary table showing historic subsidence within the GSA that were considered in establishing the minimum threshold for land subsidence are included in this section. **Table 4-7** shows the summary of total historical land subsidence in SKGSA as estimated by different agencies over various time frames and shows the summary of the historical land subsidence rates. Those tables include minimum and maximum values for each map to show the variation of land subsidence in the SKGSA.

The criteria for cumulative subsidence was based on the amount of subsidence that could be tolerated for critical infrastructure. Irrigation canals are considered the most vulnerable infrastructure due to their reliance on gravity flow; they can tolerate up to 3 feet of subsidence based on the typical amount of freeboard found in most canals. Significant and unreasonable conditions would occur if the total freeboard was lost due to subsidence, causing canal overtopping and loss of capacity. It should be noted that 3 feet of subsidence in the GSA would not necessarily cause an undesirable result, since the subsidence would need to cause a difference of 3 feet along the canal reach (i.e. 3 feet of subsidence at the head of the canal and no subsidence at the canal terminus). The spatial distribution of subsidence could cause the impact to the freeboard to range anywhere from zero to three feet. Uniform subsidence along a canal reach would not necessarily cause a loss of any capacity or freeboard. However, three feet of subsidence is the minimum amount that could cause significant issues. To address subsidence before reaching the Minimum Threshold, subsidence of one foot within a 36 square mile area in the GSA would trigger the following actions:

1. Capacity analysis to evaluate the impact of subsidence on critical infrastructure. If no capacity issues are identified, then there is no undesirable result
2. If there is a capacity issue, then the facility will be mitigated through modifications and retrofits
3. Investigate what is causing the land subsidence, and whether actions to decrease or eliminate subsidence are within the GSAs control
4. If the facility cannot be restored to its original functions, then significant actions may be needed, such as reductions in pumping or importation of additional surface water supplies, to minimize further subsidence.

Minimum threshold exceedances may occur due to subsidence that originates outside of the GSA. The minimum threshold is set based on what the GSAs believe they can directly control. If subsidence appears to be encroaching into GSA from other regions as shown by InSAR data, then neighboring GSAs will be contacted to coordinate studies that would need to be performed to evaluate the sources of subsidence in the GSA, and in the neighboring GSAs, and to coordinate mitigation efforts.

The maximum cumulative amount of land subsidence was determined by reviewing a 1949-2005 map of land subsidence by DWR.

Table 4-7 Historical Total Land Subsidence in SKGSA

| Monitoring Agency | Date Range | | - | |
|-------------------|------------|------|----------|----------|
| | Start | End | Min (in) | Max (in) |
| USGS | 1926 | 1970 | 0 | -12 |
| DWR | 1949 | 2005 | 0 | -60 |
| KRCD | 2013 | 2016 | 1.4 | -11.9 |
| NASA | 2015 | 2017 | -1 | -7 |

Table 4-8 Historical Land Subsidence Rate in SKGSA

| Monitoring Agency | Date Range | | - | |
|-------------------|------------|------|-------------|-------------|
| | Start | End | Min (in/yr) | Max (in/yr) |
| USGS | 1926 | 1970 | 0.00 | -0.27 |
| DWR | 1949 | 2005 | 0.00 | -1.07 |
| KRCD | 2013 | 2016 | 0.48 | -3.97 |
| NASA | 2015 | 2017 | -0.5 | -3.50 |

**Kings Subbasin
Coordinated Effort**

Land Subsidence
NASA (via CA Dept. Water Resources)
2015-2017

Figure 4-11

Legend

-  Kings Subbasin GSAs
-  Township/Range

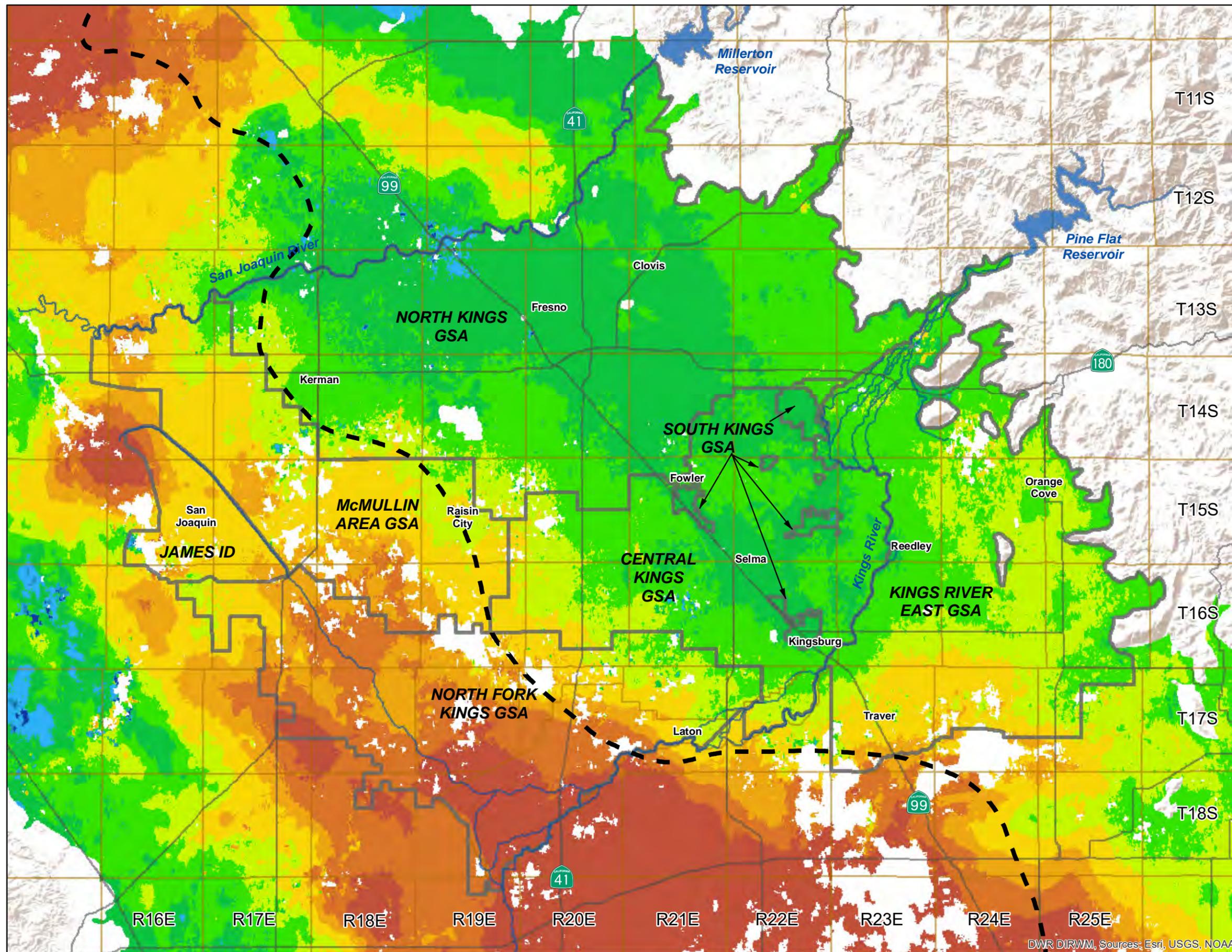
E-Clay Eastern Extent

-  Page and LeBlanc 1969, modified by KDSA

NASA InSAR Data (provided by CA DWR) *
Change from May 2015 to April 2017 (inches)

-  2 to 6
-  1 to 2
-  0 to 1
-  -1 to 0
-  -2 to -1
-  -3 to -2
-  -5 to -3
-  -7 to -5
-  -10 to -7
-  -15 to -10

* The legend shows the change in ground surface elevation from May 2015 to April 2017. The positive values indicate rebound while the negative values indicate land subsidence.



DWR DIRWM, Sources: Esri, USGS, NOAA

4.6.2.2 Relationship for Each Sustainability Indicator

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

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

The following provides an explanation of the relationship between the subsidence minimum thresholds and the other sustainability indicators and how the GSA determined that the minimum thresholds will avoid undesirable results for each Indicator:

- Groundwater Levels. Land subsidence does not impact water levels, rather the water levels impact land subsidence. Land subsidence occurs due to a decline in water levels from confined groundwater pumping. It is assumed that the neighboring GSAs will reduce pumping to some extent from the confined aquifer to become sustainable. The reduction in confined groundwater pumping would lead to water levels stabilizing because of the water level sustainable management criteria, that would lead to land subsidence stabilizing. Although an exact correlation between the groundwater level minimum thresholds and the anticipated amount of subsidence cannot be made, it is important to understand that subsidence will likely continue to occur during the planning period (2020-2040) until water levels are stabilized at the water level measurable objective. Once water levels are stabilized at the measurable objective level then the minimum threshold for subsidence allows for water levels to drop to the minimum threshold level.
- Groundwater Storage. Land subsidence impacts storage change when there is inelastic land subsidence. Once inelastic land subsidence occurs, the loss in storage cannot be reversed.
- Groundwater Quality. Land subsidence is not directly related to groundwater quality sustainability indicators. Groundwater quality is, however, impacted by water levels. Different water quality constituents may be found at different depths which would cause the water quality to change depending on the groundwater elevation.
- Sea Water Intrusion. This indicator is not applicable to this basin.
- Interconnected Surface Water. Interconnected surface water groundwater is not directly related to land subsidence.

4.6.2.3 Minimum Thresholds in Relation to Adjacent Basins

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

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

The minimum thresholds have been selected to avoid causing undesirable results in adjacent basins. It is anticipated that as water levels stabilize in the basin, so will land subsidence. Furthermore, historical subsidence in SKGSA has been lower than in adjacent areas, especially to the west, so it is reasonably assumed that SKGSA will not cause detrimental land subsidence in adjacent areas.

The majority of SKGSA has minimal subsidence and undesirable results have not been identified. **Figure 4-11** from NASA InSAR data shows that areas of greater subsidence are located outside of SKGSA to the west and south where the Corcoran clay layer exists and confined pumping occurs. SKGSA will continue to monitor the subsidence within SKGSA as well as along the borders to see if subsidence is spreading into SKGSA where the subsidence is caused from confined aquifer pumping outside of the SKGSA. SKGSA cannot control land subsidence that originates outside of GSA boundaries and outside the Basin boundaries. When subsidence that originates from confined aquifer pumping outside SKGSA and extends into the SKGSA, SKGSA will coordinate with its neighboring GSAs to address the subsidence issue.

4.6.2.4 Impact of Minimum Thresholds on Beneficial Uses and Users

§354.28 (b) The description of minimum thresholds shall include the following:
(4) How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

At the minimum threshold, the impact on water uses and water users should be minimal. SKGSA will monitor land subsidence as well as actual impacts from land subsidence. If the land subsidence monitoring shows subsidence in the area, SKGSA may assess the land subsidence in the area and address accordingly. Most beneficial users in SKGSA have mentioned they are not aware of subsidence within SKGSA or that any minimal subsidence has not caused issues of concern. Since there have been no issues with subsidence historically, it is not anticipated that land subsidence will cause issues with the minimum threshold criteria, particularly as groundwater levels are sustained. If subsidence were to occur within the SKGSA, the beneficial uses and users could potentially be affected by the flooding over the river levees or loss of conveyance capacity to delivery surface water through various irrigation canals for crop irrigation or groundwater recharge. Decreased channel capacity could also hinder the ability to convey flood flows. Downstream water users and neighboring GSAs could also be impacted if they were anticipating capture and recharge of said flows.

4.6.2.5 Current standards relevant to sustainability indicator

§354.28 (b) The description of minimum thresholds shall include the following:
(5) How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.

There are currently no standards for land subsidence. If state, federal, or local agencies implement a land subsidence standard, then it will be reviewed and may be incorporated into the GSP. If the minimum threshold differs from the regulatory standard, the nature and basis for the difference will be explained.

4.6.2.6 Measurement of Minimum Thresholds

§354.28 (b) The description of minimum thresholds shall include the following:
(6) How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.

Land subsidence is currently measured by the KRCD (survey) and NASA (remote sensing). The monitoring density is considered of adequate density and frequency to determine subsidence annually. For more information on the monitoring network, refer to Section 5.1.3.5.

4.6.3 Measurable Objectives

4.6.3.1 Description of Measurable Objectives

§354.30 (a) Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin with 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.
(b) Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.

DWR staff has indicated that the intent of SGMA was that land subsidence be avoided or minimized based to the extent within the GSAs control. Once groundwater levels have stabilized within the basin, land subsidence should be minimized as long as water levels have also stabilized in neighboring basins. The Measurable Objectives for land subsidence were set in accordance with this requirement, and are shown in **Table 4-9**. It is assumed that land subsidence would stabilize as the water levels stabilize as part of the water level measurable objectives.

Table 4-9 Measurable Objective for Land Subsidence

| Measurable Objective Parameter | Measurable Objective Quantity |
|--------------------------------|-------------------------------|
| Annual Land Subsidence Rate | 1 inch/year |

The Measurable Objective for annual land subsidence rate will be 1 inch/year, to allow for the error of the InSAR data.- The Measurable Objective for maximum cumulative land subsidence will be 0 inches over 20 years. The sustainability goal for the basin with 20 years of plan implementation is to eliminate land subsidence that is caused by actions within the GSA’s control.- Though the measurable objective during the implementation may be exceeded due to the error in the InSAR data and water levels still stabilizing, the goal is to have no subsidence once the basin and neighboring basins reaches sustainability in 2040. Even after water levels have stabilized there is the potential for residual subsidence. Residual subsidence, also called delayed subsidence, occurs when the land surface continues to decline for a period even after groundwater levels have been stabilized. This phenomenon likely occurs due to the delayed propagation of the piezometric decline in the fine-grained layers and viscous deformations typical of fine-grained materials. Also, in dry years when groundwater levels decline below the groundwater level measurable objective, it is anticipated that there will be some land subsidence in areas with confined aquifer pumping that occurs ~~during initial~~ with continued groundwater level declines. It is believed that once groundwater levels have declined to a certain level and rise back up, there will not be additional subsidence that occurs.

4.6.3.2 Operational Flexibility

§354.30 (c) Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.
(g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for finding of inadequacy of the Plan.

The operational flexibility is the difference between the measurable objective and minimum threshold. For SKGSA, operational flexibility is 36 inches of cumulative subsidence.

4.6.3.3 Representative Monitoring

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

The water level SMCs are for the unconfined aquifer and confined aquifer groundwater levels would be needed to represent land subsidence. At this time, groundwater levels will not be used as a proxy for land subsidence due to a lack of quality data on the confined aquifer potentiometric surface. Land subsidence occurs in areas that are underlain by clayey deposits dominated by the clay mineral montmorillonite. In the Central Valley, this is usually the Corcoran Clay layer, including the confined aquifer below. The Corcoran Clay layer is located west and south of the SKGSA. Since the Corcoran Clay is a confining layer, land subsidence occurs when water is pumped from the confined aquifer below the Corcoran Clay. To monitor land subsidence based on water level, the well would have to be perforated below the Corcoran clay, and not be composite (i.e. constructed across multiple aquifers).

In the western portion of the basin, the groundwater level and pumping from the confined aquifer are considered a data gap and the project to fill those data gaps are included in the GSPs of the western GSAs. The data gap project will include estimating groundwater pumping from the confined aquifer and identifying more confined aquifer wells to be able to develop a potentiometric surface. The data gap study is a high priority and will be commenced as soon as possible.

4.6.3.4 Path to Achieve Measurable Objectives

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

The interim milestones will be based on the cumulative amount of subsidence observed within a 36 square mile area over five-year incremental periods. The interim milestones are 1 foot of subsidence over a 5 year period. Subsidence of one foot within a 36 square mile area in the GSA over 5 years would trigger the following actions:

1. Capacity analysis to evaluate the impact of subsidence on critical infrastructure. If no capacity issues are identified, then there is no undesirable result
2. If there is a capacity issue, then the facility will be mitigated through modifications and retrofits
3. Investigate what is causing the land subsidence, and whether actions to decrease or eliminate subsidence are within the GSAs control.
4. If the facility cannot be restored to its original functions, then significant actions may be needed, such as reductions in pumping or importation of additional surface water supplies, to minimize further subsidence.

If land subsidence exceeds the interim milestone, then there will be increased monitoring of impacts to infrastructure and coordination with neighboring GSAs who may be causing the SKGSA undesirable results. If the land subsidence exceeds the Minimum Threshold and causes an undesirable result, then SKGSA will implement actions identified in Section 4.6.2.1.

4.6.3.5 Measurable Objectives for Additional Plan Elements

§354.30 (f) Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.

SKGSA will not be setting measurable objectives or interim milestones for additional plan elements described in Water Code Section 10727.4.

Figure 4-10: Land Subsidence, NASA, from 2015 to 2017

4.7 Interconnected Surface Water and Groundwater

Regulation Requirements

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

Interconnected surface water has been defined in the California Code of Regulations Title 23, Division 2, Chapter 1.5, Subchapter 2 as 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.

An undesirable result would occur if groundwater pumping directly caused significant and unreasonable depletions of surface water. This would require the following: 1) surface water and groundwater are hydraulically connected; 2) groundwater pumping is causing a significant reduction in surface water flows; 3) the surface water depletion is not being mitigated by the GSA or other agencies/river management programs; and 4) third parties are being adversely impacted by the surface water depletion.

Figure 4-12 is a map of the Kings Subbasin, the main waterways, and other features related to interconnected surface water-groundwater. The Kings River flows on the eastern and southeastern ends of SKGSA.

Interconnection Status

Existing municipal wells are all within several miles of the River, and it is believed they may not impact surface water flows. This could be evaluated with a hydrogeologic analysis of well interference. This may result in establishing a minimum river setback for future wells. In addition, some sections of the Kings River may not be connected to the groundwater, and in these areas, well pumping would not impact surface water flow.

River Management Programs

Since 1999, the Kings River Conservation District (the “District”), the Kings River Water Association (the “Association”), and the California Department of Fish and Wildlife (the “Department”) has operated a comprehensive program referred to as the *Kings River Fisheries Management Program* to further enhance the broad range of fish and wildlife resources associated with the Kings River and Pine Flat Reservoir. The Kings River Water Association employs adaptive management of river flows to balance fishery needs with other beneficial water uses while adjusting to changing conditions, opportunities and constraints. Among other improvements since its inception the program has:

- Made beneficial changes in the operation of Pine Flat Dam and related facilities;
- Established a temperature control pool in the reservoir;
- Enhanced releases for fisheries purposes from Pine Flat Dam;
- Installed new facilities for fish and wildlife purposes at Pine Flat Dam and the Kings River;
- Enhanced program of law enforcement, fish stocking and monitoring; and
- Made other physical and non-flow related improvements for the benefit of aquatic habitat quality.

As part of the original agreement between the District, the Association, and the Department, a minimum flow of 95 cubic feet per second (CFS) is to be maintained at Fresno Weir to support the fisheries program. Fish flows must be maintained even if losses in the River are larger than assumed (i.e., river releases from Pine Flat Dam will be modified as necessary such that the volume and timing of these flows are not otherwise impaired). These minimum fish flows are located upstream of South Kings GSA, and there are no minimum environmental flows in the River sections near South Kings GSA.

Riparian water users are found along much of the Kings River in SKGSA. There are no minimum or required releases for the riparian water users. Rather, they can simply divert water whenever it is available in the river.

Data Gap Analysis

Overall, additional information is needed to better define the status of surface water-groundwater connection more definitively, and the extent of surface water depletions, if any, in the GSA. As a result, the GSA has identified these as data gaps that must be researched before sustainable management criteria can be developed. Chapter 6 includes the description of a project called “Interconnected Surface Water-Groundwater Data Gap Analysis.” This is a high priority project that will include the following primary tasks:

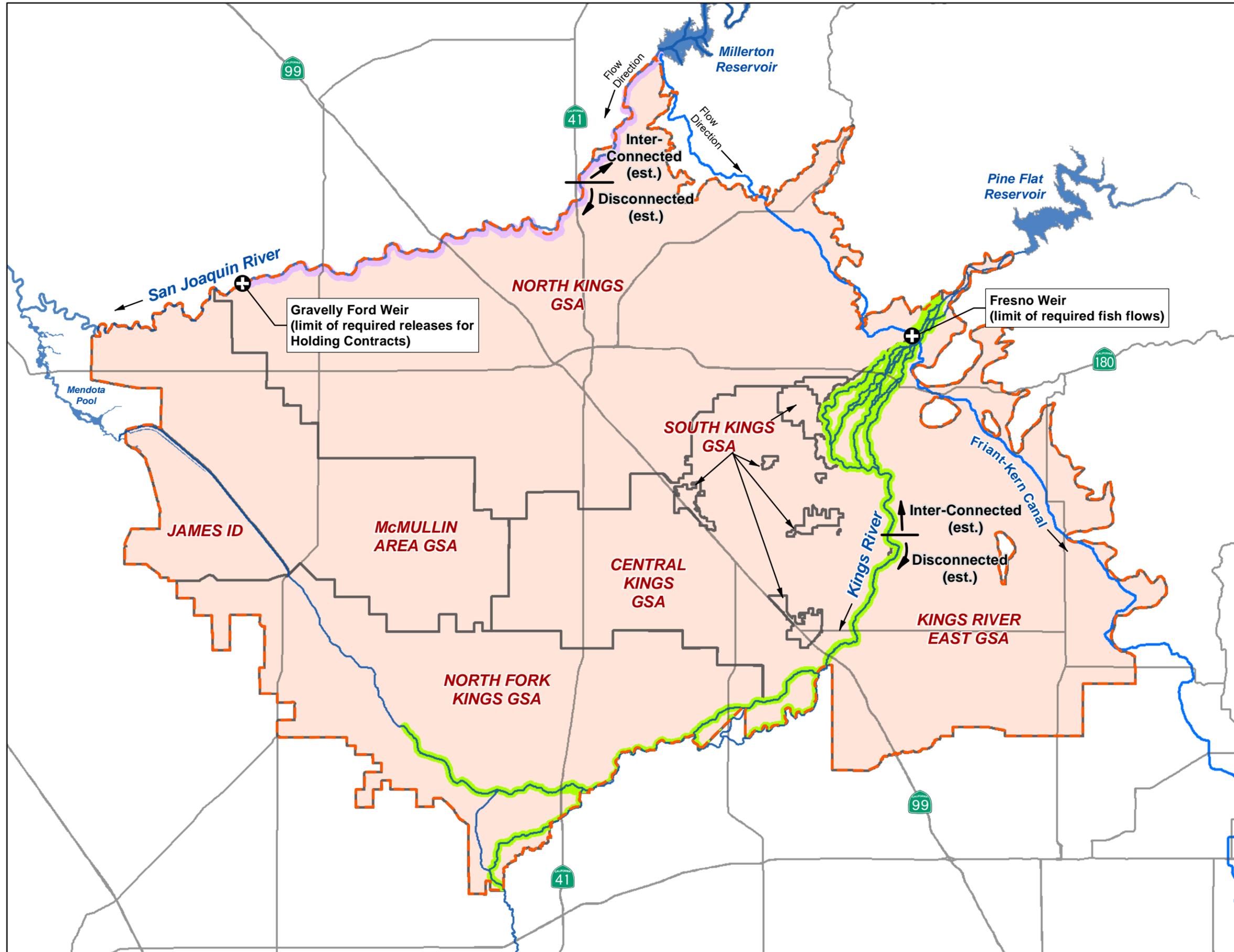
- 1) Determine interconnection status of river reaches in the GSA based on various reports, studies, models and data
- 2) Coordinate with water rights holders and river management programs to determine how they impact and mitigate for surface water depletions, and if these efforts reduce or obviate the need for actions by the GSA
- 3) Evaluate impacts of groundwater pumping on surface water depletion using a model, analytical tool or other calculation method.

The study will provide the information needed to develop sustainable management criteria. Refer to Chapter 6 for more details on the project.

Kings Subbasin

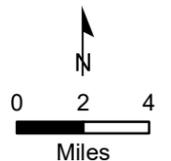
Surface Water Features

Figure 4-12



Legend

- Weir
- Holding Contract Lands
- Riparian Water Right Users
- Kings Subbasin GSAs
- Kings Subbasin (2019)
- Highway



Regulation Requirements:

~~§354.26 (d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.~~

~~Interconnected surface water has been defined in the California Code of Regulations Title 23, Division 2, Chapter 1.5, Subchapter 2 as 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.~~

~~The only place that SKGSA may be close enough to affect river flows is in the south east corner of Sanger; however, most of the wells for municipal use are located closer to the center of town, away from the river. The only other surface water in the SKGSA area are a couple of Consolidated ID canals that run through the cities, but groundwater depth throughout the rest of the GSA ranges from 40 to 80 feet, indicating a lack of connection. Lastly, the Kings River Water Association has a fisheries management program that requires instream flows on the river during the fall, winter, and spring months. Since the program maintains flows in the river, seepage from the river helps to keep groundwater levels in the nearby area at a relatively constant level. Due to the current lack of undesirable results and the unlikely event that undesirable results will occur caused by SKGSA pumping, sustainable management criteria will not be evaluated for interconnected surface water.~~

6 Projects and Management Actions to Achieve Sustainability

Regulation Requirements:

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

§354.44. Projects and Management Actions

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

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

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

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

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

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

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

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

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

(6) An explanation of 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.

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

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

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

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

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

6.1 Introduction

GSA's have two primary types of tools which may be used to achieve sustainable groundwater management. This section discusses the two types, potential Projects and Management Actions, that may be implemented by the GSA. The projects identified in this section primarily focus on recharge of groundwater supplies within the GSA. The other management actions primarily focus on the reduction of groundwater demand and increase of data collection including education and outreach, regulatory policies, incentive-based programs, and enforcement actions. The following table illustrates potential projects or management actions, applicable to the SKGSA, for achieving mitigating groundwater extraction.

The potential projects and management actions are further discussed and detailed in the remainder of this section.

Table 6-1: Potential Projects and Actions for Mitigating Groundwater Extraction

| Projects and Programs for Mitigating Groundwater Overdraft | | | | | |
|--|---|--------------------------------------|--|-------|----|
| Category | Description | Supply (S) or Demand (D) Side Action | Estimated Time to Potential Implementation (years) | | |
| Conjunctive Use | Groundwater Recharge <ul style="list-style-type: none"> ○ Recharge basins ○ Dry wells ○ Injection wells ○ Reclaimed water | S | 0 - 3 | 1 - 5 | >5 |
| | Groundwater Banking | S | | 1 - 5 | |
| Surface Water | Direct Use of Flood and Storm Water | S | 0 - 3 | 1 - 5 | >5 |
| | Import New Surface Water Supplies | S | | 1 - 5 | >5 |
| | Increase Surface Water Storage | S | | | >5 |
| Land Management | Urban Land Use Regulations | D | 0 - 3 | | |
| | Add disclaimer on property purchases | D | 0 - 3 | | |
| | Prohibition on land development unless proven water supply | D | 0 - 3 | | |
| Groundwater Use Restrictions | Groundwater Metering and Pumping Restrictions | D | 0 - 3 | | |
| | Additional Well Permit Requirements <ul style="list-style-type: none"> ○ Flow meter with ac-ft totalizer ○ Sounding tube for water level | D | 0 - 3 | | |
| | Prohibition of composite wells <ul style="list-style-type: none"> ○ Restrictions on new well permits | D | 0 - 3 | | |
| Water Conservation | Water Use Restrictions in Droughts | D | 0 - 3 | | |
| | Urban Water Conservation | D | 0 - 3 | | |
| | Industrial Water Recycling | S | | 1 - 5 | |
| | Urban Water Recycling | S | | | >5 |
| | Water Conservation Credits | D | 0 - 3 | | |
| | Tiered Pricing / Fines for Overuse | D | 0 - 3 | | |
| | Groundwater Pumping Fees | D | 0 - 3 | 1 - 5 | |
| Other | Wellhead Fees (annual or new wells) | D | 0 - 3 | | |
| | Establish groundwater allocation | N/A | 0 - 3 | | |
| | Groundwater credit system | N/A | 0 - 3 | | |
| | Rainwater Harvesting | S | | 1 - 5 | |
| | Public Education | D | 0 - 3 | | |

Legal Authority

The legal authority and basis for the projects and management actions described in this GSP Section 6 are outlined in the SGMA and related provisions (354.44 (b)(7)). The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Sections 5, 8, and 9 respectively. These GSA authorities include adopting regulations, regulating groundwater extractions, imposing fees, monitoring, enforcing programs, and more. Though the law grants the GSA these powers, the pursuit and implementation of the projects and management actions is the GSA's responsibility. The GSA must enforce their legal authority to the extent necessary to achieve sustainable groundwater management for all beneficial users within the GSA.

It is the mission of this GSP to promote responsible water resource management, while effectively enforcing the policies and standards set in place by the GSA to conserve and protect the State of California's water resources for future generations to come.

Public Notification

The GSA has initiated a web site and has initiated outreach to its constituency through mailers and public meetings. The web site will be the instrumental to keep the public aware of current conditions and success in managing the groundwater resources.

Each of the projects will allow greater ability to recharge surface water supplies. The recharge basins allow for intentional recharge which allows surface water to be diverted and recharged for later use in the winter and summer months. If the rain/snowmelt patterns change and more surface water is available outside the normal crop irrigation demand season, these facilities will allow the district to take advantage of the timing of the surface water availability and may make even more surface water available for recharge.

Potential Sustainability Projects

Each of the following projects may be implemented to meet sustainability goals. The GSA will maintain a list of potential projects and their characteristics, along with their development status, and will use this list to prioritize and secure funding as opportunities may become available. Projects discussed in this GSP will remain a part of the potential projects that the GSA may choose to implement; however, other projects may come up with higher yield or lower cost and will be considered. The projects that are currently being considered are shown on **Figure 6-1** through **Figure 6-4**. All projects listed are supply projects in the category of conjunctive use, subcategory groundwater recharge. The projects are listed by geographical location, but not in order of implementation, in the following table. The projects may be implemented by either one or more of the member agencies or by the SKGSA, directly. [Two GSA-wide projects \(GSA-01 and GSA-02\) are included in the project list. These relate to data gathering and policy development and are therefore not shown in the Table below since they do not have a water yield. Descriptions of these projects are found at the end of Section 6.2.](#)

Each of the projects may allow the member agency the ability to recharge surface water supplies. The recharge basins allow for surface water to be diverted and recharged to replenish the aquifer. If the rain/snowmelt patterns change and more surface water is available outside the normal crop irrigation demand season, these proposed facilities may allow each member agency to take advantage of the timing of the surface water availability and may make more surface water available for recharge.

Table 6-2: Summary of Potential Sustainability Projects

| ID ² | Potential Implementing Agency | Project Title | 354.44(a) | 354.44(b)(1) | 354.44(b)(2)&(4) | 354.44(b)(4) | | | 354.44(b)(8) |
|---|-------------------------------|----------------------------------|----------------|--------------------------------|----------------------------------|--------------|-----------------|---------------------------|---------------------|
| | | | Description | Measurable Objective Addressed | Quantified Project Benefit (AFY) | Start Date | Completion Date | Completion Milestone Year | Cost Estimate |
| DR01 | Del Rey CSD | American & Del Rey Avenues Basin | Recharge Basin | Multiple | 62 | Jan 2023 | Dec 2023 | 2025 | \$134,000 |
| DR02 | | Melruna & Carmel Avenues Basin | Recharge Basin | Multiple | 131 | Jan 2033 | Dec 2033 | 2035 | \$313,000 |
| DR03 | | South Del Rey Avenue Basin | Recharge Basin | Multiple | 13 | Jan 2037 | Dec 2037 | 2040 | \$142,000 |
| Del Rey CSD Geographic Area Subtotal | | | | | 206 | | | | \$589,000 |
| F01 | City of Fowler | 19.5-Acre Basin ¹ | Recharge Basin | Multiple | 1,427 | Jan 2023 | Dec 2024 | 2025 | \$2,462,000 |
| City of Fowler Geographic Area Subtotal | | | | | 1,427 | | | | \$2,462,000 |
| K01 | City of Kingsburg | Madsen Avenue Basin | Recharge Basin | Multiple | 211 | Jan 2023 | Dec 2023 | 2025 | \$78,000 |
| K02 | | Athwal Park Basin | Recharge Basin | Multiple | 208 | Jan 2027 | Dec 2027 | 2030 | \$78,000 |
| K03 | | 22.5-Acre Basin | Recharge Basin | Multiple | 1,656 | Jan 2033 | Dec 2034 | 2035 | \$2,862,000 |
| City of Kingsburg Geographic Area Subtotal | | | | | 2,074 | | | | \$3,018,000 |
| P01 | City of Parlier | Industrial Drive Basin | Recharge Basin | Multiple | 198 | Jan 2023 | Dec 2023 | 2025 | \$540,000 |
| P02 | | Milton Avenue Basin | Recharge Basin | Multiple | 185 | Jan 2028 | Dec 2028 | 2030 | \$729,000 |
| P03 | | Tuolumne Street Basin | Recharge Basin | Multiple | 224 | Jan 2032 | Dec 2032 | 2035 | \$106,000 |
| P04 | | Manning Avenue Basin | Recharge Basin | Multiple | 79 | Jan 2033 | Dec 2033 | 2035 | \$106,000 |
| P05 | | Avila Street Basin | Recharge Basin | Multiple | 73 | Jan 2034 | Dec 2034 | 2035 | \$106,000 |
| P06 | | Mendocino Avenue Basin | Recharge Basin | Multiple | 93 | Jan 2036 | Dec 2036 | 2040 | \$106,000 |
| P07 | | Academy Avenue Basin | Recharge Basin | Multiple | 144 | Jan 2037 | Dec 2037 | 2040 | \$162,000 |
| P08 | | 4.2-Acre Basin | Recharge Basin | Multiple | 278 | Jan 2038 | Dec 2038 | 2040 | \$586,000 |
| City of Parlier Geographic Area Subtotal | | | | | 1,274 | | | | \$2,441,000 |
| S01 | City of Sanger | Kelly Basin | Recharge Basin | Multiple | 231 | Jan 2023 | Dec 2023 | 2025 | \$106,000 |
| S02 | | Medrano Basin | Recharge Basin | Multiple | 68 | Jan 2024 | Dec 2024 | 2025 | \$134,000 |
| S03 | | West Sanger Basin | Recharge Basin | Multiple | 528 | Jan 2028 | Dec 2028 | 2030 | \$170,000 |
| S04 | | North Sanger Basin | Recharge Basin | Multiple | 2,548 | Jan 2038 | Dec 2039 | 2040 | \$3,482,000 |
| City of Sanger Geographic Area Subtotal | | | | | 2,866 | | | | \$3,892,000 |
| SKGSA Total | | | | | 7,848 | | | | \$12,402,000 |

Notes:

1. Project is shown in 2025 but will likely happen in phases between 2025 and 2035 to maintain goals for reaching sustainability.

+2. Two GSA-wide projects, GSA-01 and GSA-02, are not shown here since they include data gathering and policy development and have no water yield.

The process being used for project implementation will be as follows:

1. Identify potential projects
2. Prepare conceptual level feasibility study and cost estimate
3. Obtain agreement with project partner(s)
4. Secure funding
5. Prepare environmental documents and obtain permit and regulatory approvals
6. Design and prepare construction documents
7. Implement project construction
8. Operate and maintain project for sustainability

The parameters for estimating groundwater recharge for recharge basin projects are as follows:

- Estimated percolation rate = 1.0 acre-feet per acre per day (AFAD)
 - Estimated percolation rate = 0.5 AFAD for Del Rey CSD
- Water availability = 100 days per year, 4 of every 5 years (effectively 80 days per year)
- Groundwater extraction mitigation = 42% of groundwater volume pumped
 - This accounts for recharge occurring naturally or through other means in the area that is credited to the member agencies, including storm water and wastewater percolation at the wastewater treatment plants.

Water Rights

Neither the SKGSA nor the member agencies have any surface water supply contracts and supplies will need to be obtained for successful projects. The GSA has executed an agreement with the Consolidated Irrigation District for reliable access and delivery of surface water supply to utilize for groundwater recharge.

Project Benefits

During years of normal or dry precipitation excess water may not be available for recharge during the irrigation season; however, the agreement between SKGSA and CID indicates annual water availability will be shown on a 5-year rolling average to account for potential dry years. By capturing excess surface flow for infiltration, groundwater reservoirs can be replenished. Benefits of recharge include a more reliable water source that is available year-round. If water levels are maintained, the need for drilling deeper wells to reach water tables is mitigated, and if levels rise, the cost of energy for pumping decreases as well. Benefits can be monitored by analyzing groundwater levels and pumping costs over time.

Permitting and Regulatory Processes

Regulation Requirements:

§354.44. Projects and Management Actions

- (b) Each Plan shall include a description of the projects and management actions that include the following:
 - (3) A summary of the permitting and regulatory process required for each project and management action.
-
-

Each potential sustainability project will be subject to the following permitting requirements. Additional requirements specific to each unique project are detailed in the subsequent project discussions.

- California Environmental Quality Act (CEQA) – compliance with CEQA for project approval
- Pacific Gas & Electric Company (PG&E), Application for Service – for new electrical connection to serve proposed booster pump
- Consolidated Irrigation District – for construction of turnout and connection to District canal
- State Water Resources Control Board – to obtain a General Permit for Storm Water Discharges Associated with Construction Activity for all projects larger than one acre or to obtain a waiver for projects less than one acre.

- San Joaquin Valley Air Pollution Control District – for Indirect Source Review (ISR) for all projects and Dust Control Plans for projects larger than 5 acres.

Other approvals may be required, to be determined at a later date. These may include, but are not limited to, State Water Resources Control Board for Clean Water Act 401 Water Quality Certification, California Department of Fish and Wildlife for Lake and Streambed Alteration (LSA) notification and LSA agreement, and US Army Corps of Engineers for encroachment permit.

Potential Sustainability Management Actions

Following the discussion of projects below, the subsequent sections will discuss management actions the GSA may consider during initial and ongoing implementation of the GSP. The identified potential management actions (MA) may not be implemented in the order listed or may not be implemented if determined unnecessary based on sustainability achievement through other methods. The management action may be further refined or revised based on stakeholder input and/or updated available information and/or science. Additionally, benefits discussed may take more or less years to realize, depending on a variety of factors, and, depending in success or failure of other actions or projects, the number of additional actions or projects will vary.

Table 6-3: Summary of Potential Sustainability Management Actions

| Action ID | Management Action Title | 354.44(a) | 354.44(b)(4) | |
|-----------|--|--|--------------|-----------------|
| | | Description | Start Date | Completion Date |
| EO1 | Regular Communication | Promote education and outreach to all beneficial users and users within the GSA | January 2021 | December 2021 |
| EO2 | Non-Routine Responses to Minimum Threshold Exceedances | GSA may also immediately notify member agencies of a Minimum Threshold (MT) exceedance | | |
| WH1 | Registration of Extraction Facilities | GSA may register existing groundwater extraction facilities and/or complete well canvass study. | January 2021 | December 2023 |
| WH2 | Installation of Sounding Tubes and Water Quality Sample Ports | GSA may require the installation of a well sounding tube, air line, electric depth gauge, and/or other water level sensor. | | |
| WH3 | Self-Reporting of Groundwater Extraction, Level, and Water Quality | GSA may require the well owner to self-report the groundwater extraction volumes, static water levels, and water quality data twice per year | | |
| WH4 | Prohibition of Composite Wells | GSA may adopt a policy to prohibit the construction of composite wells | | |
| GP1 | Regulate Groundwater Exports | GSA may adopt a policy to prohibit new groundwater exports | January 2030 | December 2035 |
| GP2 | Require New Developments to Prove Sustainable Water Supply | GSA may adopt a policy to require new developments to prove sustainable water supplies | | |
| GP3 | Pumping Restrictions During Droughts | GSA may adopt a policy to immediately reduce or temporarily suspend groundwater pumping | | |

6.2 Projects

6.2.1 Projects within the Del Rey CSD Geographic Area

The projects discussed below may be implemented to offset a portion of the GSA’s groundwater extraction.

Figure 6-1 illustrates the locations of the projects.

Figure 6-16-1: SKGSA Projects for Groundwater Sustainability (Del Rey CSD)

6.2.1.1 American & Del Rey Avenues Basin Project

The first identified project within the Del Rey geographic area is located at the southeast corner of the intersection of East American Avenue and South Del Rey Avenue. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-4: Del Rey CSD, American and Del Rey Avenues Basin Project

| | |
|--|--|
| Project Title: American & Del Rey Avenues Basin | Project ID: DR01 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Southeast corner of the intersection of East American Avenue and South Del Rey Avenue, Del Rey, CA | |
| Project Description - 354.44(a) | |
| The project will consist of converting an existing storm drain retention basin into a recharge basin with a pipeline connected to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| By converting the existing basin into an intentional recharge basin with an area of 2.1 acres, it is anticipated that approximately 62 acre-ft of water will be recharged within the GSA, annually. Flowmeters at the basin will measure the quantity of surface water delivered for recharge. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| It is anticipated that approvals from Fresno County will be required for all work encroaching in the County right-of-way. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2025. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as Del Rey CSD or SKGSA. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 62 AFY. | |

Project Title: American & Del Rey Avenues Basin **Project ID: DR01**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the Del Rey Community Services District or the SKGSA. The water source is Consolidated Irrigation District. South Kings GSA has drafted a water supply agreement with CID for the water supply.

Legal Authority - 354.44(b)(7)

The CSD has legal authority, as discussed above, to manage the groundwater in their area and the CID has the legal authority to deliver surface water to lands within their District. Further, the District or the GSA will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The following tables summarize the probable construction cost, plus the annual repayment costs for a loan amortized over 30 years with a 5% interest rate. The useful life of the project components is anticipated to be more than 30 years, at which point replacement of some components may be necessary. The project is anticipated to yield 51 acre-ft per year, which equates to a cost of \$140 per acre-ft plus the cost of water at \$395 per acre-ft; the total cost is approximately \$535 per acre-ft.

| Item | Item Description | Estimate |
|---------------------------|--|------------------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$36,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$26,000 |
| Contingency | 25% based on conceptual design | \$22,000 |
| Total Capital Cost | | \$134,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$134,000 | \$8,717 | 62 | \$140/\$535 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the CSD reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the SKGSA or Del Rey CSD. Performance of the project would be a necessary part of the GSA’s reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The CSD and SKGSA are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.1.2 Melruna & Carmel Avenues Basin Project

The Melruna & Carmel Avenues Basin Project would involve constructing a recharge basin on the CSD-owned parcel of land at the southwest corner of Melruna and Carmel Avenues. The parcel is partially developed as a park; however, it is underutilized due to other facilities in the community. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-5: Melruna & Carmel Avenues Basin Project

| | |
|--|--|
| Project Title: Melruna & Carmel Avenues Basin | Project ID: DR02 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Southwest corner of Melruna and Carmel Avenues, Del Rey, CA | |
| Project Description - 354.44(a) | |
| The project will consist of the construction of a new basin and required piping to connect to CID facilities. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| Developing the approximately 4-acre recharge basin will result in approximately 131 acre-ft of water recharged within the GSA, annually. Surface water that is delivered to the basin will be measured through flowmeters at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| It is anticipated that approvals from Fresno County will be required for all work encroaching in the County right-of-way. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2035. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as Del Rey CSD. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 131 AFY. | |
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | |
| The project will be accomplished by the Del Rey Community Services District or the SKGSA. The water source is Consolidated Irrigation District. | |
| Legal Authority - 354.44(b)(7) | |
| The CSD has legal authority, as discussed above, to manage the groundwater in their area and the CID has the legal authority to deliver surface water to lands within their District. | |

Project Title: Melruna & Carmel Avenues Basin **Project ID: DR02**

Further, the District or GSA will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction costs and annual repayment costs for a 30-year loan with an interest rate of 5%. The infrastructure for the project is predicted to last for more than 30 years; however, some components may need to be replaced following this period. The project is estimated to provide 131 acre-ft per year of recharge, which results in a cost of approximately \$156 per acre-ft plus the cost of water at \$395 per acre-ft. In total, the cost of converting and expanding the existing basin into a functioning recharge basin will be approximately \$551 per acre-ft.

| Item | Item Description | Estimate |
|---------------------------|--|------------------|
| Construction Cost | Basin construction | \$183,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$61,000 |
| Contingency | 25% based on conceptual design | \$51,000 |
| Total Capital Cost | | \$313,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$313,000 | \$20,361 | 131 | \$156/\$551 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the CSD reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the Del Rey CSD or the GSA. Performance of the project would be a necessary part of the GSA's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The CSD has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.1.3 South Del Rey Avenue Basin Project

The South Del Rey Avenue Basin Project would involve converting and expanding the existing retention basin south of the residential development at South Del Rey Avenue and East Jefferson Avenue. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-6: South Del Rey Avenue Basin Project

Project Title: South Del Rey Avenue Basin **Project ID: DR03**

Project Type

Groundwater Recharge

Project Location

South of the residential development at South Del Rey Avenue and East Jefferson Avenue, Del Rey, CA

| | |
|---|--|
| Project Title: South Del Rey Avenue Basin | Project ID: DR03 |
| Implementing Agency | |
| The Del Rey CSD or SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The basin conversion and expansion will consist of any modifications and additions to existing pipelines to allow conveyance of surface water from CID facilities to the basin, additional excavation, fencing, and any other work required to increase the capacity of the existing basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| Developing the existing 0.46-acre retention basin into an approximately 0.75-acre recharge basin will result in approximately 13 acre-ft of water recharged within the GSA, annually. Surface water that is delivered to the basin will be measured through flowmeters at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| It is anticipated that approvals from Fresno County will be required for all work encroaching in the County right-of-way. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2040. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as Del Rey CSD. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 13 AFY. | |
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | |
| The project will be accomplished by the Del Rey Community Services District or the SKGSA. The water source is Consolidated Irrigation District. | |
| Legal Authority - 354.44(b)(7) | |
| The CSD has legal authority, as discussed above, to manage the groundwater in their area and the CID has the legal authority to deliver surface water to lands within their District. | |
| Further, the District will acquire the necessary lands and permits to construct, own and operate the project, as detailed above. | |

| | |
|--|--|
| Project Title: South Del Rey Avenue Basin | Project ID: DR03 |
| Project Cost - 354.44(b)(8) | Estimated Capital Cost Estimated annual cost/AF |

The tables below show the probable construction costs and annual repayment costs for a 30-year loan with an interest rate of 5%. The infrastructure for the project is predicted to last for more than 30 years; however, some components may need to be replaced following this period. The project is estimated to provide 13 acre-ft per year of recharge, which results in a cost of approximately \$684 per acre-ft plus the cost of water at \$395 per acre-ft. In total, the cost of converting and expanding the existing basin into a functioning recharge basin will be approximately \$1,079 per acre-ft.

| Item | Item Description | Estimate |
|---------------------------|--|------------------|
| Land Acquisition | Purchase 0.25 Acres | \$10,000 |
| Construction Cost | Basin conversion | \$50,000 |
| | Basin construction | \$13,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$28,000 |
| Contingency | 25% based on conceptual design | \$23,000 |
| Total Capital Cost | | \$142,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$142,000 | \$9,237 | 13 | \$684/\$1,079 |

| |
|---|
| Funding Source - 354.44(b)(8) |
| Funding will be obtained through the CSD reserves or obtained grants. |

| |
|--|
| Management of Groundwater Extractions and Recharge - 354.44(b)(9) |
| The project would be managed by the Del Rey CSD. Performance of the project would be a necessary part of the GSA's reporting requirements. |

| |
|--|
| Level of Uncertainty - 354.44(d) |
| The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The CSD has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low. |

6.2.2 Projects within the City of Fowler Geographic Area

The projects discussed below may be implemented to offset a portion of the GSA's groundwater extraction.

6.2.2.1 19.5-Acre Recharge Basin Project

The 19.5-Acre Recharge Basin will consist of one (1) 19.5-acre recharge basin or several smaller basins to satisfy all water recharge requirements. Locations will be determined through the City of Fowler processes. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-7: 19.5-Acre Recharge Basin Project

| | |
|--|--|
| Project Title: 19.5-Acre Recharge Basin | Project ID: FO01 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Undeveloped land to be determined later in and around the City of Fowler | |
| Implementing Agency | |
| The City of Fowler will implement the program. | |
| Project Description - 354.44(a) | |
| In addition to construction of the basin itself, all infrastructure needed to convey surface water from CID facilities to the basin will be a part of the project. The main components of the project will include excavation, turnouts, piping, outlet structures, and fencing. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The proposed recharge basin fulfills the requirement for recharge inside of the GSA. This basin will be 19.5 acres in size and will provide approximately 1,427 acre-ft of water that will be recharged into the GSA every year. In order to monitor the amount of water delivered to the basin each year, flowmeters will be placed at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone years 2025 through 2040, as needed to offset groundwater pumping. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Fowler. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 1,427 AFY. | |
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | |
| The project will be accomplished by the City of Fowler or the SKGSA. The water source is Consolidated Irrigation District. | |

Project Title: 19.5-Acre Recharge Basin **Project ID: FO01**

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary lands and permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The following tables show the costs related to constructing a new 19.5-acre recharge basin, which includes land acquisition costs. The costs related to a loan over a 30-year period with a 5% interest rate are also shown below. It is estimated that the constructed basin will last for over 30 years. It should be noted that some infrastructure will need to be replaced following the 30-year mark. This project involves constructing a basin that will result in 1,427 acre-ft of recharge annually. The construction of this basin will cost \$112 per acre-ft in addition to the \$395 per acre-ft cost for water. The overall cost of recharge is estimated to be \$507 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-------------|
| Land Acquisition | Purchase 19.5 Acres | \$683,000 |
| Construction Cost | Basin construction | \$887,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$477,000 |
| Contingency | 25% based on conceptual design | \$397,000 |
| | Total Capital Cost | \$2,462,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$2,462,000 | \$160,157 | 1,427 | \$112/\$507 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the City of Fowler reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Fowler. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.3 Projects within the City of Kingsburg Geographic Area

The projects discussed below may be implemented to offset a portion of the GSA's groundwater extraction **Figure 6-2** illustrates the locations of the projects.

Figure 6-26-2: SKGSA Projects for Groundwater Sustainability (City of Kingsburg)

6.2.3.1 Madsen Avenue Basin Project

The Madsen Avenue Basin project is a basin conversion project, in which the existing retention basin to the east of Kingsburg High School, near the intersection of Madsen Avenue and Sierra Street, will be modified to serve as a recharge basin. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-8: Madsen Avenue Basin Project

| | | | |
|---|----------------------------|--|-------------|
| Project Title: | Madsen Avenue Basin | Project ID: | KB01 |
| Project Type | | | |
| Groundwater Recharge | | | |
| Project Location | | | |
| East of Kingsburg High School, near the intersection of Madsen Avenue and Sierra Street, Kingsburg, CA | | | |
| Implementing Agency | | | |
| The City of Kingsburg or the SKGSA will implement the program. | | | |
| Project Description - 354.44(a) | | | |
| In addition to any work required on the basin itself, efforts will include modifications or additions to the basin's piping that are needed to convey surface water from CID facilities to the basin. | | | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | | | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | | | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water | |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | | | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | | | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | | | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | | | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | | | |
| Developing the existing basin will provide the city with an additional 3.3 acres of recharge and will result in roughly 211 acre-ft of water being recharged inside of the GSA annually. Flowmeters will be installed at the basin to measure the quantity of water that is being delivered for recharge. | | | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | | | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | | | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | | | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2025. | | | |

| Project Title: Madsen Avenue Basin | Project ID: KB01 | | | | | | | | | | | | | | | |
|---|--|--------------------|-----------------------------------|-------------------|-----------------------------------|------------------|----------|--------------------|--|----------|-------------|--------------------------------|----------|--|--------------------|----------|
| Evaluation of Benefits - 354.44(b)(5) | | | | | | | | | | | | | | | | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Kingsburg. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 211 AFY. | | | | | | | | | | | | | | | | |
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | | | | | | | | | | | | | | | | |
| The project will be accomplished by the City of Kingsburg or the SKGSA. The water source is Consolidated Irrigation District. | | | | | | | | | | | | | | | | |
| Legal Authority - 354.44(b)(7) | | | | | | | | | | | | | | | | |
| The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City. | | | | | | | | | | | | | | | | |
| Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above. | | | | | | | | | | | | | | | | |
| Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF | | | | | | | | | | | | | | | | |
| The project has a probable construction cost of approximately \$78,000 as seen in the table below, and the repayment cost shown is based on a loan lasting 30 years with a 5% interest rate. The lifetime of the new basin is projected to be at least 30 years and will produce 211 acre-ft of recharge on an annual basis. Construction of the basin will cost around \$24 per acre-ft and the cost of water is approximately \$395 per acre-ft, totaling approximately \$419 per acre-ft. | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Item</th> <th style="width: 60%;">Item Description</th> <th style="width: 20%;">Estimate</th> </tr> </thead> <tbody> <tr> <td>Construction Cost</td> <td>Basin conversion</td> <td style="text-align: right;">\$50,000</td> </tr> <tr> <td>Non-Contract Costs</td> <td>Design Data, Data Collection, Design, Permitting & Construction Management</td> <td style="text-align: right;">\$15,000</td> </tr> <tr> <td>Contingency</td> <td>25% based on conceptual design</td> <td style="text-align: right;">\$13,000</td> </tr> <tr> <td></td> <td style="text-align: right;">Total Capital Cost</td> <td style="text-align: right;">\$78,000</td> </tr> </tbody> </table> | | Item | Item Description | Estimate | Construction Cost | Basin conversion | \$50,000 | Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$15,000 | Contingency | 25% based on conceptual design | \$13,000 | | Total Capital Cost | \$78,000 |
| Item | Item Description | Estimate | | | | | | | | | | | | | | |
| Construction Cost | Basin conversion | \$50,000 | | | | | | | | | | | | | | |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$15,000 | | | | | | | | | | | | | | |
| Contingency | 25% based on conceptual design | \$13,000 | | | | | | | | | | | | | | |
| | Total Capital Cost | \$78,000 | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Total Capital Cost</th> <th style="width: 25%;">Annual Capital Repayment</th> <th style="width: 25%;">Annual Yield (AF)</th> <th style="width: 25%;">Cost Per AF Water (Capital/Total)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">\$78,000</td> <td style="text-align: center;">\$5,074</td> <td style="text-align: center;">211</td> <td style="text-align: center;">\$24/\$419</td> </tr> </tbody> </table> | | Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) | \$78,000 | \$5,074 | 211 | \$24/\$419 | | | | | | | |
| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) | | | | | | | | | | | | | |
| \$78,000 | \$5,074 | 211 | \$24/\$419 | | | | | | | | | | | | | |
| Funding Source - 354.44(b)(8) | | | | | | | | | | | | | | | | |
| Funding will be obtained through the SKGSA, the City of Kingsburg reserves or obtained grants. | | | | | | | | | | | | | | | | |
| Management of Groundwater Extractions and Recharge - 354.44(b)(9) | | | | | | | | | | | | | | | | |
| The project would be managed by the City of Kingsburg. Performance of the project would be a necessary part of the City's reporting requirements. | | | | | | | | | | | | | | | | |
| Level of Uncertainty - 354.44(d) | | | | | | | | | | | | | | | | |
| The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low. | | | | | | | | | | | | | | | | |

6.2.3.2 Athwal Park Basin Project

The second identified project within the City of Kingsburg geographic area is located next to Athwal Park, southwest of the intersection of Morgan Drive and Lindquist Street. The existing storm drainage basin at this

location will be converted into a recharge basin. Modifications to the basin and its piping will allow surface water to flow from CID facilities to the basin for intentional recharge. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-9: Athwal Park Basin Project

| | |
|---|--|
| Project Title: Athwal Park Basin | Project ID: KB02 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Next to Athwal Park, southwest of the intersection of Morgan Drive and Lindquist Street, Kingsburg, CA | |
| Implementing Agency | |
| The City of Kingsburg or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| In addition to any work required on the basin itself, efforts will include modifications or additions to the basin's piping that are needed to convey surface water from CID facilities to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The existing basin will be transformed into a 3.3-acre recharge basin, which will have the capacity to recharge approximately 208 acre-ft of water per year within the GSA. Flowmeters will serve the purpose of measuring the quantity of water being delivered for recharge and will be installed at the converted basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2030. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Kingsburg. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 208 AFY. | |

| Project Title: Athwal Park Basin | Project ID: KB02 | | | | | | | | | | | | | | | |
|---|--|--------------------|-----------------------------------|-------------------|-----------------------------------|------------------|----------|--------------------|--|----------|-------------|--------------------------------|----------|--|--------------------|----------|
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | | | | | | | | | | | | | | | | |
| The project will be accomplished by the SKGSA or the City of Kingsburg. The water source is Consolidated Irrigation District. | | | | | | | | | | | | | | | | |
| Legal Authority - 354.44(b)(7) | | | | | | | | | | | | | | | | |
| The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City. | | | | | | | | | | | | | | | | |
| Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above. | | | | | | | | | | | | | | | | |
| Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF | | | | | | | | | | | | | | | | |
| The following tables show the probable construction cost and annual repayment costs for a 30-year loan with a 5% interest rate. The new basin is projected to last more than 30 years, which is when some of the infrastructure may need to be replaced. The project is expected to yield 208 acre-ft per year, at a cost of \$24 per acre-ft, plus the cost of water at \$395 per acre-ft; the total cost is approximately \$419 per acre-ft. | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Item</th> <th style="width: 55%;">Item Description</th> <th style="width: 20%;">Estimate</th> </tr> </thead> <tbody> <tr> <td>Construction Cost</td> <td>Basin conversion</td> <td style="text-align: right;">\$50,000</td> </tr> <tr> <td>Non-Contract Costs</td> <td>Design Data, Data Collection, Design, Permitting & Construction Management</td> <td style="text-align: right;">\$15,000</td> </tr> <tr> <td>Contingency</td> <td>25% based on conceptual design</td> <td style="text-align: right;">\$13,000</td> </tr> <tr> <td></td> <td style="text-align: right;">Total Capital Cost</td> <td style="text-align: right;">\$78,000</td> </tr> </tbody> </table> | | Item | Item Description | Estimate | Construction Cost | Basin conversion | \$50,000 | Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$15,000 | Contingency | 25% based on conceptual design | \$13,000 | | Total Capital Cost | \$78,000 |
| Item | Item Description | Estimate | | | | | | | | | | | | | | |
| Construction Cost | Basin conversion | \$50,000 | | | | | | | | | | | | | | |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$15,000 | | | | | | | | | | | | | | |
| Contingency | 25% based on conceptual design | \$13,000 | | | | | | | | | | | | | | |
| | Total Capital Cost | \$78,000 | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Total Capital Cost</th> <th style="width: 25%;">Annual Capital Repayment</th> <th style="width: 25%;">Annual Yield (AF)</th> <th style="width: 25%;">Cost Per AF Water (Capital/Total)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">\$78,000</td> <td style="text-align: center;">\$5,074</td> <td style="text-align: center;">208</td> <td style="text-align: center;">\$24/\$419</td> </tr> </tbody> </table> | | Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) | \$78,000 | \$5,074 | 208 | \$24/\$419 | | | | | | | |
| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) | | | | | | | | | | | | | |
| \$78,000 | \$5,074 | 208 | \$24/\$419 | | | | | | | | | | | | | |
| Funding Source - 354.44(b)(8) | | | | | | | | | | | | | | | | |
| Funding will be obtained through the SKGSA, the City of Kingsburg reserves or obtained grants. | | | | | | | | | | | | | | | | |
| Management of Groundwater Extractions and Recharge - 354.44(b)(9) | | | | | | | | | | | | | | | | |
| The project would be managed by the City of Kingsburg. Performance of the project would be a necessary part of the City's reporting requirements. | | | | | | | | | | | | | | | | |
| Level of Uncertainty - 354.44(d) | | | | | | | | | | | | | | | | |
| The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low. | | | | | | | | | | | | | | | | |

6.2.3.3 22.5-Acre Recharge Basin Project

This project will include as much area as necessary to meet recharge requirements; 22.5-acres is anticipated. The following table summarizes the parameters, benefits, and other pertinent information regarding the project.

Table 6-10: 22.5-Acre Recharge Basin Project

| | |
|---|--|
| Project Title: 22.5-Acre Recharge Basin | Project ID: KB03 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Undeveloped land to be determined later in and around the City of Kingsburg, CA | |
| Implementing Agency | |
| The City of Kingsburg will implement the program. | |
| Project Description - 354.44(a) | |
| The project will consist of the construction of a new basin or basins and required piping to connect to CID facilities. Placement of the basin near these facilities will reduce piping and maintenance costs and should be considered when further developing the project. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| This project's basin or basins will have a total area of approximately 22.5 acres and will have the ability to recharge 1,656 acre-ft per year. Water quantities delivered for recharge will be measured by flowmeter at the basin(s). The addition of this supplemental project fulfills the volume requirement for the Kingsburg GSA. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2035. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Kingsburg. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 1,656 AFY. | |
| How will project be accomplished, and what is the water source? - 354.44(b)(6) | |
| The project will be accomplished by the City of Kingsburg. The water source is Consolidated Irrigation District. | |

Project Title: 22.5-Acre Recharge Basin **Project ID: KB03**

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary lands and permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction cost for the project and the repayment costs based on a loan that lasts 30 years with a 5% interest rate. The new basin area is projected to yield 1,656 acre-ft of recharge on an annual basis. With the cost of water (\$395 per acre-ft) and the cost to construct the basin (\$112 per acre-ft), the total cost of the functioning recharge basin will be approximately \$507 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-------------|
| Land Acquisition | Purchase 22.5 Acres | \$787,000 |
| Construction Cost | Basin construction | \$1,023,000 |
| | Connect basin to CID facility | \$36,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$554,000 |
| Contingency | 25% based on conceptual design | \$462,000 |
| | Total Capital Cost | \$2,862,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$2,862,000 | \$186,177 | 1,656 | \$112/\$507 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Kingsburg reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Kingsburg. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.4 Projects within the City of Parlier Geographic Area

The projects discussed below may be implemented to offset a portion of the GSA's groundwater extraction. **Figure 6-3** illustrates the locations of the projects.

Figure 6-36-3: SKGSA Projects for Groundwater Sustainability (City of Parlier)

6.2.4.1 Industrial Drive Basin Project

The first project identified for within the City of Parlier geographic area will convert the existing stormwater retention basin northwest of the intersection of East Industrial Drive and South Milton Avenue into a larger recharge basin. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-11: Industrial Drive Basin Project

| | | | |
|---|--|-------------------------------------|---|
| Project Title: | Industrial Drive Basin | Project ID: | PA01 |
| Project Type | | | |
| Groundwater Recharge | | | |
| Project Location | | | |
| Northwest of the intersection of East Industrial Drive and South Milton Avenue, Parlier, CA | | | |
| Implementing Agency | | | |
| The City of Parlier or the SKGSA will implement the program. | | | |
| Project Description - 354.44(a) | | | |
| The project will include modifying the existing basin, providing any infrastructure needed to convey surface water from CID facilities to the basin for recharge. The basin will not be increased from its current size of 3.1 acres. | | | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | | | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | | | |
| <input checked="" type="checkbox"/> | Chronic Lowering of Groundwater Levels | <input checked="" type="checkbox"/> | Reduction of Groundwater Storage |
| <input type="checkbox"/> | Seawater Intrusion | <input checked="" type="checkbox"/> | Degraded Water Quality |
| <input checked="" type="checkbox"/> | Land Subsidence | <input type="checkbox"/> | Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | | | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | | | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | | | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | | | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | | | |
| The project will develop 3.1 acres of intentional recharge basins, resulting in approximately 198 acre-ft of water recharged within the GSA, annually. The project will also require the installation of flow meters at the basins. Surface water that is delivered to the basin will be measured through the new flowmeters. | | | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | | | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | | | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | | | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2025. | | | |

Project Title: Industrial Drive Basin **Project ID: PA01**

Evaluation of Benefits - 354.44(b)(5)

The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 198 AFY.

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction cost for the project and the repayment costs based on a loan that lasts 30 years with a 5% interest rate. The new basin area is projected to yield 198 acre-ft of recharge on an annual basis. With the cost of water (\$395 per acre-ft) and the cost to construct the basin (\$177 per acre-ft), the total cost of the functioning recharge basin will be approximately \$572 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$298,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$105,000 |
| Contingency | 25% based on conceptual design | \$87,000 |
| | Total Capital Cost | \$540,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$540,000 | \$35,128 | 198 | \$177/\$572 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City is eligible for several grants or low-interest loans; therefore, the level of uncertainty is relatively low.

6.2.4.2 Milton Avenue Basin Project

This project is located in a residential development southeast of the intersection of South Milton Avenue and East Parlier Avenue. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-12: Milton Avenue Basin Project

| | | | |
|---|----------------------------|--|-------------|
| Project Title: | Milton Avenue Basin | Project ID: | PA02 |
| Project Type | | | |
| Groundwater Recharge | | | |
| Project Location | | | |
| Residential development southeast of the intersection of South Milton Avenue and East Parlier Avenue, Parlier, CA | | | |
| Implementing Agency | | | |
| The City of Parlier or the SKGSA will implement the program. | | | |
| Project Description - 354.44(a) | | | |
| The project entails the conversion of the existing stormwater retention basin at this location into a recharge basin. Modifications and additions to the existing basin and its related infrastructure will allow for conveyance of surface water from CID facilities for recharge. | | | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | | | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | | | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water | |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | | | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | | | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | | | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | | | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | | | |
| The converted recharge basin will be 2.9 acres and have the potential to recharge 185 acre-ft of water over the course of a year. Flowmeters installed at the newly converted basin will measure the quantity of water delivered for recharge. | | | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | | | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | | | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | | | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2030. | | | |

Project Title: Milton Avenue Basin

Project ID: PA02

Evaluation of Benefits - 354.44(b)(5)

The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 185 AFY.

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The following tables show the probable construction cost and annual repayment costs for a loan amortized over 30 years with a 5% interest rate. The useful life of the project components is anticipated to be more than 30 years, at which point replacement of some components may be necessary. The project is anticipated to yield 185 acre-ft per year, which equates to a cost of \$256 per acre-ft plus the cost of water at \$395 per acre-ft; the total cost is approximately \$651 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$420,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$141,000 |
| Contingency | 25% based on conceptual design | \$118,000 |
| | Total Capital Cost | \$729,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$729,000 | \$47,422 | 185 | \$256/\$651 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City is eligible for several grants or low-interest loans; therefore, the level of uncertainty is relatively low.

6.2.4.3 Tuolumne Street Basin Project

The third project identified for with the City of Parlier geographic area will provide an opportunity for recharge by converting the existing stormwater basin at the northwest corner of Tuolumne Street and Erica Avenue. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-13: Tuolumne Street Basin Project

| | |
|--|--|
| Project Title: Tuolumne Street Basin | Project ID: PA03 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Northwest corner of Tuolumne Street and Erica Avenue, Parlier, CA | |
| Implementing Agency | |
| The City of Parlier or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The project will consist of any needed modifications or additions to the existing basin, its piping, and connection to CID facilities to allow water to be delivered for recharge. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The conversion of the existing basin into a recharge basin will provide a recharge area of 3.5-acres and will yield a recharge volume of 224 acre-ft per year. Since the volume of water delivered to the basin will need to be measured, flowmeters will be installed at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2035. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 224 AFY. | |

Project Title: Tuolumne Street Basin **Project ID: PA03**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the costs related to converting an existing storm drain basin into a basin that can be used for recharge, as well as the costs related to a loan over a 30-year period with a 5% interest rate. It is estimated that the constructed basin will last for over 30 years. It should be noted that some infrastructure will need to be repaired or replaced following the 30-year mark. This completed basin is expected to have capacity for 224 acre-ft of recharge annually. The construction of this basin will cost \$31 per acre-ft in addition to the \$395 per acre-ft cost for water; the total cost is approximately \$426 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$21,000 |
| Contingency | 25% based on conceptual design | \$17,000 |
| | Total Capital Cost | \$106,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$106,000 | \$6,895 | 224 | \$31/\$426 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City is eligible for several grants or low-interest loans; therefore, the level of uncertainty is relatively low.

6.2.4.4 Manning Avenue Basin Project

The Manning Avenue Basin Project will convert the existing basin at the north east corner of Orit Ave and Manning Ave. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-14: Manning Avenue Basin Project

| Project Title: Manning Avenue Basin | Project ID: PA04 |
|---|--|
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Northwest of the intersection of East Industrial Drive and South Milton Avenue, Parlier, CA | |
| Implementing Agency | |
| The City of Parlier or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The project will involve the conversion of the existing stormwater basin to a recharge basin, which will likely include additions and modifications to the basin's existing piping in order to deliver water from CID facilities to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| In total, the basin conversion will provide the GSA with 1.4 acres of recharge basins and a recharge volume of 79 acre-ft each year. Flow meters will be installed at the basin to measure the volume of surface water delivered. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2035. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 79 AFY. | |

Project Title: Manning Avenue Basin **Project ID: PA04**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The probable construction cost to convert a 1.4-acre basin is shown in the tables below. The repayment cost estimated using a 30-year loan with a 5% interest rate, and cost per acre-ft, is also shown. The annual yield of the newly constructed recharge basin will be 79 acre-ft. It is anticipated that the cost of building the new basin will be \$88 per acre-ft with a cost of \$395 per acre-ft for water delivery, totaling approximately \$483 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$21,000 |
| Contingency | 25% based on conceptual design | \$17,000 |
| | Total Capital Cost | \$106,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$106,000 | \$6,895 | 79 | \$88/\$483 |

Funding 106 - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City is eligible for several grants or low-interest loans; therefore, the level of uncertainty is relatively low.

6.2.4.5 Avila Street Basin Project

This project entails the conversion of the existing stormwater basin east of Parlier Junior High School near the intersection of Avila Street and Tulare Street. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-15: Avila Street Basin Project

| | |
|--|--|
| Project Title: Avila Street Basin | Project ID: PA05 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| East of Parlier Junior High School near the intersection of Avila Street and Tulare Street, Parlier, CA | |
| Implementing Agency | |
| The City of Parlier or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The efforts to convert the basin into a recharge basin may include modifying or adding to the existing storm drainage system connected to the basin to allow water to flow from CID facilities to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| This project is expected to supply 1.3 acres of recharge basin area and aid in producing 73 acre-ft of recharge on a yearly basis. This project requires the installation of flowmeters at the basins, which will serve the purpose of measuring the amount of surface water that is delivered to the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2035. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 73 AFY. | |

Project Title: Avila Street Basin **Project ID: PA05**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below display the probable construction cost of the project, as well as the capital repayment costs and cost per acre-ft based on a 30-year loan with a 5% interest rate. This project is expected have an annual yield of 73 acre-ft of recharge. The total cost of the project is estimated to be \$94 per acre-ft, which includes \$395 per acre-ft for water delivery and \$489 for construction of the project.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$21,000 |
| Contingency | 25% based on conceptual design | \$17,000 |
| Total Capital Cost | | \$106,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$106,000 | \$6,895 | 73 | \$94/\$489 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.4.6 Mendocino Avenue Basin Project

This project will convert the stormwater basin directly south of Veterans Park at South Mendocino Avenue and Sixth Street into a recharge basin. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-16: Mendocino Avenue Basin Project

| | | | |
|---|-------------------------------|--|-------------|
| Project Title: | Mendocino Avenue Basin | Project ID: | PA06 |
| Project Type | | | |
| Groundwater Recharge | | | |
| Project Location | | | |
| Directly south of Veterans Park at South Mendocino Avenue and Sixth Street, Parlier, CA | | | |
| Implementing Agency | | | |
| The City of Parlier or the SKGSA will implement the program. | | | |
| Project Description - 354.44(a) | | | |
| The project will convert an existing stormwater basin into a recharge basin. In order to deliver water from CID facilities to the basin, additions and modifications to the existing structures and piping at the basin and CID lateral may be included in the project. | | | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | | | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | | | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water | |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | | | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | | | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | | | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | | | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | | | |
| The existing 2.0-acre basin will be converted into a recharge basin that is expected to recharge 93 acre-ft of water annually inside of the GSA. Flowmeters will need to be installed at this basin, so the volume of surface water delivered to the basin can be measured. | | | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | | | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | | | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | | | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2040. | | | |
| Evaluation of Benefits - 354.44(b)(5) | | | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 93 AFY. | | | |

Project Title: Mendocino Avenue Basin **Project ID: PA06**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below summarize the probable construction costs for the new basin and repayment costs for a loan that lasts 30 years and has a 5% interest rate. The new basin is projected to yield 93 acre-ft of recharge on an annual basis. With the cost of water (\$395 per acre-ft) and the cost to construct the basin (\$74 per acre-ft), the total cost is expected to be approximately \$469 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$21,000 |
| Contingency | 25% based on conceptual design | \$17,000 |
| Total Capital Cost | | \$106,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$106,000 | \$6,895 | 93 | \$74/\$469 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.4.7 Academy Avenue Basin Project

The Academy Avenue Basin Project is a basin conversion project located in the residential development to the southeast of the intersection of South Academy Avenue and East South Avenue. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-17: Academy Avenue Basin Project

| | |
|--|--|
| Project Title: Academy Avenue Basin | Project ID: PA07 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Northwest of the intersection of East Industrial Drive and South Milton Avenue, Parlier, CA | |
| Implementing Agency | |
| The City of Parlier or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| This project will involve converting the existing stormwater basin into a recharge basin by making additions and modifications to the basin’s piping and allowing the flow of water from the Kingsburg Branch canal to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The conversion of the existing basin will result in 2.4 acres of recharge basin, which will have the ability to recharge 144 acre-ft per year. The converted basin will require the installation of flowmeters to measure the quantity of water that is delivered for recharge. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2040. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 144 AFY. | |

Project Title: Academy Avenue Basin **Project ID: PA07**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The following tables show the probable construction cost and annual repayment costs for a loan amortized over 30 years with a 5% interest rate. The useful life of the project components is anticipated to be more than 30 years, at which point replacement of some components may be necessary. The project is anticipated to yield 144 acre-ft per year, which equates to a cost of \$73 per acre-ft plus the cost of water at \$395 per acre-ft; the total cost is approximately \$468 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$54,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$32,000 |
| Contingency | 25% based on conceptual design | \$26,000 |
| | Total Capital Cost | \$162,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$162,000 | \$10,538 | 144 | \$73/\$468 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.4.8 4.2-Acre Recharge Basin Project

This project provides any additional area required that was not provided by the construction, conversion, and expansions of basins identified in the previous projects. The location of the basin(s) included in this project is yet to be determined but will have reduced piping costs with close proximity to CID facilities. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-18: 4.2-Acre Recharge Basin Project

| | |
|--|--|
| Project Title: 4.2-Acre Recharge Basin | Project ID: PA08 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Undeveloped land to be determined later in and around the City of Parlier, CA | |
| Implementing Agency | |
| The City of Parlier or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| This project will consist of the construction of a new basin or basins and required piping to connect to CID facilities. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| This new basin will have an area of approximately 4.2 acres, which is expected to generate an annual recharge volume of 278 acre-ft. Flowmeters at the basin will measure the quantity of surface water delivered for recharge. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2040. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Parlier. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 278 AFY. | |

Project Title: 4.2-Acre Recharge Basin **Project ID: PA08**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Parlier or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary lands and permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction costs and repayment costs based on a 30-year loan with an interest rate of 5%. The new basin is projected to have an annual yield of 278 acre-ft and cost \$137 per acre-ft to construct. With the cost of water at approximately \$395 per acre-ft, the total cost of the operational basin is \$532 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Land Acquisition | Purchase 4.2 Acres | \$148,000 |
| Construction Cost | Basin construction | \$193,000 |
| | Connect basin to CID facility | \$36,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$114,000 |
| Contingency | 25% based on conceptual design | \$95,000 |
| | Total Capital Cost | \$586,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$586,000 | \$38,120 | 278 | \$137/\$532 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Parlier reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Parlier. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.5 Projects within the City of Sanger Geographic Area

The projects discussed below may be implemented to offset a portion of the GSA's groundwater extraction. **Figure 6-4** illustrates the locations of the projects.

Figure 6-46-4: SKGSA Projects for Groundwater Sustainability (City of Sanger)

6.2.5.1 Kelly Basin Project

The first identified project for within the City of Sanger geographic area involves the conversion of an existing stormwater basin on the southwest side of the Swan Avenue and North Avenue intersection. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-19: Kelly Basin Project

| Project Title: Kelly Basin | Project ID: SA01 |
|---|--|
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Southwest side of Swan Avenue and North Avenue, Sanger, CA | |
| Implementing Agency | |
| The City of Sanger or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The existing basin will be converted to a recharge basin and will be connected to CID facilities through existing storm drain mains, which can be dual purposed for conveyance of surface water to the basin. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The project will convert an existing basin into 3.6 acres of intentional recharge basin, resulting in approximately 231 acre-ft of water recharged within the GSA on an annual basis. Flowmeters at the basin will measure the quantity of water that is being delivered to the basin for recharge. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2025. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Sanger. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 231 AFY. | |

Project Title: Kelly Basin **Project ID: SA01**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Sanger or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The following tables show the probable construction cost and annual repayment costs for a loan amortized over 30 year with a 5% interest rate. The useful life of the project components is anticipated to be more than 30 years, at which point replacement of some components may be necessary. The project is anticipated to yield 231 acre-ft each year, which equates to cost of \$30 per acre-foot plus the cost of water at \$395 per acre-foot; the total cost is approximately \$425 per acre-foot.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$18,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$21,000 |
| Contingency | 25% based on conceptual design | \$17,000 |
| | Total Capital Cost | \$106,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$106,000 | \$6,895 | 231 | \$30/\$425 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Sanger reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Sanger. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.5.2 Medrano Basin Project

This project will involve converting the existing stormwater basin at the southeast corner of 8th Street and Tucker Avenue into a basin that can be used for groundwater recharge. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-20: Medrano Basin Project

| | |
|--|--|
| Project Title: Medrano Basin | Project ID: SA02 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Southeast corner of 8 th Street and Tucker Avenue, Sanger, CA | |
| Implementing Agency | |
| The City of Sanger or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| The Medrano Basin Project will convert an existing stormwater basin into a recharge basin. Additions and modifications to the existing nearby storm drain system will be needed to allow conveyance of water from the Lonetree Channel to the basin for recharge. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| This basin conversion will provide 1.3 acres of basin that can be used for recharge. The new basin is estimated to recharge approximately 68 acre-ft of water each year. Flowmeters will need to be installed at the converted basin to measure the quantity of surface water that is being delivered to the recharge basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2025. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Sanger. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 68 AFY. | |

Project Title: Medrano Basin **Project ID: SA02**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Sanger or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary lands and permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below summarize the probable construction costs and the repayment costs for a 30-year loan with a 5% interest rate. The lifetime of the new basin is projected to be at least 30 years and will produce 68 acre-ft of recharge on an annual basis. Construction of the basin is expected to cost around \$128 per acre-ft and the cost of water is approximately \$395 per acre-ft, totaling approximately \$523 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin conversion | \$50,000 |
| | Connect basin to CID facility | \$36,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$26,000 |
| Contingency | 25% based on conceptual design | \$22,000 |
| Total Capital Cost | | \$134,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$134,000 | \$8,717 | 68 | \$128/\$523 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Sanger reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Sanger. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.5.3 West Sanger, 7.6-Acre Basin Project

The West Sanger Basin Project will consist of the construction of a new recharge basin on the west side of the City. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-21: West Sanger, 7.6-Acre Basin Project

| | |
|---|--|
| Project Title: West Sanger, 7.6-Acres Recharge Basin | Project ID: SA03 |
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Undeveloped land on the west side of the City of Sanger, CA | |
| Implementing Agency | |
| The City of Sanger or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| In addition to excavation efforts, work will include construction and installation of necessary turnout and outlet structures, piping, and fencing. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The new basin constructed with this project will provide an area of 7.6 acres with a recharge volume of 528 acre-ft per year. Flowmeters will be installed so the delivered water for recharge can be measured at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2030. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Sanger. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 528 AFY. | |

Project Title: West Sanger, 7.6-Acres Recharge Basin **Project ID: SA03**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Sanger or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction costs and repayment costs estimated based on a 30-year loan with an interest rate of 5%. The new basin is projected to have an annual yield of 528 acre-ft and cost \$21 per acre-ft to construct. With the cost of water being approximately \$395 per acre-ft, the total cost of the operational basin is \$416 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-----------|
| Construction Cost | Basin construction | \$100,000 |
| | Connect basin to CID facility | \$9,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$33,000 |
| Contingency | 25% based on conceptual design | \$28,000 |
| Total Capital Cost | | \$170,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$170,000 | \$11,059 | 528 | \$21/\$416 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Sanger reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Sanger. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.5.4 North Sanger, 27.4-Acre Recharge Basin Project

The 27.4-Acre Basin Project will consist of the construction of a new recharge basin on the north side of the City. The following table summarizes the parameters, benefits and other pertinent information regarding the project.

Table 6-22: North Sanger, 27.4 Acre Basin Project

| Project Title: North Sanger, 27.4-Acre Recharge Basin | Project ID: SA04 |
|---|--|
| Project Type | |
| Groundwater Recharge | |
| Project Location | |
| Undeveloped land on the north side of the City of Sanger, CA | |
| Implementing Agency | |
| The City of Sanger or the SKGSA will implement the program. | |
| Project Description - 354.44(a) | |
| In addition to excavation efforts, work will include construction and installation of necessary turnout and outlet structures, piping, and fencing. | |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project could also provide some groundwater quality benefits and/or impact on reducing land subsidence. | |
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| This is a high priority project and will be implemented, if determined feasible, as soon as the program is established. | |
| Process to Provide Notice of Implementation - 354.44(b)(1)(B) | |
| The SKGSA will provide notice of the program as part of SGMA outreach and education and will notify landowners. | |
| Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2) | |
| The new basin constructed with this project will provide an area of 27.4 acres with a recharge volume of 2, 548 acre-ft per year. Flowmeters will be installed so the delivered water for recharge can be measured at the basin. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| No additional permits or regulatory approvals are anticipated other than those mentioned above. | |
| Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| Construction of this project will be undertaken as soon as funding is available. The completion is targeted for milestone year 2040. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| The volume of water delivered for recharge will be measured daily and summarized monthly by the delivering water agency as well as the City of Sanger. The rate of accrual of benefits will depend on the availability and frequency of Kings River water. The anticipated annual benefit is 2,548 AFY. | |

Project Title: North Sanger, 27.4-Acre Recharge Basin **Project ID: SA04**

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by the City of Sanger or the SKGSA. The water source is Consolidated Irrigation District.

Legal Authority - 354.44(b)(7)

The City has legal authority, as discussed above, to manage the groundwater in their area and the City has the legal authority to deliver surface water to lands within their City.

Further, the City will acquire the necessary lands and permits to construct, own and operate the project, as detailed above.

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The tables below show the probable construction costs and repayment costs estimated based on a 30-year loan with an interest rate of 5%. The new basin is projected to have an annual yield of 2,548 acre-ft and cost \$111 per acre-ft to construct. With the cost of water being approximately \$395 per acre-ft, the total cost of the operational basin is \$506 per acre-ft.

| Item | Item Description | Estimate |
|--------------------|--|-------------|
| Land Acquisition | Purchase 27.4 Acres | \$961,000 |
| Construction Cost | Basin construction | \$1,249,000 |
| | Connect basin to CID facility | \$36,000 |
| Non-Contract Costs | Design Data, Data Collection, Design, Permitting & Construction Management | \$674,000 |
| Contingency | 25% based on conceptual design | \$562,000 |
| | Total Capital Cost | \$3,482,000 |

| Total Capital Cost | Annual Capital Repayment | Annual Yield (AF) | Cost Per AF Water (Capital/Total) |
|--------------------|--------------------------|-------------------|-----------------------------------|
| \$3,482,000 | \$226,509 | 2,548 | \$111/\$506 |

Funding Source - 354.44(b)(8)

Funding will be obtained through the SKGSA, the City of Sanger reserves or obtained grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project would be managed by the City of Sanger. Performance of the project would be a necessary part of the City's reporting requirements.

Level of Uncertainty - 354.44(d)

The level of uncertainty primarily involves the availability of funding and the willingness of the landowners to sell the necessary property. The City has reserve funds available and are eligible for several grants or low-interest loans, therefore the level of uncertainty is relatively low.

6.2.6 Projects Implemented by the South Kings GSA

The GSA has identified two projects that include data collection, research and policy development that will directly aid in future development and implementation of sustainable management criteria.

6.2.6.1 Surface Water – Groundwater Interconnection Data Gap Analysis

The following describes a project to perform additional research and data gathering to fill data gaps related to interconnected surface water and groundwater. Note that specific details still need to be developed as part of the project, and a general description is provided below.

~~The 27.4 Acre Basin Project will consist of the construction of a new recharge basin on the north side of the City. The following table summarizes the parameters, benefits and other pertinent information regarding the project.~~

Table 6-23: Surface Water – Groundwater Interconnection Data Gap Analysis ~~North Sanger, 27.4 Acre Basin Project~~

| | | | |
|--|--|--------------------|------------------|
| Project Title: | <u>Surface Water – Groundwater Interconnection Data Gap Analysis</u> North Sanger, 27.4 Acre Recharge Basin | Project ID: | <u>GSA01SA04</u> |
| Project Type | <u>Data collection and analysis</u> | | |
| Project Location | <u>The project will be implemented in areas adjacent to rivers that potentially have interconnected surface water and groundwater.</u> | | |
| Implementing Agency | <u>The GSA will be the implementing agency.</u> | | |
| Project Description - 354.44(a) | <p><u>The GSA currently lacks sufficient information on where local rivers are interconnected with groundwater, to what extent groundwater pumping is depleting surface water, if at all, and how river management programs ameliorate impacts of surface water depletions.</u></p> <p><u>The study described below will help provide a better picture of the extent groundwater pumping is impacting surface water and whether the GSA considers those impacts to be significant and unreasonable. This information can then be used to develop sustainable management criteria.</u></p> <p><u>The work will be performed in three general phases:</u></p> <p><u>Phase 1: Determine Interconnection Status</u> <u>Phase 2: Coordinate with Water Rights Holders and River Management Programs</u> <u>Phase 3: Evaluate Impacts of Groundwater Pumping on Surface Water</u></p> <p><u>These three phases are described below in more detail, including specific tasks that may be required to fill existing data gaps.</u></p> <p><u>Phase 1: Determine Interconnection Status</u> <u>The purpose of this phase is to determine which reaches of the rivers, if any, are interconnected with groundwater. Some existing information was documented in the 2020 GSPs, but more research will be performed to better define reaches that may be interconnected. Reaches that are determined to be interconnected will be addressed in Phases II and III described later. Reaches that are not interconnected will not be evaluated further, and sustainable management criteria for surface water-groundwater interconnection will not be established in these areas.</u></p> | | |

Project Title: [Surface Water – Groundwater Interconnection Data Gap Analysis](#)
~~North Sanger, 27.4-Acre Recharge Basin~~

Project ID:
[GSA01SA04](#)

Existing studies, reports and models will be reviewed to determine if interconnection has already been firmly established within the GSA area. Sources that will be reviewed include:

- [USGS Reports](#)
- [San Joaquin River Restoration Project Reports](#)
- [Department of Water Resources Reports](#)
- [Central Valley Hydrologic Model](#)
- [ICONS Dataset Tool](#)
- [Groundwater Sustainability Plans for neighboring GSAs](#)
- [Other studies and models not listed above](#)

The next step will include evaluating water level data from existing riverside wells, existing piezometers, and regional groundwater contour maps to assess interconnection. This will also include collecting data on river flows and river stage, when available. A comparison of river bottom to groundwater levels will be made, and in accordance with guidance documents an assumption of depth of unlikely interconnection may be made to determine areas of impact. River thalweg elevations will also be surveyed in specific locations, if needed.

If the presence of interconnection cannot be determined with existing information, then riverside piezometers may need to be installed to collect water level data for comparison to river flow and river stage. Due to the seasonal and annual variability of flows, the piezometers may need to be monitored for several years before conclusions on the interconnection status can be made.

Phase 2 - Coordinate with Water Rights Holders and River Management Programs

Several factors unique to the Kings River and San Joaquin River impact river releases, river seepage and depletion of surface waters. These include Holding Contracts along the San Joaquin River, San Joaquin River Restoration Program Flows, riparian water users along the Kings River, the Kings River Fisheries Management Program, and highly variable surface water supplies. The agencies involved with these programs will be contacted to discuss the SGMA requirements, existing data available, future data needs and sustainable management criteria. Working with these agencies and the water rights holders, the GSA will develop a framework for evaluating and managing river reaches that are interconnected with groundwater.

These existing river management programs currently account for river losses, which help to mitigate for surface water depletion. Consequently, the conclusions from these discussions may determine that groundwater pumping is not causing significant and unreasonable depletion of surface water, or they may conclude that additional efforts are needed to quantify surface water depletion (see Phase III below) to eventually develop sustainable management criteria.

Phase 3 – Evaluate Impacts of Groundwater Pumping on Surface Water

This phase would include estimating the impact of groundwater pumping on surface water depletions for use in ultimately establishing sustainable management criteria for the 2025 GSP update. This work would only be performed in areas known to be interconnected under Phase I, and determined to be potentially impacted based on discussions with other agencies described in Phase II.

The first step will be to select a model, analytical tool or calculation method for estimating groundwater pumping impacts on the rivers. The tool will be selected based on several factors, especially what is most practical and useful with the existing data available.

Project Title: [Surface Water – Groundwater Interconnection Data Gap Analysis](#)
[North Sanger, 27.4-Acre Recharge Basin](#)

Project ID:
[GSA01SA04](#)

[A zone of influence \(distance from the river’s border\) will be established along interconnected areas to identify corridors along rivers where pumping could have a significant impact on river flows. These will define the study areas. Groundwater pumping from these areas will be estimated. Surface water depletion will be estimated using the selected tool. Surface water depletion will vary by season and different hydrologic year types. Investigations will also look at whether the study area is already fully developed \(i.e., built-out\), and the likelihood of any future increases in groundwater pumping in the corridor.](#)

[Development of sustainable management criteria is not included or described in this project, since it will depend on the results from the aforementioned tasks. However, sustainable management criteria will be developed based on the legal requirements established under SGMA.](#)

Measurable Objective(s) Addressed - 354.44(b)(1)

[The project will provide information to help manage interconnected surface water and groundwater in the GSA.](#)

- | | |
|--|---|
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels | <input checked="" type="checkbox"/> Reduction of Groundwater Storage |
| <input type="checkbox"/> Seawater Intrusion | <input checked="" type="checkbox"/> Degraded Water Quality |
| <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water |

Circumstances and Criteria for Implementation - 354.44(b)(1)(A)

[This is a high priority project that is necessary to understand, manage and limit the impacts from depletion of surface waters from groundwater pumping. The GSAs are committed to implementing this project. The hydrogeologic analyses will be performed using standard methods and best practices.](#)

Process to Provide Notice of Implementation - 354.44(b)(1)(B)

[The public and relevant entities will be given the opportunity and time to comment on the results of any data analysis, which will be discussed at GSA board meetings and presented in Annual SGMA reports or 5-year GSP updates.](#)

Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)

[The proposed study will collect data and perform analyses needed to establish which sections of the rivers are interconnected with groundwater, and whether surface water depletions from groundwater pumping are having adverse impacts. This information is needed to develop sustainable management criteria and meet the legal requirements of SGMA.](#)

Permitting and Regulatory Requirements - 354.44(b)(3)

[Permits will be required for new monitoring wells, if they are needed. Since the wells would not extract water, obtaining the well permits should not be a problem. Right-of-way agreements or easements may be needed depending on where the wells are located. No other permits or approvals are expected to be necessary for the program.](#)

Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits

[Following is a preliminary schedule for each of the three project phases:](#)

| Phase | Description | Period |
|-----------------------|--|--|
| 1 | Determine Interconnection Status | Jan 2023– December 2023* |
| 2 | Coordinate with Water Rights Holders and River Management Programs | January 2024 – December 2024 |
| 3 | Evaluate Impacts of Groundwater Pumping on Surface Water | January 2024 – December 2025 |

Project Title: [Surface Water – Groundwater Interconnection Data Gap Analysis](#)
[North Sanger, 27.4-Acre Recharge Basin](#)

Project ID:
[GSA01SA04](#)

* If piezometers need to be installed to evaluate interconnection, then several years of monitoring may be required to firmly establish the interconnection status. Preferably, data would be collected and analyzed for several hydrologic year types, including dry, normal and wet years. This could result in certain river sections falling behind the schedule shown in the table above.

Evaluation of Benefits - 354.44(b)(5)

The project will provide the data and information necessary to develop sustainable management criteria for interconnected surface water-groundwater. This could benefit surface water users by eliminating adverse impacts to their water supply from groundwater pumping, if any.

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be implemented by the GSA using available funding. No surface water or groundwater source are required for implementation.

Legal Authority - 354.44(b)(7)

The GSAs have the authority to implement a project such as this because the SGMA statute grants the GSA the powers and authorities to “perform any act necessary or proper” to implement SGMA regulations and allows the GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (CWC 10725.2).

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

The total combined cost of the project for all seven GSAs in the Kings Basin is estimated to vary from \$100,000 to \$2 million. The actual cost for each individual GSA will vary based on their local conditions. Total costs will vary based on the length of river found to be interconnected, whether piezometers need to be installed, whether existing river management programs obviate the need for developing sustainable management criteria, and the type of analysis tool developed.

Installing piezometers could cost several hundred thousand dollars. Development of a numerical model for the San Joaquin and Kings Rivers could be as much as \$500,000 to \$1 million and would be of limited use until sufficient data is collected to calibrate the model. Other analytical methods would likely cost significantly less.

Funding Source - 354.44(b)(8)

Initial studies and investigations will be funded with existing GSA funds. Piezometers and a numerical model would likely require supplemental funding, such as State or Federal grants.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The project will not impact groundwater extractions or recharge. The project is meant to gain a better understanding of the impact of extractions on surface water through data collection.

Level of Uncertainty - 354.44(d)

The GSA is committed to the project and there is a high level of certainty this project will be performed. The initial phase of the project is expected to proceed without delay or significant funding restrictions. Installation of an extensive piezometer network could require hundreds of thousands of dollars and may be dependent on available funding, and State and Federal grant opportunities may be pursued.

6.2.6.2 Domestic Well Mitigation Program

The following describes a project to develop policies and procedures for mitigating domestic wells that go dry or are in imminent threat of going dry. Specific details still need to be developed as part of the project, and a general description is provided below. This description below was developed with guidance from the *Framework for a Drinking Water Well Impact Mitigation Program* (Self Help Enterprises et al.). The Domestic Well Mitigation Program will initially be developed through a basin-wide effort, and each GSA will then refine the policy to meet their specific conditions, develop funding and implement their individual program.

Table 6-24: Domestic Well Mitigation Program

| | |
|--|-------------------------------------|
| Project Title: <u>Domestic Well Mitigation Program</u> | Project ID: <u>GSA024</u> |
| Project Type | |
| <u>Overdraft Mitigation</u> | |
| Project Location | |
| <u>The Domestic Well Mitigation Program (program) will occur throughout the entire GSA</u> | |
| Implementing Agency | |
| <u>The GSA will be the implementing agency.</u> | |
| Project Description - 354.44(a) | |
| <p><u>The Kings Basin and the GSA have been in overdraft for many years resulting in a significant lowering of the regional and local groundwater elevations, and a significant reduction in the amount of useable groundwater in storage. The GSA plans to correct the overdraft by 2040 as required by SGMA, however there will be a continued decline through 2040 until water levels have stabilized. Stabilizing groundwater levels immediately or raising groundwater levels is not feasible without significant land following given the current water supply conditions, and would have devastating immediate economic impacts. Although water levels will be stabilized by 2040 at the Measurable Objective level, they will likely reach lower levels during dry years. The maximum anticipated lower water level is called the Minimum Threshold. As a result, some domestic wells are expected to go dry during the SGMA implementation period (2020-2040). This is generally limited to shallow domestic wells, since most irrigation wells and agency-owned wells are typically deeper and have often been designed to account for declining water levels. However, some small water supply systems and certain agricultural wells may be impacted and may be considered for mitigation. As described within the GSP, most of the basin has several hundred feet of aquifer with suitable water quality below current water levels.</u></p> <p><u>A Domestic Well Mitigation Program (Program) is proposed to be developed and implemented for wells that have gone dry or are in imminent threat of going dry. The policies and procedures for the Program will be developed through a basin-wide effort, then each GSA can modify the Program to meet their specific needs and will perform public outreach, develop funding, and implement the program for their GSA.</u></p> <p><u>The overall process for developing and implementing a Domestic Well Mitigation Program is outlined below:</u></p> <ol style="list-style-type: none"> <u>1. Review other existing and planned well mitigation programs within other GSAs throughout the State</u> <u>2. Evaluate the merits of partnering with or expanding any current local or State programs.</u> <u>3. Develop policies and procedures with input from GSAs and stakeholders</u> <u>4. Develop detailed inventory of domestic wells</u> <u>5. Predict number of potentially impacted wells and identify high priority areas</u> <u>6. Secure long-term funding for the program</u> | |

Project Title: Domestic Well Mitigation Program

Project ID:
GSA024

7. Perform public outreach to landowners and stakeholders
8. Develop database and registration system for wells owners to sign up
9. Develop criteria for qualifying wells
10. Evaluate each application and determine merits for funding

Following are discussions on specific topics that will be investigated during program development:

Evaluation Process

An application form will be developed for landowners to request mitigation for domestic well impacts. A detailed step-by-step evaluation process will also be documented.

The following are some of the items that will be considered when evaluating applications for mitigation:

- What is causing loss of well capacity? Decline in water levels or other issues such as plugged screens, the well pump, etc.
- The appropriateness of the original well design and construction. Can the well be deepened, or would a new well be needed?
- The percentage (if any) of well owner's mitigation responsibility and other sources of potential funding.
- What is the best mitigation option? Installing a new well, well deepening, other option.

Mitigation

Once a potential well has been identified as adversely impacted by declining groundwater levels and requires mitigation, then several options may be considered including:

- Installing a new well
- Deepening the well if it has an open bottom
- Modifying pump equipment
- Modify current pumping practices (i.e., reduce or cycle pumping from a nearby well)

Deepening a well could be the most economical option but will only be technically feasible if the well is an open bottom well. When necessary, a new well may need to be constructed. The program may have different contribution levels for deepening a well versus construction of an entirely new well. The age and condition of the well impacted will be considered, and the GSA will develop standard depreciated value of wells by age based on published literature, guidelines and local understanding.

The need for short-term solutions, such as providing bottled water and water tanks while a well is being mitigated, will be considered as part of the program. Landowners will be encouraged to contact the GSA before their well goes completely dry to avoid these circumstances. In addition, protocols will be established to help process applications and approve well mitigation in an expedient manner.

Design Criteria

The GSA will develop minimum design criteria for new wells. New wells will need to meet State and GSA Well Standards to receive any reimbursement, and will be subject to routine monitoring by the GSA. Criteria will also be considered for materials used in construction of the well, and minimum depth beyond existing or anticipated future groundwater levels.

Outreach

Project Title: Domestic Well Mitigation Program

Project ID:
GSA024

Public outreach and education will be performed during development of the mitigation program and prior to implementation.

Comments on the draft mitigation program will be solicited during initial development of the policies and procedures. If a Proposition 218 election is needed to establish funding, then education on the program will be an integral part of garnering support for any new fees or assessments.

Prior to implementation, extensive outreach will be needed to notify landowners of the program requirements and how they can apply for assistance. Outreach may need to be performed in multiple languages as appropriate for the GSA. Outreach methods could include workshops, mailings, flyers, website postings, Board meeting announcements, etc.

Measurable Objective(s) Addressed - 354.44(b)(1)

The program will directly address the impacts of the chronic lowering of groundwater levels and reduction in groundwater storage by providing funding for replacement wells or well modifications to eligible landowners.

- | | |
|--|--|
| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels | <input checked="" type="checkbox"/> Reduction of Groundwater Storage |
| <input type="checkbox"/> Seawater Intrusion | <input type="checkbox"/> Degraded Water Quality |
| <input type="checkbox"/> Land Subsidence | <input type="checkbox"/> Depletion of Interconnected Surface Water |

Circumstances and Criteria for Implementation - 354.44(b)(1)(A)

This is a high priority program that is necessary to mitigate the impacts of declining water levels and provide water supply to meet basic health and safety needs. The GSAs are committed to implementing this program. No funding is currently available for the program, so various sources, such as grants, funding through existing state programs, and land-based assessment or water user fees, will be investigated. If the landowners do not approve funding the program through a ballot measure (such as Proposition 218 election), this would signify low public support for the program, and the lack of funding could jeopardize implementation. Any election-based assessment process will need to incorporate public outreach to educate voters on the project benefits.

Process to Provide Notice of Implementation - 354.44(b)(1)(B)

The public and relevant entities will be given the opportunity and time to comment on the Domestic Well Mitigation Program prior to adoption by the GSA Board. The GSA will also provide the public with an opportunity to comment on CEQA studies, if any.

Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)

The proposed Domestic Well Mitigation Program will directly mitigate impacts due to the following:

- Reduction of groundwater in storage; and
- Chronic lowering of groundwater levels.

The Domestic Well Mitigation Program will provide a direct benefit to beneficial users in the GSA who have had their well go dry because of declining water levels during GSP implementation. The metric for measuring program benefits will be the number of domestic wells that are impacted and mitigated under this program.

Permitting and Regulatory Requirements - 354.44(b)(3)

The Domestic Well Mitigation Program may require a CEQA Initial Study but will more likely qualify for a CEQA exemption. The program could also qualify for a Programmatic EIR. If the wells owners are

Project Title: [Domestic Well Mitigation Program](#)

Project ID:
[GSA024](#)

[reimbursed for the well construction then the GSA would not be responsible for any permits. No other permits are expected to be necessary for the program.](#)

Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits

[The policies and procedures for the Domestic Well Mitigation Program will be developed as a Basin-wide effort by the end of 2024. This will likely include coordination with other local mitigation programs, evaluation of a range of potential policies and procedures, economic studies, and preparation of a final report. Each GSA will then modify the Program as needed for their specific conditions and seek to develop a funding mechanism for the Program. Funding development for the Program is anticipated to take 12-24 months. Once the program is funded, a public outreach program will be implemented and the Domestic Well Mitigation Program will be initiated. The GSAs have been and will be reviewing well construction permits to recommend future well construction below minimum threshold levels. Currently in the Kings Basin, domestic well mitigation programs are already being implemented by other entities for low-income residents. During program development, the GSAs will refer landowners to these local programs as well as other resources and funding programs from the County, State or non-profit organizations. Some of these programs include: California Safe and Affordable Drinking Water \(SADW\) Fund, Safe and Affordable Funding for Equity and Resilience \(SAFER\) program, Proposition 1 funding, and programs being administered by Self-Help Enterprises. These programs can assistance with well replacement, as well as interim support such as bottled water and storage tanks while waiting for a new well.](#)

Evaluation of Benefits - 354.44(b)(5)

[The program will help to ensure that owners of domestic wells that have gone dry as a result of water levels declining to minimum threshold water levels are not impacted and maintain a reliable water supply for basic health, safety and consumption.](#)

How will project be accomplished, and what is the water source? - 354.44(b)(6)

[The project will be implemented by the GSA once fully developed and a funding source is identified. This program relies on available groundwater. There is no surface water source required for implementation.](#)

Legal Authority - 354.44(b)(7)

[DWR has indicated that GSAs have the authority to implement a program such as this because the SGMA statute grants the GSA the powers and authorities to “perform any act necessary or proper” to implement SGMA regulations and allows the GSA to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation \(CWC 10725.2\).](#)

Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF

[Following are preliminary estimated costs for implementing the program. These will be refined during project development and finalized prior to efforts to secure funding.](#)

[Development of Policies and Procedures. The estimated cost to develop the Domestic Well Mitigation Program policies and procedures is \\$70,000, which will be split among the different GSAs in the Kings Groundwater Subbasin. Each GSA will then modify the Program, if needed, to be compatible with their specific conditions.](#)

Project Title: Domestic Well Mitigation Program

Project ID:
GSA024

Develop Funding. The Subbasin will collaborate with programs and funding sources that already exist. Each GSA will need to develop long-term funding as needed for their specific GSA needs for expected impacted wells within each GSA. This could include preparation of grant applications, a Proposition 218 election, user fees, or other options. These costs will vary by GSA.

Public Outreach. Public outreach will be performed in each GSA. These costs will vary by GSA and will be estimated during development of the Program.

Project Administration. General administration costs for the program will vary by GSA and will be determined during the development of the Program.

Well Mitigation. Well mitigation costs will vary by GSA and location within each GSA in accordance with groundwater levels and the specific minimum thresholds that have been determined. An estimate of well mitigation costs will be developed by each GSA as part of their Program development and funding plan development. For reference, in 2022, a local well driller quoted \$60 to \$75/lineal foot for a new domestic well, which does not include costs for the pump or other appurtenances. The cost to abandon a well is approximately \$5,000. Assuming an estimated cost per well for mitigation of \$40,000 and estimated 1,000 wells in the basin that might need to be mitigated during the implementation period until water levels stabilize, the total cost of this program could be \$40,000,000. A contingency funding plan may need to be developed if the number of impacted wells is found to be significantly higher than estimated.

Funding Source - 354.44(b)(8)

The funding source for this Program is yet to be identified. The GSA will investigate several funding sources including grants, land-based assessment, and water use fees and collaborate with programs and funding sources that already exist. The State has many existing grant programs for community water systems and well construction funding. County, state and federal assistance will be needed to successfully implement this program. Grants may help to defray some costs, but a local funding source will also be needed, so the GSA landowners will likely need to be taxed to fund the program. The GSAs or individual water agencies may need to perform a Proposition 218 election to increase fees to fund the program. The GSAs will also work with local NGOs that may be able to provide assistance or seek grant monies to help fund the program.

Management of Groundwater Extractions and Recharge - 354.44(b)(9)

The program will not impact groundwater extractions or recharge. The program is meant to maintain domestic well capacity and use as water levels continue to decline until sustainability has been reached.

Level of Uncertainty - 354.44(d)

The GSA is fully committed to developing a Domestic Well Mitigation Program. Implementing the program will be dependent upon securing funding from existing State and/or Federal programs to supplement local GSA funding after landowners approve a new tax or assessment to fund the program.

6.3 Potential Management Actions

The following sections will discuss potential management actions the SKGSA may consider during the GSP implementation. The menu of management actions discussed below may not be implemented in the order they are presented, and some may not be implemented at all, based on progress in achieving sustainability through other actions or projects. Additionally, other management actions may be introduced as new technology or techniques become available and/or based on stakeholder input. In the development of the management actions, the GSA intends to embody the lessons learned from other groundwater managed basins (EDF, 2017) and strive to accomplish the following:

- Develop trust by being inclusive and transparent.
- Use a portfolio of approaches to achieve sustainability.
- Ensure efficient and accurate data collection.
- Devise a fair groundwater allocation.
- Craft a groundwater trading structure that reflects local hydrologic conditions.
- Address concerns of funding GSA management actions.
- Assure performance by rigid penalties and enforcement.

It is the mission of this GSP to promote responsible water resource management, while effectively enforcing the policies and standards set in place by the South Kings GSA to conserve and protect the State of California's water resources for future generations to come.

6.3.1 Education and Outreach Management Actions

EO-1 Regular Communication

The SKGSA will promote education and outreach to all beneficial users and users within the GSA as detailed in [Section 2.5](#).

EO-2 Non-Routine Responses to Minimum Threshold Exceedances

In addition to regular correspondence, the GSA may also immediately notify member agencies of a Minimum Threshold (MT) exceedance as defined in [Section 4.3](#). In an effort to provide communication and outreach, the notification may contain the following information:

- Description and location of the MT exceedance.
- Notice of increased frequency of water level and/or water quality monitoring.
- The potential effects to the member agency.
- The planned GSA response (i.e., trigger of specific projects and managements actions).
- A written reminder of the GSA powers and authorities granted in SGMA, as well as, State intervention when Undesirable Results occur.

The regular correspondence and notice of MT exceedance may or may not generate a quantifiable groundwater demand reduction.

Table 6-25: Summary of Management Actions EO1 and EO2

| | |
|--|--------------------|
| Management Action No.: | EO1 and EO2 |
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| The measurable objectives would be the number of annual correspondence letters and MT exceedance notices that are mailed each year | |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| The education and outreach management action may be developed and implemented shortly after the adoption of the GSP. The policy would remain indefinitely and be reevaluated every 5 years. A trigger for the end of this management action may be that another GSA management action or program provides comparable annual education letters and outreach notices. | |
| Process for Public Notification - 354.44(b)(1)(B) | |
| The process for public notification will be addressed by the consistent communication and outreach between the GSA and the groundwater extractor. The GSA will develop a system to initiate communication on a regular basis and will additionally respond to overdraft or non-compliance with minimum thresholds with escalating correspondence as deemed necessary. The cost associated with GSA correspondence will be assessed on an annual basis. | |
| Permitting and Regulatory Requirements - 354.44(b)(3) | |
| Not permits or regulatory requirements are anticipated for this Action. | |
| Status and Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits | |
| The education and outreach program with annual education letter and notice of MT exceedance has not been drafted. It is expected to commence shortly after the adoption of the GSP and be completed within 1 year. The initial focus will be the annual correspondence letter since the notices of MT exceedance may not occur for many years. | |
| Evaluation of Benefits - 354.44(b)(5) | |
| <p>The GSA will use education and outreach opportunities to encourage active engagement, open lines of communication with interested and affected stakeholders, let them know the future opportunities for input, establish communication channels, and receive feedback on the GSP implementation process.</p> <p>The expected benefits may mitigate overdraft by educating the public about the current use and quality of groundwater supplies. Without levying penalties, the GSA intends for all correspondence and mailed notices to educate extractors about the GSA’s monitoring practices, procedures, and enforcement capabilities. Other program benefits include the transparent and expeditious communication of GSA groundwater overdraft conditions, implementation of specific projects and managements actions, funding opportunities, and potential for State intervention if undesirable results occur.</p> | |
| How will the management action be accomplished? - 354.44(b)(6) | |
| The annual correspondence and escalation letters will be accomplished by utilizing the in-house mailing database that the GSA will develop and maintain. All correspondence will be drafted by GSA staff and will be in accordance with the actions of the Board of Directors. Further detail regarding communication can be found in Section 2.5 . | |
| Estimated Costs - 354.44(b)(8) | |
| The costs related to the education and outreach management action include one-time expenses and reoccurring annual expenses. The one-time expenses include the labor costs of the GSA, GSA’s counsel, and GSA’s consultant to prepare the formal program description and adopt the management action policy. The written policy would detail the specific content of the chosen correspondence method, the source of the data being reported, the frequency of the correspondence, mailing or delivery logistics, expected costs, and the intent of the policy. Through a GSA Board resolution, the program would be incorporated into the GSA’s policy manual for transparency. | |

Management Action No.: EO1 and EO2

The reoccurring costs for mailed correspondence would include the costs of printing, stuffing envelopes, labeling, and postage among. In terms of the content of all correspondence, the costs associated with the GSA’s selected groundwater extraction quantification method are not to be included in this section; these options and costs will be described in previously. The initial costs of implementing this MA will be determined upon implementation. The reoccurring costs associated with the mailing or delivery of MT exceedance notices are difficult to estimate at this time because there are multiple factors that would change the notice frequency. For example, MT exceedances may not start occurring for 15+ years, notices may only be mailed to affected portions of the GSA, and exceedances may occur multiple times within a given year.

6.3.2 Well Head Requirements Management Actions

6.3.2.1 Well Metering and Sampling Requirements

The GSA recognizes that community involvement and outreach alone will not curtail groundwater overdraft. Additional well requirements may be required to more effectively manage and understand the dynamic groundwater conditions. Within the Del Rey CSD, well construction permitting is managed by Fresno County Environmental Health Division (FCEHD) as detailed in **Section 2.3.4**; the remaining member agencies manage new well construction within their respective city boundaries and do not allow new, private wells, to be constructed. Obtaining a well permit through FCEHD is currently a ministerial process, not requiring discretionary action or CEQA. The intent of this management action is to have the SKGSA work cooperatively with the FCEHD to increase well requirements without disrupting the current ministerial permit process. Additionally, the GSA would promote constant communication with the FCEHD and would seek to maintain more monitoring responsibility. The GSA may adopt a policy to augment the current well requirements set by the State/FCEHD and establish new permit criteria, enforce GSA policies, and require GSA approval of all permit paperwork for non-de minimis extractors before FCEHD permit issuance. The policy would affect permits to construct, deepen, destroy, recondition, or repair a well. In order to increase data collection, reporting, and ongoing groundwater management efforts, the additional well requirements policy may contain the following information:

- Registration of extraction facilities with the GSA.
- Require the installation of wellhead meters, sounding tubes, and water quality sample ports.
- Require the well owner to self-report groundwater extraction volumes, static water levels, and water quality data.
- Prohibit the construction of composite wells.
- Curtail or prohibit new well construction.

The GSA may consider separating the additional well requirements management action into multiple policies or be silent on various bulleted components until the GSA deems them necessary. For example, the requirement of installing sounding tubes and water quality sample ports may be enacted before the requirement of a well flow meter. Further explanation and detail of the potential additional well requirements are continued below.

The desired outcome of additional well permitting requirements is the ability to monitor groundwater extractions, water levels, and water quality in a thorough, accurate, and efficient manner across the GSA. The measurable objectives differ amongst the bulleted considerations.

WH-1 Registration of Extraction Facilities

As stated in SGMA 10725.6, “a GSA may require the registration of a groundwater extraction facility within the management area of the GSA.” The GSA has greatly benefited from the current exchange of well

information and use of the online DWR Well Completion Report Map Application tool found here: <https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37>.

However, through research of the proposed well monitoring network, the GSA understands many existing wells do not have well completion reports or have not been entered into the DWR database and may be absent from the existing records. The intent of registration of groundwater extraction facilities would be to complement existing well recordkeeping and ensure that the GSA can fully understand and quantify the potential impacts of groundwater decline. Coupled with the registration of extraction facilities, the GSA may invest in a complete well canvass study to verify the number of wells and presence of a flow meter.

WH-2 Installation of Sounding Tubes and Water Quality Sample Ports

The GSA may require the installation of a well sounding tube, air line, electric depth gauge, and/or other water level sensor for the purpose of measuring water levels throughout the GSA. The accurate and widespread collection of water level data will provide the GSA with the necessary information to monitor the success/failure of the GSP against the established Sustainable Management Criteria in **Section 4**. The policy would describe the acceptable types of water level measuring devices and sample ports, installation requirements, and penalties for tampering, neglect, or misconduct. The installation must provide or allow for the accurate measurement of static groundwater level in feet below the ground surface. If applicable, the water level measurement device must be routinely maintained by the well owner. Once the well construction, deepening, or destruction work was completed, the contractor would be required to provide a Notice of Completion, also known as a Well Driller’s Report or Well Log, within thirty (30) days of completion. The report would document that the work was completed in accordance with the Well Standards Ordinance and GSA additional well requirements policy.

WH-3 Self-Reporting of Groundwater Extraction, Level, and Water Quality

The GSA may require the well owner to self-report to the GSA the groundwater extraction volumes, static water levels, and water quality data twice per year, generally in April and October. The policy would describe the frequency of reporting, various methods of reporting, due dates, and specific instructions for data collection. If there is limited compliance with self-reporting, the GSA may elect to gather the appropriate data with their own staff. The policy would describe that the frequency of the reporting may be temporarily increased if minimum thresholds are exceeded.

WH-4 Prohibition of Composite Wells

The GSA may adopt a policy to prohibit the construction of composite wells, or wells drawing from more than one aquifer. Though wells can benefit from tapping two or more aquifers for increased production, the construction of composite wells create a potential health or water quality concern for cross contamination. In addition, the reporting of static water levels and water quality data from a composite well does not provide clear indication of water source. Misleading or erroneous data would be useless to the GSA in their understanding and management of groundwater.

Table 6-26: Summary of Management Actions WH1 through WH4

| Management Action No.: | WH1 through WH4 |
|---|-----------------|
| Measurable Objective(s) Addressed - 354.44(b)(1) | |
| <p>WH1: The measurable objective would be the number of documented extraction facilities. The method of evaluation may be comparing the number of registered wells to the FCEHD and DWR well records.</p> <p>WH2: The measurable objective would be the number of installed meters, sounding tubes and water quality sample ports. The method of evaluation would be reviewing the number of well permits and confirming whether meters, sounding tubes, and sample ports were installed.</p> <p>WH3: The measurable objective would be number of received reports for each mailing cycle. The method of evaluation would be reviewing the number of responses from groundwater users (excluding de minimis extractors), analyzing data validity/accuracy, and filling data gaps.</p> <p>WH4: The measurable objective would be number of received reports for each mailing cycle. The method of evaluation would be reviewing the number of responses from groundwater users (excluding de minimis extractors), analyzing data validity/accuracy, and filling data gaps.</p> | |
| Circumstances and Criteria for Implementation - 354.44(b)(1)(A) | |
| <p>The current situation of critical groundwater overdraft leading to the unsustainable management of groundwater resources justifies the implementation of additional well requirements. This policy requires the support and coordination of the member agencies for successful implementation. For existing wells, there may be extenuating circumstances where the installation of flow meter, sounding tube, and/or water</p> | |

Management Action No.: WH1 through WH4

quality sample port are not practical or financially advisable. The policy would remain indefinitely or until another GSA program serves the same purpose.

Process for Public Notification - 354.44(b)(1)(B)

Educational correspondence regarding self-reporting of groundwater extractions would be accomplished through direct communication between the grower and the GSA. This will take place in the form of self-reporting and the monitoring of water level and water quality which is then compiled and distributed through each mailing cycle of correspondence mailings. Should the Board of Directors choose to adopt policy addressing WH-1-WH-4 the public will be notified through established GSA correspondence methods as explained in **Section 2.5**.

Permitting and Regulatory Requirements - 354.44(b)(3)

The regulatory process would require member agency coordination and support to ensure new well permits issued within the GSA adhere to the GSA policy. No other environmental or regulatory permits would be required.

Status and Schedule - 354.44(b)(4)

The additional well requirements policy has not been drafted. The draft policy and GSA discussions may commence shortly after the adoption of the GSP and be completed within 2 years.

Evaluation of Benefits - 354.44(b)(5)

The expected benefits would include a complete geo-database of groundwater extraction locations. Requiring new well permits to provide accurate information on location, depth, perforated zone, and measured water use and level would allow for more accurate data analysis of groundwater extraction, storage change, and water table fluctuations. The expected benefits of water quality sample ports and analytical testing would fill data gaps and provide extractors with useful information. The benefits of self-reporting include the avoidance of GSA staff or consultant time to individually collect data. The benefits of prohibiting composite wells include the avoidance of potential migration of pollutants.

How will the management action be accomplished? - 354.44(b)(6)

WH1: Validating all documented extraction facilities and the GSA may authorize a complete well canvass study to verify the number of wells and presence of a flow meter.

WH2 & WH3: Additional review will take place in order to confirm the number of reported well permits and to verify the installation of meters, sounding tubes and sample ports.

WH-4: Analyzing the received reports from each mailing cycle and assessing the data for accuracy and gaps.

Estimated Costs - 354.44(b)(8)

The additional well requirements management action would not directly generate a quantification of demand reduction. However, the foundation for the mitigation of overdraft would be established for ongoing monitoring of groundwater extractions, water levels, and water quality.

The costs related to the additional well requirements management action include one-time expenses and ongoing monthly expenses. The one-time expenses include the labor costs of the GSA, GSA's counsel and GSA's consultant to prepare the formal program description and adopt the management action policies. Through a GSA Board resolution, the program would be incorporated into the GSA's policy manual for transparency. The database of extraction facilities would be created and include individual fields for owner, location, well construction information, GSA additional requirements (i.e., meter, sounding tube, sample port, etc.), and future measurement data. The costs to implement these management actions will be determined if and when they are selected for implementation.

The adoption of this policy would have other resulting costs for the groundwater extractor including:

- Purchase and installation of the well meter, sounding tube, and sample port.

| Management Action No.: | WH1 through WH4 |
|------------------------|--|
| | <ul style="list-style-type: none"> • For existing wells, pump discharge modifications to ensure proper meter installation per the manufacturer’s specifications. • Labor costs related to self-reporting • Laboratory testing of water quality. |

6.3.3 Groundwater Pumping Restrictions Management Actions

6.3.3.1 Groundwater Pumping Restrictions

The GSA may consider a groundwater pumping restrictions management action encompassing policies related to the prohibition of new groundwater exports, requiring new developments to prove sustainable water supply, pumping restrictions during droughts, and moratorium on new production wells.

GP-1 Regulate Groundwater Exports

The GSA may adopt a policy to prohibit new groundwater exports outside of the GSA boundary. The GSA may assure performance by enforcing rigid penalties for illegal actions. The GSA may approve external exports in limited quantities for emergency situations and levy fees for metering the exported amount.

GP-2 Require New Developments to Prove Sustainable Water Supply

The GSA may adopt a policy to require new developments to prove sustainable water supplies. The GSA may review and comment on all new development environmental documents to ensure water balance and corresponding mitigation measures are implemented. This policy requires the support and coordination of the member agencies during their typical project permitting process.

GP-3 Pumping Restrictions During Droughts

The GSA may adopt a policy to immediately reduce or temporarily suspend groundwater pumping during specific intervals such as extreme drought periods. Immediate restrictions may be the result of minimum threshold exceedances. The GSA may consider significant penalties for violators. The GSA may consider liens or cease and desist orders for excessive abuse.

Table 6-27: Summary of Management Actions GP1 through GP3

| Management Action No.: | GP1 through GP3 |
|------------------------|---|
| | Measurable Objective(s) Addressed - 354.44(b)(1) |
| | <p>GP1: The goal is to ensure all groundwater supplies within the GSA are consumed or retained within the GSA boundary. The measurable objective is the metered volume of exported water with the goal of 0 AFY.</p> <p>GP2: The goal is to ensure all new developments have documented sustainable water supply and groundwater supplies are consumed or retained within the GSA boundary. The measurable objective is proven new development water balance with the goal of 0.0 acre-feet groundwater overdraft /year.</p> <p>GP3: The goal is to immediately reduce groundwater pumping, in the event of a drought. The measurable objective is the volume of groundwater extraction in acre-feet and number of violators.</p> |
| | Circumstances and Criteria for Implementation - 354.44(b)(1)(A) |
| | <p>GP1: Though groundwater exports outside of the GSA are not currently a common practice, the GSA understands the changing water market conditions may entice beneficial users to seek financial gains by exporting groundwater. The policy may be implemented shortly after the adoption of the GSP and remain indefinitely. The policy fees and penalties may be reviewed by the GSA annually.</p> |

Management Action No.: GP1 through GP3

GP2: The policy may be implemented shortly after the adoption of the GSP and remain until GSA overdraft has ended or indefinitely.

GP3: Circumstances of extreme drought or triggers of minimum threshold exceedances may expedite the policy adoption. The policy would remain until extreme drought conditions ended or minimum thresholds were no longer exceeded.

Process for Public Notification - 354.44(b)(1)(B)

The GSA will utilize the established methods of correspondence as described in EO-1 and EO-2 to coordinate directly with the extractor to address necessary actions associated with groundwater pumping restrictions. If deemed necessary the Board of Directors will adopt policy to, address, issue warnings and implement pumping restrictions if the circumstances require it.

Permitting and Regulatory Requirements - 354.44(b)(3)

No permit or regulatory process is required for the GSA to adopt policies to support the regulations described in this Management Action. No other environmental or regulatory permits would be required.

Status and Schedule - 354.44(b)(4)

The policies have not been drafted. They may commence after 10 years of GSP adoption and be completed within 5 years.

Evaluation of Benefits - 354.44(b)(5)

GP1: The expected benefits may mitigate overdraft by ensuring groundwater supplies are consumed or retained within the GSA boundary. Emergency groundwater exports may be metered and recorded by the GSA. The method of evaluation may be reviewing the number of emergency export permits. Estimated 0 - 100 acre-feet per year may be retained within the GSA boundary.

GP2: The expected benefits may mitigate overdraft by ensuring new developments utilize groundwater supplies in accordance with current GSA groundwater allocations and groundwater supplies are consumed or retained within the GSA boundary. The method of evaluation may be quantifying the number of new developments that are approved without GSA comment/approval. Estimated up to 100 acre-feet per year may be retained within the GSA boundary.

GP3: The expected benefits may mitigate local overdraft and minimum threshold exceedances by reducing or temporarily stopping groundwater extractions in a given area. The method of evaluation may be reviewing the financial impacts of reduced or suspended pumping. Estimated up to 6,000 acre-feet per year.

How will the management action be accomplished? - 354.44(b)(6)

GP1: The GSA may adopt a policy to charge a fee for existing groundwater exports and/or prohibit new groundwater exports outside of the GSA boundary.

GP2 and GP3: Additionally, the GSA will assess groundwater conditions as deemed necessary and may adopt policies to support these actions.

Estimated Costs - 354.44(b)(8)

The costs to draft and adopt policies and implement those policies will be determined if and when the management actions are implemented, and the costs are better known.

**SOUTH KINGS GROUNDWATER
SUSTAINABILITY AGENCY**

MEMBER AGENCY REIMBURSEMENT POLICY

July 2022

SKGSA

Member Agency Reimbursement Policy

I. PURPOSE AND INTENT

The purpose of this policy is to establish procedures that will allow for financial reimbursement of member agencies, defined as the cities of Fowler, Sanger Kingsburg, and Parlier and the Del Rey Community Services District for expenses implementing recharge projects beneficial to the South Kings Groundwater Sustainability Agency (SKGSA). The policy will address the following components of the reimbursement procedure:

- A. Eligible Reimbursement Expenses
- B. Reimbursement Consideration & Authorization
- C. Project Prosecution and Completion
- D. Reimbursement Request Procedure
- E. Reimbursements to Member Agencies

II. ELIGIBLE REIMBURSEMENT EXPENSES

These guidelines apply to all expenses related to maintenance and operations of existing facilities, construction of new projects to be built by local agencies and other related Board authorized expenses as described below:

- A. Operations and Maintenance of Existing Facilities – SKGSA will reimburse local agencies for expenses related to operations and maintenance of facilities either owned by the local agency or by the SKGSA that are directly related to providing a recharge benefit to the SKGSA and are not part of normal maintenance or operations activities when use is within a shared facility such as a storm drainage basin. Eligible activities may include, but not necessarily be limited to, mowing, repairs to fencing, piping, valves, headwalls, upgrades to meters and telemetry equipment and other activities approved by the Board.
- B. Construction of New Groundwater Recharge Facilities - SKGSA will reimburse local agencies for expenses related to construction of new facilities proposed to be owned by the SKGSA that are related to providing a groundwater recharge function. These facilities may include, but not necessarily be limited to, engineering design, land acquisition, excavation, fencing, installation of pipe system improvements, manholes, headwalls, meters, telemetry equipment, landscaping, access roads, and other activities or improvements approved by the

Board. Any infrastructure or other works as well as any property acquired for a project for which the local agency received SKGSA reimbursement shall become the property of the SKGSA at the completion of the project including all obligations and maintenance/operations responsibilities.

- C. Funding Acquisition Activities - SKGSA will reimburse local agencies for expenses related to preparation of grant or loan funding applications for groundwater related improvements and facilities proposed to be owned by the SKGSA. This would include preliminary engineering, land acquisition activities, and environmental analysis required for completion of the funding application.

Regarding projects to be built by local agencies using State or Federal funding the reimbursement commitment is with the understanding that all projects must also comply with additional specific guidelines issued from the funding agencies.

III. REIMBURSEMENT CONSIDERATION & AUTHORIZATION

The SKGSA may authorize a reimbursement to a member agency as follows:

The initial action related to funding reimbursements to member agencies for eligible activities is issuance of a Reimbursement Commitment Voucher (RCV). After review by the Technical Advisory Committee (TAC) and Administrative Committee (AC), the Board will consider an eligible activity submitted by a member agency for reimbursement and, if deemed an approved eligible reimbursement consistent with the goals and objectives of the SKGSA, will issue a RCV to the member agency. The RCV will describe the work activities and costs eligible for reimbursement along with a time schedule for reimbursements. Member agencies will be required to submit the following in a format acceptable to the SKGSA for Board consideration of a reimbursement request:

- A. A project description highlighting the recharge component beneficial to SKGSA including a location map and discussion of anticipated environmental determination.
- B. A project schedule
- C. A cash expenditure and reimbursement plan showing a schedule of both project cash expenditures by the member agency and expected SKGSA reimbursements.

The SKGSA expects the amount and detail of information about a project to correspond to the size and complexity of the project and SKGSA funding participation. A financial plan and cash reimbursement plan can be one-line statements for smaller projects that expect SKGSA reimbursement in a single lump sum after project completion. However, the funding request must identify the SKGSA fiscal year in

which reimbursement will be requested.

The SKGSA may issue an RCV covering all aspects of a project, or a series of partial project RCV's for certain component stages, or a provisional project approval. Member agencies may apply for a partial project approval for preparation of a grant application, preliminary engineering and/or environmental work, and later seek project approval covering final engineering, right-of-way, and construction. The SKGSA may also give provisional project approval with stated conditions that must be fulfilled subsequently, for example where the financial plan for later stages of a large project is uncertain or incomplete.

The SKGSA may make project approval and funding allocations simultaneously for project development stages. A reimbursement commitment may extend across several fiscal years as determined by the Board.

IV. PROJECT PROSECUTION AND COMPLETION

A. Project Prosecution

The SKGSA allocates reimbursement funding to specified projects, not to an agency or its overall program. Funds may only be expended for the project for which they were allocated.

Member agencies must be specific about the kinds of expenditures and fiscal year timing when requesting reimbursement. The authorization reimbursement is tied to fiscal years in the SKGSA budget. If a specific member agency activity is scheduled for reimbursement in a specific fiscal year, it must be requested in that specific year or receive a time extension by the Board prior to the end of the subject fiscal year.

The following is a general guide for project timing related to reimbursable tasks:

- Reimbursement Commitment Requests must be made 3 months in advance of beginning of work. The first reimbursement payments on a project will be budgeted in the next available fiscal year budget after receipt of the Reimbursement Commitment Request unless a budget amendment for the current fiscal year is approved by the Board.
- Member Agency may start reimbursable project development work any time after receipt of a RCV from the Board except for legacy projects started or completed prior to the adoption of this policy as approved by the Board;
- Member Agency cannot receive reimbursement for any work completed prior to receipt of a RCV from the Board except for legacy projects started or completed prior to the adoption of this policy as approved by the Board;
- Member Agency must receive approval of the completed portions of the work

by the TAC prior to reimbursement payments being made to the member agency by the SKGSA.

B. Progress Reports

SKGSA will provide limited project review and oversight as needed to approve reimbursement payments and project completion. It does not intend to manage project work, project plans, or project construction.

The SKGSA is intent on ensuring that projects proceed as scheduled and that reimbursement funds are expended on a timely basis. Therefore, member agencies are required to prepare progress reports quarterly for projects and submit these reports to the SKGSA Secretary. The SKGSA Secretary will transmit the reports to the Board such that the members are informed on project progress. The reports submitted by the local agency should:

- Identify progress to date versus planned progress;
- Identify any significant deviations from the original project scope of work and explain how these deviations will impact project completion; and
- Indicate if funds are being expended in a timely fashion consistent with the RCV issued for the project.

These progress reports will reflect current costs, schedules, and expenditure projections, but they do not absolve the member agency of responsibility to notify the SKGSA whenever changes in costs, schedules, or expenditure projections are necessary. These issues must be addressed promptly when known

V. REIMBURSEMENT REQUEST PROCEDURE

Upon completion of a project or eligible activity, the member agency is responsible for preparing a Final Project Expenditure Report (report). The report should identify the resources allocated to the project, expenditures incurred, amount of SKGSA's reimbursement commitment to the project including funds not used which can be reallocated by SKGSA. The Final Project Expenditure Report must be completed within 120 days of project completion and sent to the SKGSA Secretary for processing.

A specific project audit may be conducted, at the local agency's expense, on an individual project basis, or may be performed at the same time as the agency's annual Single Audit.

If an individual project audit is done, the auditor must prepare a Final Audit Report. If the agency chooses the Single Audit option, a Management Letter will be required. In either case, the audit will include compliance tests required by the Single Audit Act and its implementing directive, OMB Circular A-128. The compliance testing should ensure controls are in place to assure that:

1. Reimbursement claims submitted to SKGSA for the project are supported by payment vouchers and canceled checks or other trackable expenditure documentation.
2. Charges for the various categories of eligible costs incurred by the member agency are fully supported.
3. Ineligible costs were not claimed reimbursable on the project.

The Final Audit Report or Management Letter must be completed within one year of project completion.

Project completion is defined as when all work identified in the RCV has been completed and final costs are known. The report documents (Final Project Expenditure Report or Final Audit Report and Management Letter) will be sent to the SKGSA Secretary. Failure to comply with these reporting requirements may result in withholding of future reimbursements by the SKGSA.

VI. PROJECT COST CHANGES

Reimbursement Commitment Vouchers are for a fixed amount as described in the member agency's request documentation. In general, cost increases must be covered with local funds unless otherwise approved by the SKGSA Board.

The Board can consider allocating additional funds to a project with a previously issued RCV for cost increases, but this must be requested by the Member Agency and approved by the SKGSA Board. The Board does not budget contingency reserve for projects in which it issues a RCV.

The Board generally will not cover cost increases for reasons of inflation in right-of-way or construction costs, changes in the economic climate in the construction industry, unforeseen environmental costs, or changes in scope proposed by the member agency.

VII. CHANGES IN SCHEDULE

If a local agency must significantly amend the project schedule, the revised schedule shall be transmitted to the SKGSA Secretary in a timely basis. This is especially critical when delays change the amount of funds required in a fiscal year. Failure to advise SKGSA of such schedule changes could jeopardize or void the reimbursement commitment for the project.

VIII. PROJECT CANCELLATION

Project cancellation can occur only through mutual agreement among the SKGSA and member agency. The SKGSA or member agency may propose project cancellation at any point of project if the SKGSA wished to cease progress on the project, if the local agency fails to make suitable progress on the project; or if the member agency is

unable or unwilling to continue. Specific terms of the project cancellation will be executed in a separate agreement between the SKGSA and member agency and approved by the SKGSA Board.

The agreement that results in project cancellation shall revert any unspent funding on the project to other activities deemed appropriate by the SKGSA Board. Any partially completed works or land acquired for a cancelled project will become the property of the SKGSA.

FIRST AMENDMENT TO
AGREEMENT FOR PURCHASE AND SALE
OF REAL PROPERTY AND JOINT ESCROW INSTRUCTIONS

This First Amendment to Agreement for Purchase and Sale of Real Property and Joint Escrow Instructions (this “Amendment”) is entered into as of June __, 2022, by and between the SOUTH KINGS GROUNDWATER SUSTAINABILITY AGENCY, a joint powers authority (“Buyer”), and K. HOVNIANIAN HOMES NORTHERN CALIFORNIA, INC., a California corporation (“Seller”).

RECITALS

A. Seller and Buyer entered into an Agreement for Purchase and Sale of Real Property and Joint Escrow Instructions, dated March 23, 2022 (the “Purchase Agreement”), pursuant to which Seller agreed to sell and Buyer agreed to purchase certain property described therein.

B. Buyer and Seller now desire to amend the Purchase Agreement in accordance with the terms and conditions of this Amendment.

NOW, THEREFORE, in consideration of the promises and covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1) Capitalized Terms. Capitalized terms used herein and not otherwise defined herein shall have the meanings given to such terms in the Purchase Agreement.

2) Closing Date. Section 5.1 of the Purchase Agreement is hereby deleted in its entirety and the following inserted therefor:

“5.1 Closing Date. Escrow shall close within thirty (30) days after the recordation of the final map subdividing the Property, among other things, into a legal parcel in compliance with the California Subdivision Map Act, but in no event later than September 30, 2022.”

3) Counterparts. This Amendment may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Amendment.

4) Facsimile or .pdf Signatures. Either or all parties may execute this Amendment by facsimile or .pdf signature, and any such facsimile or .pdf signature shall be deemed an original signature and Escrow Agent is hereby authorized and instructed to rely thereon.

5) Effect of Amendment. In the event of any inconsistencies between this Amendment and the Purchase Agreement, the terms of this Amendment shall govern. Except as provided for herein, all other terms and conditions of the Purchase Agreement shall remain

unchanged and the parties hereto reaffirm the terms and conditions of such Purchase Agreement. This Amendment may only be varied by a document, in writing, of even or subsequent date hereof, executed by the parties hereto.

[signatures on following page]

IN WITNESS WHEREOF, Buyer and Seller have executed this Amendment as of the date first written above.

BUYER:

SOUTH KINGS GROUNDWATER
SUSTAINABILITY AGENCY, a joint powers
authority

By: _____
Karnig Kazarian, Board Chairman

Dated: _____

ATTEST:

David Peters, Board Secretary

APPROVED AS TO FORM:

Michael Linden, SKGSA Attorney

SELLER:

K. HOVNANIAN HOMES NORTHERN
CALIFORNIA, INC., a California corporation

By: _____
Name: Chad Fuller
Title: Vice President, Chief Legal Counsel

Dated: _____

RESOLUTION 2022-__

**A RESOLUTION OF THE SOUTH KINGS GROUNDWATER SUSTAINABILITY
AGENCY AUTHORIZING REMOTE TELECONFERENCE MEETINGS PURSUANT
TO ASSEMBLY BILL 361**

WHEREAS, the South Kings Groundwater Sustainability Agency (“South Kings GSA”) is a California Joint Powers Authority formed to implement the Sustainable Groundwater Management Act of 2014 in a portion of the Department of Water Resources Bulletin 118 Kings Subbasin; and

WHEREAS, on March 4, 2020, the Governor of the State of California issued a Proclamation of State of Emergency in response to the COVID-19 pandemic, which Proclamation remains in effect; and

WHEREAS, on March 17, 2020, the Governor issued Executive Order N-29-20, modifying the teleconferencing rules set forth in the California Open Meeting law, Government Code section 54950 et seq. (the “Brown Act”), subject to compliance with certain requirements; and

WHEREAS, on June 11, 2021, the Governor issued Executive Order N-08-21, providing that the modifications would remain in place through September 30, 2021; and

WHEREAS, on September 16, 2021, Governor Newsom signed Assembly Bill 361 (“AB 361”), providing that a legislative body subject to the Brown Act may continue to meet under modified teleconferencing rules if the meeting occurs during a proclaimed state of emergency and state or local officials have imposed or recommended measures to promote social distancing; and

WHEREAS, social distancing measures have been imposed and implemented by the State of California to mitigate the spread of COVID-19; and

WHEREAS, the governing board (“Board”) of the South Kings GSA believes the spread of COVID-19 poses an imminent risk to the health and safety of in person meeting attendees; and

WHEREAS, the South Kings GSA Board is conducting virtual meetings by way of telephonic and/or internet-based services as to allow members of the public to fully participate in meetings and offer public comment; and

WHEREAS, the South Kings GSA Board deems it necessary to invoke the provisions of AB 361 related to telephonic and/or internet-based services for its meetings.

THEREFORE, IT IS HEREBY RESOLVED by the South Kings GSA Board as follows:

SECTION ONE: The recitals set forth above are true and correct and are adopted as findings of the South Kings GSA Board.

SECTION TWO: The South Kings GSA Board has reconsidered the circumstances of the State

of Emergency.

SECTION THREE: State or local officials have recommended measures to promote social distancing, including the holding of virtual meetings for legislative bodies within the County of Fresno that are subject to the Brown Act.

SECTION FOUR: Meetings of the Legislative Body shall be held 100% virtually through August 12, 2022.

SECTION FIVE: Staff is directed to return to the South Kings GSA Board no later than thirty (30) days after the adoption of this resolution, or at the next meeting of the South Kings GSA Board, if later, for the Legislative Body to consider whether to again make the findings required to meet under the modified teleconference procedures of AB 361.

PASSED AND ADOPTED by the Board of Directors of the South Kings GSA at a regularly scheduled meeting held on the 13th day of July, 2022 by the following vote:

AYES, Directors:

NOES, Directors:

ABSENT, Directors:

Karnig Kazarian
Chair, Board of Directors
South Kings Groundwater Sustainability Agency