Agenda Item **6**

CITY OF YUBA CITY
STAFF REPORT

Date: December 21, 2021

To: Honorable Mayor & Members of the City Council

From: Public Works Department

Presentation By: Diana Langley, City Manager

Summary

Subject: Sutter Subbasin Groundwater Sustainability Plan Tentative Adoption

Recommendation: Adopt a Resolution to adopt the Sutter Subbasin Groundwater Sustainability Plan acting as the City of Yuba City Groundwater Sustainability Agency

Fiscal Impact: Estimated annual cost of $35,000 - consisting of a combination of staff time and consultants, that will be budgeted in the annual operating budget

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Purpose:

To responsibly manage regional groundwater sources by meeting state requirements to develop and submit a Groundwater Sustainability Plan for the Sutter Subbasin by January 31, 2022.

Background:

In 2014, the Legislature passed groundwater legislation collectively known as the Sustainable Groundwater Management Act (SGMA). The intent of SGMA is to provide sustainable management of groundwater basins statewide. SGMA requires that basins designated as high- or medium-priority be managed under a Groundwater Sustainability Plan (GSP). The Sutter Subbasin is designated as a medium-priority subbasin by DWR and is not considered to be critically overdrafted.

Groundwater Sustainability Agencies (GSAs) in the Sutter Subbasin region, including the City of Yuba City, coordinated their efforts to meet SGMA requirements. Under SGMA, GSAs were allowed the option of developing a Groundwater Sustainability Plan presenting a long-term plan for sustainable groundwater management practices, or to submit an Alternative Plan demonstrating that sustainable groundwater practices were already in place and effectively protecting groundwater resources. The Sutter Subbasin GSAs originally submitted an Alternative Plan in December 2016, but the plan was rejected by the Department of Water Resources (DWR) upon review.

Subsequently, the Sutter Subbasin GSAs entered a Memorandum of Understanding and a Memorandum of Agreement for the funding and development of a full GSP, which was approved by Council on April 6, 2021. Submission of the completed GSP is due to DWR on January 31, 2022.

Analysis:

The final draft of the Sutter Subbasin Groundwater Sustainability Plan for review, adoption, and

submission can be found at www.suttersubbasin.org.

The plan developed through the current effort will have a role in determining groundwater management throughout the region overlying the Sutter Subbasin. The City of Yuba City relies on groundwater in order to meet drinking water demands of the community in drought or low-water years. The plan also addresses groundwater management practices required of agricultural operations in the region, which have important economic and social importance to the City of Yuba City.

Once adopted and accepted by the Department of Water Resources, plan implementation will include the development of a number of annual reporting and groundwater monitoring requirements, as well as continued administration and management coordination with the other Sutter Subbasin GSAs. While most of these groundwater monitoring activities will be conducted by a third party and the costs shared among the cooperative GSAs, there may be some additional activities required for the City within our jurisdiction.

Also included in the GSP are a number of water and wastewater Capital Improvement Projects which were identified to protect and enhance groundwater supplies, many of which have already been prioritized by the City as part of the Capital Improvement Program and the water and wastewater rate study. These projects include aquifer storage and recovery, groundwater well rehabilitation, wastewater outfall diffuser replacement, and replacement of sewer mains. Projects identified in the GSP may be eligible for future state and/or federal grant funding.

The Groundwater Sustainability Plan will be updated every five years, as required by the SGMA legislation.

Fiscal Impact:

The City's annual cost share for plan implementation is estimated at $35,000, which includes activities such as collecting publicly available subsidence and stream gauge data and quality control of monitoring data. The City may also require additional expenditures for groundwater monitoring within our GSA boundaries.

Projects which are included in the Groundwater Sustainability Plan may be eligible for additional state and/or federal grant funding opportunities.

Alternatives:

Do not adopt the Sutter Subbasin Groundwater Sustainability Plan. If so, the City would lose influence as a stakeholder in the Sutter Subbasin groundwater management process and the ability to qualify for grants through SGMA funding sources.

Recommendation:

Adopt a Resolution to adopt the Sutter Subbasin Groundwater Sustainability Plan acting as the City of Yuba City Groundwater Sustainability Agency.

Attachments:

1. Resolution
2. Sutter Subbasin Groundwater Sustainability Plan Executive Summary

Prepared By: Submitted By:

Katherine Willis
Regulatory Compliance Administrator

Diana Langley
City Manager

ATTACHMENT 1

RESOLUTION NO._____

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF YUBA CITY ADOPTING THE SUTTER SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

WHEREAS, the City of Yuba City recognizes the importance of regional groundwater sources for the environmental and economic stability of our City and the surrounding region; and

WHEREAS, the State of California adopted the legislation known collectively as the Sustainable Groundwater Management Act (the Act) in 2014 in order to facilitate sustainable management of groundwater basins statewide; and

WHEREAS, the Act requires all Groundwater Sustainability Agencies (GSAs) to develop and adopt a Groundwater Sustainability Plan (the Plan) in order to establish and ensure the sustainable groundwater management practices; and

WHEREAS, the City of Yuba City formally elected to become a GSA to represent the Sutter Subbasin within the limits of the City of Yuba City on March 21, 2017 in order to act as a stakeholder in the development and implementation of groundwater monitoring and management within the region; and

WHEREAS, the City of Yuba City entered into a Memorandum of Understanding and a Memorandum of Agreement with the other Sutter Subbasin GSAs on April 6, 2021 for the funding and development of the Plan; and

WHEREAS, the Sutter Subbasin GSAs have completed the development of the Plan and issued a Notice of Intention on October 5, 2021 regarding submittal of the proposed Plan to all cities and counties within the Sutter Subbasin to invite public comment. The required 90-day public comment period will conclude on January 3, 2022; and

WHERAS, the Sutter Subbasin GSAs will submit the Plan to the California Department of Water Resources prior to January 31, 2022 for review and approval in accordance with the Act, upon the conclusion of the public comment period and the official adoption by the participating GSAs.

NOW, THEREFORE, be it resolved that the City Council of the City of Yuba City hereby adopts the “Sutter Subbasin Groundwater Sustainability Plan” as an official plan, acting as the City of Yuba City Groundwater Sustainability Agency, inclusive of any edits to the Plan as part of the public comment period and effective as of January 4, 2022.

The forgoing resolution was duly and regularly introduced, passed, and adopted by the City Council of the City of Yuba City at a regular meeting thereof held on the 21st day of December, 2021.

AYES:

NOES:

ABSENT:

_____
Dave Shaw, Mayor

ATTEST:

_____
Ciara Wakefield, Deputy City Clerk

APPROVED AS TO FORM
COUNSEL FOR YUBA CITY:

_____
Shannon Chaffin, City Attorney
Aleshire & Wynder, LLP

ATTACHMENT 2

Final Draft

Sutter Subbasin GSP
Executive Summary

Prepared for:

Sutter Subbasin GSAs

Prepared by:

Woodard & Curran
801 T Street
Sacramento, CA 95811

November 2021

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EXECUTIVE SUMMARY

ES-1. INTRODUCTION

In 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) in response to continued overdraft of California's groundwater resources. The Sutter Subbasin (Subbasin) is one of 127 alluvial basins and subbasins identified by the California Department of Water Resources (DWR) as a high or medium priority groundwater basin and therefore subject to the requirements of SGMA. SGMA requires the preparation of a Groundwater Sustainability Plan (GSP) to provide a path to achieve and document sustainable groundwater management within 20 years following GSP adoption, promoting the long-term sustainability of locally-managed groundwater resources. Within the framework of SGMA, sustainability is generally defined as the long-term reliability of groundwater supply to meet the needs of existing and future beneficial uses and users of groundwater in the Subbasin with the absence of undesirable results.

SGMA requires development of a GSP that achieves groundwater sustainability in the Subbasin by 2042. This GSP provides a framework for sustainable groundwater management moving forward, including water budgets, sustainable management criteria, projects and management actions, monitoring, and implementation activities such as stakeholder outreach and the development of annual reports and five-year evaluations and assessments to this GSP.

ES-2. PLAN AREA

The Sutter Subbasin covers approximately 445 square miles of the Sacramento Valley floor and surrounds the foothills of the Sutter Buttes (**Figure ES-1**). The Sutter Subbasin is part of the larger Sacramento Valley Groundwater Basin and neighbors the following subbasins: Butte, Wyandotte Creek, North Yuba, South Yuba, North American, Yolo, and Colusa. The Sutter Subbasin is bounded on the west by the Sacramento River and on the east by the Feather River. Both rivers serve beneficial uses including recreation, agricultural, and wildlife. Other major features within the Sutter Subbasin include the Sutter Bypass (an artificial flood corridor), Sutter National Wildlife Refuge, and portions of the Sutter Buttes.

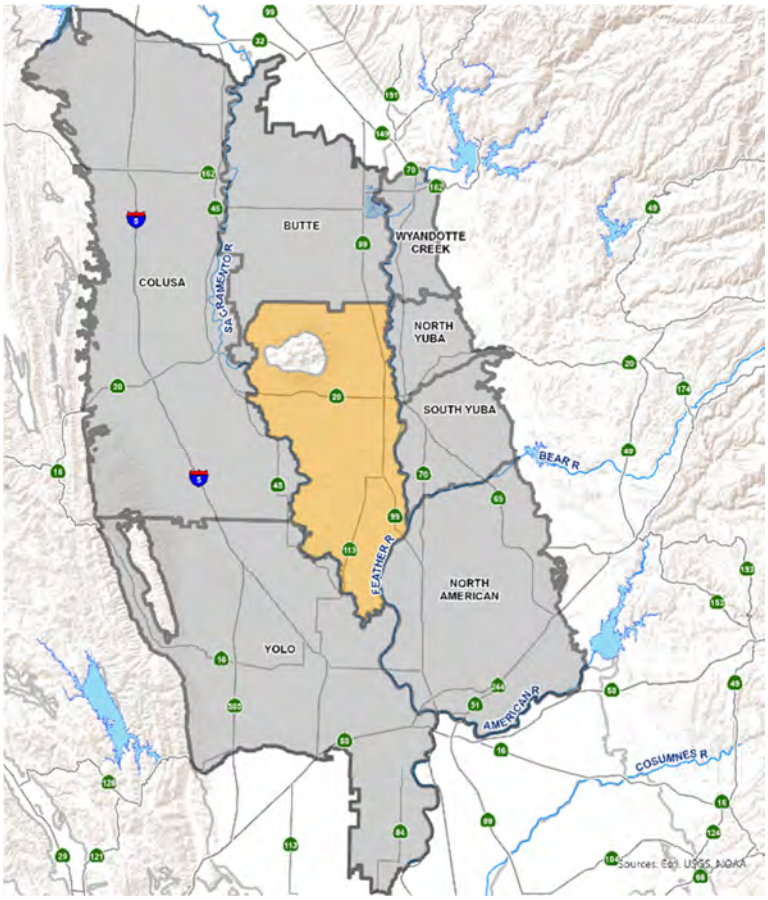

Figure ES-1. GSP Plan Area and Neighboring Subbasins

Land use within the Sutter Subbasin is managed by the cities of Live Oak and Yuba City, as well as Sutter County, and is predominantly agricultural with the production of rice as its primary crop. Surface water and groundwater are the water sources for irrigation, managed wetland, municipal, industrial, and urban/domestic purposes. Implementation of existing land use plans is unlikely to affect the water supply and groundwater sustainability over the planning and implementation horizon as the largest planned changes are related to urban growth with a reduction of agricultural lands.

Existing water resources monitoring and management plans are currently in place throughout the Subbasin, including the Irrigated Lands Regulatory Program (ILRP), Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS), and California Statewide Groundwater Elevation Monitoring (CASGEM) program, as well as Sutter County well standards and permitting. These existing programs can help inform SGMA activities through coordination with monitoring and management entities on overlapping activities and goals.

ES-3. GOVERNANCE AND ADMINISTRATION

This GSP was developed by the nine Sutter Subbasin Groundwater Sustainability Agencies (GSAs): Butte Water District – Sutter, City of Live Oak, City of Yuba City, County of Sutter, Reclamation District No. 70, Reclamation District No. 1500, Reclamation District No. 1660, Sutter Extension Water District, and Sutter Community Service District. Each GSA has its own individual organization and management structures as well as legal authority under which it operates.

The Sutter Subbasin Groundwater Management Coordination Committee (SSGMCC) contains one representative from each GSA and was created to cooperatively carry out the purposes of SGMA by coordinating the development, adoption, and implementation of this GSP. Activities of the SSGMCC include providing technical direction for GSP development, identifying projects and management actions, reporting to their respective GSA boards, and coordinating approval and adoption of this GSP by their respective GSA boards.

ES-4. OUTREACH AND COMMUNICATION

The goal of the public engagement effort related to GSP development and implementation is to understand the needs of stakeholders and groundwater uses and users in the Subbasin; consider the interests of diverse social, cultural, and economic elements of the population; increase awareness and understanding of SGMA and the GSP; and promote active involvement in the process to achieve and maintain sustainability.

Public workshops were held approximately once per quarter during GSP development (five in total) to update interested residents and stakeholders about the GSP preparation process and included presentations on data, information, and analyses, as well as activities to solicit input and feedback from participants. Beyond these meetings, information regarding plan development, noticing, and public comments periods was distributed via the project website (http://suttersubbasin.org/), e-mail notices, social media postings, press releases, and mailings, and utility bill notifications (**Figure ES-2**). Supporting materials (online and hard copy) were prepared in English, Spanish, and Punjabi.

Outreach efforts will continue throughout the implementation of this GSP and plan to include continuing SSGMCC meetings, regular updates at GSA board or city council meetings, maintenance of the project website, local outreach at public events, and distribution of a quarterly newsletter to interested parties.

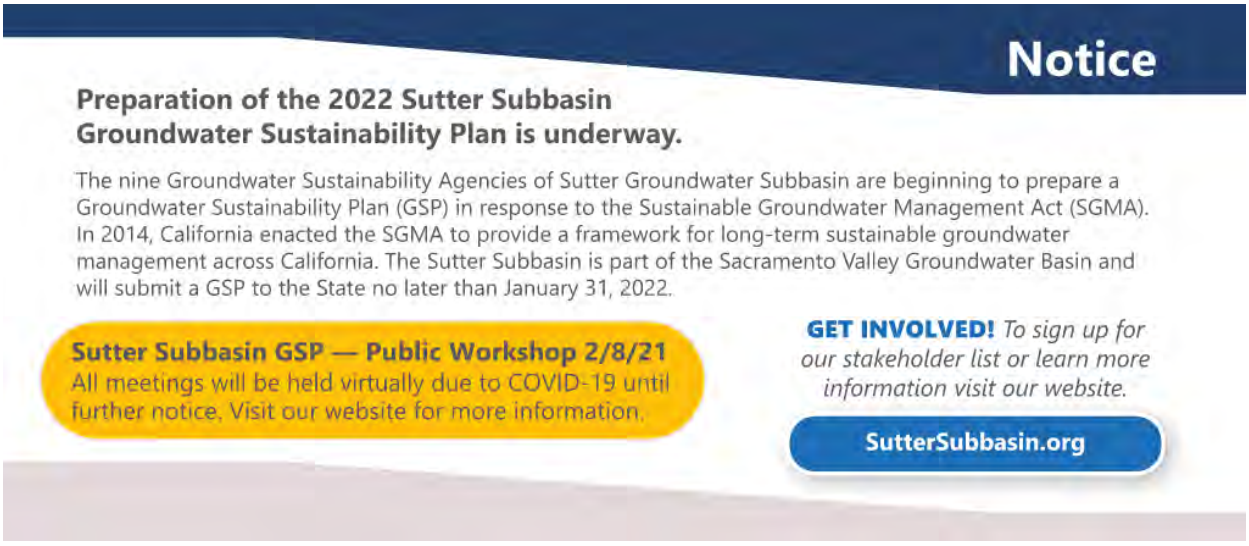

Figure ES-2. Sample Utility Bill Insert for Public Workshop

ES-5. BASIN SETTING

The Basin Setting chapter of this GSP includes the Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budgets sections which describe the Subbasin's physical setting, characteristics, and current conditions. This information serves as a basis for defining and assessing reasonable sustainable management criteria and projects and management actions.

Hydrogeologic Conceptual Model

Lying within the Sacramento Valley Groundwater Basin, the regional geology of the Sutter Subbasin consists of freshwater sediments that are underlain by marine sediments and igneous or metamorphic rocks. The freshwater sediments consist of the volcanoclastic rocks of the Sutter Buttes and sediments weathered from the Sierra Nevada to the east. The Willows Fault is the primary active fault structure within Sutter County and lies to the southwest and west of the Sutter Buttes. The Sutter Buttes, which form an elliptical lateral boundary, is the only prominent topographic feature, located in the northern part of the Subbasin, abruptly rising 2,000 feet above the surrounding valley floor. The topography of the Sutter Subbasin, aside from the Sutter Buttes, is primarily comprised of gentle flatlands with elevations ranging from 80 feet above mean sea level (MSL) in the northeast to 20 feet above MSL in the south. Soils consist mainly of poorly drained clay and clay loam soils, but near the rivers, well drained loam to sandy loam may be present.

The Sutter Subbasin groundwater system is composed of a single principal aquifer comprised of various formations that create zones with varying hydrogeologic properties. As such, this GSP recognizes three Aquifer Zones (AZ) within the principal aquifer: AZ-1 (surface to 150 feet below ground surface [ft bgs]), AZ-2 (150 to 400 ft

bgs), and AZ-3 (greater than 400 ft bgs). In subsequent sections of this GSP, AZ-1 has been further subdivided to include the Shallow AZ (surface to 50 ft bgs) to assess and monitor for impacts related to interconnected surface water and groundwater dependent ecosystems (GDEs), with AZ-1 then including depths from 50 to 150 ft bgs.

Groundwater Conditions

Groundwater level trends in the Sutter Subbasin are largely flat over time, indicating sustainable conditions, as aquifer rebound is observed during all water year types (**Figure ES-3**). Shallow groundwater levels are relatively stable over time and indicate that most groundwater production is occurring below this aquifer zone. More groundwater appears to be produced from the deeper aquifer zones, as indicated by large fluctuations in groundwater elevations where responses to groundwater pumping are observed with rebound following the irrigation season as the aquifer recharges and returns to pre-pumping levels on a seasonal basis.

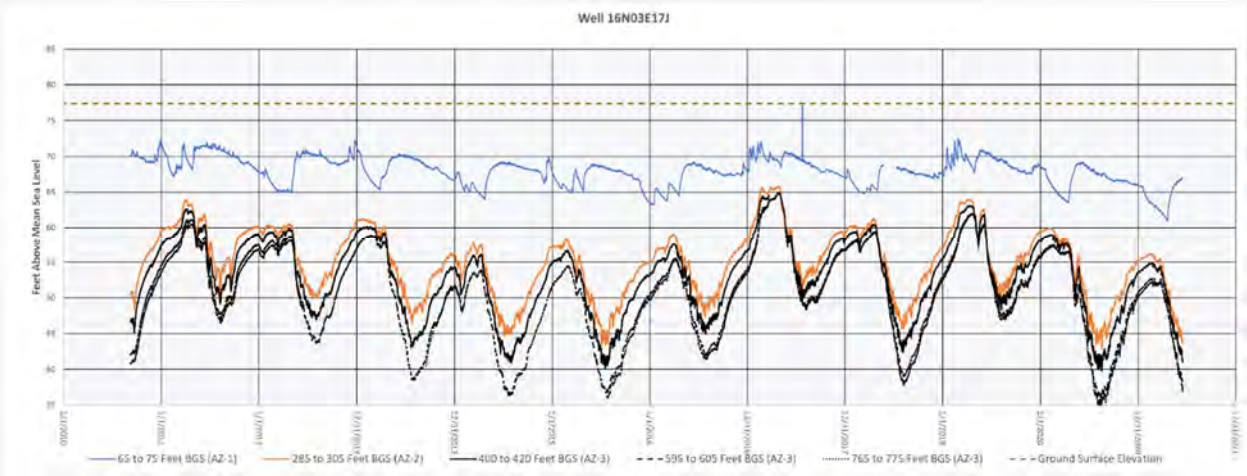

Figure ES-3. Sample Nested Well Hydrograph in Sutter Subbasin

As with groundwater levels, groundwater storage volumes in the Sutter Subbasin have been generally stable over at least the past 30 years (the length of available record). The volume of groundwater in storage increases as groundwater levels rise and decreases as groundwater levels fall; thus, stable groundwater level conditions also result in stable groundwater storage conditions. Total groundwater storage in the Sutter Subbasin is estimated to be 49 million acre-feet (AF) based on the C2VSimFG-Sutter integrated flow model.

Due to its location inland from the Pacific Ocean and set back from the Sacramento-San Joaquin Delta, seawater intrusion and related groundwater conditions are not applicable to the Sutter Subbasin.

Groundwater quality in the Sutter Subbasin varies by location. Several constituents have been detected at levels that exceed the maximum contaminant level (MCL) for drinking water, including arsenic, boron, total dissolved solids (TDS), and nitrate.

Median arsenic concentrations have decreased since 1952 and most recently are below the Primary MCL of 0.01 mg/L. Median boron concentrations peaked between 2009 and 2012 but remained below the agricultural water quality objective of 0.7 mg/L, and maximum concentrations of boron have decreased over time. Maximum TDS concentrations have substantially decreased since 1952, peaking in 2006, with the most recently observed maximum concentration occurring below the Upper Secondary MCL of 1,500 mg/L. Median nitrate concentrations have increased since 1952 and have been detected above the Primary MCL of 10 mg/L for nitrate as N as of 2012. The most recently observed maximum concentration exceeds the Primary MCL for nitrate by over 10 times. All constituents were found to be naturally occurring, except nitrate, detections of which are few and scattered throughout the Subbasin.

Land subsidence within the Sutter Subbasin has been minimal in recent years and there has been no reported negative impacts of land subsidence on critical infrastructure. While elastic land subsidence is observed as a result of seasonal fluctuations in groundwater levels and associated aquifer pressure, evidence of inelastic land subsidence has not been recorded within the Subbasin.

Interconnected surface waters (surface waters that are hydraulically connected by a saturated zone to the groundwater system) are categorized as “losing” when the groundwater elevations adjacent to a river or stream decline causing the river or stream to “lose” water to the underlying aquifer, or “gaining” when hydraulic gradients flow from the groundwater aquifer to the river or stream. The Sutter Bypass, Feather River, and Sacramento River were all found to have fluctuating gaining and losing conditions throughout the Subbasin.

GDEs in the Sutter Subbasin exist primarily where vegetation is reliant on shallow groundwater supply for survival. Potential GDEs have been identified along the Feather River and the most northeastern portion of the Sutter flyway.

Water Budgets

Water budgets are developed to provide a quantitative account of water (including surface water and groundwater) entering and leaving the Sutter Subbasin under historical, current, projected, and projected with climate change conditions. The water budgets were estimated using C2VSimFG-Sutter, a numerical groundwater and surface water model developed specifically for the Sutter Subbasin. The primary components of the groundwater budget include (also depicted in **Figure ES-4**):

- Inflows:
  - Deep percolation from rainfall, irrigation-applied water, and applied water for refuge use
  - Stream seepage
  - Land subsidence inflow

  - Conveyance seepage
  - Subsurface inflow from adjacent subbasins
- Outflows:
  - Groundwater outflow to streams
  - Groundwater pumping
  - Subsurface outflow to adjacent subbasins
- Change in groundwater storage

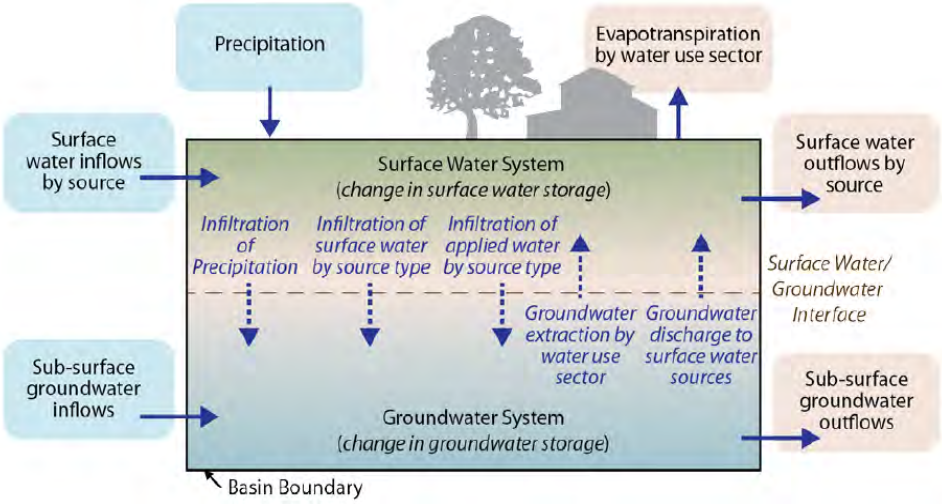

Figure ES-4. Overview of Water Budget Components

The average annual change in groundwater storage is stable under all water budget scenarios, with a net 0 AF change in storage under projected conditions (both with and without climate change). **Figure ES-5** shows the average annual volume of inflow and outflow from the groundwater budget for all water budget scenarios.

The sustainable yield for the Sutter Subbasin is estimated as 182,000 acre-feet per year (AFY). The estimated sustainable yield is higher than simulated average annual groundwater pumping in all four water budget scenarios – historical, current conditions, projected conditions, and projected conditions with climate change. Therefore, it can be reasonably stated that the Subbasin is currently operating under sustainable conditions and is expected to continue to be sustainable if changes estimated in the projected conditions scenario hold true into the future. Additionally, sustainable yield is a long-term value and groundwater pumping may exceed the estimated sustainable yield value during certain years, balanced by other years with reduced pumping so that the long-term average remains at or below the sustainable yield.

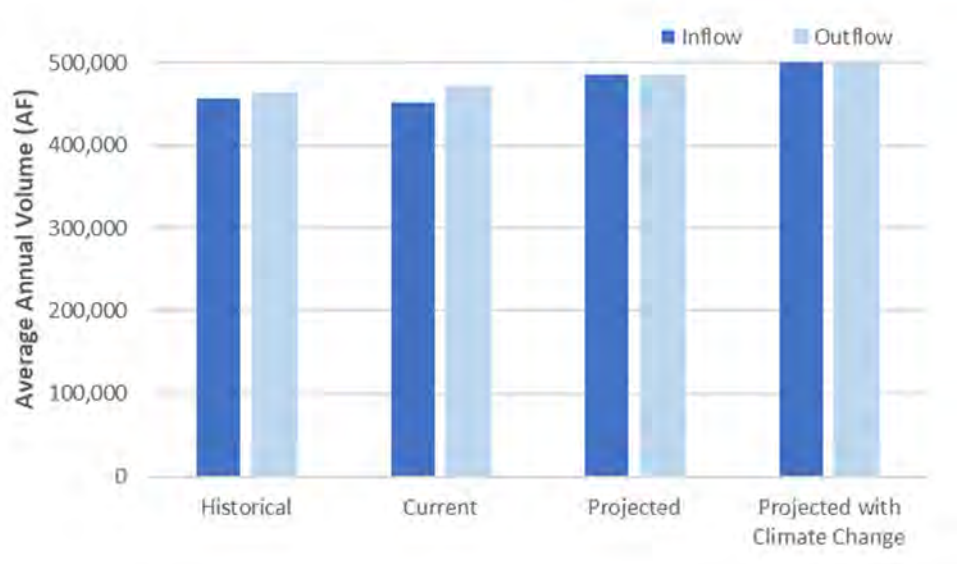

Figure ES-5. Sutter Subbasin Average Annual Groundwater Budget

ES-6. SUSTAINABILITY MANAGEMENT CRITERIA

SGMA introduces several terms to measure sustainability including (**Figure ES-6**):

- **Sustainability Indicators** – Sustainability indicators refer to adverse effects caused by groundwater conditions occurring throughout the Subbasin that, when significant and unreasonable, cause undesirable results. The six sustainability indicators identified by DWR are the following:
  - Chronic lowering of groundwater levels
  - Reduction of groundwater storage
  - Seawater intrusion
  - Degraded water quality
  - Land subsidence
  - Depletions of interconnected surface water
- **Sustainability Goal** – This goal is the culmination of conditions resulting in the absence of undesirable results within 20 years.
- **Undesirable Results** – The condition at which for each sustainability indicator significant and unreasonable impacts are likely to be observed.
- **Minimum Thresholds** – Minimum thresholds are a numeric value for each sustainability indicator and are used to define when undesirable results occur.
- **Measurable Objectives** – Measurable objectives are a specific set of quantifiable goals for the maintenance and improvement of groundwater conditions.

- **Interim Milestones** – Targets set in five-year increments over the GSP implementation period to reach the measurable objectives within 20 years.
- **Margin of Operational Flexibility or Operating Range** – The range of active management between the measurable objective and minimum threshold.

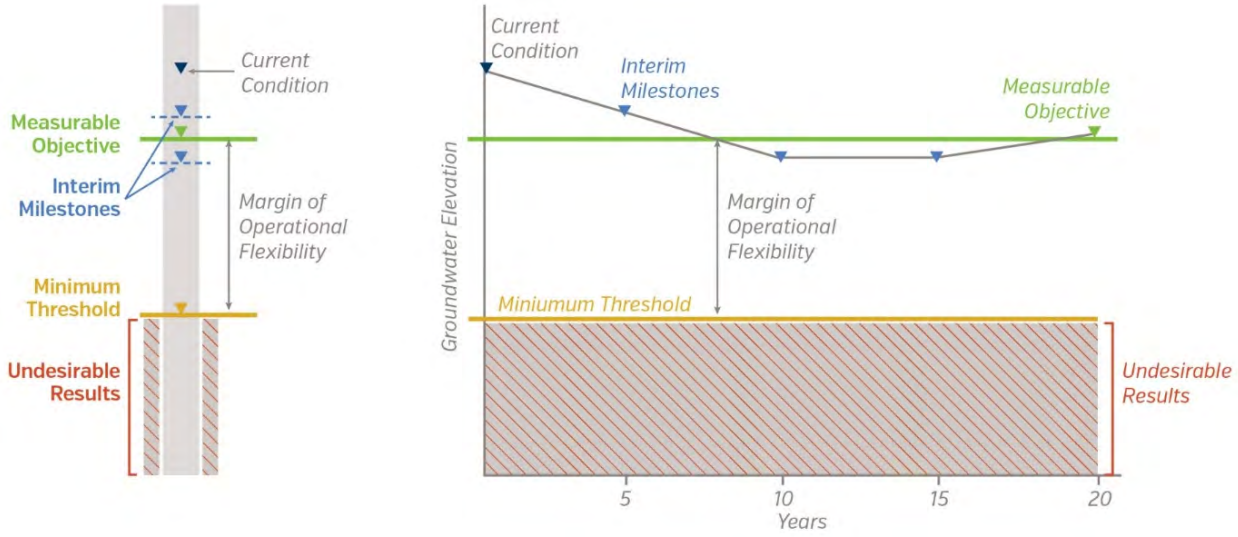

Figure ES-6. Sustainable Management Criteria Schematic for Groundwater Levels

The sustainability goal for the Sutter Subbasin is as follows:

> *The Sutter Subbasin will maintain locally-managed groundwater resources for existing and future beneficial uses and users that are economically viable and sustainable by managing groundwater use within the sustainable yield, resulting in the avoidance of undesirable results. This goal will be achieved through implementation of proposed projects and management actions and monitoring activities aiding in reaching or maintaining established interim milestones and measurable objectives culminating in the absence of undesirable results by 2042. Water managers in the Sutter Subbasin will work together and collaboratively with stakeholders and neighboring subbasins through GSP implementation and beyond to achieve this goal.*

The method prescribed by SGMA to measure undesirable results and achieve the sustainability goal involves setting minimum thresholds and measurable objectives for a series of representative monitoring sites. The Sustainable Management Criteria (SMC) are summarized in **Table ES-1**.

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Table ES-1. Summary of Sustainable Management Criteria

Sustainability Indicator	Undesirable Results	Identification of Undesirable Results	Minimum Threshold	Measurable Objective
Chronic lowering of groundwater levels	Groundwater levels dropping to a level at which domestic or irrigation wells go dry or lose functional pumping capacity, resulting in significantly higher pumping costs and/or the significant and unreasonable effort to maintain or deepen production wells.	25% of representative monitoring locations across all aquifer zones drop below the minimum threshold criteria concurrently over two consecutive seasonal high water level measurements.	The deepest of: 1. The historic low from available record at each representative monitoring site; or 2. 90% of the average groundwater elevation from the projected water budget (baseline condition over 60-year period using C2VSimFG-Sutter) at each representative monitoring site with a 50% artificial increase in evapotranspiration; or 3. The average operating range using the above criteria for the following aquifer zones: - Shallow AZ and AZ-1 = 8.0 feet - AZ-2 and AZ-3 = 16.5 feet.	Average of the available historical record at each representative monitoring site.
Reduction of groundwater storage	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels are used as proxy.
Seawater intrusion	Undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Minimum thresholds are not developed because undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.	Measurable objectives are not developed because undesirable results related to seawater intrusion are not applicable to the Sutter Subbasin.

Sustainability Indicator	Undesirable Results	Identification of Undesirable Results	Minimum Threshold	Measurable Objective
Degraded water quality	A result stemming from a causal nexus between groundwater-related activities, such as groundwater extraction or recharge, and a degradation in groundwater quality that causes a significant and unreasonable reduction in long-term viability of domestic, agricultural, municipal, or environmental uses over the planning and implementation horizon of this GSP.	50% of representative monitoring wells across all aquifer zones exceed the minimum threshold for two consecutive measurements at each location during non-drought years and where these minimum threshold exceedances can be tied to a causal nexus between SGMA-related activities and water quality.	The higher of: 1. The Upper Secondary Maximum Contaminant Level (SMCL) for TDS of 1,000 mg/L and Primary MCL for nitrate as N of 10 mg/L; or 2. Current water quality conditions for TDS and nitrate as N based on available data from 2000 to the time of GSP development at each representative monitoring well or nearby well in the same aquifer zone.	The higher of: 1. Current water quality conditions for TDS and nitrate as N based on available data from 2000 to the time of GSP development at each representative monitoring well or nearby well in the same aquifer zone. 2. The Recommended SMCL for TDS of 500 mg/L and 70% of the Primary MCL for nitrate as N of 7 mg/L.
Land subsidence	A result due to groundwater extraction that causes a significant reduction in the viability of the use of infrastructure for water distribution and flood control.	At least 25% of representative subsidence monitoring sites exceed the minimum threshold for subsidence over the 5-year monitoring period.	0.5 feet of subsidence over a 5-year period, representing the point at which water conveyance and levee infrastructure become sensitive to land subsidence ant twice the operational error of land survey measurements.	0.25 feet of subsidence over a 5-year period, representing the range of error for land survey measurements.
Depletions of interconnected surface water	A result that causes significant and unreasonable adverse effects on beneficial uses and users of interconnected surface water within the Sutter Subbasin over the GSP planning and implementation horizon.	25% of representative monitoring locations across all aquifer zones drop below the minimum threshold concurrently over two consecutive seasonal high water level measurements.	Same as chronic lowering of groundwater levels. Groundwater levels used as proxy.	Same as chronic lowering of groundwater levels. Groundwater levels used as proxy.

ES-7. SUSTAINABILITY IMPLEMENTATION

The Sutter Subbasin GSP contains the required sections for sustainability implementation, including Projects and Management Actions and a Representative Monitoring Network monitoring program.

Projects and Management Actions

As the Sutter Subbasin is currently sustainable and projected to remain sustainable, there are no projects or management actions required to achieve sustainability. However, projects and management actions can enhance understanding of the groundwater system and improve the ability to adaptively manage the Subbasin so that undesirable results can be prevented. Most projects and management actions contained in this GSP will be implemented as-needed and as funding is available.

Projects and management actions listed in the Sutter Subbasin GSP include select on-going and planned projects and management actions, such as:

- System modernization by water purveyors
- Boundary flow and primary spill measurement and drainage recovery
- Multi-benefit recharge
- Grower education
- Installation of shallow monitoring wells

As-needed projects and management actions will be implemented, as deemed necessary, to support sustainability, allow for adaptation to changing conditions, and achieve other water management objectives, such as:

- Direct and in-lieu groundwater recharge
- Wetland habitat improvement, such as through securing firm water supplies or fish screen projects
- Surface water supply augmentation through backwash recovery
- Updated electrical Supervisory Control and Data Acquisition (SCADA) and telemetry
- Water quality enhancement through replacement of sewer mains
- Projects to address data gaps, such as:
    - Investigations of interactions between rivers and changes in groundwater levels
    - Investigation of source of elevated salinity in the shallow aquifer zone
    - Study of aquifer properties
    - Data collection to improve the HCM
    - Comprehensive groundwater quality investigation

- Investigation and characterization of the Sutter Buttes, including salinity monitoring, airborne electromagnetic (AEM) survey, and an inter-basin working group focused on water quality
- Groundwater dependent ecosystem mapping confirmation
- Well census
- Land subsidence monitoring evaluation

A living list of projects and management actions will be maintained and updated in the Subbasin data management system (DMS) using the Opti platform, reflecting the current status of each and continually adjusting as needed to meet changing basin conditions. The list of projects and management actions in the DMS constitutes the required list for the Sutter Subbasin GSP per the GSP Emergency Regulations Subarticle 5. Projects and Management Actions.

Monitoring

The Sutter Subbasin GSP includes monitoring networks for the five applicable sustainability indicators, where seawater intrusion is not applicable to the Sutter Subbasin. The objective of these monitoring networks is to monitor conditions across the Subbasin and detect trends toward undesirable results such that adaptive management actions and projects can be implemented to prevent the onset of undesirable results. Specifically, the monitoring networks were developed to:

- Monitoring changes in groundwater conditions relative to measurable objectives and minimum thresholds
- Monitor impacts to the beneficial uses and users of groundwater resulting from groundwater use
- Demonstrate progress toward achieving measurable objectives described in the GSP

Five monitoring networks were developed for the Sutter Subbasin GSP: groundwater levels by aquifer zone (also used as proxy for reduction in groundwater storage sustainability indicator), groundwater quality by aquifer zone, land subsidence, and interconnected surface water. All monitoring networks described in this GSP are representative monitoring networks and are used to determine compliance with the quantitative minimum thresholds and measurable objectives established at each representative monitoring site.

The monitoring networks were designed by evaluating existing monitoring programs, such as CASGEM, monitoring conducted by DWR, or local agency monitoring programs. The monitoring networks largely consist of monitoring sites that have historical monitoring data and no significant barriers to future monitoring events. Data gaps identified in the Sutter Subbasin monitoring network include unknown construction

details for several groundwater quality monitoring wells and limited shallow monitoring wells currently available along identified interconnected surface waters. Progress will be made to fill these identified data gaps prior to the first five-year evaluation and assessment, where updated monitoring networks will be included in future GSP updates.

Monitoring frequencies vary by sustainability indicator. For groundwater levels and interconnected surface water, measurements will be taken during seasonal high (March through April) and seasonal low (September through October) conditions. Additional groundwater level measurements may be taken in areas where rice growing activities substantially alter the timing of seasonal highs and lows in shallow aquifer zones. Groundwater quality for identified constituents of concern (TDS and nitrate as N) will be analyzed annually with samples collected in September. Measurements for interconnected surface waters will be collected concurrently with those for groundwater levels. Land subsidence will be monitored by DWR using the Sacramento Valley Global Positioning System (GPS) Subsidence Monitoring Network every five years, with the next survey to be completed in 2022. Publicly available Interferometric Synthetic Aperture Radar (InSAR) and stream gage data will be collected and evaluated on an annal basis.

ES-8. PLAN IMPLEMENTATION

Implementing the Sutter Subbasin GSP will require numerous management activities by the Sutter Subbasin GSAs, including:

- GSA administration and activities associated with the SSGMCC
- Conducting outreach and stakeholder engagement
- GSP-related monitoring activities at specified timing and frequency and analysis of monitoring data relative to established SMC
- Updating the Subbasin DMS
- C2VSim-FG model refinements
- Implementing adaptive management strategies as needed
- Implementing projects and management actions, as needed and as funding is available
- Annual Report development and submittal to DWR by April 1 each year
- Evaluating and updating the GSP at least every five years

Implementation of the Sutter Subbasin GSP will require funding from the GSAs as well as external sources. Outside grants will be sought to assist with reducing the cost of implementation to participating agencies, residents, and landowners in the Subbasin. The estimated initial cost of GSP implementation activities is between approximately $632,000 and $1,212,000 per year during the initial years of implementation, excluding

implementation of projects and management actions. Costs associated with the implementation of identified projects and management actions will vary depending on the project type and stage of the project (e.g., planning or construction). The Sutter Subbasin GSAs will individually fund implementation of projects in their respective areas unless otherwise agreed upon by the GSAs' governing bodies.

ES-9. REFERENCES AND TECHNICAL STUDIES

Lists of references used to develop this GSP are included following each GSP chapter. Technical studies relied upon in developing the Sutter Subbasin GSP are included as a chapter of this GSP.