SUTTER SUBBASIN
Groundwater Sustainability Plan

WOODARD &CURRAN

DEPARTMENT OF WATER RESOURCES · STATE OF CALIFORNIA ·

PROP 1
GOVERNOR EDMUND G. BROWN, JR.
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Groundwater Sustainability Plan

for the Sutter Subbasin Groundwater Sustainability Plan

Sutter Subbasin

January 2022

Prepared for Sutter Subbasin Groundwater Management Coordination Committee

Sutter County GSA
Butte Water District GSA
City of Live Oak GSA
Sutter Extension Water District GSA
Sutter Community Services District GSA
City of Yuba City GSA
Reclamation District 70 GSA
Reclamation District 1660 GSA
Reclamation District 1500 GSA

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LIMITATION

The work products presented in this Groundwater Sustainability Plan (GSP) are a compilation of work completed by multiple professionals under the direction of a Professional Geologist (PG) or Professional Engineer (PE) as indicated by the stamps shown below. The signatures below represent work completed in the Hydrogeologic Conceptual Model under the oversight of Joseph Turner, PG, and for the GSP as a whole as prepared under the oversight of Leslie Dumas, PE. The signatures below are for the individual oversight roles and responsibilities, and the signing professional assumes no responsibility for any errors or misleading statements in plan sections not prepared under their direct oversight.

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Contents

Figures

Tables

Appendices

Acronyms

AB	Assembly Bill
ADVM	acoustic doppler velocity meter
AF	acre-feet
AF/ac	acre-feet per acre
AFY	acre-feet per year
ASR	aquifer storage and recovery
AWMP	Agricultural Water Management Plan
AZ	Aquifer Zone
Bgs	below ground surface
BMP	best management practice
BWD	Butte Water District
BWGWD	Biggs-West Gridley Water District
C2VSimFG-Sutter	California Central Valley Groundwater-Surface Water Simulation Model – Fine Grid, Sutter Subbasin
CALSIMETAW	California Simulation of Evapotranspiration Applied Water
CARB	California Air Resources Board
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CDEC	California Data Exchange Center
CDFW	California Department of Fish and Wildlife
CDP	Census Designated Place
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
COC	chain of custody
COC	constituents of concern
CSD	Community Services District
CT	Central tendency
CVJV	Central Valley Joint Venture
CVP	Central Valley Project

CV-RWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWC	California Water Code
DAC	Disadvantaged Community
DDW	Division of Drinking Water, California State Water Resources Control Board
DMS	Data Management System
DPR	Department of Pesticide Regulation
DTW	depth to water
DWR	California Department of Water Resources
EC	electrical conductivity
EDA	Economically Distressed Area
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ET	evapotranspiration
FRRAWMP	Feather River Regional Agricultural Water Management Plan
GAMA	Groundwater Ambient Monitoring and Assessment
GDE	groundwater dependent ecosystem
GIS	geographic information system
GMP	Groundwater Management Plan
GPS	Global Positioning System
GQTM	Groundwater Quality Trend Monitoring
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWE	groundwater elevation
HCM	Hydrogeologic Conceptual Model
IC	Irrigation Company
ILRP	Irrigated Lands Regulatory Program
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan

ITRC	Cal Poly Irrigation Training & Research Center
LAFCO	Local Agency Formation Commission
JPA	joint powers authority
MAF	million acre-feet
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MHI	median household income
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSL	mean sea level
MW	monitoring well
MWC	Mutual Water Company
NASA JPL	National Aeronautics and Space Administration Jet Propulsion Laboratory
NCCAG	National Communities Commonly Associated with Groundwater
NEPA	National Environmental Protection Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NRCS	National Resources Conservation Service
NSVIRWMP	Northern Sacramento Valley Integrated Regional Water Management Plan
NWIS	United States Geological Survey National Water Information System
PLSS	Public Land Survey System
PMAs	projects and management actions
PRISM	Precipitation-Elevation Regressions on Independent Slopes Model
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Program Plan
RD	Reclamation District
RP	reference point

RPE	reference point elevation
RWQCB	Regional Water Quality Control Board
SAGBI	Soil Agricultural Groundwater Banking Index
SB	Senate Bill
SCADA	Supervisory Control Data Acquisition
SCEHD	Sutter County Environmental Health Division
SDAC	Severely Disadvantaged Community
SEWD	Sutter Extension Water District
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SMC	sustainable management criteria
SMCL	Secondary Maximum Contaminant Level
SMWC	Sutter Mutual Water Company
SNMP	Salt and Nutrient Management Plan
SSGMCC	Sutter Subbasin Groundwater Management Coordination Committee
SVWQC	Sacramento Valley Water Quality Coalition
SWP	State Water Project
SWPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWRCB-DDW	State Water Resources Control Board, Division of Drinking Water
SWRP	Storm Water Resource Plan
TAF	thousand acre-feet
TDS	total dissolved solids
TNC	The Nature Conservancy
TSS	Technical Support Services
UCCE	University of California Cooperative Extension
USBR	United States Bureau of Reclamation
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey

UWMP	Urban Water Management Plan
VIC	Variable Infiltration Capacity
WA	Wildlife Area
WDL	Water Data Library
WDR	Water Discharge Requirement
WWTF	Wastewater Treatment Facility
WY	Water Year
µS/cm	microsiemens per centimeter
2070CT	2070 central tendency

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PREFACE

Development of the Sutter Subbasin Groundwater Sustainability Plan (GSP), along with nearly all other GSPs developed for non-critically overdrafted high- and medium-priority basins in California, has coincided with one of the most severe and extensive recorded droughts in the western United States. As of this writing (in January 2022), the Sutter Subbasin GSP has been assembled as the impacts of a second dry year are beginning to be felt and a third dry year is anticipated for Water Year (WY) 2022. Drought conditions in much of California, including the Sutter Subbasin, are classified as "exceptional," the most extreme classification defined by the U.S. Drought Monitor[1]. Observed impacts during exceptional droughts, according to U.S. Drought Monitor, may include:

- Widespread water shortages
- Surface water depletions
- Extremely low Central Valley Project and State Water Project irrigation water deliveries
- Curtailment of both junior and senior water rights
- Extremely high water prices
- Dry wells
- Drilling of more and deeper wells
- Increased groundwater pumping to meet demands, resulting in increased pumping costs
- Poor water quality
- Fallowed fields, orchard removal, and low vegetable yields
- Extensive wildfires
- Impacts to recreational activities
- Wildlife impacts, including impacts to survival and mortality
- High agricultural unemployment

Governor Gavin Newsom declared a drought emergency on April 21, 2021 in Mendocino and Sonoma Counties[2] due to drought conditions in the Russian River Watershed. This emergency declaration was later extended to the Klamath River Watershed Counties, Sacramento-San Joaquin Delta Watershed Counties (including

[1] Available at: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CA

[2] Governor Newsom's State of Emergency Proclamation from April 21, 2021 declaring a drought emergency is available at: https://www.gov.ca.gov/wp-content/uploads/2021/04/4.21.21-Emergency-Proclamation-1.pdf.

Sutter County, which contains the entirety of the Sutter Subbasin), and the Tulare Lake Watershed Counties[1] on May 10, 2021. On July 8, 2021, Executive Order N-10-21 was signed by Governor Newsom[2] calling on all Californians to voluntarily reduce their water use by 15% compared to 2020 levels. On August 20, 2021, the State Water Resources Control Board (SWRCB) issued curtailment orders[3] to approximately 4,500 water rights (out 6,600 total water rights holders) holders in the Sacramento-San Joaquin Delta to protect drinking water supplies, prevent salinity intrusion, and minimize impacts to fisheries and the environment for a period of one year with periodic evaluation of the orders. Most recently, on October 19, 2021, Governor Newsom issued a proclamation extending the drought emergency statewide and further urging Californians to conserve water as the western United States faces a potential third dry year.

As of January 2022, no widespread reports of water supply issues from groundwater wells have been observed in the Sutter Subbasin. Several water purveyors have implemented drought policies and management strategies in an effort to alleviate water supply impacts as a result of the current drought. For example, Sutter Extension Water District has implemented a drought policy including a basis for water allocations based on historical land use and conversions from rice growing to other crop types, irrigation reductions, penalties for water waste, and guidelines for intra-district water transfers. Butte Water District has implemented a similar drought policy including reduction of surface water allocations, irrigation practices, use of private wells, and penalties for taking of water during curtailment. The City of Yuba City has incorporated its Water Shortage Contingency Plan into its adopted 2020 Urban Water Management Plan, which includes the City's strategy for allocating water during water supply shortages while assuring customers at all times that it will meet the minimum health and safety requirements for a drinking water purveyor (pursuant to Water Code Section 10632 of the Urban water Management Planning Act).

Technical work and public involvement informing development of the Sutter Subbasin GSP began in September 2020 with the complete public draft of the GSP released in October 2021. The best available science, tools, and data have been utilized for the development of this GSP, with the use of available WY 2020 and WY 2021 data where appropriate and applicable. Drought conditions in WY 2020 and WY 2021 have coincided with development of this GSP and the timeline has not permitted a complete evaluation and inclusion of data from these years at this time. Due to the schedule

[1] Governor Newsom's State of Emergency Proclamation from May 10, 2021 extending the April 21, 2021 drought emergency is available at: https://www.gov.ca.gov/wp-content/uploads/2021/05/5.10.2021-Drought-Proclamation.pdf.

[2] Executive Order N-10-21 is available at: https://www.gov.ca.gov/wp-content/uploads/2021/07/7.8.21-Conservation-EO-N-10-21.pdf.

[3] Media release for curtailment orders is available at: https://www.waterboards.ca.gov/press_room/press_releases/2021/pr08202021_delta_curtailments.pdf.

mandated by the Sustainable Groundwater Management Act (SGMA) for completion and submittal of this GSP to the California Department of Water Resources (DWR) by January 31, 2022, it has not been possible to include conditions that have manifested due to the current drought in development of the Sutter Subbasin GSP. Complete data sets encompassing the current drought are not available at this time due to time need to compile such data and perform quality control prior to review and adoption of this GSP. However, these conditions will be factored into future required GSP annual reports and five-year evaluations of this GSP as available.

With a 20-year implementation period and a 50-year planning horizon, the Sutter Subbasin GSP is considered to be a “living” document. The Sutter Subbasin Groundwater Sustainability Agencies (GSAs) will implement this GSP using adaptive management strategies to respond to challenges related to groundwater sustainability, including monitoring of conditions in the Subbasin according to a prescribed schedule and implementing projects and management actions (PMAs). Conditions will be evaluated on an annual basis (or more frequently, as warranted) utilizing monitoring data collected as part of this GSP, as well as other publicly available sources, and PMAs will be added or revised in the GSP annual reports. During five-year GSP evaluations, the GSP will also be reviewed and revised, as needed, as more is known about the effects of current and future conditions.

With the unknowns associated with the compounding impacts of a third dry year, the Sutter Subbasin GSAs recognize the severe impacts that all beneficial users of water in the Subbasin may continue to face and are committed to an open, transparent, and inclusive process in implementing this GSP in the short and long term. The long-term sustainability of the Sutter Subbasin is the end goal and the Sutter Subbasin GSAs are committed to tackling important local issues and adapting to changing conditions to the benefit of all stakeholders.

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Executive Summary

SUTTER SUBBASIN
GROUNDWATER SUSTAINABILITY PLAN

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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.

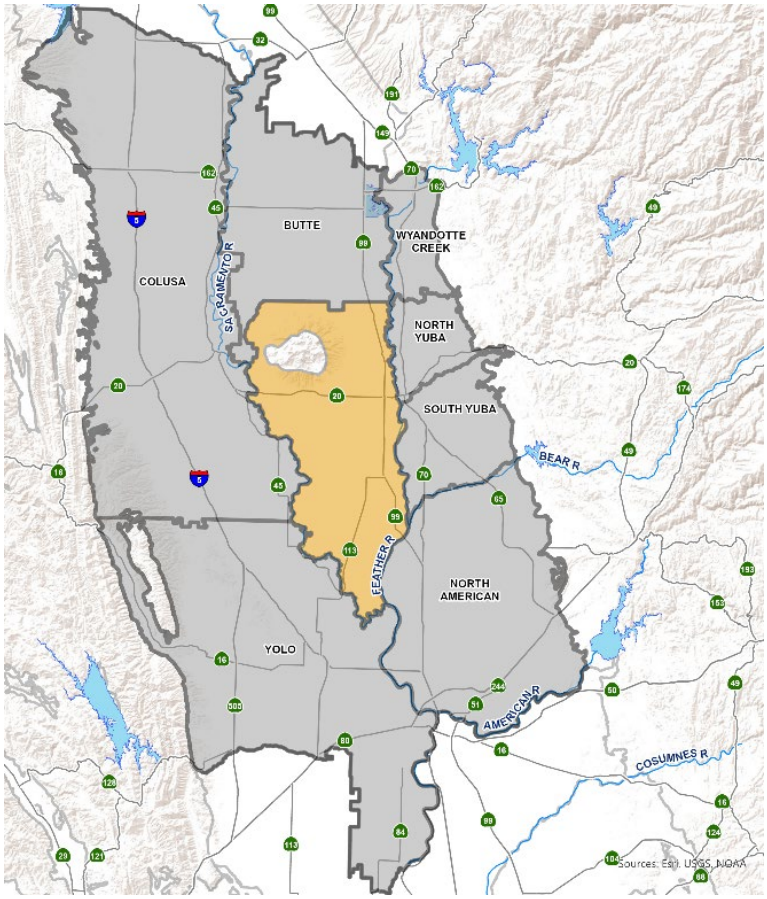

Figure ES-1. GSP Plan Area and Neighboring Subbasins

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.

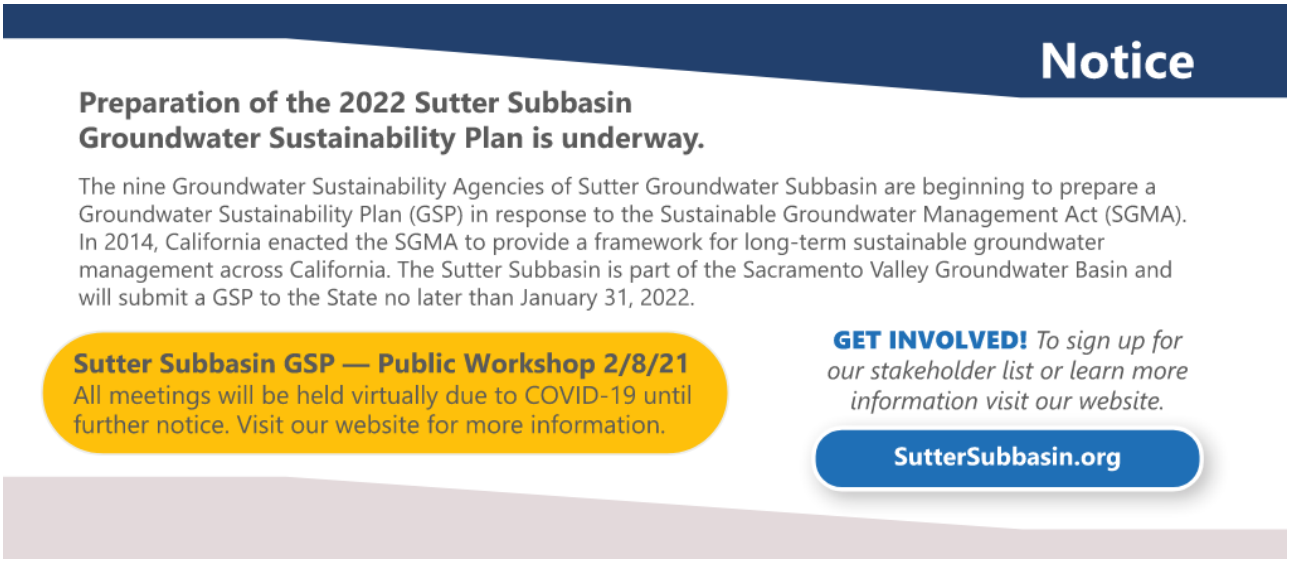

Figure ES-2. Sample Utility Bill Insert for Public Workshop

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.

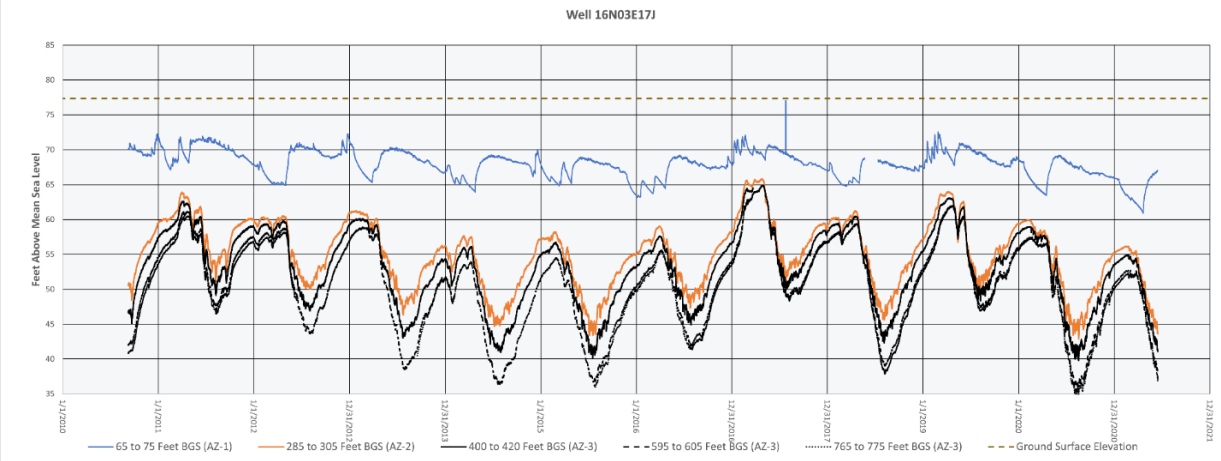

Figure ES-3. Sample Nested Well Hydrograph in Sutter Subbasin

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

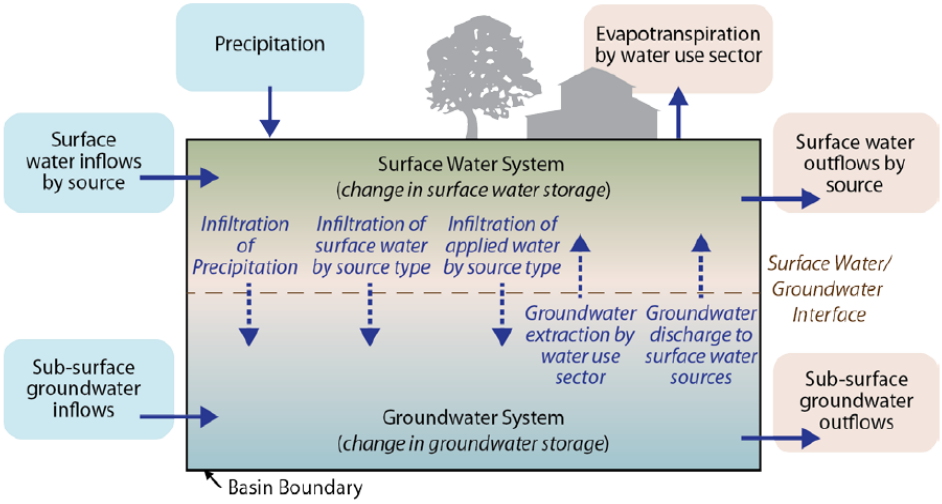

Figure ES-4. Overview of Water Budget Components

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.

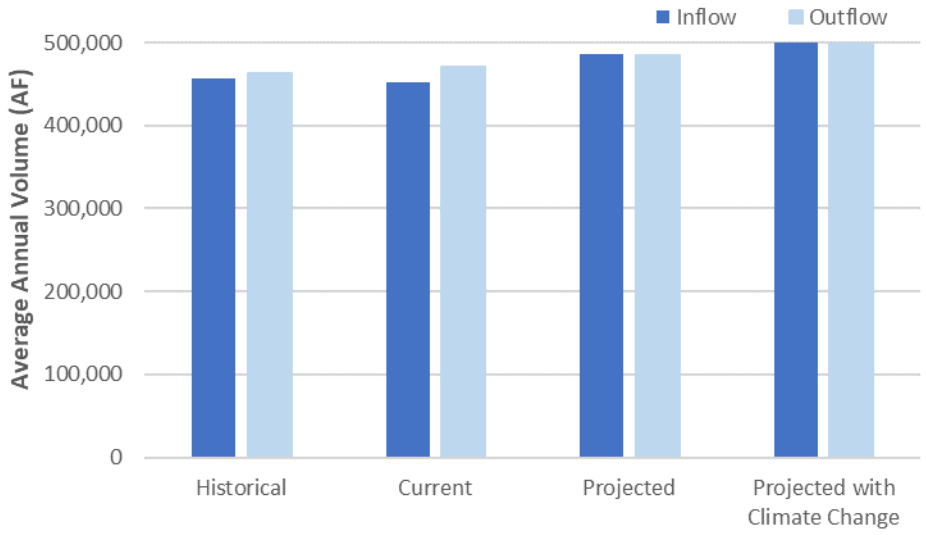

Figure ES-5. Sutter Subbasin Average Annual Groundwater Budget

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.

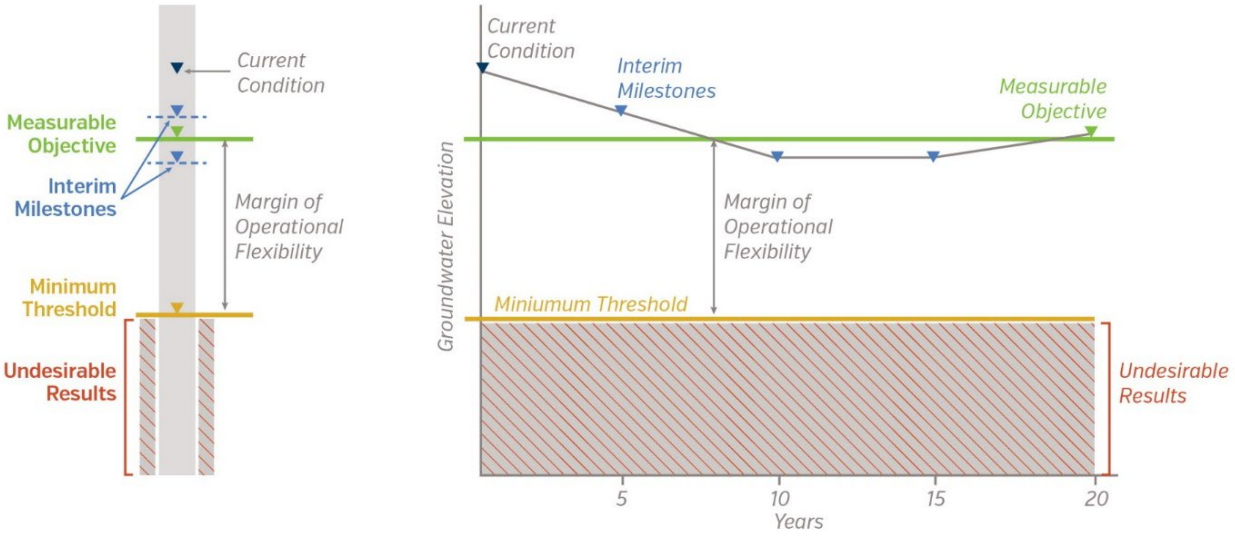

Figure ES-6. Sustainable Management Criteria Schematic for Groundwater Levels

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.

CHAPTER ONE

Introduction

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1. INTRODUCTION

This section introduces the purpose and organization of this Groundwater Sustainability Plan and includes the sustainability goal and a description of the Sutter Subbasin.

1.1 Purpose of the Groundwater Sustainability Plan

In 2014, the State of California enacted the Sustainable Groundwater Management Act (SGMA), which is comprised of regulatory requirements set forth in a three-bill legislative package consisting of Assembly Bill (AB) 1739 (Dickinson), Senate Bill (SB) 1168 (Pavley), and SB 1319 (Pavley). The Sutter Groundwater Subbasin (Sutter Subbasin or Subbasin) has been identified by the California Department of Water Resources (DWR) as a medium-priority basin. Therefore, Groundwater Sustainability Agencies (GSAs) in the Subbasin are tasked with developing and submitting a Groundwater Sustainability Plan (GSP or Plan) to DWR by no later than January 31, 2022.

SGMA defines sustainable groundwater management as "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results" (SGMA Regulations §10721(v)). "Undesirable results" are defined by SGMA as any of the following effects caused by groundwater conditions occurring throughout the basin (SGMA Regulations §10721(x)):

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degraded water quality
- Significant and unreasonable land subsidence
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

This GSP has been developed by the Sutter Subbasin GSAs and addresses SGMA regulatory requirements while reflecting local needs and preserving local control over water resources. The Sutter Subbasin GSP provides a path to achieve and document sustainable groundwater management within 20 years following Plan adoption and promotes the long-term sustainability of locally-managed groundwater resources. As defined by SGMA, this GSP's planning and implementation horizon is a "50-year time period over which a groundwater sustainability agency determines that plans and measures will be implemented in a basin to ensure that the basin is operated within its sustainable yield."

1.2 Sutter Subbasin Sustainability Goal

A sustainability goal is the culmination of conditions resulting in the absence of undesirable results within 20 years of GSP implementation. The sustainability goal reflects this requirement and succinctly states the GSP's objectives and desired conditions of the Subbasin.

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.*

Additional discussion of the sustainability goal can be found in **Chapter 6** *Sustainable Management Criteria*.

1.3 Description of the Sutter Subbasin

The Plan Area covered by this GSP includes the entirety of the Sutter Groundwater Subbasin, identified by DWR in Bulletin 118 as Subbasin No. 5-021.62 (DWR, 2018). The Sutter Subbasin covers approximately 445 square miles of the Sacramento Valley floor and surrounding the foothills of the Sutter Buttes, and is part of the larger Sacramento Valley Groundwater Basin located within the Sacramento River Hydrologic Region. More detail on the Sutter Subbasin is provided in **Section 2.1**.

1.4 Groundwater Sustainability Plan Organization

This GSP has been organized to comply with the GSP Emergency Regulations (California Code of Regulations, Title 23. Waters, Division 2. Department of Water Resources, Chapter 1.5. Groundwater Management. Subchapter 2. Groundwater Sustainability Plans) and generally follow the DWR Preparation Checklist for GSP Submittal (DWR, 2016). **Appendix 1-A** includes DWR's GSP elements guide for this GSP, indicating the page numbers as well as section, figure, and table numbers of all required GSP elements.

1.5 References

California Department of Water Resources (DWR). 2018. 5-021.62 Sacramento Valley – Sutter Basin Boundaries Description. https://cadwr.app.box.com/s/rhqaflj4t5d063he9o314ojzz394idec/file/764121944134. Accessed: July 28, 2021.

California Department of Water Resources (DWR). 2016. Guidance Document for the Sustainable Management of Groundwater: Preparation Checklist for GSP Submittal. December. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Preparation-Checklist-for-GSP-Submittal.pdf. Accessed: July 28, 2021.

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CHAPTER TWO

Plan Area

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2. PLAN AREA

2.1 Plan Area Description

The Plan Area covered by this GSP includes the entirety of the Sutter Groundwater Subbasin (California Department of Water Resources [DWR] Basin 5-021.62), covering approximately 445 square miles of the Sacramento Valley floor and surrounding the foothills of the Sutter Buttes. The Sutter Subbasin is part of the larger Sacramento Valley Groundwater Basin located within the Sacramento River Hydrologic Region. Major features within the Sutter Subbasin include portions of the Sutter Buttes, the Feather and Sacramento Rivers, Sutter Bypass, the cities of Live Oak and Yuba City, and Sutter National Wildlife Refuge.

This section of the Sutter Subbasin GSP describes the Sutter Subbasin and includes the following:

- A detailed description of geographic areas covered by the GSP in relation to SGMA governing entities, jurisdictional boundaries, existing land use and related water sources, well density, and areas of de minimis groundwater pumping.
- Descriptions of existing water resources monitoring and management programs, including discussions of how they may limit operational flexibility and how the Plan will adapt to such limits.
- Descriptions of existing conjunctive use programs in the Subbasin.
- Discussion of general plans and other land use plans and how implementation of existing land use plans (both within and outside of the Subbasin) may change water demands or impact sustainable groundwater management, and how the Plan addresses such potential effects is also discussed.
- Descriptions of local relevant well permitting processes as they relate to land use planning.
- Any additional Plan elements included per California Water Code (CWC) §10727.4, as appropriate.

In total, this section of the Sutter Subbasin GSP satisfies §354.8 of the GSP Emergency Regulations.

2.1.1 Plan Area Definition

The Sutter Subbasin is located in the Sacramento Valley Groundwater Basin and adjoins the following seven subbasins: Butte, Wyandotte, North Yuba, South Yuba, North American, Yolo, and Colusa. The northern boundary of the Sutter Subbasin consists of the Sutter County-Butte County line, except for the portion of Biggs-West Gridley Water District Groundwater Sustainability Agency (GSA) within Sutter County that is included within the Butte Subbasin. The eastern boundary consists primarily of the Sutter County-Yuba County line to its terminus just north of Nicolaus Census

Designated Place (CDP), where the Feather River forms Sutter Subbasin's eastern boundary until the Feather River reaches the Yolo County line. The southern and western boundaries of the Sutter Subbasin follow the Sutter County boundary shared with Yolo and Colusa Counties. The Plan Area covered by this GSP, the entirety of the Sutter Subbasin, is shown in **Figure 2-1**.

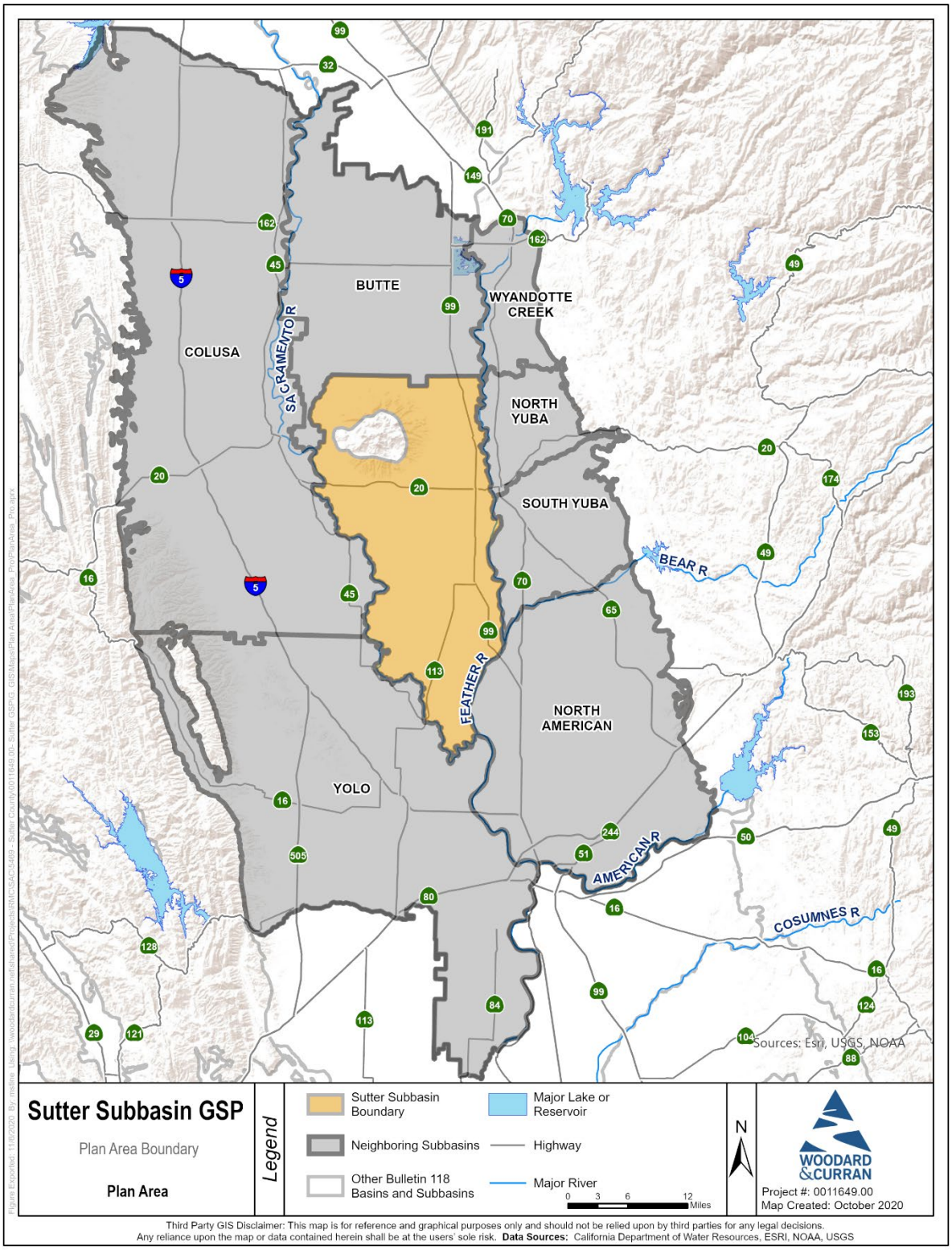


Figure 2-1. Plan Area

2.1.2 Plan Area Jurisdictional Boundaries

The Plan Area for this GSP consists of the entire Sutter Subbasin of the Sacramento Valley Groundwater Basin, which includes the following nine GSAs (**Figure 2-2**):

- 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
- Sutter Community Service District

All GSAs within the Sutter Subbasin are exclusive GSAs. There are no adjudicated areas or areas covered by an Alternative Plan within the Sutter Subbasin.

Table 2-1 summarizes the jurisdictional areas within the Sutter Subbasin. These include counties, cities, water districts, irrigation districts, reclamation districts, mutual water companies, and state and federal agencies. Federal lands within the Sutter Subbasin consist primarily of the Sutter National Wildlife Refuge (operated by the United States Fish and Wildlife Service) and state lands consist primarily of a portion of Sutter Buttes State Park and wildlife and ecological preserve land along the Sutter Bypass and Feather River operated by the California Department of Parks and Recreation and California Department of Fish and Wildlife, respectively (**Figure 2-3**). The Subbasin also includes wildlife areas, such as Gray Lodge Wildlife Area and Lake of the Woods State Wildlife Area, as well as protected areas and private and publicly managed easements in addition to the following private duck clubs (**Figure 2-4**):

- Live Oak Duck Club
- North Butte Duck Club
- Sutter Butte Duck Club
- Sutter Basin Duck Club
- Duck Blind at Sutter Refuge

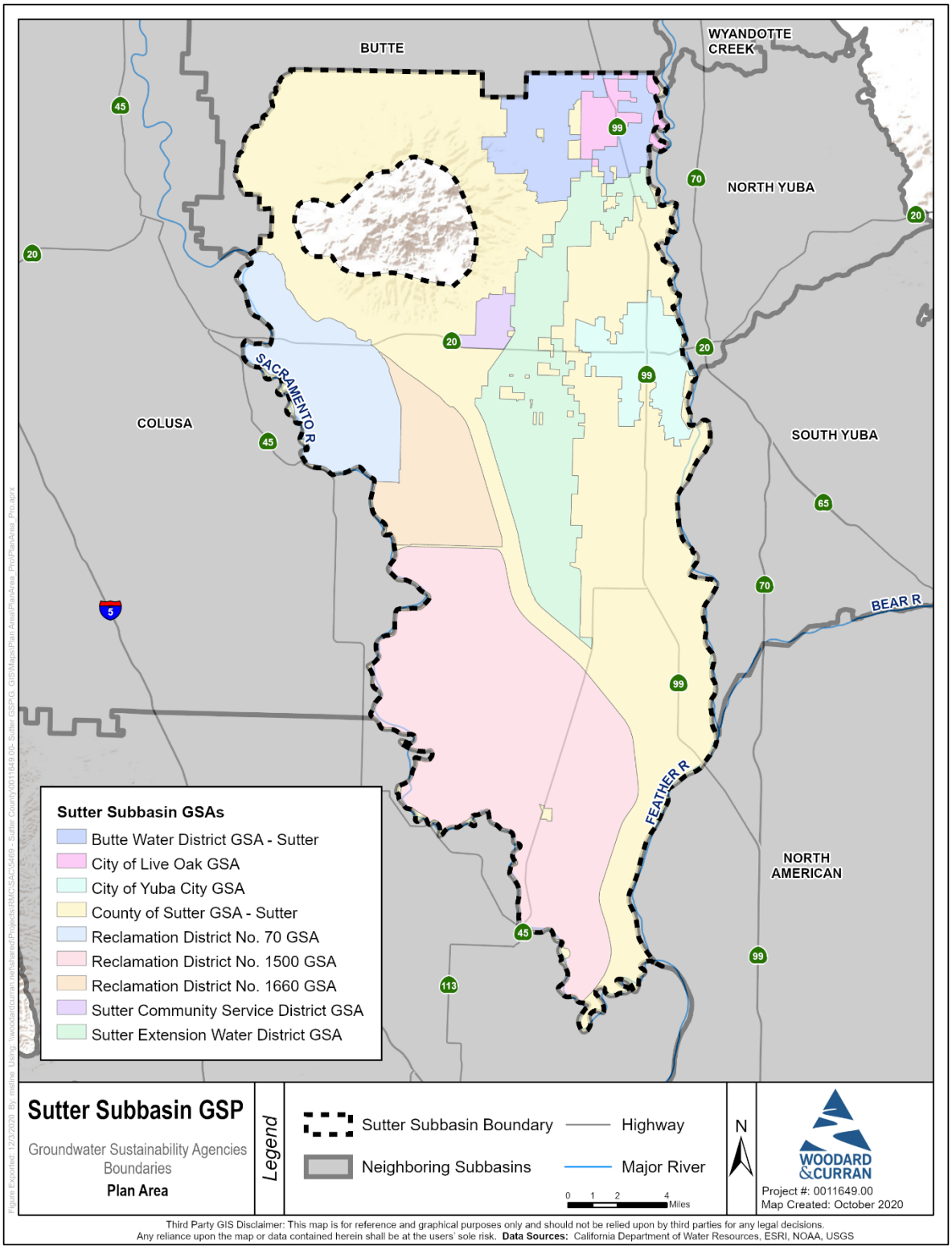


Figure 2-2. Sutter Subbasin Groundwater Sustainability Agencies

Table 2-1. Jurisdictional Areas in the Sutter Subbasin

Jurisdictional Area	List of Entities
Counties	• Sutter County
Cities	• City of Live Oak • City of Yuba City
Tribal Land	• N/A
Agencies with Water Management Responsibilities	• Butte Slough Irrigation Company (IC) • Butte Water District (WD) • East Nicolaus Mutual Water Company (MWC) • Feather WD • Garden Highway MWC • M Chaplin, B Lewis, D Lewis • Meridian Farmers Water Company (WC) • Mitzue Oji Family Partnership • Newhall Land & Farming Co. • Oji Brothers Farm Inc. • Oswald WD • Pelger MWC • Sutter Bypass Butte Slough Water Users Association • Sutter County Water Works District No. 1 (Robbins) • Sutter Extension WD • Sutter MWC • Tisdale Irrigation & Drainage Co. • Tudor MWC • Sutter Community Service District (CSD) • City of Yuba City • City of Live Oak • Reclamation District 70 • Reclamation District 777 • Reclamation District 783 • Reclamation District 1500 • Reclamation District 1660 • Reclamation District 2054 • Reclamation District 2056
Areas Covered by Relevant General Plans	• Sutter County • City of Live Oak • City of Yuba City
Federal Land	• United States Fish and Wildlife Service
State Land	• California Department of Parks and Recreation • California Department of Fish and Wildlife

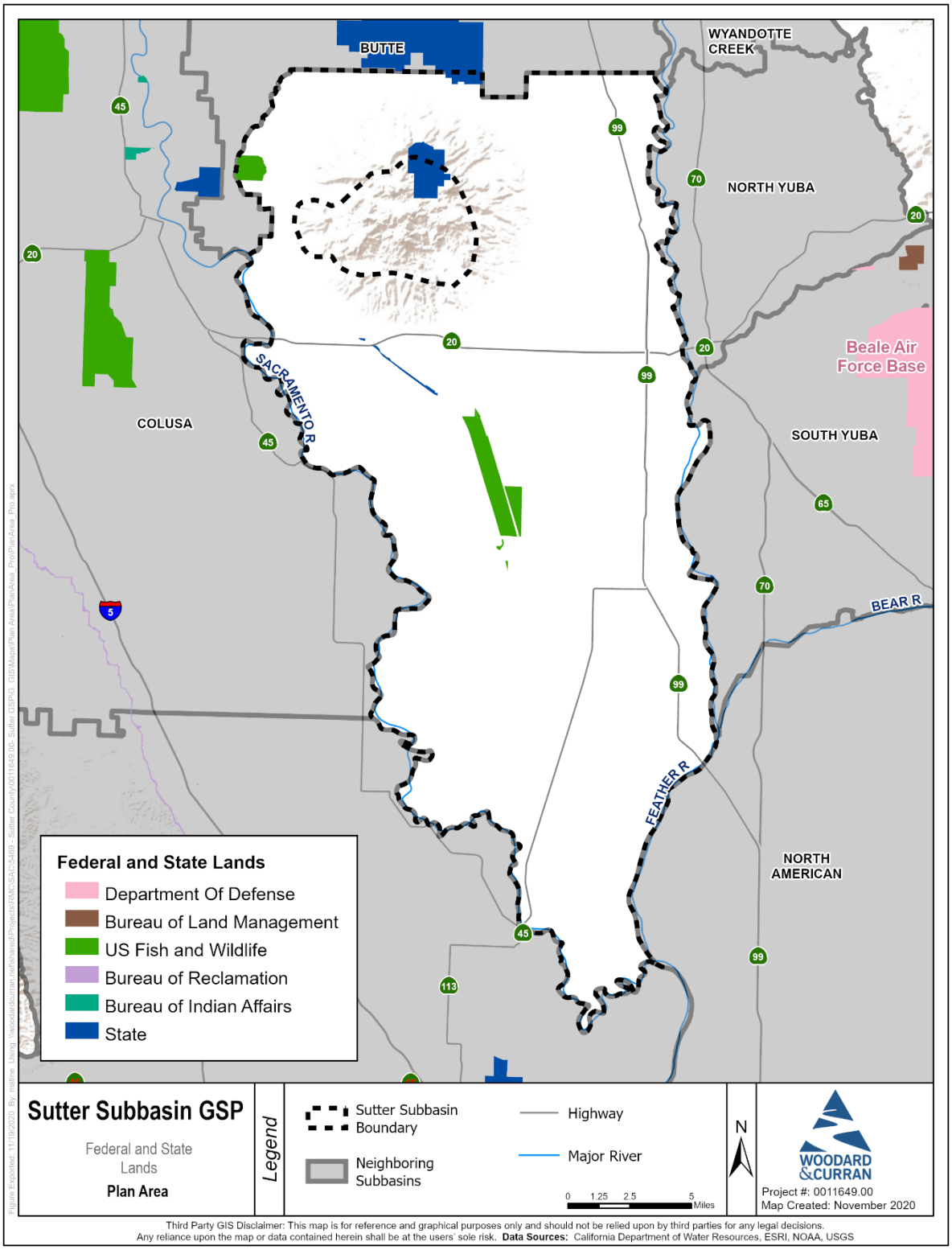


Figure 2-3. Federal and State Lands in the Sutter Subbasin

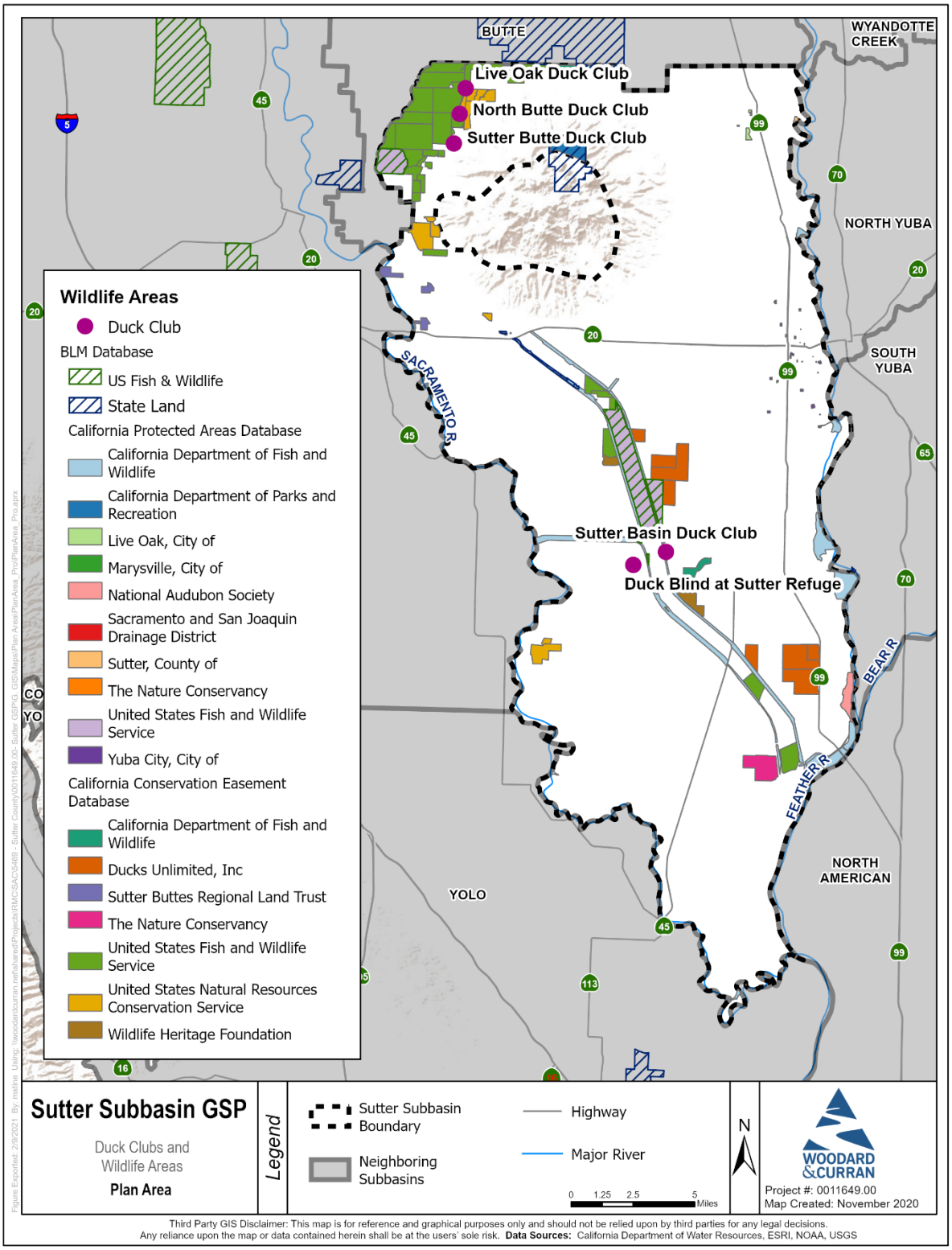


Figure 2-4. Duck Clubs and Wildlife Areas

Cities within the Sutter Subbasin include the City of Live Oak and the City of Yuba City. Sutter County is the only county overlying the Sutter Subbasin (**Figure 2-5**). There are no federal- or state-recognized tribal communities in the Sutter Subbasin; however, the following tribes have been identified as possibly having a cultural and traditional affiliation within the County:

- Estom Yumeka Maidu Tribe of the Enterprise Rancheria
- Mooretown Rancheria of Maidu Indians
- United Auburn Indian Community of the Auburn Rancheria
- Yocha Dehe Wintun Nation
- Shingle Springs Band of Miwok Indians
- Pakan'yani Maidu of Strawberry Valley Rancheria

Agencies with water management authority include reclamation districts, water districts, cities, mutual water companies, irrigation companies, and private farmland shown in **Figure 2-6** and listed in **Table 2-1**.

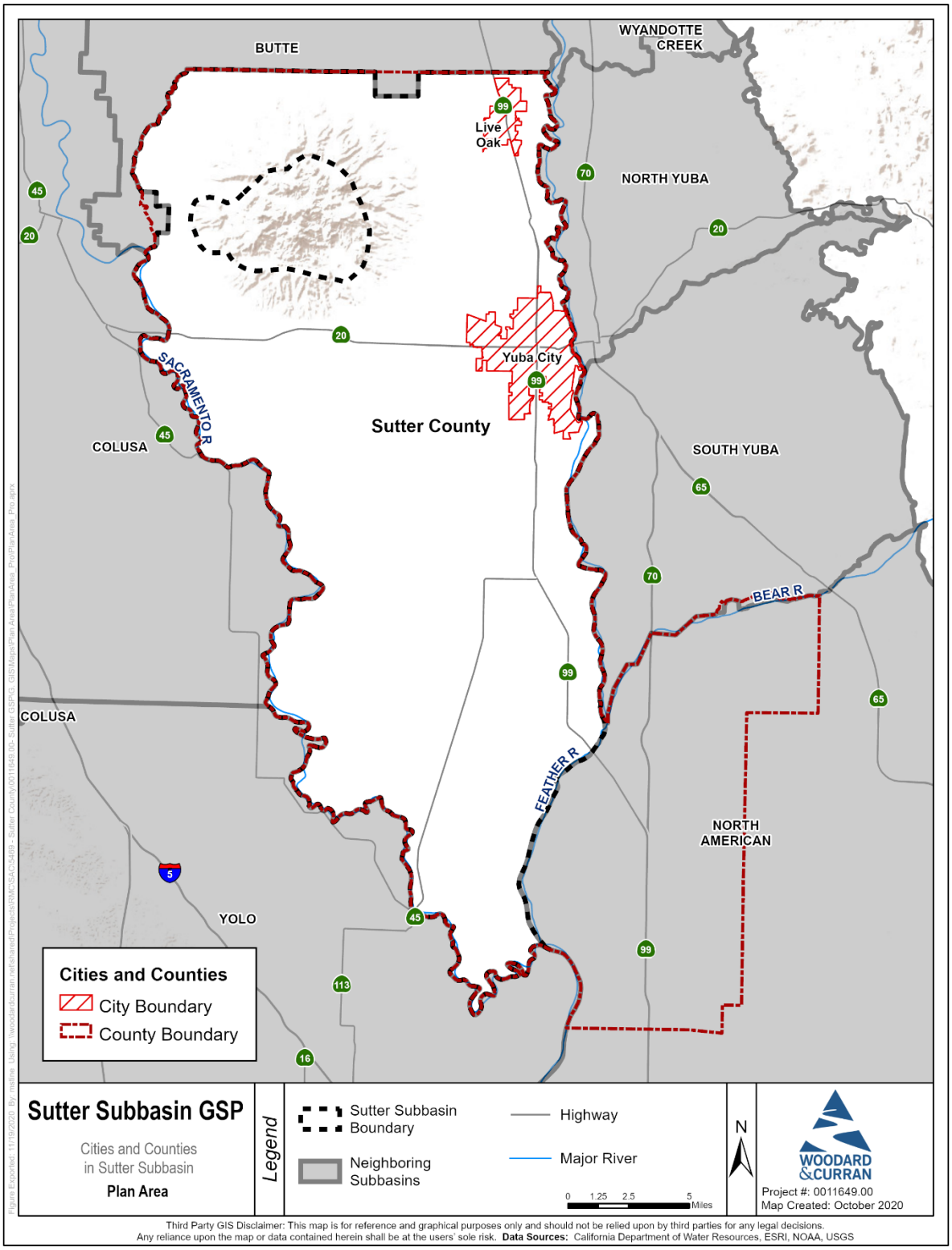


Figure 2-5. Cities and Counties in the Sutter Subbasin

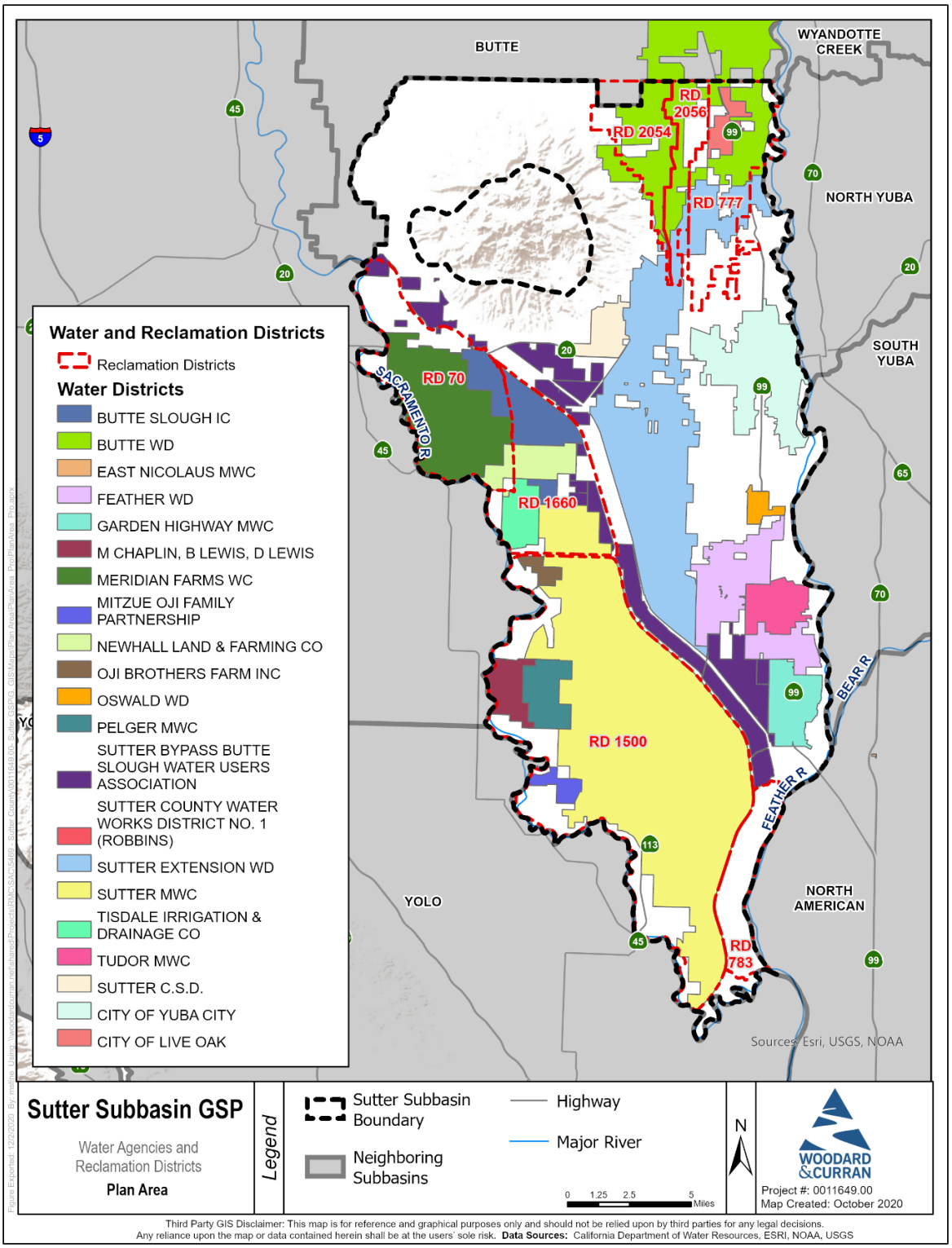


Figure 2-6. Agencies with Water Management Responsibilities in the Sutter Subbasin

2.1.3 Plan Area Setting

Water use within the Sutter Subbasin is largely supplied by a mix of surface water and groundwater. Approximately 60 percent of agricultural users utilize only surface water for irrigation purposes, while 20 percent utilize only groundwater and 20 percent irrigate with a mix of surface water and groundwater (Wood Rodgers, 2012). The predominant source of water for permanent crops is groundwater. Smaller communities and individual domestic well owners rely exclusively on groundwater while the City of Yuba City provides mostly surface water and a smaller proportion of groundwater.

2.1.3.1 Groundwater Use

Groundwater in the Sutter Subbasin is used for municipal, industrial, irrigation, domestic, stock watering, frost protection, and other purposes. Communities reliant upon groundwater include Sutter, Meridian, Robbins, and Live Oak (**Figure 2-7**). Users within white areas not served by a water purveyor, primarily within the Sutter County GSA, are reliant upon groundwater and are considered *de minimis* groundwater extractors (**Figure 2-8**).

Figure 2-9 show the density per square mile (PLSS Section) of domestic, production, and public wells in the Sutter Subbasin as identified by the California Department of Water Resources' (DWR) Well Completion Report Map Application. Domestic wells are defined as individual domestic wells which supply water for the domestic needs of an individual residence or system of four or less service connections (DWR, 1981). Within the Sutter Subbasin, there are an estimated total of 2,482 domestic wells, where the majority of PLSS Sections contain five or fewer domestic wells (195 out of 283 PLSS Sections with five or fewer domestic wells) (**Figure 2-9**). One PLSS section, southeast of the Sutter Buttes, is estimated to contain 225 domestic wells.

Production well statistics include wells that are designated as irrigation, municipal, public, and industrial on well completion reports, generally indicating wells designed to obtain water from productive zones containing good quality water (DWR, 1991). There are estimated to be 1,210 production wells in the Sutter Subbasin, where the majority of PLSS Sections contain only between one and three production wells (216 out of 337 PLSS Sections with three or fewer production well) and only 21 PLSS sections have 10 or more production wells (**Figure 2-10**). Public wells are defined as wells that provide water for human consumption to 15 or more connections or regularly serve 25 or more people daily for at least 60 days out of the year (SWRCB, n.d.(b)). Within the Sutter Subbasin, there are 69 public wells listed in the DWR database where 36 PLSS Sections have only 1 public well and 11 PLSS Sections have more than two public wells (**Figure 2-11**). The status of the wells (e.g., active, abandoned, or destroyed) contained in the DWR Well Completion Report Map Application have not been independently confirmed and it should be noted the well quantities are only estimated since not all well completion reports are in the map application and, at times, the well location has been mislocated on the well completion report.

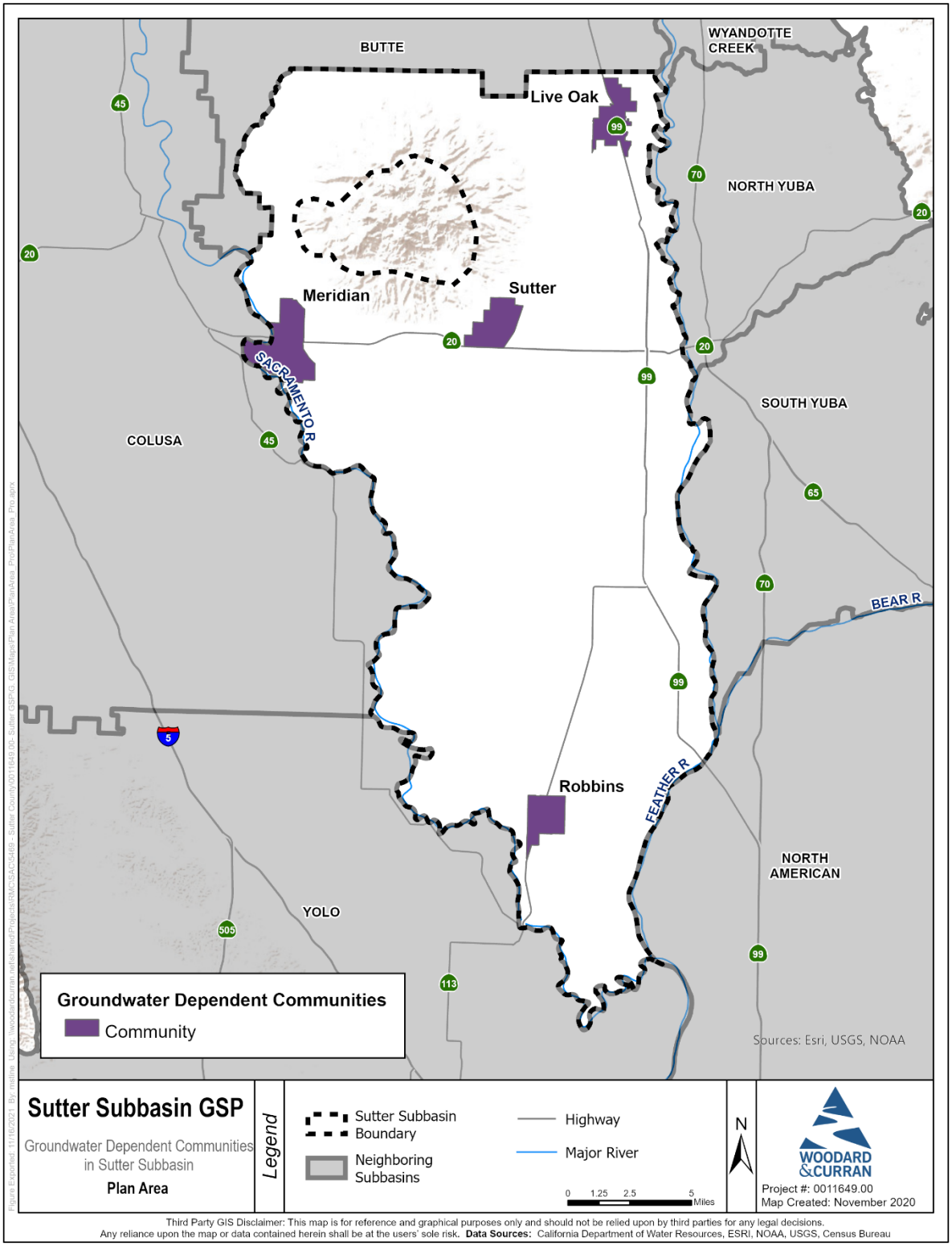


Figure 2-7. Communities Dependent Upon Groundwater in the Sutter Subbasin

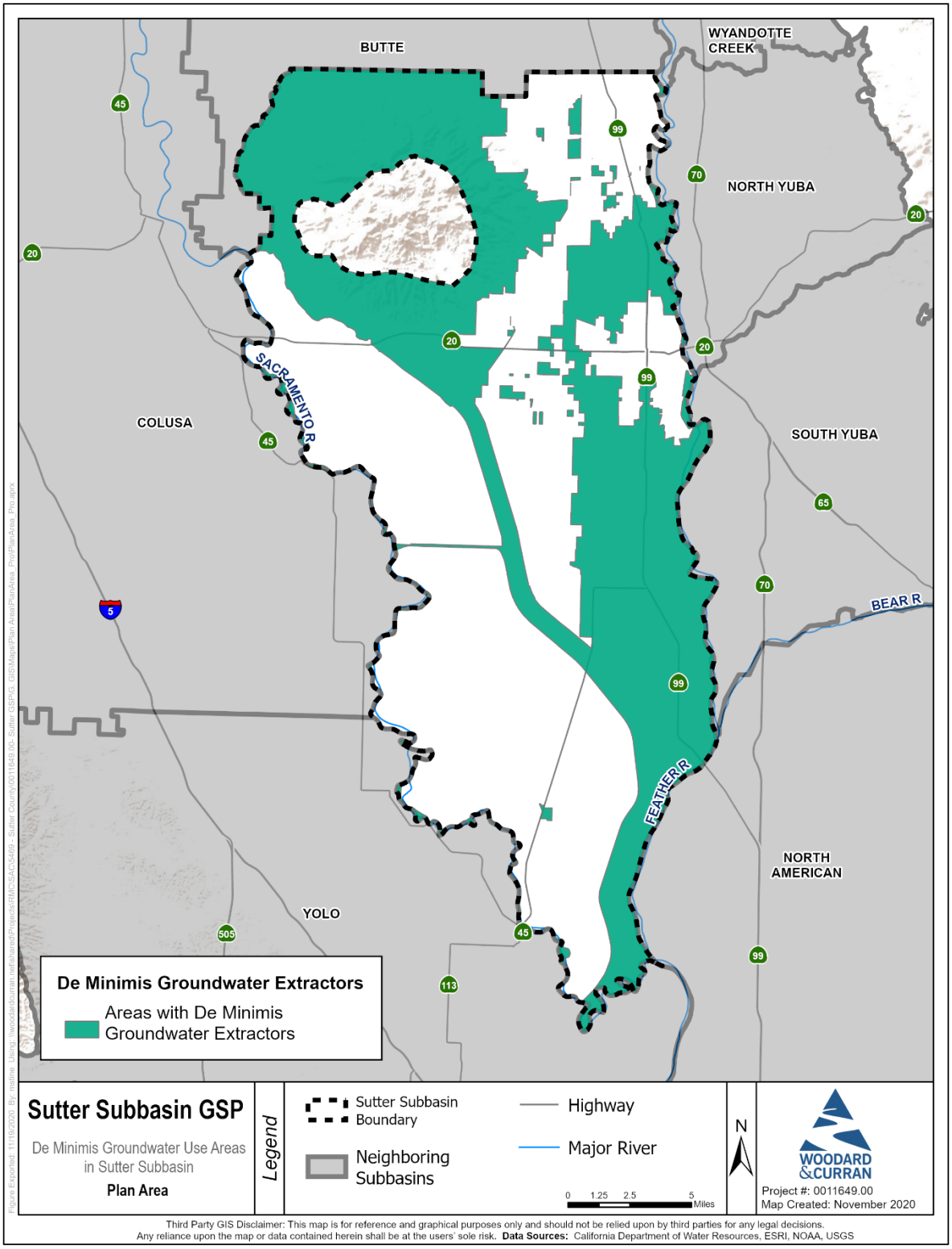


Figure 2-8. De Minimis Groundwater Production Areas in the Sutter Subbasin

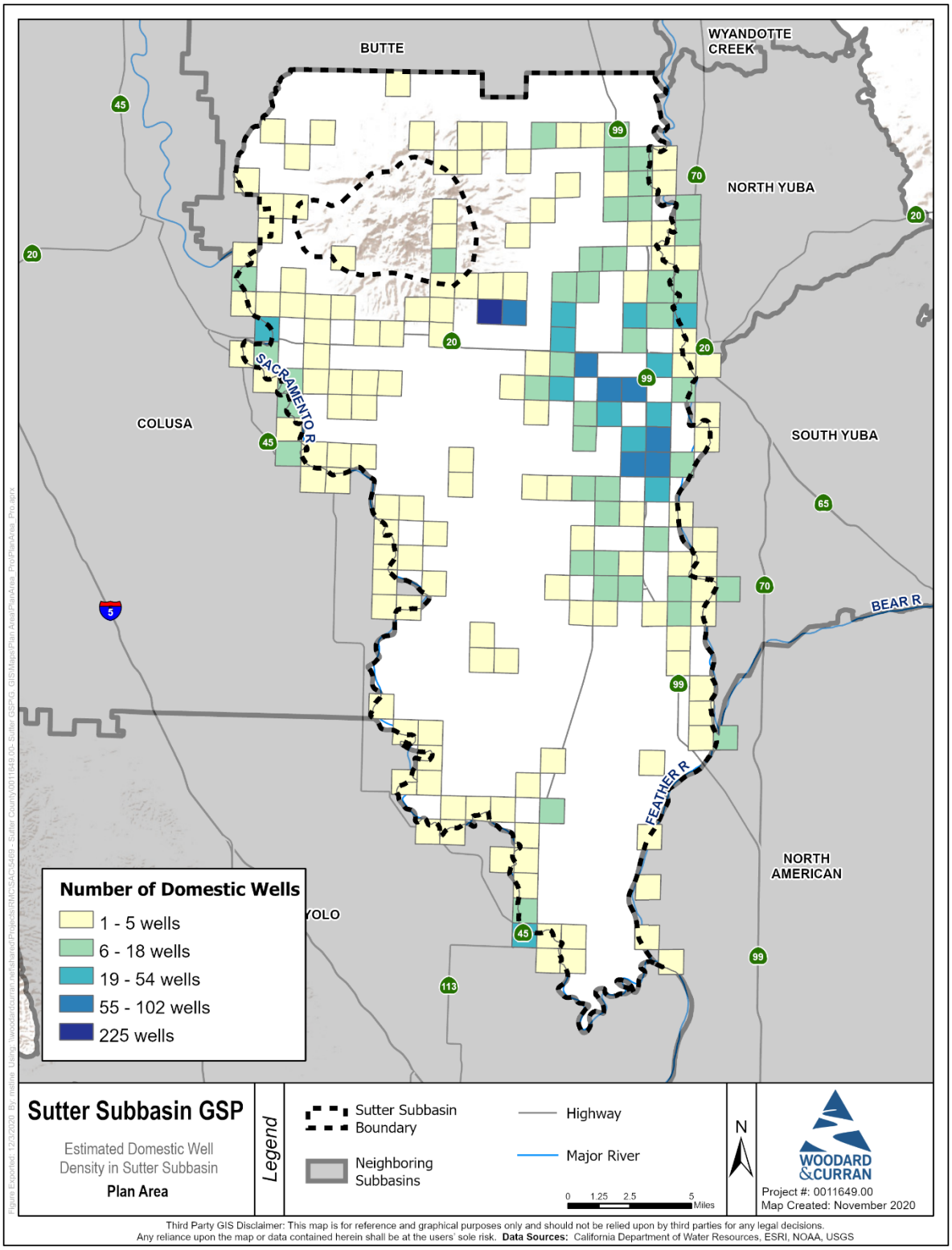


Figure 2-9. Density of Domestic Wells Per Square Mile

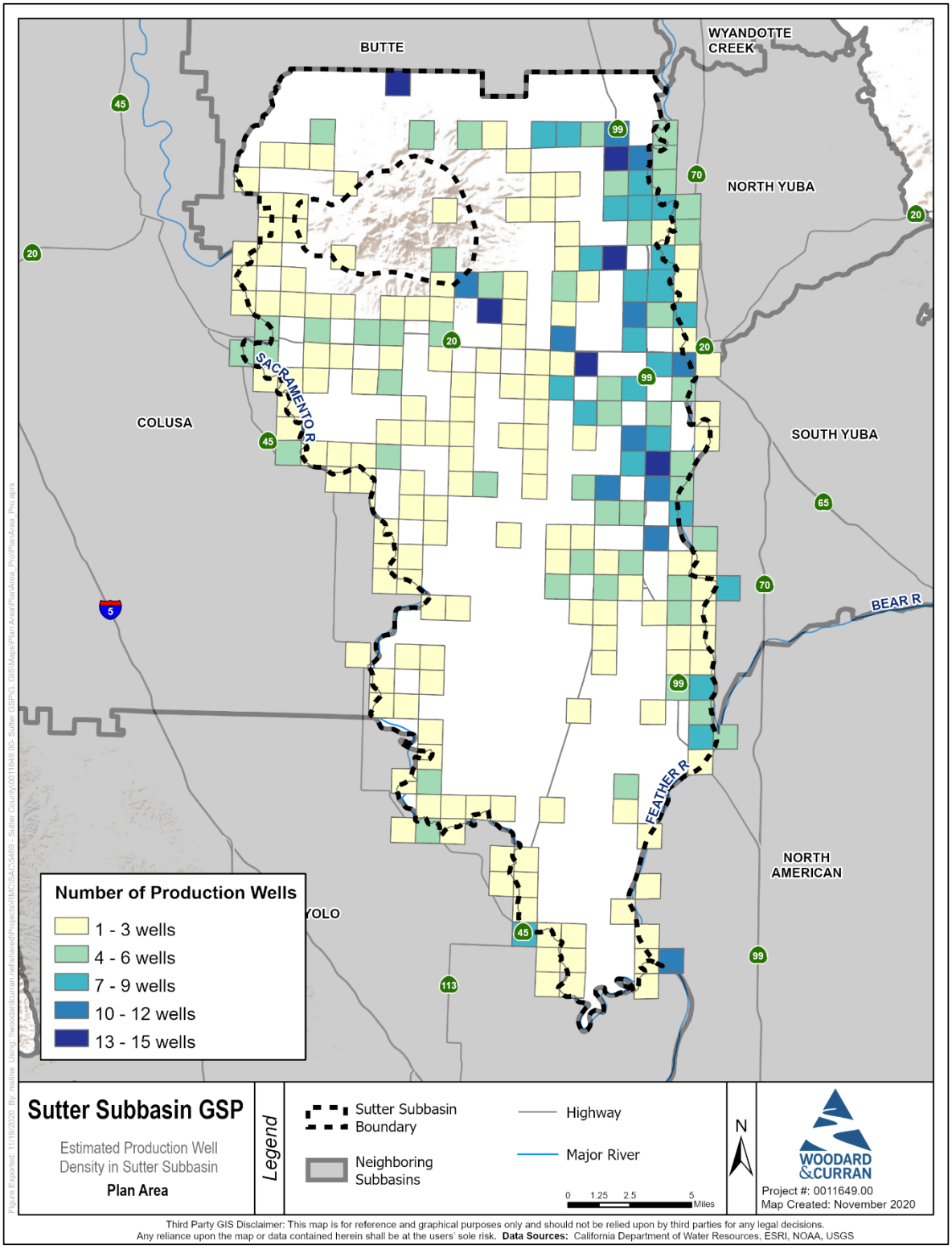


Figure 2-10. Density of Production Wells Per Square Mile

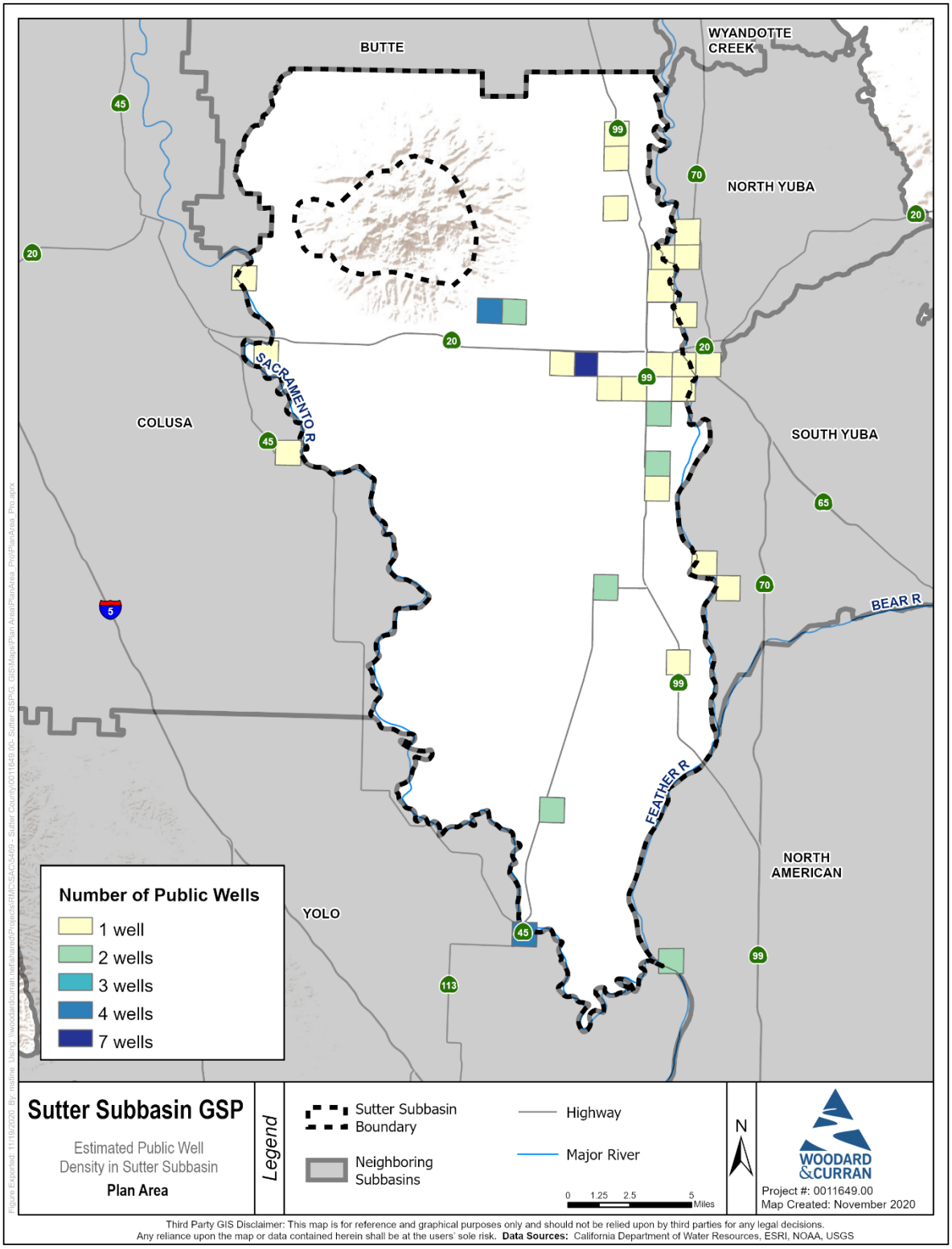


Figure 2-11. Density of Public Wells Per Square Mile

2.1.3.2 Surface Water

The following subsections describe watershed and surface water features, flood management, and surface water use within the Sutter Subbasin.

2.1.3.2.1 Watershed and Surface Water Features

The Sutter Subbasin is located within the Sacramento River watershed, which is bounded on the west by the Sacramento River and east by the Feather River (Wood Rodgers, 2012). The Sacramento River watershed includes tributaries originating in the Sierra Nevada, the Coast Range, and the Cascade Mountains. The main tributaries to the Sacramento River that impact surface water supplies within the Sutter Subbasin include Feather River and Bear River.

The Sacramento River is the major surface water feature within the Sutter Subbasin, defining the western boundary of the Sutter Subbasin with the Butte, Colusa, and Yolo Subbasins. Running north-south along the western part of the Subbasin, the Sacramento River is the main drainage for the Sacramento Valley watershed on its way to the Sacramento-San Joaquin Delta and San Francisco Bay. The Sacramento River supports many beneficial uses including recreational, agricultural, and wildlife.

The Feather River is a major tributary of the Sacramento River and outlines a major portion of Sutter Subbasin's eastern boundary shared with the North Yuba and South Yuba Subbasins. The river trends north-south along the northern and central portions of the Subbasin to the convergence with the Bear River, where it changes course and flows southwest through the south-central portion of the County until it intersects the Sutter Bypass and the Sacramento River. Like the Sacramento River, the Feather River provides beneficial uses including recreation, agricultural, and wildlife.

The Bear River is a tributary to the Feather River and enters Sutter County from Placer County near the City of Wheatland in Yuba County. It roughly forms the boundary between Sutter and Yuba Counties up to the convergence with the Feather River. The Bear River generally flows west until it converges with the Feather River, approximately one mile upstream from the rural community of Nicolaus. Although smaller than the Sacramento and Feather Rivers, the Bear River also provides beneficial uses that include recreation, agricultural, and wildlife. Discharges within the river are partially controlled by several upstream reservoirs. The Camp Far West Reservoir (located in the counties of Yuba, Placer, and Nevada) is the last downstream reservoir on the river and subsequently regulates surface water discharges to downstream users.

2.1.3.2.2 Flood Management

The Sutter Bypass is another major surface water feature in the Sutter Subbasin. An artificial flood corridor constructed in the 1930s, the Sutter Bypass is described by the Army Corp of Engineers as "… a leveed portion of the natural floodway in the Sutter Basin. The bypass is south of the Sutter Buttes from Colusa to Verona between the

Sacramento and Feather Rivers. Flows enter the Sutter Bypass from the Butte Basin at its upper end near Colusa at the Butte Slough. Other flows enter from Wadsworth Canal, interior drainage from pumping plants, and the Sacramento River by way of the Tisdale Weir and Bypass. Flows exit the Sutter Bypass and combine with the Sacramento River, Feather River, Natomas Cross Canal, and Yolo Bypass upstream from the Fremont Weir near the town of Verona" (Wood Rodgers, 2012). During periods of heavy precipitation and runoff, a portion of the flow within the Sacramento River is diverted through the Sutter Bypass to alleviate the flood control system along the Sacramento River.

Flows in all of the major rivers in Northern California are managed by dams, such as Lake Oroville and Lake Shasta. The reservoirs are managed to provide flood protection while collecting runoff from the watershed. Releases from the reservoirs occur from spring through summer to provide irrigation water for agriculture as well as provide drinking water and base flows downstream. Aside from the major rivers and tributaries within Sutter County, there are no significant surface water storage reservoirs within the Sutter Subbasin.

2.1.3.2.3 Surface Water Use

Surface water is primarily used for agricultural purposes within the Sutter Subbasin and obtained through Sacramento River Settlement Contracts Central Valley Project (CVP) contracts, Feather River diverters, and surface water rights held by individual users. The Sacramento River is currently not used for municipal or domestic water supplies within the Sutter Subbasin. Yuba City obtains a large portion of its annual water supplies for municipal and domestic use from the Feather River.

The U.S. Bureau of Reclamation (USBR) currently contracts with approximately 145 water districts, water purveyors, or private users for water rights to the Sacramento River (Wood Rodgers, 2012). The total amount of water under the settlement contacts is approximately 2.2 million acre-feet and covers a total of almost 440,000 acres of land bordering the Sacramento River and its tributaries between Redding and Sacramento. The Settlement Contracts were originally executed in 1964 with a term not to exceed 40 years. Since 2004, new contracts have been executed with approximately 145 existing Sacramento River Settlement Contracts.

The Settlement Contracts include a Base Supply and Project Water. The Base Supply is the amount that reflects the agreed upon water right of the respective entity. This is generally regarded as pre-1914 water rights and also water rights perfected after 1914 and reflect water that would be available to the respective entities under "natural" conditions. Project Water represents the amount of water USBR agrees to provide from its CVP yield. Under the provisions of the Settlement Contracts, both the Base Supply and Project Supply could be reduced by 25 percent of the total contract amount, but only in certain water year types.

In accordance with the CVP Improvement Act (CVPIA), USBR negotiated long-term water services contracts in 2007. According to Section 3404c of the CVPIA, Renewal of Existing Long-Term Contracts requires the USBR to renew any existing long-term repayment or water service contract for the delivery of water from the CVP for a period of 25 years and may renew such contracts for successive periods of up to 25 years each.

The long-term renewal contracts, unlike the Settlement Contracts, have no specified reductions in delivery; during critically dry or water-short years, the water supply available from the Project will be allocated among the contractors. The long-term renewal contracts also contain a tiered pricing provision. The Base Supply is 80 percent of the total contract amount, and Tier 1 and Tier 2 supplies represent 10 percent each of the remaining contract amount. Each tier has an incrementally higher water cost. The Tier 1 and Tier 2 water, which is available in most years, is typically not used due to the incremental higher cost of water.

Feather River diverters in the Sutter Subbasin hold diversion agreements with DWR to transport water from the Feather River using State Water Project facilities for both diversion and storage. Butte Water District and Sutter Extension Water District entered into agreement with DWR in May 1969 along with the Biggs-West Gridley Water District and Richvale Irrigation District. Feather Water District and Garden Highway Mutual Water Company hold separate contracts with DWR for diversion of Feather River water. These diversion agreements do not alter or modify existing water rights held on the Feather River by these districts/agencies.

2.2 Land Use Elements

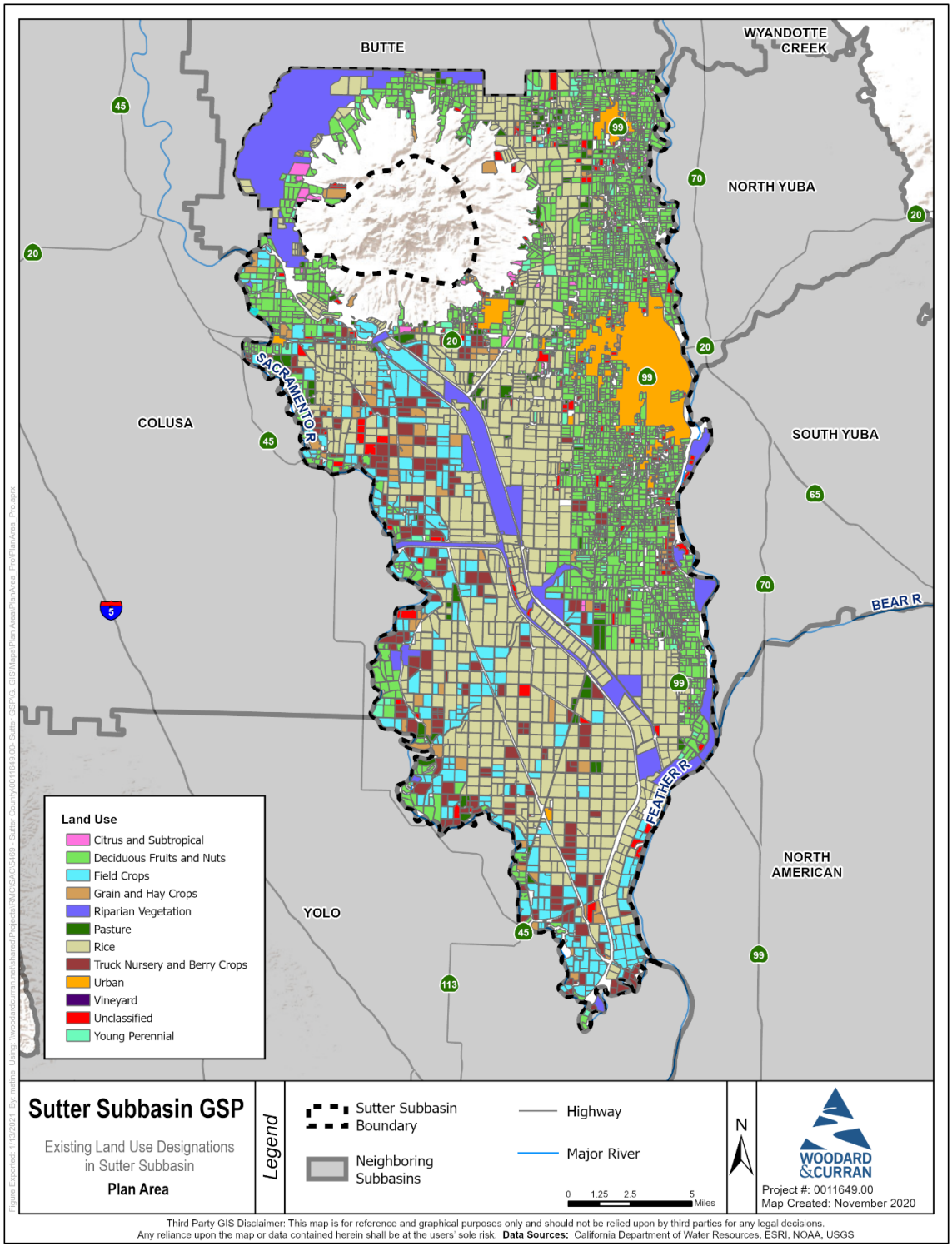
Land use within the Sutter Subbasin is managed by the cities of Live Oak and Yuba City, as well as Sutter County, and is predominantly agricultural. Rice is the predominant permanent crop grown in the Subbasin along with walnuts, stone fruits, tomatoes, and sunflowers. **Figure 2-12** shows the distribution of different land use types across the subbasin, while **Table 2-2** summarizes the respective acreage of land use in the Sutter Subbasin by land use type.

Surface water from the Feather and Sacramento Rivers and groundwater are the water sources used for irrigation, managed wetland, municipal and industrial, and urban/domestic purposes (**Figure 2-13**). Areas served by water agencies primarily utilize surface water as the primary supply source, with the exception of the City of Live Oak and Sutter Community Services District (**Figure 2-14**). Although surface water is available in areas served by water agencies, supply may also be augmented by groundwater, particularly during prolonged dry or drought periods. Most of the area served by Sutter County GSA (known as the County "white areas") relies on groundwater, where there are large areas of ranchland surrounding the Sutter Buttes that is not irrigated.

Table 2-2. Crop Category Acreage in the Sutter Subbasin

Statewide Crop Mapping Category	Acres
Citrus and Subtropical	1,020
Deciduous Fruits and Nuts	57,358
Field Crops	22,263
Grain and Hay Crops	5,771
Riparian Vegetation	21,291
Pasture	4,311
Rice	77,400
Truck Nursery and Berry Crops	14,249
Urban	11,775
Vineyard	59
Unclassified	4,610
Young Perennial	4,310
Total Acreage	**224,417**

Source: California Natural Resources Agency (January 2020)
Note: Crop categories and acreage are consistent with the source data.



Source: California Natural Resources Agency (January 2020)
Note: Crop categories and acreage are consistent with the source data.

Figure 2-12. Existing Land Use Designations in the Sutter Subbasin

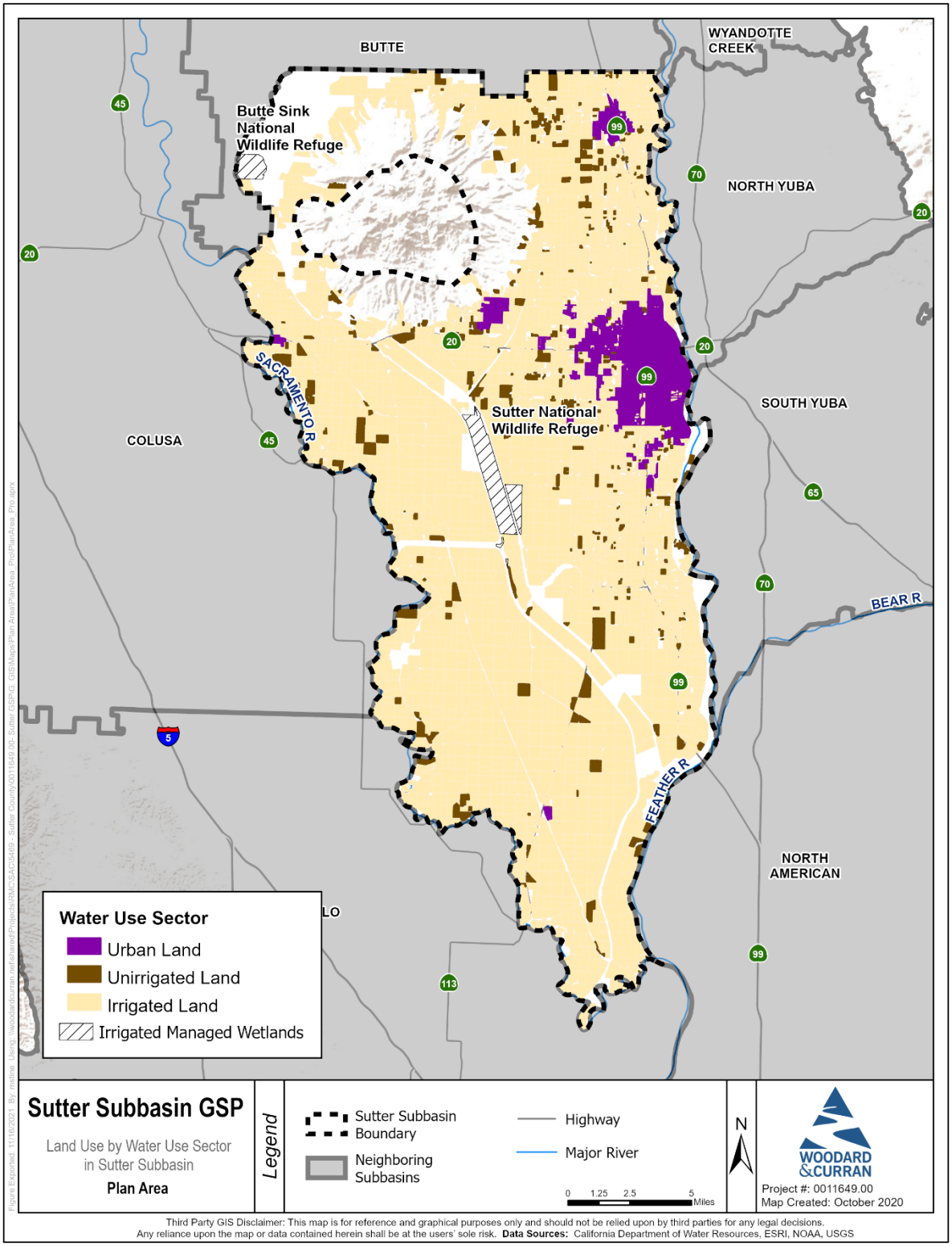


Figure 2-13. Land Use by Water Use Sector in the Sutter Subbasin

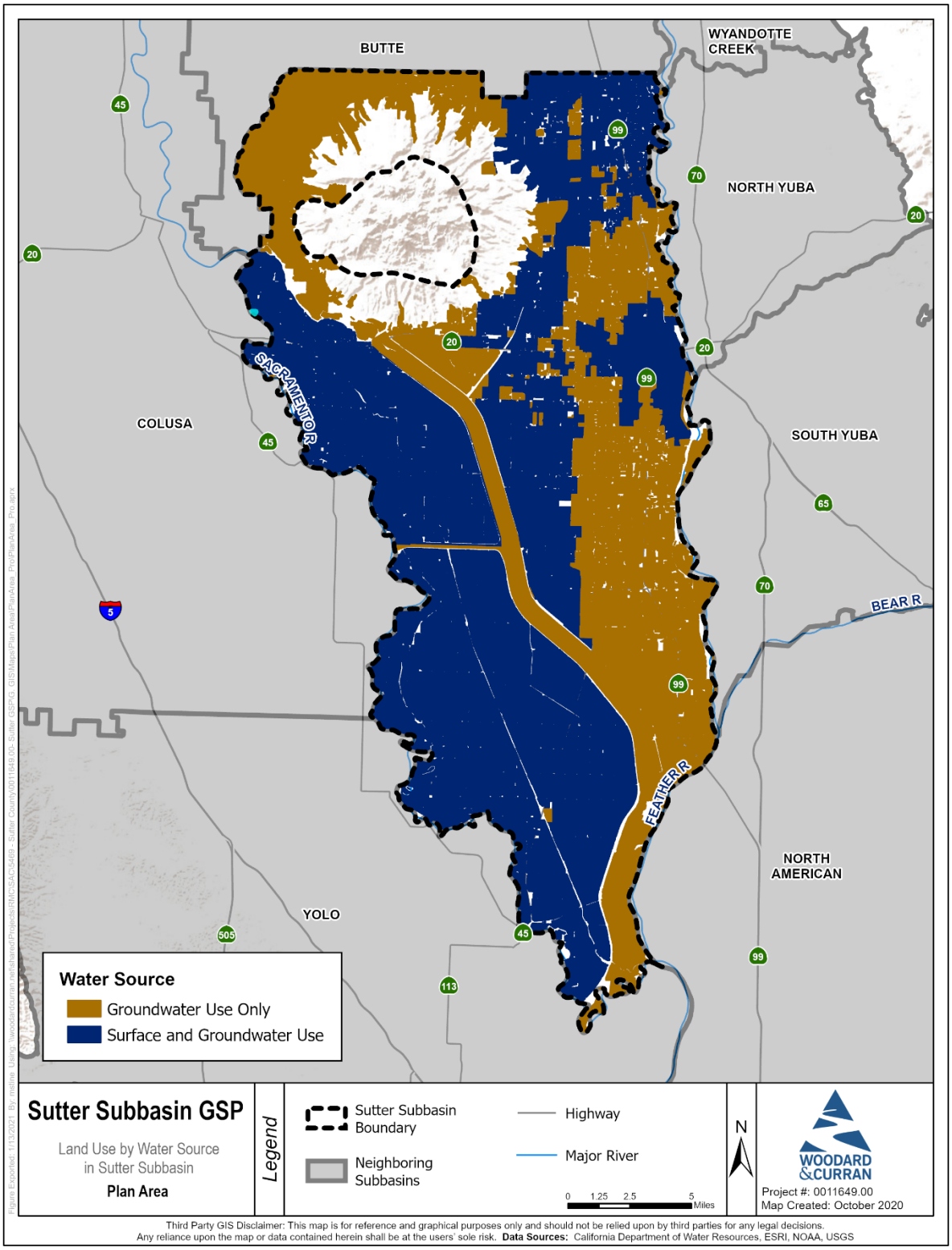


Figure 2-14. Land Use by Water Source in the Sutter Subbasin

2.2.1 General Plans in the Plan Area

Sutter County and the cities of Live Oak and Yuba City have developed General Plans to plan and guide land use within their respective spheres of influence. The following sections provide a general description of these General Plans and how implementation of existing land use plans may change water demands within the Subbasin, how implementation of this GSP may affect water supply assumptions of relevant land use plans, and how implementation of land use plans outside of the Subbasin could impact sustainable groundwater management within the Sutter Subbasin.

Figure 2-15 shows the location of relevant General Plans. The following section describes the General Plan policies and objectives relevant to water resources management in the Sutter Subbasin. This section satisfies §354.5(f) of the GSP Emergency Regulations under SGMA.

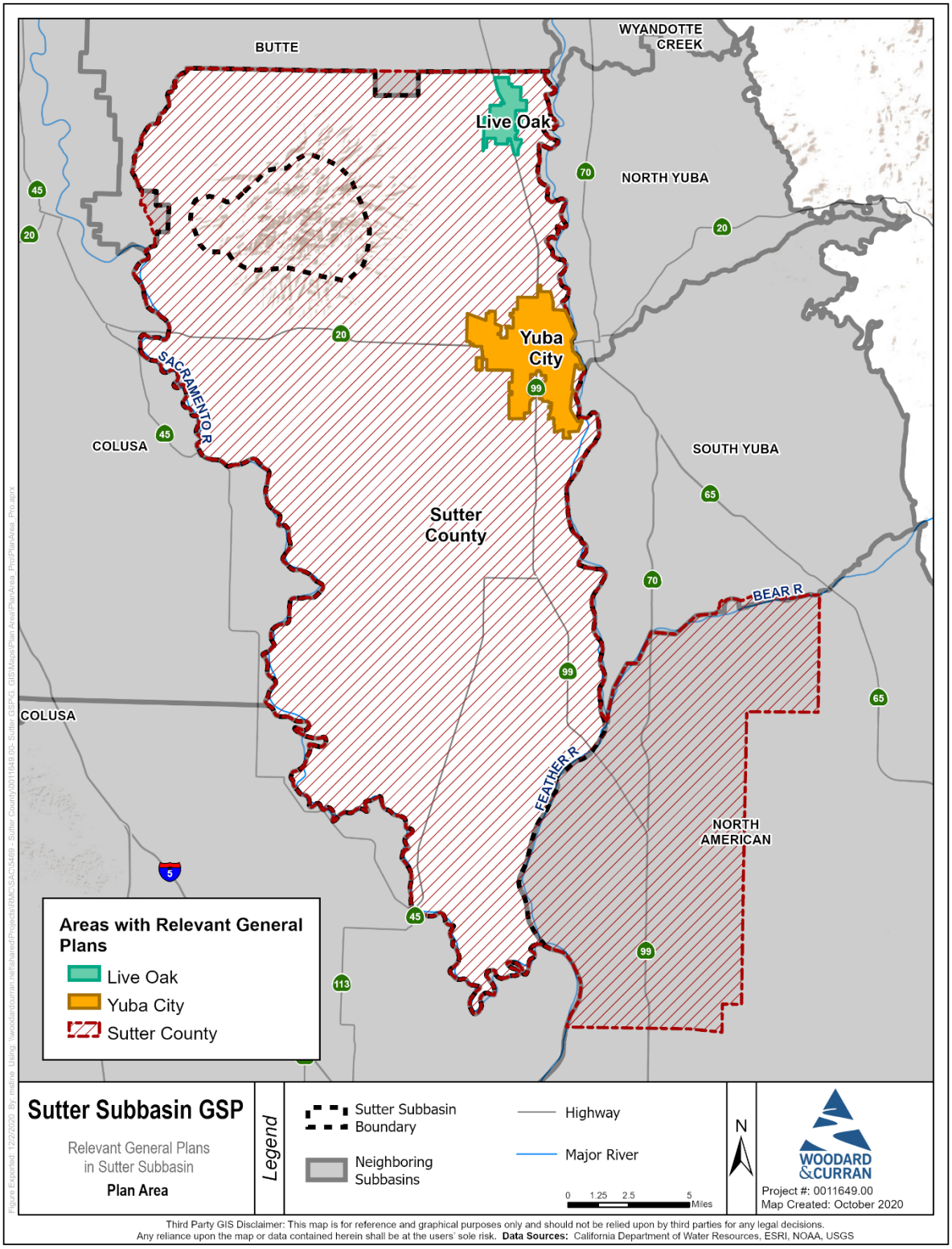


Figure 2-15. Relevant General Plans

2.2.1.1 Sutter County 2030 General Plan

The Sutter County 2030 General Plan (Sutter County, 2011) presents a vision for the County through 2030 and beyond. The General Plan is a result of the collective efforts of elected and appointed officials, citizens, business owners, and County staff who all contributed to defining a desired framework for growth and conservation in unincorporated Sutter County. It is the intent of the General Plan to ensure a future for Sutter County that is distinguished by its livable nature – a place that is sustained in the long term by striking a suitable balance between strong agricultural traditions, natural resource preservation, and economic growth opportunities.

The following policies from each relevant General Plan Element, as well as implementation programs, may potentially influence implementation of the GSP or be influenced by GSP implementation.

2.2.1.1.1 Land Use Element

- **Goal LU 9.** Designate adequate and compatible sites for governmental/public uses and take a lead role when feasible on regional issues of importance to Sutter County, its residents, and businesses.
    - **Policy LU 9.5.** Regional Planning Efforts. Support and participate as appropriate in countywide, regional, and other multi-agency planning efforts related to land use, housing, revenue, economic development, tourism, agriculture, natural resources, air quality, habitat conservation, transportation, transit, infrastructure, water supply, flood control, solid waste disposal, emergency preparedness, and other issues relevant to the County.

2.2.1.1.2 Agricultural Resources Element

- **Goal AG-3.** Protect the natural resources needed to ensure that agriculture remains an essential and sustainable part of Sutter County's future.
    - **Policy AG 3.1.** Efficient Water Management. Support the efficient management and use of agricultural water resources where economically feasible to support agriculture.
    - **Policy AG 3.2.** Water Conservation and Recycling. Support the efforts of the multiple water agencies operating in Sutter County to adopt water conservation practices and explore the feasibility of water recycling for agriculture.
    - **Policy AG 3.3.** Water Quality and Quantity. Support efforts to maintain water resource quality and quantity for the irrigation of productive farmland.
    - **Policy AG 3.4.** Water Competition from Urban Uses. Oppose the loss of agricultural water due to competition from urban water consumption both within and outside the County.

- **Policy AG 3.5.** Water Use Reduction. Encourage reduction measures in the Climate Action Plan targeted to manage agricultural water use. Such measures may include encouraging agricultural water users to conserve water and providing information on technologies that reduce agricultural water use.
- **Policy AG 3.6.** Groundwater Resources. Support the efforts of the local water agencies to promote groundwater recharge, conjunctive use, conservation of significant recharge areas, and other activities to protect and manage Sutter County's groundwater resources.
- **Policy AG 3.7.** Alternative Energy. Support the use of energy-saving technologies and alternative energy sources (solar, wind, biofuels) in all agricultural industries and operations such as the pumping of irrigation water, food processing, and water treatment. Support the use of alternative energy-powered farm vehicles and trucks.
- **Policy AG 3.8.** Habitat Protection. Promote wildlife friendly agricultural practices. Encourage habitat protection and management that is compatible with and does not preclude or restrict on-site agricultural production.
- **Policy AG 3.9.** Chemical Use. Support the efforts of growers to follow state and federal regulations concerning the use of pesticides, herbicides, and manufactured fertilizers.
- **Policy AG 3.10.** Soil Management. Implement, as appropriate, reduction measures in the Climate Action Plan targeted to promote soil management practices that reduce nitrogen dioxide emissions.

- **Goal AG-4.** Provide for growth, expansion, and diversification of Sutter County's agricultural industries.
  - **Policy AG 4.3.** New Technologies. Support the development and use of new technologies that facilitate resource efficient operation of agriculturally related industries, including food processing. These technologies may include energy development technologies, such as wind, solar and waste sources; energy and water conservation technologies; cultivation practices; global positioning system (GPS) applications; and others that improve the profitability of agriculture in Sutter County.

2.2.1.1.3 Economic Development Element

- **Goal ED 2.** Maintain a business-friendly environment for both existing and new companies.
  - **Policy ED 2.1.** Infrastructure for New Business. Ensure the provision of adequate infrastructure for business development, including flood control, road

and rail networks, telecommunications backbone, sewer, drainage facilities, and water supply.

2.2.1.1.4 Infrastructure Element

- **Goal I 1.** Ensure the availability of an adequate, reliable, and safe potable water supply for current and future County residents, businesses, and other water users.
  - **Policy I 1.1.** Availability. Require new development to study, coordinate, and plan the provision of potable water services to support the new development and demonstrate the availability of a long-term, safe, and reliable potable water supply.
  - **Policy I 1.2.** Infrastructure Planning. Require the establishment of potable water master plans for areas served, or to be served, by County-owned or County-operated water systems or private water companies. Ensure that the required infrastructure is successfully planned and designed.
  - **Policy I 1.3.** Capital Funding. Require new development to construct or fully fund its needed potable water infrastructure.
  - **Policy I 1.4.** Efficient Infrastructure. Require potable water infrastructure that is to be owned or operated by the County to be designed and constructed to minimize the long-term life cycle costs of the infrastructure. Require the plans and design of potable water infrastructure to be owned or operated by another public agency or private utility be approved by the servicing agency/utility.
  - **Policy I 1.5.** Dedications. Require fee title dedication of land (or easements if determined appropriate by the Public Works Director) to the County to ensure adequate space for, access to, operation of, maintenance of, and repair of the potable water infrastructure.
  - **Policy I 1.6.** Operations and Maintenance Funding Plans. Require new development to establish funding plans to cover the long-term operation, maintenance, and repair of the development's potable water infrastructure.
  - **Policy I 1.7.** Provision of Services. Minimize County operated potable water systems serving urbanized areas. Transfer County operated potable water systems in urban areas to incorporated cities, public community service districts, or private utility companies where and when feasible and beneficial to the customers.
  - **Policy I 1.8.** Require new development to provide water systems supporting the development based on the following guidelines for water supply:
    - Urban development, and suburban development on parcels less than 1 acre in size, shall utilize community water systems. Demonstrate adequate and safe long-term water supply can be provided without negatively impacting

adjacent land uses or water supplies prior to development of new or expanded community water systems.

- Rural development, and suburban development on parcels 1 acre or larger in size, shall utilize community water systems where feasible and cost effective as determined by the County. If utilizing a community water system is not feasible, individual wells may be used where the water demand/intensity of new development is appropriately limited and where adequate and safe long-term water supply can be provided without negatively impacting adjacent land uses or water supplies.
- Agricultural areas may utilize individual water wells.

- **Policy I 1.9.** Connection to Community Water System. Connect existing developed areas to community water systems where practical.
- **Policy I 1.10.** Individual Water Wells. New individual wells shall meet County well construction and water quality standards.
- **Policy I 1.11.** Improve Water Availability. Support the creation of new water projects in appropriate locations that improve water availability for urban, rural, and agricultural water uses in Sutter County, including recycled water projects.
- **Policy I 1.12.** Water Conservation. Support water conservation programs that increase water use efficiency and provide incentives for adoption of water-efficiency measures.
- **Policy I 1.13.** Water-Efficient Landscaping. Require the use of water-efficient landscaping in new development.

- **Goal I 2.** Ensure efficient and safe collection, treatment, and disposal of wastewater, biosolids, and septage.
  - **Policy I 2.1.** Availability. Require new development to study, coordinate, and plan the provision of wastewater services to support the new development and demonstrate the availability of long-term, safe, and reliable wastewater collection, treatment, and disposal.
  - **Policy I 2.2.** Establish wastewater collection and treatment master plans for areas served, or to be served, by County-owned or County-operated wastewater systems. Ensure that the required infrastructure is successfully planned and designed.
  - **Policy I 2.3.** Capital Funding. Require new development to construct or fully fund its needed wastewater infrastructure.
  - **Policy I 2.4.** Efficient Infrastructure. Require wastewater infrastructure that is to be owned or operated by the County to be designed and constructed to minimize the long-term life cycle costs of the infrastructure. Require the plans and design

of wastewater infrastructure to be owned and/or operated by another public agency or private utility be approved by the servicing agency/utility.

- **Policy I 2.5.** Dedications. Require fee title dedication of land (or easements if determined appropriate by the Public Works Director) to the County to ensure adequate space for, access to, operation of, maintenance of, and repair of the wastewater infrastructure.
- **Policy I 2.6.** Operations and Maintenance Funding Plans. Require new development to establish funding plans to cover the long-term operation, maintenance, and repair of the development's wastewater infrastructure.
- **Policy I 2.7.** Provision of Services. Minimize County operated wastewater systems serving urbanized areas. Transfer County operated wastewater systems in urban areas to incorporated cities or public community service districts where and when feasible and beneficial to the customers.
- **Policy I 2.8.** New Development. Require new development to provide wastewater systems supporting the development based on the following guidelines for wastewater collection and disposal:
  - Urban development shall utilize publicly owned treatment works (POTW).
  - Rural development and suburban development shall utilize POTW when feasible and cost effective as determined by the County. If utilizing a POTW is not feasible, individual wastewater treatment and disposal systems may be used where soil conditions are acceptable; all County, state, and federal requirements can be met; the wastewater generation/ intensity of new development is appropriately limited; and long-term disposal can be provided without negatively impacting adjacent land uses or groundwater supplies.
  - Agricultural areas may utilize individual wastewater treatment and disposal systems where soil conditions are acceptable and all County, state, and federal requirements can be met.
- **Policy I 2.9.** Connection to Publicly Owned System. Connect existing developed areas to publicly owned treatment works where practical.
- **Policy I 2.10.** Groundwater Protection. Continue to regulate the siting, design, construction, and operation of wastewater disposal systems in accordance with County regulations to minimize contamination of groundwater supplies.

- **Goal I 3.** Ensure stormwater runoff is collected and conveyed safely and efficiently.
  - **Policy I 3.1.** Availability. Require new development to study, coordinate, and plan the provision of stormwater services to support the new development and demonstrate the availability of long-term, safe, and reliable stormwater collection, and reliable stormwater collection, and conveyance.

- **Policy I 3.2.** Infrastructure Planning. Establish stormwater collection master plans for areas served, or to be served, by County-owned or County-operated stormwater systems. Ensure that the required infrastructure is successfully planned and designed.
- **Policy I 3.3.** Capital Funding. Require new development to construct or fully fund its needed stormwater infrastructure.
- **Policy I 3.4.** Efficient Infrastructure. Require stormwater infrastructure that is to be owned or operated by the County to be designed and constructed to minimize the long-term life cycle costs of the infrastructure. Require the plans and design of stormwater infrastructure to be owned and/or operated by another public agency or private utility be approved by the servicing agency/utility.
- **Policy I 3.5.** Dedications. Require fee title dedication of land (or easements if determined appropriate by the Public Works Director) to the County to ensure adequate space for, access to, operation of, maintenance of, and repair of the stormwater infrastructure.
- **Policy I 3.6.** Operations and Maintenance Funding Plans. Require new development to establish funding plans to cover the long-term operation, maintenance, and repair of the development's stormwater infrastructure.
- **Policy I 3.7.** Provision of Services. Minimize County operated stormwater systems serving urbanized areas. Transfer County operated stormwater systems in urban areas to incorporated cities, water agencies, County drainage districts, or public community service districts where and when feasible and beneficial to the customers.
- **Policy I 3.8.** New Development. Require new development to provide stormwater systems supporting the development based on the following guidelines for stormwater collection and conveyance:
  - Urban development shall utilize underground storm drain systems sized to collect and convey peak flows from the 10-year storm; and may utilize overland flow systems and open channels sized to convey peak flows from the 100-year storm. Detention facilities shall be consolidated at publicly owned points in the system.
  - Rural development and suburban development shall utilize underground storm drain systems where feasible and cost effective as determined by the County, sized to collect and convey peak flows from the 10-year storm; and may utilize overland flow systems and open channels sized to convey peak flows from the 100-year storm. If utilizing an underground system is not feasible, detention facilities and open channels for stormwater collection and conveyance may be utilized, provided these systems prevent property damage from a 100-yearstorm event.

        - Agricultural areas may utilize detention facilities and open channels for stormwater collection and conveyance, provided these systems prevent property damage from a 100-year storm event.
    - **Policy I 3.9.** Connection to Publicly Owned System. Connect existing developed areas to publicly owned stormwater drains or open channel systems where practical.
    - **Policy I 3.10.** Mitigation of Stormwater Flows. Require new development to adequately mitigate increases in stormwater flow rates and volume.
    - **Policy I 3.11.** Stormwater Quality. Ensure that new development protects water quality in runoff, streams, and rivers.
    - **Policy I 3.12.** Joint Use of Open Channels and Detention Basins. Parks or sports fields may be located within stormwater detention basins where practical. Bicycle paths and walkways may be located within stormwater conveyance channels, or on service roads for channels, where practical. Open channels and stormwater detention basins shall normally not be used for habitat purposes.

- **Implementation Program I 1-A**
    - Review new development applications in unincorporated areas to ensure that adequate water service will be available through the County, or other service providers, to serve the new development. Require evidence of service availability.
- **Implementation Program I 1-B**
    - Condition new development to perform a water supply assessment in accordance with the requirements of state law.
- **Implementation Program I 1-C**
    - Develop potable water service guidelines and possible agreements with the cities of Live Oak and Yuba City for the provision of potable water within the cities' spheres of influence.
- **Implementation Program I 1-D**
    - Apply, and update as necessary, County improvement standards for potable water infrastructure planning, design, and construction.
- **Implementation Program I 1-E**
    - Develop a Countywide potable water master plan consistent with this General Plan. The design and construction of potable water systems are to be consistent with the approved master plan.

- **Implementation Program I 1-F**
  - Condition new development to construct infrastructure and dedicate land to support development as identified in the Countywide potable water master plan or other development studies. Condition new development to construct necessary potable water infrastructure prior to the issuance of building permits for residential development or certificate of occupancy for non-residential development; or if appropriate, ensure the potable water infrastructure is adequately financed through development impact fees, by agreement, or other mechanisms.
- **Implementation Program I 1-G**
  - Where the development's contribution to the potable water infrastructure exceeds its fair share, require the development to fully fund, or finance, the infrastructure and be reimbursed as the County receives impact fees/funding from other future development benefitting from the improvements.
- **Implementation Program I 1-H**
  - Condition new development to develop and implement a financing mechanism to fund the long-term operations and maintenance needs of potable water infrastructure. Funding plans shall ensure the collection of sufficient funds to cover current and anticipated future expenditures, capital replacements, and cost increases.
- **Implementation Program I 1-I**
  - Review new development to ensure that proposed water systems are adequate and appropriate for the type of development and are consistent with federal, state, and local codes and standards, and master plans.
- **Implementation Program I 1-J**
  - Require a groundwater study prior to development of new well systems serving urban/suburban and rural/suburban development to identify potential effects on aquifer volume and groundwater levels and the extent to which existing municipal and agricultural wells could be affected. The results of the study shall be used to develop the proper siting, design, and operation of new or expanded well systems, including a process for ongoing monitoring and contingency planning.
- **Implementation Program I 1-K**
  - Require existing development currently utilizing private wells for potable water supply to connect to a community water system when the community system is within 200 feet of the development, the community system agrees to allow the connection, and the private well no longer complies with applicable regulations or requires significant repairs.

- **Implementation Program I 1-L**
  - Support the California State Regional Water Quality Control Board's efforts to monitor known groundwater contamination areas and ensure that existing water sources are protected and contamination is as limited as is feasible.
- **Implementation Program I 1-M**
  - Apply the County's water well standards and applicable development standards to ensure safe and sanitary water supplies for development utilizing wells for potable water. Update the County's water well standards as needed.
- **Implementation Program 2-A**
  - Review new development applications in unincorporated areas to ensure that adequate wastewater service will be available through the County, or other service providers, to serve the new development. Require evidence of service availability.
- **Implementation Program 2-B**
  - Develop wastewater service guidelines and possible agreements with the cities of Live Oak and Yuba City for the provision of wastewater service within the cities' spheres of influence.
- **Implementation Program 2-C**
  - Apply, and update as necessary, County improvement standards for wastewater infrastructure planning, design, and construction.
- **Implementation Program 2-D**
  - Develop a Countywide wastewater master plan consistent with this General Plan; require design of wastewater systems to be consistent with the approved master plan; and ensure wastewater systems are constructed consistent with the approved designs.
- **Implementation Program 2-E**
  - Condition new development to construct infrastructure and dedicate land to support development as identified in the Countywide wastewater master plan or other development studies. Condition new development to construct necessary wastewater infrastructure prior to the issuance of building permits for residential development or certificate of occupancy for non-residential development; or if appropriate, ensure the wastewater infrastructure is adequately financed through development impact fees or by agreement.

- **Implementation Program 2-F**
  - Where the development's contribution to the wastewater infrastructure exceeds its fair share, require the development to fully fund the infrastructure and be reimbursed as the County receives impact fees/funding from other future development benefitting from the improvements.
- **Implementation Program 2-G**
  - Condition new development to establish and implement a financing mechanism to fund the long-term operations and maintenance needs of the wastewater infrastructure. Funding plans shall ensure the collection of sufficient funds to cover current and anticipated future expenditures, capital replacements, and cost increases. Funding should normally be collected through service fees and assessments.
- **Implementation Program 2-H**
  - Review new development to ensure that proposed wastewater systems are adequate and appropriate for the type of development and are consistent with federal, state, and local codes and standards, and master plans.
- **Implementation Program 2-I**
  - Apply, and update as necessary, County code and development standards regarding on-site wastewater disposal. Permit on-site wastewater treatment and disposal on existing lots only when appropriate for the type of development, where a publicly owned collection system is not reasonably available, and where such disposal will not constitute a hazard to health or water supplies.
- **Implementation Program 2-J**
  - Condition new development, where authorized to utilize individual wastewater treatment and disposal systems as an interim measure, to connect to a publicly owned wastewater collection system and treatment works when the publicly owned collection system is within 200 feet of the development, and the system owner agrees to allow the connection.
- **Implementation Program 2-K**
  - Require existing development using individual wastewater treatment and disposal systems to connect to a publicly owned wastewater collection system and treatment works when the publicly owned collection system is within 200 feet of the development, the system owner agrees to allow the connection, and the individual system no longer complies with applicable regulations or requires significant repairs.

- **Implementation Program 2-L**
  - Restrict new development use of septic systems in areas that are prone to flooding or that have a seasonal high-water table and/or water seepage problems.
- **Implementation Program I 1-N**
  - Develop water conservation standards for new development to increase water use efficiency.
- **Implementation Program I 3-A**
  - Review new development applications in unincorporated areas to ensure that adequate stormwater service will be available through the County, or other service providers (including the State for any State-owned pump stations), to serve the new development. Require evidence of service availability. If the use of State-owned pump stations is proposed, sufficient capacity shall be demonstrated through completion of a drainage study that is incorporated into any countywide or master drainage study.
- **Implementation Program I 3-B**
  - Develop stormwater service guidelines and possible agreements with the cities of Live Oak and Yuba City for the provision of stormwater service within the cities' spheres of influence.
- **Implementation Program I 3-C**
  - Develop a Countywide stormwater master plan consistent with this General Plan; require design of stormwater systems to be consistent with the approved master plan; and ensure stormwater systems are constructed consistent with the approved designs.
- **Implementation Program I 3-D**
  - Apply, and update as necessary, County improvement standards regarding stormwater drainage, infrastructure, planning, and design and construction disposal.
- **Implementation Program I 3-E**
  - Condition new development to construct infrastructure and dedicate land to support development as identified in the Countywide stormwater master plan or other development studies. Condition new development to construct necessary stormwater infrastructure prior to the issuance of building permits for residential development or certificate of occupancy for non-residential development; or if appropriate, ensure the stormwater infrastructure is adequately financed through development impact fees or by agreement.

- **Implementation Program I 3-F**
    - Where the development's contribution to the stormwater infrastructure exceeds its fair share, require the development to fully fund the infrastructure and be reimbursed as the County receives impact fees/funding from other future development benefitting from the improvements.
- **Implementation Program I 3-G**
    - Condition new development to develop and implement a financing mechanism to fund the long-term operations and maintenance needs of the stormwater infrastructure. Funding plans shall ensure the collection of sufficient funds to cover current and anticipated future expenditures, capital replacements, and cost increases. Funding should normally be collected through service fees and assessments.
- **Implementation Program I 3-H**
    - Review new development to ensure that proposed stormwater systems are adequate and appropriate for the type of development and are consistent with federal, state, and local codes and standards, and master plans.
- **Implementation Program I 3-I**
    - Require existing development using individual detention or retention facilities to connect to a publicly owned stormwater collection system when the publicly owned collection system is within 200 feet of the development and the system owner agrees to allow the connection.
- **Implementation Program I 3-J**
    - Condition new development to adequately study and plan local drainage for the development. Require that new development conform to the relevant County, State, and Federal requirements and standards governing stormwater drainage and water quality.
- **Implementation Program I 3-K**
    - Consider opportunities for joint recreational use of new public detention basins and open channels.

2.2.1.1.5 Environmental Resources Element

- **Goal ER 2.** Conservation. Incorporate energy efficiency and water conservation, including the potential use of recycled water, in park design, development, and operations.
    - **Policy ER 2.1.** No Net Loss. Require new development to ensure no net loss of state and federally regulated wetlands, other waters of the United States

(including creeks, rivers, ponds, marshes, vernal pools, and other seasonal wetlands), and associated functions and values through a combination of avoidance, restoration, and compensation.

- **Goal ER 6.** Preserve and protect the County's surface water and groundwater resources.
  - **Policy ER 6.1.** Integrated Water Management Programs. Integrate water management programs that emphasize multiple benefits and balance the needs of agricultural, rural, and urban users.
  - **Policy ER 6.2.** Surface Water Resources. Protect the surface water resources in the County including the Sacramento, Feather, and Bear Rivers and their significant tributaries.
  - **Policy ER 6.3.** Groundwater Sustainability. Protect the sustainability of groundwater resources.
  - **Policy ER 6.4.** Groundwater Recharge Areas. Require new development to preserve areas that provide important groundwater recharge, stormwater management, and water quality benefits such as undeveloped open spaces, natural habitat, riparian corridors, wetlands, and natural drainage areas.
  - **Policy ER 6.5.** Regional Coordination on Groundwater Use. Coordinate with local and regional jurisdictions on groundwater use to minimize overdraft conditions of aquifers.
  - **Policy ER 6.6.** Groundwater Protection. Regulate stormwater collection and conveyance, as necessary, to protect groundwater supplies from contamination.
  - **Policy ER 6.7.** Water Rights. Support the protection of the existing water rights of water agencies and providers within Sutter County. Do not support out-of-area water transfers where they would adversely impact water supply within Sutter County. Support either out-of-area, or in-basin water transfers that would not negatively impact water supply within Sutter County.
  - **Policy ER 6.8.** Recycled Water. Explore the feasibility of utilizing recycled water, where appropriate, cost effective, and safe.
  - **Policy ER 6.9.** Water Use Reduction. Encourage the reduction measures in the Climate Action Plan targeted to reduce water use. Such measures may include adopting a per capita water use reduction goal; implementing a water conservation and efficiency program; providing incentives for new development to reduce potable water use; installing water meters for uses not using wells; encouraging water suppliers to adopt a water conservation pricing schedule; encouraging upgrades in water efficiency; providing training and education on water efficiency; and increasing recycled water use.

- **Policy ER 6.10.** Stormwater Quality. Control pollutant sources from construction and operational activities, and improve stormwater runoff quality, through the use of stormwater protection measures in accordance with County, state, and federal regulations.
- **Policy ER 6.11.** New Development. Require new development to protect the quality of water resources and natural drainage systems through site design, and use of source controls, stormwater treatment, runoff reduction measures, best management practices, and Low Impact Development.
- **Policy ER 6.12.** Natural Watercourses. Require new development to integrate natural watercourses and provide buffers between waterways and urban development to minimize disturbance of watercourses and to protect water quality.
- **Policy ER 6.13.** Education. Educate the public about practices and programs to minimize water pollution.

- **Implementation Policy ER 6-A**
  - Develop a Countywide Groundwater Management Plan and participate in the development and implementation of an Integrated Regional Water Management Plan.
- **Implementation Policy ER 6-B**
  - Conduct a study to determine the feasibility of utilizing recycled water, where appropriate, cost effective, and safe.
- **Implementation Policy ER 6-C**
  - Update and revise the joint Yuba City–Sutter County Stormwater Management Plan to include the growth areas.
- **Implementation Policy ER 6-D**
  - Require new development that incorporates or is adjacent to natural watercourses to consult with the U.S. Army Corps of Engineers, California Department of Fish and Game, and/or the Regional Quality Control Board to determine the appropriate buffer width between waterways and urban development.

2.2.1.2 City of Live Oak 2030 General Plan

The City of Live Oak 2030 General Plan (City of Live Oak, n.d.) serves as a tool to identify and provide policy guidance to achieve the community's version of the future. The following policies from each relevant General Plan Element as well as implementation programs may potentially influence implementation of the GSP or be influenced by GSP implementation.

2.2.1.2.1 Land Use Element

- **Goal LU-2.** Make improvements to existing developed areas as the city grows.
    - **Policy LU-2.2.** The City will encourage infill development, which is defined as development that has access to water and wastewater infrastructure in adjacent existing streets, by:
        - analyzing infrastructure deficiencies in the existing City;
        - identifying infrastructure investment priorities needed to encourage reinvestment in the existing city;
        - coordinating infill infrastructure priorities with redevelopment planning and capital improvements planning; and,
        - exploring opportunities to provide incentives for infill development, such as lower impact fees.
- **Implementation Program LU-2.1**
    - The City will maintain water, wastewater, and drainage master plans that identify and prioritize infrastructure improvements to the City. The City will incorporate improvements to existing City infrastructure in capital improvements planning, consistent with these master plans. The City also will identify federal, state, and regional grant and loan programs for infrastructure improvements in the existing developed City.
- **Implementation Program LU-2.2**
    - The City will update development impact fees, following the adoption of the 2030 General Plan update. The fees developed as a part of this update will take into account existing infrastructure availability. Infill development will have lower fees, where it is shown to have lower costs. Infill development is defined as development that has access to water and wastewater infrastructure in adjacent existing streets.
- **Implementation Program LU-4.1**
    - The City's water, wastewater, and drainage master plans will provide for infrastructure improvements designed to induce redevelopment in the downtown core area. The City will incorporate downtown infrastructure in capital improvements planning. The City will identify federal, state, and regional grant and loan programs for design, planning, and implementation of the City's polices for downtown core area redevelopment and revitalization, including infrastructure improvements. The City will consult with Sacramento Area Council of Governments to identify priority transit projects that serve development downtown.

2.2.1.2.2 Community Character Element

- **Goal DESIGN-14.** Incorporate Live Oak's natural amenities into the community's built environment.
    - **Policy DESIGN-14.3.** The City will encourage the use of site landscaping that uses appropriate native plant materials in order to enhance the natural character of the region; to reduce water and pesticide use; and to provide habitat to native species.

2.2.1.2.3 Conservation and Open Space Element

- **Goal AGRICULTURAL-1.** Preserve agricultural resources and support the practice of farming.
    - **Policy Agriculture-1.5.** The City will work with farmers, property owners, extensions, agencies, and agricultural organizations to enhance the viability of agricultural uses and activities.
- **Implementation Program Biological-3**
    - The City will adopt development standards that require a riparian protection buffer (RPB) specifying an appropriate setback distance from existing riparian habitat or natural water bodies for development or other significant disturbance. This habitat is known to occur near the west bank of the Feather River. In areas with existing development, the RPB shall not be less than 25 feet, measured from top of the bank. In all other areas, the RPB shall not be less than 100 feet, measured from top of bank. If existing riparian vegetation is greater than 100 feet in width, the RPB shall encompass all of the riparian habitat; however, in no case shall the RPB be required to exceed 250 feet. Where feasible, the riparian buffers shall be incorporated into open space corridors, public landscapes, and parks. Trails and other recreation development should be designed and constructed to be compatible with riparian ecosystem.
- **Goal AIR-1.** Plan and design the community to encourage walking, bicycling, and use of transit.
    - **Policy Air-1.4.** The City will encourage and provide incentives for infill development, defined as development that has water and sewer infrastructure available in adjacent streets and does not require extension of such infrastructure to serve the subject project. (See also the Public Utilities, Services and Facilities Element and the Land Use Element.)
- **Goal WATER-1.** Maintain and improve groundwater and surface water quality.
    - **Policy Water-1.1.** New development shall incorporate drainage system design that emphasizes infiltration and decentralized treatment (rather than traditional

piped approaches that quickly convey stormwater to large, centralized treatment facilities), to the greatest extent feasible.

- **Policy Water-1.2.** Existing swales and sloughs should be preserved, restored, and used for stormwater drainage whenever possible.
- **Policy Water-1.3.** The City will require developments to use best management and design practices to reduce stormwater runoff levels, improve infiltration to replenish groundwater sources, and reduce pollutants close to their sources. The City will require new development to use permeable surfaces for hardscape wherever possible. Impervious surfaces such as driveways, streets, and parking lots should be interspersed with vegetated areas that allow for infiltration of stormwater. Low impact development (LID) techniques, such as rain gardens, filter strips, swales, and other natural drainage strategies, should be used to absorb stormwater, reduce polluted urban runoff, recharge groundwater, and reduce flooding.
- **Policy Water-1.4.** The City will require development projects to incorporate appropriate scaled stormwater facilities. The City will place emphasis on making these holding areas serve multiple functions, such as soccer fields or passive recreation areas.

- **Goal WATER-2.** Ensure adequate and efficient long-term water supply.
  - **Policy Water-2.1.** The City will incorporate into its entitlement review process compliance with portions of state law that require demonstration of adequate long-term water supply for large development projects (Senate Bills 610 and 221).
  - **Policy Water-2.2.** The City will condition approval of new development on the availability of sufficient water supply, storage, and fire flow (water pressure), per City standards.
  - **Policy Water-2.3.** The City will encourage the use of native, drought-tolerant landscaping throughout the City to conserve water and filter runoff.
  - **Policy Water-2.4.** Native and drought-tolerant landscaping should comprise at least 50 percent of landscapes in commercial and industrial projects and 100 percent of all medians and right-of-way landscaped areas along public streets.
  - **Policy Water-2.5.** The City will require the use of water conservation technologies, such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment, in all new construction and retrofitted and substantially remodeled buildings, consistent with building code requirements.
  - **Policy Water-2.6.** The City will support the retrofitting of existing buildings throughout Live Oak with water-saving fixtures.

- **Policy Water-2.7.** The City will participate in regional groundwater basin planning and regional water-management planning efforts to ensure that future demand for water does not overdraft the groundwater supply.
- **Policy Water-2.8.** The City will adopt water conservation pricing (e.g., tiered rate structures) to encourage efficient water use.

- **Implementation Program Water-1**
  - The City will revise the Public Works Improvement Standards, as necessary, to encourage use of natural drainage systems and low impact development principles in order to reduce stormwater infrastructure costs and improve water quality. The City will make revisions required to emphasize the slowing down and dispersing of stormwater by using existing landscaped swales and constructing new swales to convey stormwater runoff, encouraging sheet flow and the use of landscaped infiltration basins in planter strips along roadways, and employing other best management practices, as appropriate. The City will establish standards and fee programs to require and/or provide incentives for methods to slow down and filter stormwater, as outlined in this Element. These measures include, but are not limited to, reduced pavement, permeable pavement, vegetation that retains and filters stormwater, and the use of drainage sheet flow and filtration.
- **Implementation Program Water-2**
  - The City will revise landscaping requirements to include drought-tolerant, low-maintenance plants.
- **Implementation Program Water-3**
  - The City will participate, as appropriate, in the Sutter County Groundwater Management Plan to ensure perennial sustainable yield and avoidance of overdraft and long-term drawdown within and adjacent to the [former] East Butte subbasin, while accommodating land use change as described in the 2030 General Plan.

2.2.1.2.4 Public Utilities, Services, and Facilities Element

- **Goal PUBLIC-1.** Provide a safe and reliable water supply and delivery system.
  - **Policy PUBLIC-1.1.** The City will maintain a water master plan that provides for phased, efficient extension of water delivery and water quality infrastructure, including new wells, new pumping and storage capacity, and treatment systems, as necessary, to meet the needs of new development.
  - **Policy PUBLIC-1.2.** The City will maintain and improve water quality according to state and federal standards.

- **Policy PUBLIC-1.3.** New development shall provide land for wells and other water infrastructure and shall construct and dedicate water infrastructure as directed by the City.
- **Policy PUBLIC-1.4.** New development shall contribute on a fair-share basis toward new groundwater wells, water treatment improvements, conveyance facilities, and water supply projects, consistent with the City's water master plan and City standards.
- **Policy PUBLIC-1.5.** City approval of new development requires analysis and demonstration of secure and reliable water supply prior to approval. A formal water supply assessment, as defined in California Water Code Sections 10910–10912, will be required as part of City environmental review and project approval for projects that meet the minimum size requirements defined by this state law.
- **Policy PUBLIC-1.6.** New development shall contribute on a fair-share basis toward City strategies to increase water storage capacity for domestic water supply, back-up emergency supply, and fire flow.
- **Policy PUBLIC-1.7.** The City will improve water conveyance and fire flow in the existing city to encourage redevelopment, as necessary and as funding is available.
- **Policy PUBLIC-1.8.** The City will proactively leverage state, regional, and federal funding for water supply and water quality improvements to serve developed areas.
- **Policy PUBLIC-1.9.** When water delivery improvements are made in areas adjacent to developed areas, the City will identify opportunities for existing developed properties to connect into new City water systems.
- **Policy PUBLIC-1.10.** The City will establish long-term financing mechanisms and phased improvements planning to improve water infrastructure in the existing developed city to induce infill development. The goal of the City's financing and capital improvements planning will be to fund improvement of water distribution infrastructure in developed city neighborhoods, without increasing service fees for existing customers.

- **Goal PUBLIC-2.** Ensure reliability of the City's water supply through water conservation and an efficient water distribution system.
  - **Policy PUBLIC-2.1.** The City will ensure that new groundwater well sites are located where the aquifer is stable enough to avoid long-term drawdown.
  - **Policy PUBLIC-2.2.** The City will explore the use of recycled water from the City's wastewater treatment plant for landscape irrigation and other appropriate uses.

- **Policy PUBLIC-2.3.** The City will plan for, and new development shall be consistent with state law requirements for water conservation through the City's Urban Water Management Plan (California Water Code sections 10630–10656).
- **Policy PUBLIC-2.4.** New development should install water-conserving appliances and faucets, drought-tolerant landscaping, recycled water systems, and other water conservation improvements and programs, to the greatest extent feasible.
- **Policy PUBLIC-2.5.** The City will encourage water conservation measures not required by state law, such as recycled water systems.
- **Policy PUBLIC-2.6.** The City will establish use-based water rates. The City will consider adopting relatively low rates for a basic water allocation, and higher water rates beyond this basic allocation.
- **Policy PUBLIC-2.7.** The City will provide education to residents and businesses on benefits and methods of water conservation.

- **Implementation Program PUBLIC-1.1**
  - The City will adopt a water master plan that is consistent with the 2030 General Plan, to provide for phased improvements to meet future needs. The master plan will include an inventory of existing development, estimates of future demand within the existing city, and estimates of future growth within areas planned for annexation, consistent with the General Plan. The City will incorporate analysis from the water master plan into its capital and ongoing fee programs.
  - The master plan will identify improvements to serve the needs of new development and will also identify any deficiencies in the existing developed city. The master plan will provide a plan to address any such deficiencies.
  - The master plan will identify potential locations for new well sites where a stable and reliable supply should be available, and where City use would not cause long-term drawdown.
  - The City will also prepare and adopt an Urban Water Management Plan for water conservation in the City, consistent with state law requirements. The City will implement the Urban Water Management Plan through enforcement of standards for new growth. The City will identify improvements that should be made to the existing City to conserve water and will phase in these improvements, as feasible.
  - The City will explore opportunities in the water master plan, as well as the Urban Water Management Plan, to encourage water conservation measures not required by state law. The City will, if feasible, provide incentives that are substantial enough to encourage new and existing development to install and use recycled water systems and other water-conserving improvements.

Incentives could include lower up-front water hookup fees and lower ongoing water rates, depending on the extent of water conservation measures included.

- The City will update the water master plan, as necessary, to address growth needs, regulatory changes, and water quality issues.

- **Implementation Program PUBLIC-1.2**
  - The City will continue the arsenic removal program, as necessary, in order to meet all federal and state standards for all groundwater wells in the city. The City will implement a study to investigate the need for additional programs for water treatment, monitoring, and cleanup of other constituents (pollutants), as necessary. The City will implement a nitrate monitoring program that will include periodic monitoring and impose time standards for any cleanup needed.
- **Goal PUBLIC-3.** Use environmental best practices and provide cost effective wastewater collection, conveyance, and treatment systems to serve new and existing portions of the city.
  - **Policy PUBLIC-3.1.** The City will prepare a wastewater master plan that provides for phased, efficient extension of wastewater collection and improvements to wastewater treatment and disposal systems, to meet existing and future needs.
  - **Policy PUBLIC-3.4.** City sewer connection fees and ongoing sewer rates should be proportionally lower for properties that fund and install recycled water systems and are able to reduce overall wastewater demand.
  - **Policy PUBLIC-3.9.** The City will ensure compliance with state and federal standards for wastewater disposal. Monitoring and reporting programs may be required, as appropriate.
- **Implementation Program PUBLIC-3.1**
  - The City will adopt a wastewater master plan that is consistent with the 2030 General Plan, to provide for phased improvements to meet future needs. The master plan will include an inventory of existing development, estimates of future demand within the existing city, and estimates of future demand within areas planned for annexation. The wastewater master plan will provide cost-effective methods for expanding the system to meet future growth needs without raising sewer rates in the existing city. The master plan will identify deficiencies in the existing developed city that need to be addressed prior to, or in advance of infill development.
  - The Wastewater Master Plan will identify improvements and funding required to comply with Regional Water Quality Control Board and other applicable state and federal water quality standards.

- The City will update the wastewater master plan, as necessary, to address growth needs, regulatory changes, technological innovations, and regional plans for wastewater treatment and disposal. As part of the wastewater master planning process, the City will identify improvements needed to meet applicable state and federal wastewater disposal standards. The City will incorporate analysis from the wastewater master plan into its capital and ongoing fee programs.
- The City will examine whether installation of recycled water systems and/or installation of drought tolerant landscaping would substantially reduce the costs of wastewater treatment plant capacity upgrades and conveyance facilities compared to a scenario that does not use these water-saving features. The City will explore opportunities to pass savings related to wastewater infrastructure to properties that install and use recycled water and install drought tolerant landscaping, as feasible.

- **GOAL PUBLIC-4.** Provide storm drainage systems that protect property and public safety and that prevent erosion and flooding.
  - **Policy PUBLIC-4.2.** As part of the master plan and capital improvements planning, the City will set priorities and make repairs to the City's existing stormwater drainage system.
  - **Policy PUBLIC-4.3.** The City will develop a funding mechanism to improve existing drainage systems and develop new ones in existing City areas that currently lack stormwater drainage infrastructure.
  - **Policy PUBLIC-4.12.** New development shall be designed to control surface runoff discharges to comply with City standards, National Pollutant Discharge Elimination System Permit requirements, and Regional Water Quality Control Board standards, as applicable.

- **Implementation Program PUBLIC-4.1**
  - The City will adopt a drainage master plan, consistent with the policy direction in the 2030 General Plan, to provide for phasing and financing of drainage improvements in the existing developed city and in the new growth area.
  - The master plan will include an inventory of existing development, estimates of future needs in the existing city, and estimates of future growth in the new growth area. The drainage master plan will address how to meet future growth needs, if possible, without any rate increases in the existing city.
  - The drainage master plan will also identify deficiencies and provide for drainage improvements in the existing developed city. As part of both the Drainage Master Plan and capital improvements planning, the City will set priorities and make repairs to the City's existing stormwater drainage system. Areas in the existing

developed city that lack drainage infrastructure will take priority in the improvement schedule.

- The City will update the drainage master plan, as necessary, to address growth needs, regulatory changes, and technological innovations. The City will incorporate analysis from the wastewater master plan into its capital and ongoing fee programs.

- **Goal PUBLIC-5.** Use best environmental practices in the City's drainage systems to ensure water quality and take advantage of cost-saving multi-use opportunities.
  - **Policy PUBLIC-5.1.** The City's drainage master plan will plan and provide for appropriate components of natural drainage systems, which not only can be less costly to construct and maintain compared to a traditional piped system, but also provide water quality benefits and allow stormwater facilities to provide community amenities.
  - **Policy PUBLIC-5.2.** The City's drainage master plan should incorporate the use of newly constructed, appropriately landscaped drainage swales to filter, slow down, and better convey stormwater runoff.
  - **Policy PUBLIC-5.3.** Existing Reclamation District 777 and Reclamation District 2056 drainage channels should be improved, to the greatest extent feasible, to create more naturalized swales that provide stormwater conveyance. These channels should be restored with native, low-maintenance landscaping to filter stormwater and enhance neighborhood aesthetics.
  - **Policy PUBLIC-5.8.** New development should use LID techniques such as preserving or restoring natural landscape features for drainage, minimizing hard (impervious) surfaces, and using other methods that reduce, recycle, and filter stormwater.

- **Implementation Program PUBLIC-5.1**
  - The City will adopt a drainage master plan, consistent with the policy direction in the 2030 General Plan, to provide for phasing and financing of drainage improvements in the existing city and in the new growth area.
  - The City's drainage master plan will implement natural drainage systems that use newly constructed or restored drainage swales to convey stormwater runoff.
  - The City's drainage and parks and recreation planning and fees should account for the cost savings of this dual-use application of both park and drainage impact fees. Planning and fees should consider savings of LID techniques, where appropriate.

- **Goal PUBLIC-11.** Ensure that adequate infrastructure, water supply, water storage, and water pressure is available for fire flow requirements.

- **Policy PUBLIC-11.1.** The City will provide adequate water supply, storage, and appropriately-sized distribution pipelines to provide appropriate fire flows and emergency reserve, according to County fire flow standards until such time as the City adopts its own standards.
- **Policy PUBLIC-11.2.** New development shall provide adequate minimum fire flow pressures and emergency fire reserve capacity, as required by the City, to ensure public safety and protection of property.

Public Safety

- **Goal PS-2.** Minimize the loss of life and damage to property caused by flood events.
  - **Policy PS-2.7.** As feasible, new development should incorporate stormwater treatment practices that allow percolation to the underlying aquifer and minimize off-site surface runoff (and therefore flooding).
- **Goal PS-4.** Protect the community from the harmful effects of hazardous materials.
  - **Policy PS-4.3.** The City will coordinate with appropriate federal, state, and regional agencies to address local sources of groundwater and soil contamination, including underground storage tanks, septic tanks, agriculture, and industrial uses.
  - **Policy PS-4.5.** The City will support efforts to identify and remediate soils and groundwater contaminated with toxic materials, and to identify and eliminate sources contributing to such contamination.

2.2.1.3 City of Yuba City General Plan

The City of Yuba City General Plan was adopted in 2004 and was coordinated with and supports ideas in the Sutter County General Plan. The General Plan was developed with the vision of a growing community that preserves much of its small town feel and social fabric with an improved economy, new job opportunities, affordable housing, improved public services and facilities, new parks, an urban growth boundary that protects the much-prized rural agricultural landscape, and an overall improved quality of life.

The following policies from each relevant General Plan Element as well as implementation programs may potentially influence implementation of the GSP or be influenced by GSP implementation.

2.2.1.3.1 Public Utilities Element

- Guiding Policies
  - **7.1-G-1.** Ensure that an adequate supply of water is available to serve existing and future needs of the City.

- **7.1-G-2.** Ensure that necessary water supply infrastructure and storage facilities are in place prior to construction of new development.
- **7.1-G-3.** Maintain existing levels of water service by preserving and improving infrastructure, replacing water mains as necessary, and improving water transmission facilities.
- **7.1-G-4.** Encourage water conservation with incentives for decreased water use and active public education programs.
- **7.2.-G-1.** Ensure that adequate wastewater treatment capacity is available to serve existing and future needs of the City.

- Implementing Policies
  - **7.1-I-1.** Evaluate the adequacy of water infrastructure in areas where intensification of land use is anticipated to occur and develop a strategy to implement projects in the Water Supply Master Plan to offset deficiencies in capacity.
  - **7.1-I-2.** Coordinate capital improvements planning for all municipal water service infrastructure with the direction, extent, and timing of growth.
  - **7.1-I-3.** Decline requests for extension of water beyond the sphere of influence, except in cases of existing documented health hazards and in areas where the City has agreements to provide services.
  - **7.1-I-4.** Establish equitable methods for distributing costs associated with providing water service to development, including impact mitigation fees where warranted.
  - **7.1-I-5.** Explore ways to encourage use of reclaimed water for irrigation and landscaping purposes.

    Utilizing reclaimed water is currently not cost-effective. Should the costs of reclaimed water become more attractive, the City should define a program for encouraging reclaimed water use.
  - **7.1-I-6.** Establish guidelines and standards for water conservation and actively promote use of water-conserving devices and practices in both new construction and major alterations and additions to existing buildings.
  - **7.2-I-1.** Maintain existing levels of wastewater service by preserving and improving infrastructure, including replacing sewer mains as necessary.
  - **7.2-I-2.** Evaluate the adequacy of sewer infrastructure in areas where land use intensification is anticipated to occur and develop a strategy to address potential deficiencies in capacity.

- **7.2-I-3.** Coordinate capital improvements planning for all sewer service infrastructure with the direction, extent, and timing of growth.
- **7.2-I-4.** Decline requests for sewer extensions beyond the urban growth boundary, except in cases of existing documented health hazards and in areas where the City has prior agreements to provide services.
- **7.2-I-5.** Establish equitable methods for distributing costs associated with providing wastewater services to development, including impact mitigation fees where warranted.

2.2.1.3.2 Environmental Conservation Element

- Guiding Policies
  - **8.5-G-1.** Enhance the quality of surface water and groundwater resources and prevent their contamination.
  - **8.5-G-3.** Ensure that the City's drinking water continues to meet or exceed water quality standards.
- Implementing Policies
  - **8.5-I-1.** Establish conservation programs and measures for Yuba City employers, residents, and service providers.
  - **8.5-I-2.** Comply with the Central Valley Regional Water Quality Control Board's regulations and standards to maintain and improve the quality of both surface water and groundwater resources.
  - **8.5-I-3.** Continue to control stormwater pollution and protect the quality of the City's waterways, by preventing oil and sediment from entering the river.
  - **8.5-I-4.** Encourage State and regional agencies to monitor groundwater supplies and take steps to prevent overuse, depletion, and toxicity.
  - **8.5-I-5.** Continue to regularly monitor water quality to maintain high levels of water quality for human consumption and ecosystem health.
  - **8.5-I-6.** Protect waterways by prohibiting the dumping of debris and refuse in and near waterways and storm drains.
  - **8.5-I-7.** Require new construction to utilize best management practices such as site preparation, grading, and foundation designs for erosion control to prevent sediment runoff into waterways, specifically the Feather River.

    Best management practices include:

    - *Requiring that low berms or other temporary facilities be built between a construction site and drainage area to prevent sheet-flooding stormwater from entering storm drains and waterway;*

- *Requiring installation of storm drains or other facilities to collect stormwater runoff during construction; and*
- *Requiring onsite retention where appropriate.*

- **8.5-I-8.** Prepare and disseminate information about the potentially harmful effects of toxic chemical substances and safe alternative measures.
- **8.5-I-9.** If areas of groundwater contamination are identified, the City shall develop plans to limit further contamination and to protect public health.
- **8.5-I-10.** Support the application of reclaimed water to reduce the demand on municipal water supplies, if economically feasible.

  Water reclamation not only extends water supplies, it can also reduce wastewater disposal costs, save users' costs, save energy, and reduce the discharge of pollutants to the environment. The City supports only safe and practical applications of reclaimed water.

2.2.2 Existing Land Use Plans and Impacts to Sustainable Groundwater Management

The vast majority of the land uses in Sutter County are preserved for agriculture (Sutter County, 2011). Sutter County consists of 389,120 acres that predominantly overlie two groundwater subbasins, the Sutter and North American Subbasins (with a small portion of the Butte Subbasin located within Sutter County). The General Plan and the following discussion cover the entire County and does not divide the information by subbasin.

Approximately 92 percent of the total County area is predicted to remain stable and is not expected to change in character within the timeframe (25-year planning horizon) of the Sutter County General Plan. The areas of change are relatively few and small in size. In total, approximately 32,681 acres, or slightly over 8 percent of unincorporated lands, have been identified as potential urban growth areas. **Table 2-3** provides the projected growth areas and population as contained within the Sutter County General Plan (2011).

Table 2-3. Sutter County Population, Historical and Projected

Town or City	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Live Oak	4,090	4,280	4,543	4,842	4,976	5,282	5,536	5,698	5,865	5,971	6,090	6,229
Yuba City	26,000	27,000	28,728	30,180	31,385	33,395	34,071	34,543	35,030	35,574	36,040	36,758
Balance Of County	31,700	32,450	32,888	33,575	34,217	33,525	33,941	34,332	34,804	35,112	35,333	35,943
County Total	**61,800**	**63,700**	**66,159**	**68,597**	**70,578**	**72,202**	**73,548**	**74,573**	**75,699**	**76,657**	**77,463**	**78,930**

Town or City	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Live Oak	6,295	6,339	6,380	6,473	6,603	7,266	7,890	8,255	8,355	8,422	8,517	8,243
Yuba City	45,506	46,792	48,505	51,034	57,975	60,197	61,835	62,974	64,042	64,818	65,487	66,096
Balance Of County	27,921	27,955	28,133	27,590	22,519	21,901	21,838	21,754	21,521	21,525	21,587	21,609
County Total	**79,722**	**81,086**	**83,018**	**85,097**	**87,097**	**89,364**	**91,563**	**92,983**	**93,918**	**94,765**	**95,591**	**95,948**

Town or City	2013	2014	2015	2016	2020	2025	2030	2035	2040
Live Oak	8,184	8,339	8,331	8,346	8,441	8,558	8,765	8,792	8,909
Yuba City	66,513	66,716	67,779	68,052	82,390	95,513	110,725	128,361	148,806
Balance Of County	21,490	21,470	20,838	20,910	18,108	15,342	13,610	14,299	14,760
County Total	**96,187**	**96,525**	**96,948**	**97,308**	**108,939**	**119,413**	**133,100**	**151,452**	**172,475**

Implementation of existing land use plans is unlikely to affect the water supply and groundwater sustainability over the planning and implementation horizon. The largest planned changes are related to urban growth with a reduction of agricultural lands.

2.2.2.1 Urban Water Supply

Sutter County has had limited urban growth since 1989, with its population increasing by about 50 percent. Urban development has occurred in Yuba City, Live Oak, and a few small towns and communities including Robbins, Sutter, and Tisdale. **Table 2-3** provides the historical and projected future population for the entire Sutter County. Urban growth in the Subbasin is summarized in **Table 2-3**, while the remaining "Balance of County" is essentially within the North American Subbasin. The population in the Sutter County portion of the Sutter Subbasin as of 2016 is projected to double by 2040, almost entirely in Yuba City.

The source of water for the increased population in Yuba City will be surface water. Groundwater is not anticipated to be used for future growth (Carollo Engineers, 2016), but a couple of wells will be maintained for use during droughts. The City of Live Oak is planning to support its growth with eight new wells (EcoLogic, 2009). The estimated groundwater supply is expected to increase from 3,100 acre-feet (AF) in 2015 to 11,800 AF by 2030 (EcoLogic, 2009).

Population in the Sutter Community Services District area has the capacity to grow on groundwater, but without a new wastewater treatment plant the community will not be allowed to increase its population. The Sutter County Development Services Department is currently prohibiting further development within the community of Robbins due to high wastewater treatment usage compared to treatment capacity, therefore restricting population growth within the community. Golden State Water Company received authorization from the California Public Utility Commission in 2021 to acquire the Robbins water system from Sutter County, with the transfer completed in

late 2021. Improvements to the Robbins water system include drilling a new well, rehabilitating the existing well, and customer meters.

2.2.2.2 Agricultural Water Supply

The County has been historically, and continues to be, an agricultural community. Irrigated agricultural land accounts for about 70 percent of the total area in the County. The remaining land is used for habitat preserves, open range land grazing, roads, and other infrastructure. The largest land use is for rice production, averaging about 40 percent of the total County and has ranged from 31 to 46 percent. Pasture is the next largest land use followed by orchards which average about 16 percent and has ranged from 12 to 19 percent. Since about 1994, agricultural land use has been relatively stable with a slight decline in rice acreage and a slight increase in orchards.

Existing agricultural irrigation entities in Sutter County include the following: Garden Highway Mutual Water Company; Meridian Farms Water Company; Sutter Bypass Butte Slough Water User Association; Butte Slough Irrigation Company; Sutter Extension Water District; Sutter Mutual Water Company; Tisdale Irrigation and Drainage Company; Tudor Mutual Water Company; Butte Water District; Feather Water District; and Oswald Water District. These entities supply surface water from the Feather and Sacramento Rivers. Reclamation districts have the capacity to place pumps in drainage canals and reuse water.

The types of crops that can be grown are determined by soil types, water supply market conditions, availability of surface water, and water quality. In many areas, the soil types are conducive to rice production and access to good quality surface water has been secure relative to many other areas of California. These conditions have supported stability in both the amount of land devoted to agricultural production and in the types of crops grown on these lands.

As noted above, an important reason for the stability of both irrigated acreage and of cropping patterns in the Subbasin is the large area within the Subbasin having soils suitable for rice cultivation. Rice is mainly grown on soils favorable to the maintenance of standing water: specifically, clay soils with low vertical hydraulic conductivity. Soil features, such as fine-texture or cemented layers with low vertical hydraulic conductivity, are common over broad areas in the Subbasin and are considered advantageous for flooded rice culture. Although deep ripping of restrictive layers can make these soils more suitable for non-flooded crops, it would also reduce suitability for rice planting.

Sacramento Valley rice farmers use mainly surface water for irrigation. The quality of this water is generally high having been derived from melting snow that enters rivers through managed reservoir discharge. Salinity is removed from the land by runoff and percolating water, mostly fairly early in the reclamation process, so there is little residual salinity in established rice fields.

Sutter County's agricultural water usage for the entire county is approximately 60 percent surface water, 20 percent groundwater, and 20 percent that is irrigated by both surface water and groundwater. The predominant source of water for permanent crops is groundwater (Wood Rodgers, 2012), whereas rice and irrigated truck crops typically use surface water. Groundwater use has varied from 122,000 to 235,000 AFY.

2.2.2.3 Managed Wetlands Water Supply

The Central Valley Project Improvement Act (CVPIA) Refuge Water Supply Program (RWSP) ensures annual water deliveries of a specified quantity, of suitable flow rate and timing, and suitable quality to identified wetland habitat areas to maintain and improve wetland habitat areas (CDFW, n.d.). The CVPIA RWSP mandates are to acquire or secure the water supply necessary to meet delivery requirements, convey the water, and upgrade or build new conveyance facilities. USBR implements long-term water supply contracts through the refuge managing agencies, which include U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and Grassland Resource Conservation District. Each refuge managing agency provides an annual water delivery schedule and updates the schedule monthly based on their allocated Level 2 water supply and the estimated acquisition of Incremental Level 4 water supply. Level 2 water supply represents the historical average amount of water deliveries prior to CVPIA enactment in 1992 and is the baseline water required for wildlife habitat management. Incremental Level 4 water supply represents the additional increment of water required for optimal wetland habitat. Full Level 4 water deliveries are satisfied when both Level 2 and Incremental Level 4 supply requirements are met in full.

Almost all Level 2 water supply requirements are secured annually and received by refuges due to long-term contracts with USBR (CDFW, n.d.). Only 43% of Incremental Level 4 allocations were required and delivered each year from willing sellers on an average annual basis from 2005 to 2014 due to too few willing sellers and/or too little funding to buy willing seller's water. Incremental 4 water supplies may be acquired through voluntary measures such as water conservation, conjunctive use, purchase, lease, donation, or similar activities. Currently, both the Gray Lodge Wildlife Area and Sutter National Wildlife Refuge are not able to receive full Level 4 water based on incomplete water conveyance infrastructure. A small portion of the Gray Lodge Wildlife Area is located in the Sutter Subbasin and refuge water delivery points are located in the Butte Subbasin. For the Sutter National Wildlife Refuge, the Level 2 water contract quantity is 23,500 AFY and the 100% Incremental Level 4 water contract quantity is 6,500 AFY, therefore Full Level 4 water deliveries are 30,000 AFY (USBR, July 2004).

2.2.2.4 Land Use Plans Outside Sutter Subbasin

Land use plans outside of the Sutter Subbasin generally include general plans in Butte, Yuba, Placer, Yolo, and Colusa Counties. Areas neighboring the Sutter Subbasin within Butte, Placer, Yolo, and Colusa Counties are generally projected to continue present

agricultural uses. The North Yuba and South Yuba Subbasins, located within Yuba County, submitted a joint GSP to DWR in January 2020. Implementation of the Yuba Subbasins GSP is anticipated to continue sustainable management of groundwater in the Yuba Subbasins and is not anticipated to affect the water supply assumptions in the relevant general plans within the subbasins. Therefore, it is anticipated that land use plans within the neighboring North Yuba and South Yuba Subbasins will not affect the ability of the Sutter Subbasin to achieve sustainable groundwater management.

2.3 Existing Water Resources Monitoring and Management Programs

As required by §354.8(c) and (d) of the GSP Emergency Regulations, the following section describes existing water resources-related management and monitoring plans, and a discussion of how these programs will either impact GSP implementation and/or will be incorporated into the GSP.

2.3.1 Water Resources Management Programs

Existing water resources management programs include local Groundwater Master Plans (GMPs), the City of Yuba City Water Treatment Plant and Distribution System Master Plan, the City of Yuba City 2015 Urban Water Management Plan, Agricultural Water Management Plans, the North Sacramento Valley Integrated Regional Water Management Plan (IRWMP), Irrigated Lands Regulatory Program (ILRP), and Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS).

2.3.1.1 Sutter County Groundwater Management Plan

Sutter County developed a Groundwater Management Plan (Wood Rodgers, 2012) that is compliant with Assembly Bill (AB) 3030, Senate Bill (SB) 1938, and AB 359 legislation. The Sutter County GMP was prepared with input and direction from County stakeholders, with financial and technical assistance from DWR, with the purposes of:

- Summarizing the currently understanding of groundwater underlying Sutter County and its role in the County's overall water supply, making that information publicly available.
- Formulating goals and objectives that can be used as guidelines to help manage groundwater resources to meet current and future demands in Sutter County.
- Establish a plan for the County's involvement in ongoing monitoring and management of groundwater to promote these goals and objectives.
- Maintain eligibility for grant funding administered by DWR to increase the understanding of groundwater basins underlying Sutter County.

The plan covers the entire county, including the entire Sutter Subbasin. The GMP will continue to be implemented by Sutter County until the adoption of this GSP by the Sutter Subbasin GSAs.

2.3.1.2 Butte Water District Groundwater Management Plan

The Butte Water District GMP (No author, 1996) is compliant with AB 3030 and developed with the purpose of managing and monitoring groundwater resources existing and available within the District boundaries. The Butte Water District GMP has been implemented in a cooperative manner with other local private and or public water-purveying public agencies for the purpose of preserving, protecting, and monitoring

basin area groundwater extraction, distribution, allocation, or exportation to ensure compliance with Water Code Section 1745.10.

The GMP covers the existing boundaries of the Butte Water District and will continue to be implemented by Butte Water District until the adoption of this GSP by the Sutter Subbasin GSAs.

2.3.1.3 Feather Water District Groundwater Management Plan

The Feather Water District GMP (No author, 2005) is compliant with AB 3030 with the objective and purpose to manage, monitor, and preserve groundwater resources existing and available within its current and future boundaries in order to maintain and maximize long-term reliability of the groundwater supply, to prevent significant depletion of the groundwater storage over the long term, to prevent significant degradation of the quality of the groundwater, and to protect natural recharge and investigate possible use of intentional recharge of groundwater supply. Feather Water District has coordinated with other local private or public water purveying public agencies for the purpose of preserving, protecting, and monitoring basin area groundwater extraction, distribution, allocation, and exportation to ensure compliance with Water Code Sections 1745.10, et seq.

The GMP covers the existing boundaries of the Feather Water District and will continue to be implemented by Feather Water District until the adoption of this GSP by the Sutter Subbasin GSAs.

2.3.1.4 Reclamation District No. 1500 Groundwater Management Plan

The Reclamation District No. 1500 GMP (CH2M Hill, 2012) was developed in association with Sutter Mutual Water Company and Pelger Mutual Water Company and is compliant with SB 1938. The GMP supports effective and sustainable groundwater management, which includes delivering cost-effective, quality irrigation water for sustainable agricultural protection and environmental benefit. The objectives of the GMP include:

- Maintaining Sutter Basin long-term agricultural viability
- Promoting resource sustainability
- Increasing long-term water supply reliability
- Promoting cooperative regional outreach and regulatory compatibility

The GMP covers the Reclamation District No. 1500, Sutter Mutual Water Company, and Pelger Mutual Water Company boundaries and will continue to be implemented until the adoption of this GSP by the Sutter Subbasin GSAs.

2.3.1.5 Sutter Extension Water District Groundwater Management Plan

The Sutter Extension Water District GMP (No author, 1995) is compliant with AB 3030 and developed with the purpose of managing and monitoring groundwater resources existing and available within the District boundary. Sutter Extension Water District has coordinated and cooperated with other local private or public water purveying public agencies for the purpose of preserving, protecting, and monitoring basin area groundwater extraction, distribution, or exportation ensuring compliance with Water Code Sections 1745.10, et seq.

The GMP covers the existing boundaries of the Sutter Extension Water District and will continue to be implemented by Sutter Extension Water District until the adoption of this GSP by the Sutter Subbasin GSAs.

2.3.1.6 City of Yuba City Water Treatment Plant and Distribution System Master Plan

The City of Yuba City's Water Treatment Plant and Distribution System Master Plan (Water Master Plan) (West Yost Associates, 2019) identifies strategies for cost-effectively meeting the City's water treatment plant and distribution system needs; guides capital expenditures for the water treatment plant and distribution system; and presents comprehensive renewal and replacement strategies. The resulting Water Master Plan provides a comprehensive road map for the City for future planning.

2.3.1.7 City of Yuba City 2020 Urban Water Management Plan

The City of Yuba City's 2020 Urban Water Management Plan (UWMP) (Tully & Young, 2021) addresses the City's water management planning efforts to assure adequate water supplies to meet forecast demands over the next 25 years. As required by the Urban Water Management Planning Act, the City's 2020 UWMP specifically assesses the availability of its supplies to meet forecast water uses during average, single-dry, and five consecutive drought years through 2045. Verification that future demands will not exceed supplies and assuring the availability of supplies in dry-year conditions are critical outcomes of the City's 2020 UWMP. UWMPs are prepared every 5 years by law to support urban water suppliers' long-term resources planning.

2.3.1.8 Yuba City Basin Storm Water Resource Plan

The Yuba City Basin Storm Water Resources Plan (SWRP) (West Yost Associates, 2018) is a comprehensive document that identifies, prioritizes, and schedules storm water projects within the Yuba City Basin. Development of the SWRP was led by the City of Yuba City and meets the requirements of SB 985, as the Yuba City Basin SWRP has been reviewed and approved by the State Water Resources Control Board (SWRCB) and Central Valley Regional Water Quality Control Board (CV-RWQCB) (California Water Boards, June 2020). SWRP content includes an introduction and description of the watershed and subwatersheds; public outreach and coordination; data

collection; quantitative methods; SWRP project evaluations, quantitative methods, and project ranking/prioritization; implementation strategy and schedule; standard provisions; and SWRP checklist and self-certification.

2.3.1.9 Agricultural Water Management Plans

No agricultural water suppliers in the Sutter Subbasin are required to submit 2020 Agricultural Water Management Plans (AWMPs). However, Butte Water District voluntarily elected to update their individual supplier AWMP components in the Feather River Regional 2020 AWMP Update, even though Butte Water District serves less than 25,000 acres and is therefore exempt from the requirements set forth by DWR (NCWA, April 2021).

There are three agricultural water suppliers within the Sutter Subbasin that were required to submit 2015 AWMPs to DWR. Butte Water District (NCWA, December 2016) and Sutter Extension Water District (NCWA, December 2016) participated in the development of the *2015 Feather River Regional AWMP*. Sutter Mutual Water Company submitted the *Sacramento Valley Regional Water Management Plan Annual Update* (No author, 2012), *SBx7-7 Water Measurement Compliance Program* (MBK Engineers, October 2016), *Water Balance Summary* (CH2M Hill and MBK Engineers, October 2016a), and *Drought Management Plan* (CH2M Hill and MBK Engineers, October 2016b) to meet 2015 AWMP requirements. AWMPs must include background and description of the service area covered by the Plan, an inventory of water supplies, a water balance analysis, evaluation of potential climate change impacts and adaptation strategies, and an evaluation of water management activities and opportunities related to efficient water management practices and water use efficiency improvements.

2.3.1.10 North Sacramento Valley 2014 Integrated Regional Water Management Plan

The 2014 North Sacramento Valley Integrated Regional Water Management Plan (IRWMP), updated in March 2020, includes all or portions of Butte, Colusa, Glenn, Shasta, Sutter, and Tehama Counties. The IRWM region is managed by the North Sacramento Valley Regional Water Management Group (NSV RWMG), which consists of three members selected by the respective county Board of Supervisors.

The NSV RWMG, with the help of its Technical Advisory Group, began development of the IRWMP in 2012 in an open and transparent process with all NSV Board meetings held in compliance with the Brown Act. Collaboration with the public and other local, state, and federal agencies throughout the IRWMP development and implementation process has been a key component in developing and carrying out the goals and objectives of the IRWMP. As a basis for the broad category goals and specific objectives identified in the IRWMP, the following statement of intent was established for the NSV IRWMP:

To establish a regional collaborative structure with the objective of ensuring an affordable, sustainable water supply that supports agricultural, business, environmental, recreational, and domestic needs in the Northern Sacramento Valley.

The following goals and objectives were drafted to support and further the region's statement of intent for the IRWMP.

- **Goal 1:** Water Supply Reliability
  - **Objective 1-1:** Document baseline conditions and trends for surface water and groundwater resources.
  - **Objective 1-1a:** Adaptation to changes in the amount, intensity, timing, quality, and variability of runoff recharge.
  - **Objective 1-2:** Quantify current and future water demands.
  - **Objective 1-3:** Maximize efficient utilization and reliability of surface and groundwater supplies in coordination with local GMPs.
  - **Objective 1-4:** Coordinate and protect regional groundwater resources, consistent with locally developed GMPs that monitor groundwater levels, groundwater quality, and inelastic land subsidence. The effects of sea level rise on groundwater quality have been considered and determined to be inapplicable to the NSV region.
  - **Objective 1-5:** Develop regional water transfer guidelines to facilitate efficient management of water supplies that recognize the NSV Region as having the first priority for use.
  - **Objective 1-6:** Protect existing and established surface water rights.
  - **Objective 1-7:** Honor and preserve area-of-origin statutory protections.
  - **Objective 1-8:** Protect existing and established regional CVP and State Water Project (SWP) water contract supplies.
  - **Objective 1-9:** Increase surface water storage and hydropower generation within the region.
  - **Objective 1-10:** Develop and implement a regional drought preparedness strategy to minimize socio-economic impacts.
  - **Objective 1-11:** Develop and improve water resources infrastructure to increase water supply reliability within our region.
  - **Objective 1-12:** Develop, update, and implement GMPs through local jurisdictions.

- **Goal 2:** Flood Protection and Planning
  - **Objective 2-1:** Develop and coordinate flood risk reduction plans and projects consistent with current law and regulation to provide protection for agricultural, urban, and rural communities.
  - **Objective 2-2:** Evaluate new flood control projects that have potential economic impacts on agricultural land.
  - **Objective 2-3:** Develop and coordinate flood preparedness programs and alert systems for flood-prone areas consistent with existing flood and hazard mitigation plans.
  - **Objective 2-4:** Implement mutually beneficial flood risk reduction and floodplain ecosystem enhancement programs and projects on a voluntary basis.
- **Goal 3:** Water Quality Protection and Enhancement
  - **Objective 3-1:** Develop and improve infrastructure to meet State and Federal standards for drinking water quality.
  - **Objective 3-2:** Develop and improve infrastructure for wastewater collection, treatment, discharge, and reuse.
  - **Objective 3-3:** Meet State and Federal standards for water quality in surface water bodies and groundwater basins.
  - **Objective 3-4:** Minimize adverse water quality impacts from point sources to surface and groundwater.
  - **Objective 3-5:** Minimize adverse water quality impacts from non-point sources to surface and groundwater.
- **Goal 4:** Watershed Protection and Management
  - **Objective 4-1:** Aggressively manage invasive species within the watershed.
  - **Objective 4-2:** Integrate mutually beneficial agricultural production and habitat conservation programs and projects that do not redirect impact to neighbors.
  - **Objective 4-3:** Improve and protect riparian and fish habitat, and fish passage.
  - **Objective 4-4:** Implement healthy forest/foothill management activities that improve watersheds
  - **Objective 4-5:** Protect wetlands that are critical to hydrologic function.
  - **Objective 4-6:** Integrate recreational opportunities within water resource programs and projects.

  - **Objective 4-7:** Evaluate habitat conservation and ecosystem improvement programs and projects that have potential economic impacts on agricultural lands.

- **Goal 5:** IRWM Sustainability
  - **Objective 5-1:** Preserve the autonomy of local governments, special districts, and Tribes.
  - **Objective 5-2:** Enhance communication and coordination among federal, state, Tribal, and local governments, and other stakeholders.
  - **Objective 5-3:** Maintain a governance structure to update the IRWMP and support IRWMP project implementation.
  - **Objective 5-4:** Coordinate with neighboring IRWM regions to identify opportunities to enhance water management.
  - **Objective 5-5:** Pursue funding opportunities to implement programs and projects consistent with the IRWMP.
  - **Objective 5-6:** Coordinate IRWM activities with land-use planning.
- **Goal 6:** Public Education and Information Dissemination
  - **Objective 6-1:** Conduct public education and outreach to promote IRWMP goals.
  - **Objective 6-2:** Develop and disseminate information to protect regional water supplies.
  - **Objective 6-3:** Disseminate information on flood risks, Federal Emergency Management Agency’s (FEMA's) flood insurance rate maps (FIRM), and new FEMA policies.
  - **Objective 6-4:** Develop and disseminate water quality information throughout the region.
  - **Objective 6-5:** Develop and disseminate scientific information on aquatic, riparian, and watershed resources.

2.3.1.11 Irrigated Lands Regulatory Program

Groundwater quality from agricultural lands in the area is managed under the Irrigated Lands Regulatory Program (ILRP) by the SWRCB, which has separate requirements for rice land and irrigated land. Groundwater quality sampling in selected monitoring wells occurs every two years. The ILRP, initially implemented in 2003, regulates wastes from commercially-irrigated lands that discharge into surface water and groundwater under the Porter-Cologne Water Quality Control Act. The CV-RWQCB works directly with regional or crop-based coalitions as well as growers to reduce impacts of irrigated agricultural discharges to waters of the State. Pollutants of concern regulated under the

ILRP include pesticides, fertilizers, salts, pathogens, and sediment. The Sutter Subbasin is within two different voluntary coalitions related to ILRP: The California Rice Commission and the Sacramento Valley Water Quality Coalition, specifically the Butte-Yuba-Sutter Subwatershed. These coalition groups work directly with member growers to assist in compliance with CV-RWQCB requirements by conducting surface water monitoring and preparing regional plans to address water quality issues.

2.3.1.12 CV-SALTS

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a joint effort between CV-RWQCB, SWRCB, and stakeholders to reduce salt and nitrate impacts, restore groundwater quality, and provide safe drinking water supplies throughout the Central Valley. CV-SALTS was established in 2006 as a collaborative basin planning effort aimed at developing and implementing comprehensive salinity and nitrate management throughout the Central Valley. The Central Valley Salt and Nitrate Management Plan (SNMP) (CV-SALTS, December 2016) was adopted by the CV-RWQCB in March 2016 and the SWRCB adopted amendments to the Sacramento and San Joaquin Basin Plan and Tulare Lake Basin Plan to incorporate the Central Valley SNMP in October 2019.

Implementation of the Central Valley SNMP occurs under two programs – the Nitrate Control Program and the Salinity Control Program. For the Nitrate Control Program, dischargers are provided two compliance pathways: (1) traditional permitting as an individual discharger or as a coalition (i.e., irrigated lands coalition), or (2) groundwater management zone permitting. Zone permitting allows dischargers to work as a collective in collaboration with the CV-RWQCB to provide safe drinking water with the option to extend time to achieve nitrogen balance. The Sutter Subbasin is ranked as "Not Prioritized by SNMP" in the Central Valley SNMP, meaning the Sutter Subbasin will need to comply with the SNMP in the future but implementation of SNMP requirements will be phased in by the CV-RWQCB as resources allow. For the Salinity Control Program, discharges are also provided two compliance pathways: (1) traditional permitting as an individual discharger or as a coalition (i.e., irrigated lands coalition), or (2) participation in the Prioritization and Optimization (P&O) Study. Implementation of the Salinity Control Program does not prioritize groundwater subbasins as under the Nitrate Control Program and Notices to Comply with the Salinity Control Program were issued in January 2021.

2.3.2 County Well Construction/Destruction Standards and Permitting

Sutter County Environmental Health Division (SCEHD) is the well permitting agency Sutter Subbasin. One permit application is used for a new well or to deepen, reconstruct, recondition, or destroy a well (SCEHD, July 2013). The permit application requires a site plan showing the location of the well and the accessor's parcel number. A C-57 Water Well Contractor's license and signature of licensee is required by the

contractor completing the permit and work. The design and construction of the well shall be in conformance with the State's Water Well Standards as denoted in Bulletin 74-81, "Water Standards: State of California" and Bulletin 74-90, "California Well Standards" as referenced in the County of Sutter Department of Public Works Improvement Standards (2005, rev. 2010). Water wells are also addressed in the Sutter County Code of Ordinances, 700 – Health and Sanitation, Chapter 765 Water Wells (Sutter County, n.d.).

2.3.3 Water Resources Monitoring Programs

Existing water monitoring programs in the Sutter Subbasin are operated by federal, state, and local agencies to quantify and track groundwater and surface water conditions. Descriptions of existing water monitoring programs within the Sutter Subbasin are included in the following subsections.

2.3.3.1 Groundwater

2.3.3.1.1 CASGEM

The California Statewide Groundwater Elevation Monitoring (CASGEM) program is implemented by DWR to collect groundwater level monitoring data from a network of representative wells within basins and subbasins throughout the state to facilitate collaboration between local monitoring entities and DWR and report such information to the public. Four designated monitoring entities have notified DWR of their intent to monitor the entirety of the Sutter Subbasin: Sutter County, Reclamation District No. 1500, Sutter Extension Water District, and Feather Water District. Sutter County submitted a Groundwater Monitoring Plan and Reclamation District No. 1500, Sutter Extension Water District, and Feather Water District submitted their respective Groundwater Management Plans to DWR to monitor for seasonal and long-term groundwater level trends.

Groundwater levels are measured at 63 active CASGEM mandatory monitoring wells and 175 voluntary wells in the Subbasin (**Figure 2-16**). These wells have records extending back as far as 1929 and 70 wells have records extending back prior to 1968. The majority of wells in the CASGEM program have at least a 10-year historical record.

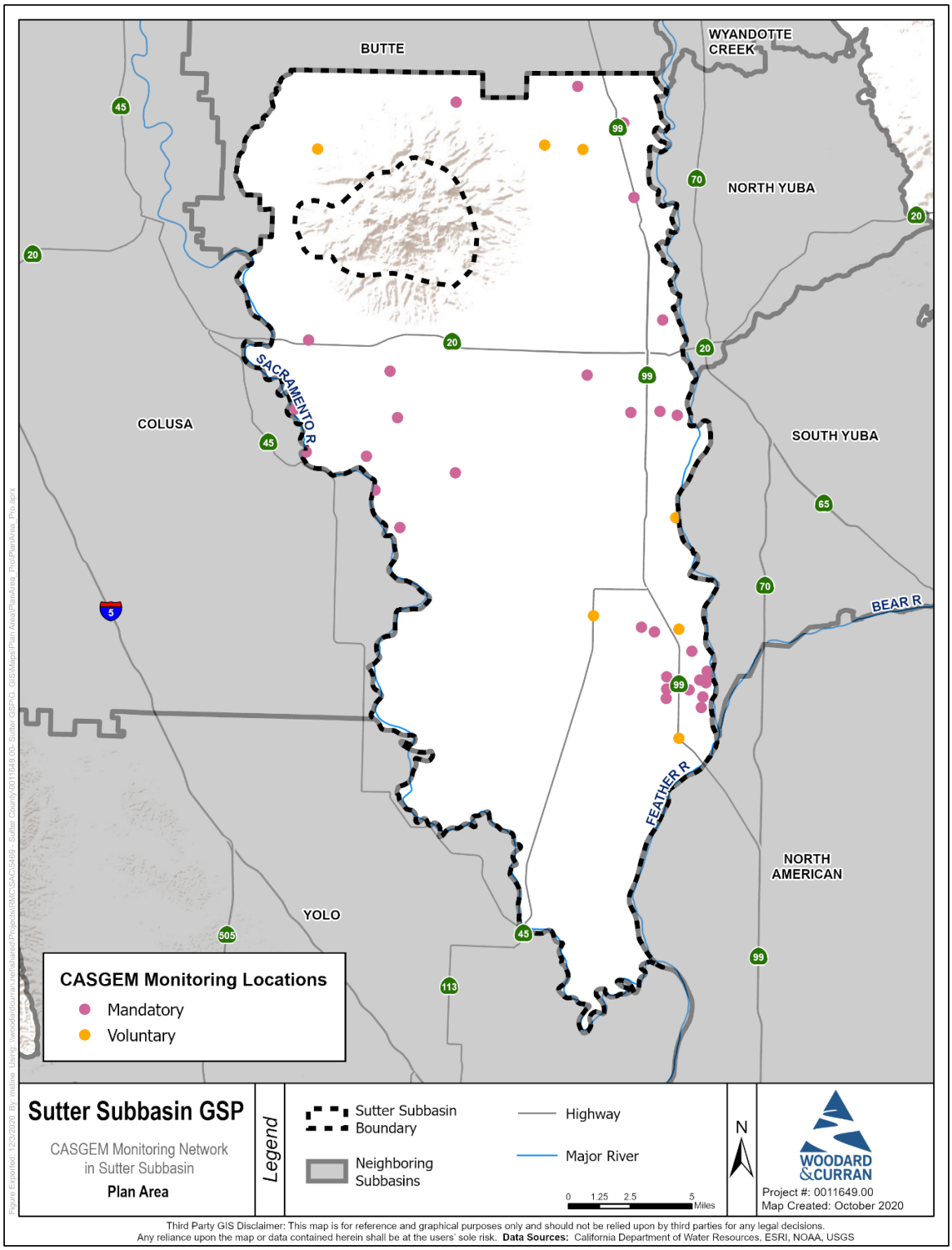


Figure 2-16. Sutter Subbasin CASGEM Monitoring Network

2.3.3.1.2 Department of Water Resources, Groundwater Levels and Quality

DWR's Water Data Library (WDL) includes a compendium of groundwater level and quality data. DWR's statewide groundwater level monitoring network consists of approximately 1,300 wells covering 78 Bulletin 118-2003 defined groundwater basins, 17 non-alluvial basins, and six hydrologic regions (DWR, 2003). Approximately half of the wells monitored by DWR are located within the Sacramento River Hydrologic Region (DWR, 2003). DWR monitors 237 wells for groundwater levels within the Sutter Subbasin, with data reported to the CASGEM and WDL databases. DWR is currently reassessing its water quality monitoring program. Water quality monitoring in the Subbasin is suspended while DWR performs this assessment.

2.3.3.1.3 Irrigated Lands Regulatory Program

As part of the ILRP, growers in the Sutter Subbasin participate in Groundwater Quality Trend Monitoring (GQTMs) through the California Rice Commission and Butte-Yuba-Sutter Subwatershed of the Sacramento Valley Water Quality Coalition. The GQTM Program is intended to monitor shallow groundwater to ensure irrigated agricultural discharges do not impair access to safe and reliable drinking water.

The objectives of the GQTM Program developed by the California Rice Commission (CH2M Hill, March 2016) are to determine current water quality conditions of groundwater relevant to rice operations and to develop long-term groundwater quality information that can be used to evaluate the regional effects of rice operations and its practice. The California Rice Commission has selected 20 active wells in the U.S. Geological Survey (USGS) groundwater monitoring network as part of the trend network surrounded by land used to grow rice is located closer to the edges of rice fields. Field parameters, including conductivity, pH, dissolved oxygen, and temperature, as well as total dissolved solids, nitrate + nitrite as nitrogen, and total ammonia as nitrogen will be monitored annually at each well, while anions (carbonate, bicarbonate, chloride, and sulfate) and cations (boron, calcium, sodium, magnesium, and potassium) will be monitored for initially (beginning in 2017) and then once every 5 years at each well. **Figure 2-17** shows the location of the California Rice Commission trend monitoring wells, with 3 wells located in the Sutter Subbasin. These 3 wells in the Sutter Subbasin were sampled for water quality parameters in 2018 and 2020. As of May 2020, the California Rice Commission has not recommended future monitoring of these 3 wells under the ILRP (Jacobs and Montgomery & Associates, May 2020).

The Sacramento Valley Water Quality Coalition has identified one well within the Sutter Subbasin portion of the Butte-Yuba-Sutter Subwatershed GQTM Program (**Figure 2-18**) (LSCE, July 2018). Well SVWQC_002 will be monitored for nitrate as N, electrical conductivity, pH, dissolved oxygen, temperature, oxidation-reduction potential, and turbidity on an annual basis and total dissolved solids, carbonate, bicarbonate, chloride, sulfate, boron, calcium, sodium, magnesium, and potassium every 5 years.

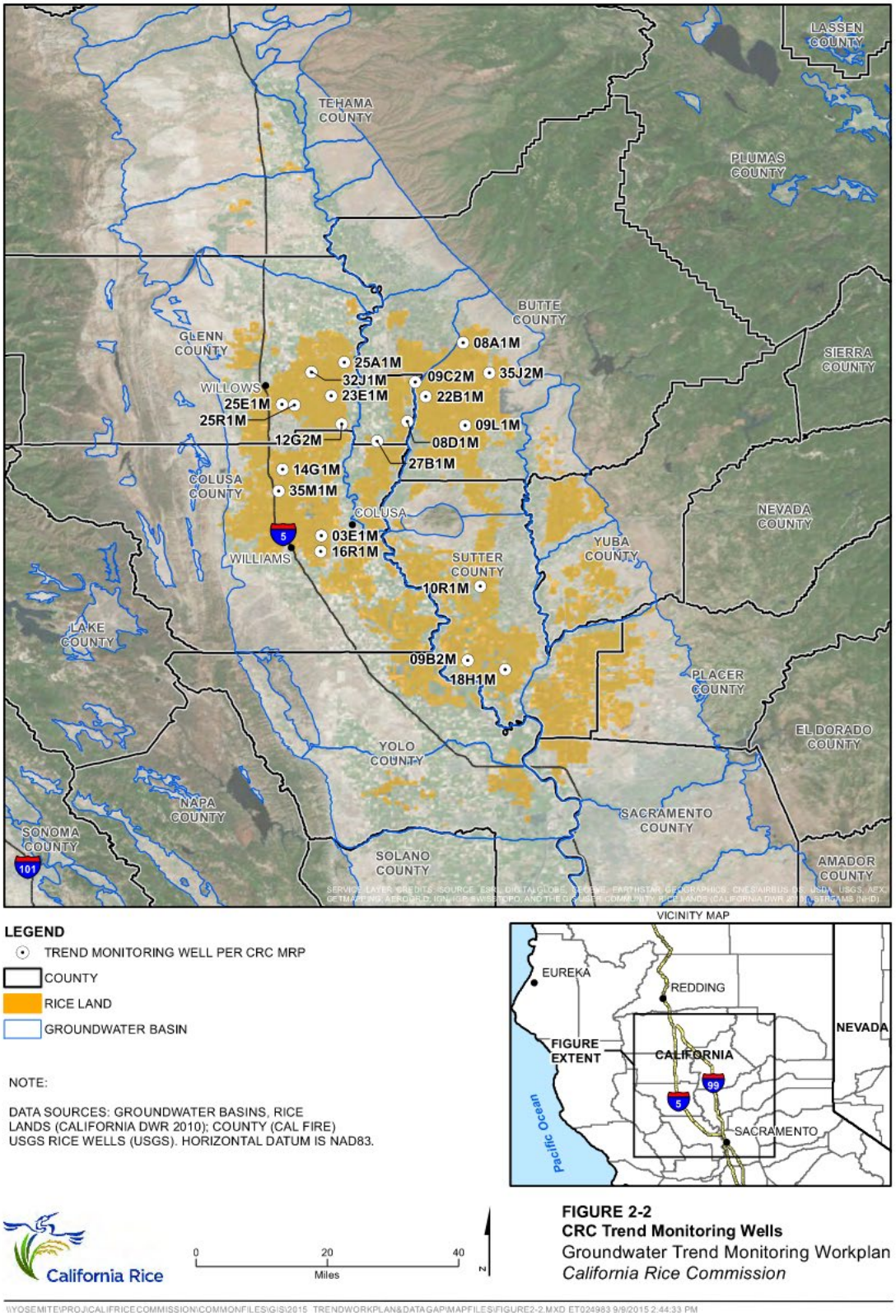


Figure 2-17. California Rice Commission GQTM Program Network

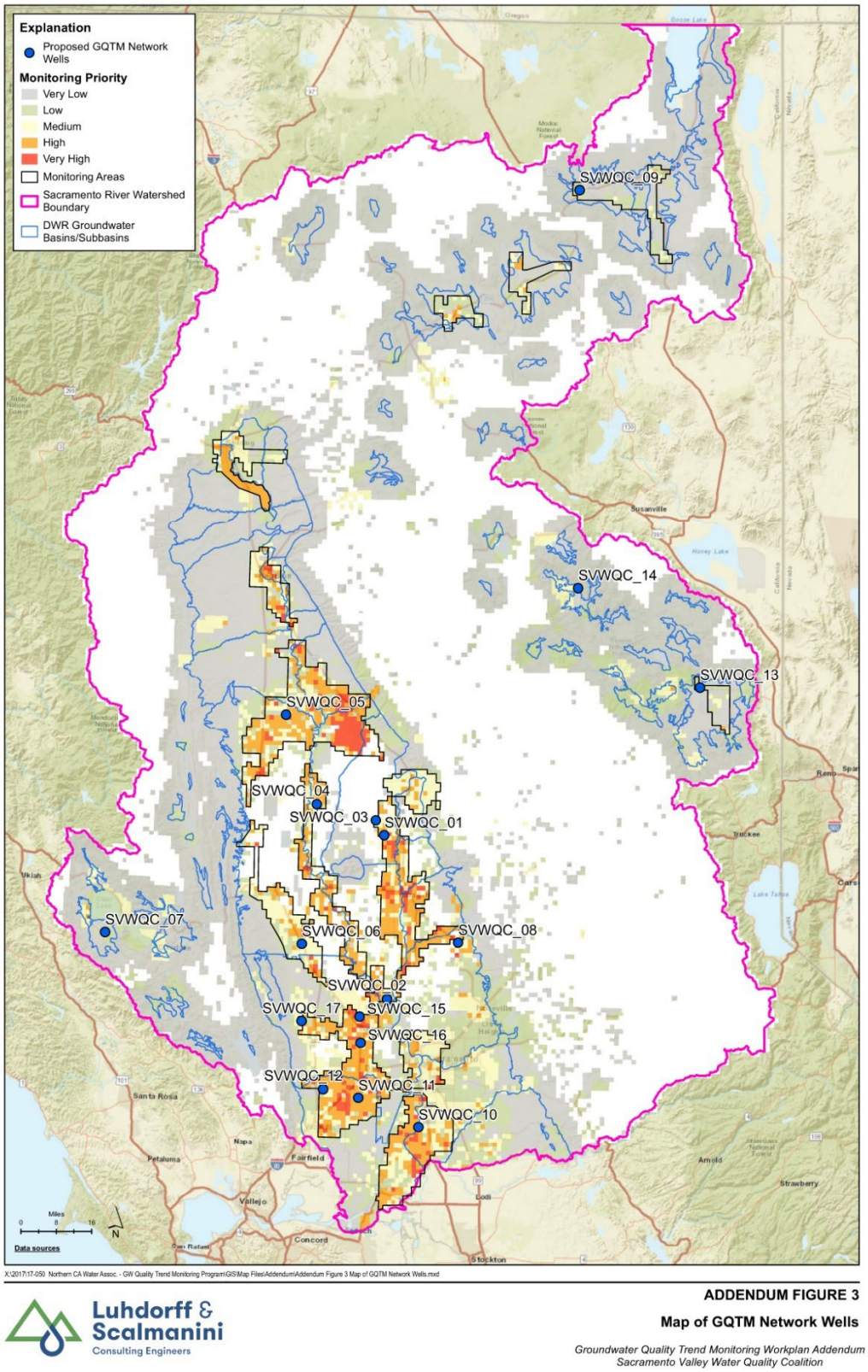


Figure 2-18. Sacramento Valley Water Quality Coalition GQTM Program Network

2.3.3.1.4 Groundwater Ambient Monitoring and Assessment Program

The Groundwater Ambient Monitoring and Assessment (GAMA) Program, established in 2000, is a statewide groundwater quality monitoring program based on interagency collaboration among the SWRCB and the Regional Water Quality Control Boards, DWR, Department of Pesticide Regulation (DPR), USGS, and Lawrence Livermore National Laboratory, and cooperation with local water agencies and well owners (California Water Boards, July 2020). The primary goals of GAMA are to improve statewide comprehensive groundwater monitoring and increase the availability to the general public of groundwater quality and contamination information. Additional goals of GAMA include to establish ambient groundwater quality on a basin wide scale, continue periodic groundwater sampling and groundwater quality studies in order to characterize chemicals of concern and identify trends in groundwater quality, and centralize the availability of groundwater information to the public and decision makers to better protect California's groundwater resources.

GAMA includes several projects to monitor groundwater quality. Within the Sutter Subbasin, the Middle Sacramento Valley Deep Aquifer Assessment (Bennett et al., 2011) was conducted as part of the Priority Basin Project, which provides a comprehensive statewide assessment of groundwater quality to help identify and understand the risks to groundwater. Monitoring data collected under the GAMA program are available via several online tools (California Water Boards, December 2020(a)), including GeoTracker GAMA.

2.3.3.1.5 GeoTracker

GeoTracker is the SWRCB's data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. GeoTracker contains records for sites that require cleanup, such as Leaking Underground Storage Tank (LUST) sites, Department of Defense sites, and Cleanup Program sites. GeoTracker also contains records for various unregulated projects as well as permitted facilities including Irrigated Lands, Oil and Gas production, operating Permitted USTs, and Land Disposal Sites. A search of GeoTracker for the Sutter Subbasin indicates that there approximately 265 active groundwater monitoring wells in the Subbasin (SWRCB, n.d.(a)).

2.3.3.1.6 State Water Resources Control Board, Division of Drinking Water

The SWRCB's Division of Drinking Water (DDW) monitors public water system wells for California Code of Regulations Title 22 requirements relative to levels of organic and inorganic compounds such as metals, microbial compounds, and radiological analytes. Data are available for active and inactive drinking water sources, for water systems that serve the public, and wells defined as serving 15 or more connections, or more than 25 people per day for 60 or more days per year. DDW wells throughout the state are

monitored for Title 22 requirements, including pH, alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, barium, copper, iron, zinc, and nitrate.

2.3.3.1.7 SGMA Data Viewer

DWR's SGMA Data Viewer provides access to groundwater-related datasets that are organized by the requirements of SGMA and the GSP regulations for the purposes of supporting GSP development and implementation (DWR, n.d.(b)). SGMA Data Viewer provides centralized data access to improve coordination of datasets collected and displayed across various state and federal portals and applications for the purpose of helping GSAs meet the requirements of SGMA and the GSP regulations. Data types presented within SGMA Data Viewer include periodic and continuous groundwater level measurements from DWR and U.S. Geological Survey; groundwater level contours; Well Completion Reports; land subsidence data including extensometers, continuous GPS, and InSAR; CDEC stations; climate change factors; land use; soil and geologic data; and jurisdictional boundaries.

2.3.3.1.8 National Water Information System

The U.S. Geological Survey's National Water Information System (NWIS) database contains surface water data collected by automatic recorders and field measurements as well as chemical, physical, and biological sampling results from wells across the country and within the Sutter Subbasin (USGS, n.d.). Real-time and daily data daily data are available to describe river state, streamflow, lake levels, surface water quality, rainfall, groundwater levels, and groundwater quality.

2.3.3.2 Surface Water

2.3.3.2.1 State Water Resources Control Board Surface Water Ambient Monitoring Program

The SWRCB's Surface Water Ambient Monitoring Program (SWAMP) operates four primary statewide monitoring programs to evaluate the condition of surface waters: Bioaccumulation Monitoring Program, Bioassessment Program, Freshwater CyanoHABs Program, and Stream Pollution Trends Program (California Water Boards, December 2020(b)). Data for the Sutter Subbasin is available in the California Environmental Data Exchange Network (CEDEN) from August 2007 through February 2020 (California Water Boards, n.d.).

2.3.3.2.2 Department of Pesticide Regulation Surface Water Protection Program

The California Department of Pesticide Regulation's (DPR's) Surface Water Protection Program monitors agricultural and non-agricultural sources of pesticide residues in surface water. The goal of the Surface Water Protection Program is to characterize pesticide residues, identify the source of contamination, determine the mechanisms of off-site movement of pesticides to surface water, and develop site-specific mitigation

strategies (CDPR, n.d.). The program includes both a preventative and response component toward reducing the presence of pesticides in surface water. The preventative component includes local outreach to promote management practices that reduce pesticide runoff, while the response component includes mitigation options to meet water quality goals and identify self-regulating efforts to reduce pesticide exposure. Data are available in CEDEN from January 1998 through April 2005.

2.3.3.2.3 Sacramento Watershed Coordinated Monitoring Program

The Sacramento Watershed Coordinated Monitoring Program is a coordinated effort between the CV-RWQCB and DWR Northern Region to monitor water quality trends in the Sacramento River Watershed (California Water Boards, June 2019). Coordinated monitoring was initiated in the fall of 2008 and monitoring sites are sampled on a quarterly basis for water column toxicity, total organic carbon, nutrients, and E. coli, where a subset of monitoring sites are also monitored for sediment toxicity (California Water Boards, 2009). There are two sampling sites within the Sutter Subbasin: Butte Slough near Meridian and Sutter Bypass at RD-1500 Powerplant. Both sites within the Sutter Subbasin are integrator sites for SWAMP Statewide Stream Contaminant Trend Monitoring. Additionally, there are four sampling sites directly adjacent to the Sutter Subbasin located within neighboring subbasins: Sacramento River above Colusa Basin Drain near Knights Landing, Colusa Basin Drain near Knights Landing, Feather River near Verona, and Sacramento River near Knights Landing (California Water Boards, February 2009). Data by water quality parameter is available for download at the Sacramento River Watershed Data Portal website (Sacramento River Watershed Data Program, n.d.).

2.3.3.2.4 California Data Exchange Center Monitoring Program

The California Data Exchange Center (CDEC) installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting (DWR, n.d.(a)). CDEC provides provisional real-time data along with historical 15-minutes, hourly, and daily data for monitoring sites on the Sacramento River, Feather River, and Sutter Bypass within the Sutter Subbasin. CDEC displays real-time data from DWR as well as the following cooperative agencies: National Weather Service, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, U.S. Geological Survey, California Department of Fish and Wildlife, Sacramento Municipal Utilities District, Pacific Gas & Electric Company, East Bay Municipal Utilities District, and local entities.

2.3.3.2.5 National Water Information System

Refer to **Section 2.3.3.1.8** for an overview of the U.S. Geological Survey's NWIS.

2.3.3.3 Land Surface

2.3.3.3.1 DWR and USBR Subsidence Monitoring

DWR, in coordination with local, State, and federal partners (including Sutter County), monitors for potential land subsidence throughout the Sacramento Valley. The existing subsidence monitoring network consists of 32 GPS monuments and one extensometer located within Sutter County (Wood Rodgers, 2012). A baseline survey of the GPS monuments was conducted in 2008 by DWR and USBR in coordination with the Sacramento Valley Height-Modernization Project (DWR and USBR, September 2008). The primary purpose of this survey (the Sacramento Valley GPS Subsidence Project) was to provide a comprehensive Sacramento Valley GPS subsidence network to serve as a framework for monitoring land subsidence resulting from groundwater extractions. The baseline observations began on March 17, 2008 and were concluded on June 17, 2008. The network was planned for monitoring every 5 years, although 2013 monitoring did not occur due to budget limitations.

DWR resurveyed the monument network in 2017 with assistance from 19 state, county, and local agencies and a private entity (DWR NRO, December 2018). The methodology used was similar to the DWR survey. Analysis of the results was performed to depict the change in height at each monument from 2008 to 2017. Observed subsidence during this time period was less than 0.4 feet throughout the Sutter Subbasin.

2.3.4 Implications of Existing Monitoring and Management Programs in this GSP

Existing monitoring and management programs within the Sutter Subbasin support groundwater management and are not anticipated to limit operational flexibility. Monitoring under the Sutter Subbasin GSP will be coordinated to the extent possible with these other, existing monitoring programs.

2.4 Existing and Planned Conjunctive Use Programs

Several agencies within the Subbasin conduct short-term groundwater transfer programs as part of conjunctive use of groundwater in the Subbasin. These agencies are Sutter Extension Water District, Butte Water District, and Garden Highway Mutual Water Company. Substitution transfers are completed by these agencies not using their full allotment of surface water. These agencies transfer a portion of their allotment to agencies south of the Sacramento-San Joaquin Delta and pump groundwater in-lieu of using their surface water. These agencies began the water transfers in 2009 and the volume of water transferred since 2009 is presented in **Table 2-4**.

Table 2-4. Groundwater Substitution Transfers in Sutter Subbasin in Acre-Feet per Year, 2009 through 2021

Water Year	Sutter Extension Water District	Butte Water District	Garden Highway Mutual Water Company	Total Water Transfers
2009	4,105	2,730	4,068	**10,903**
2010	2,870	4,082	3,846	**10,798**
2011	-	-	-	**-**
2012	-	-	-	**-**
2013	2,863	3,854	3,837	**10,554**
2014	4,105	3,971	5,364	**13,440**
2015	1,725	1,140	-	**2,865**
2016	17,433*	-	-	**17,433**
2017	-	-	-	**-**
2018	4,540*	-	6,000*	**10,540**
2019	-	-	-	**-**
2020	-	-	6,500*	**6,500**
2021	-	-	2,000*	**2,000**
Total	**37,641**	**15,777**	**31,615**	**85,033**

Sources: GEI, 2016; California Water Boards, 2016; California Water Boards, 2018; California Water Boards, 2020; California Water Boards, 2021

*Indicates approved transfer amount, as reported by California State Water Board. Actual transfer amount may vary slightly.

Yuba City completed an aquifer storage and recovery (ASR) feasibility assessment (Carollo Engineers et al., November 2010) and is developing plans for an ASR

demonstration project in one or two targeted aquifer zones at the City's water treatment plant site. In 2015, the City completed construction of three multiple-completion groundwater monitoring wells at the water treatment plant site for the purpose of more fully characterizing the hydrogeology of the site and to assess groundwater flow gradients and groundwater quality in the two targeted aquifer zones. The City is conducting ongoing groundwater monitoring to establish baseline conditions prior to implementing an ASR demonstration project.

2.5 Plan Elements from California Water Code Section 10727.4

2.5.1 Control of Saline Water Intrusion

The Sutter Subbasin does not experience saline water intrusion; therefore, this element is not applicable. See **Section 6.4.3** for an explanation of why the saline water intrusion sustainability indicator does not apply to the Sutter Subbasin.

2.5.2 Wellhead Protection Areas and Recharge Areas

Wellhead Protection Areas, as defined under the Federal Wellhead Protection Program (§1428 of the State Drinking Water Act Amendments of 1986), are the surface and subsurface areas surrounding a water well or well field supply for a public water system through which contaminants are reasonably likely to move toward and reach such water or well field. The SWRCB-DDW's Drinking Water Source Assessment and Protection program (DWSAP) serves as the State's Wellhead Protection Program. There are no existing local wellhead protection programs in the Sutter Subbasin; therefore, agencies within the Subbasin adhere to federal, state, and county regulations governing wellhead protection.

Groundwater recharge areas are discussed in **Section 5.1.7**.

2.5.3 Mitigation of Contaminated Groundwater

Details on migration of contaminated groundwater are discussed in **Section 5.2.5.1**.

2.5.4 Well Abandonment and Well Destruction Programs

A summary of well abandonment and destruction programs within the Sutter Subbasin are detailed in **Section 2.3.2**.

2.5.5 Activities Implementing, Opportunities for, and Removing Impediments to Conjunctive Use or Underground Storage

Details regarding existing and planned conjunctive use programs are discussed in **Section 2.4** and opportunities for and removing impediments to conjunctive use or underground storage are discussed in **Section 7.1**.

2.5.6 Measures Addressing Groundwater Contamination Cleanup, Groundwater Recharge, In-Lieu Use, Diversions to Storage, Conservation, Water Recycling, Conveyance, and Extraction Projects

Details on projects that may include, but are not limited to, addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversion to storage, conservation, water recycling, conveyance, and extraction are discussed in **Section 7.1**.

2.5.7 Efficient Water Management Practices, as defined in Section 10902, for the Delivery of Water and Water Conservation Methods to Improve the Efficiency of Water Use

Details on efficient water management practices are discussed in **Section 2.3.1**.

2.5.8 Efforts to Develop Relationships with State and Federal Regulatory Agencies

The GSAs will continue to coordinate with DWR on groundwater level and groundwater quality monitoring and with DWR and USBR on subsidence monitoring. The GSAs will coordinate with entities implementing the ILRP and CV-SALTS to discuss water quality information and needs. The GSAs will continue to coordinate with CV-RWQCB and Sutter County regarding groundwater contaminant plumes. Environmental organizations and California Department of Fish and Wildlife (CDFW) will be engaged to discuss opportunities to improve the understanding of groundwater dependent ecosystems (GDEs) and potential depletions of interconnected surface water.

2.5.9 Processes to Review Land Use Plans and Efforts to Coordination with Land Use Planning Agencies to Assess Activities that Potentially Create Risk to Groundwater Quality and Quantity

Entities with land use authority in the Sutter Subbasin include Sutter County and the cities of Live Oak and Yuba City. These same entities are also individual GSAs participating in the development and implementation of this GSP. As such, land use planning is integrally combined with through groundwater management through the implementation of this GSP.

2.5.10 Impacts on Groundwater Dependent Ecosystems

Impacts on groundwater dependent ecosystems have not been assessed at this time due to a lack of available information and relative data necessary to analyze impacts to GDEs, as well as location, timing, and quantity of interconnected surface waters. Data to evaluate possible impacts to GDEs will be collected during the first five years of GSP implementation and will be evaluated in the GSP five-year update. For more information about the identification of GDEs in the Sutter Subbasin, refer to **Section 5.2.8**.

2.6 References

Bennett, G.L., M.S. Fram, and K. Belitz. 2011. *Status of Groundwater Quality in the Southern, Middle, and Northern Sacramento Valley Study units, 2005-08: California GAMA Priority Basin Project*. U.S. Geological Survey Scientific Investigations Report 2011-5002, 120 p. https://pubs.usgs.gov/sir/2011/5002/. Accessed: January 13, 2021.

California Department of Fish and Wildlife (CDFW). n.d. *Refuge Water Supply Program Details*. https://wildlife.ca.gov/Conservation/Watersheds/Refuge-Water/Details. Accessed: November 11, 2021.

California Department of Pesticide Regulation (CDPR). n.d. *Overview of the Surface Water Protection Program*. https://www.cdpr.ca.gov/docs/emon/surfwtr/overvw.htm. Accessed: January 13, 2021.

California Department of Water Resources (DWR). 1981. *Water Well Standards: State of California, Bulletin 74-81*. https://www.acwd.org/DocumentCenter/View/169/Bulletin-74-81-Water-Well-Standards---State-of-California?bidId=. Accessed: January 14, 2021.

California Department of Water Resources (DWR). 1991. *California Well Standards, Bulletin 74-90*. https://www.countyofglenn.net/sites/default/files/Environmental_Health/WP_DWR_Bulletin_74-90.pdf. Accessed: January 14, 2021.

California Department of Water Resources (DWR). 2003. *Bulletin 118-2003: California's Groundwater*. https://cawaterlibrary.net/document/bulletin-118-californias-groundwater-2003/. Accessed: January 13, 2021.

California Department of Water Resources (DWR). 2016. Water Districts shapefile. https://data.cnra.ca.gov/dataset/water-districts. Accessed: March 31, 2016.

California Department of Water Resources (DWR). 2019. CA Bulletin 118 Groundwater Basins shapefile (updated 2018). https://data.cnra.ca.gov/dataset/ca-bulletin-118-groundwater-basins. Accessed: June 4, 2019.

California Department of Water Resources (DWR). n.d.(a). *California Data Exchange Center*. https://cdec.water.ca.gov/misc/CDEC_Brochure.pdf. Accessed: January 14, 2021.

California Department of Water Resources (DWR). n.d.(b). *SGMA Data Viewer*. https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels. Accessed January 13, 2021.

California Department of Water Resources (DWR). n.d.(c). Groundwater Monitoring (CASGEM). https://water.ca.gov/Programs/Groundwater-

Management/Groundwater-Elevation-Monitoring--CASGEM. Accessed: October 30, 2020.

California Department of Water Resources (DWR). n.d.(d). Well Completion Report Mapp Application. https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37. Accessed: November 16, 2020.

California Department of Water Resources, Northern Region Office (DWR NRO). December 2018. *2017 GPS Survey of the Sacramento Valley Subsidence Network*.

California Department of Water Resources, SGMA Portal. February 2017a. City of Live Oak GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/136. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. February 2017b. Sutter Community Service District GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/114. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. February 2017c. Sutter Extension Water District GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/121. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. March 2017. Reclamation District No. 1500 GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/239. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. April 2017. City of Yuba City GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/264. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. June 2017a. Reclamation District No. 70 GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/320. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. June 2017b. Reclamation District No. 1660 GSA shapefile. https://sgma.water.ca.gov/portal/gsa/print/321. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. July 2019a. Butte Water District GSA – Sutter shapefile. https://sgma.water.ca.gov/portal/gsa/print/119. Accessed: August 24, 2020.

California Department of Water Resources, SGMA Portal. July 2019b. County of Sutter GSA – Sutter shapefile. https://sgma.water.ca.gov/portal/gsa/print/218. Accessed: August 24, 2020.

California Department of Water Resources (DWR) and United States Bureau of Reclamation (USBR). September 2008. *2008 DWR/USBR Sacramento Valley Subsidence Project – Project Report*.

California Natural Resources Agency. January 2020. 2016 Statewide Crop Mapping GIS Map Service. https://data.cnra.ca.gov/dataset/statewide-crop-mapping/resource/653de2ff-d734-4a9a-b7a5-417c45ed83b5. Accessed: January 13, 2021.

California State Water Resources Control Board (SWRCB). n.d.(a). *GeoTracker – Download ESI Data by County*. https://geotracker.waterboards.ca.gov/data_download_by_county. Accessed: October 4, 2020.

California State Water Resources Control Board (SWRCB). n.d.(b). *What is a Public Water System?*. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/waterpartnerships/what_is_a_public_water_sys.pdf. Accessed: January 12, 2021.

California Water Boards. February 2009. *SWAMP Monitoring Plan – Sacramento Watershed Coordinated Monitoring Program*. https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/workplans/regionalworkplan2.pdf. Accessed: January 14, 2021.

California Water Boards. 2009. *SWAMP Achievements Report – Sacramento Watershed Coordinated Monitoring Program*. https://www.waterboards.ca.gov/water_issues/programs/swamp/achievements/2009/monitoring/sac_coordmp.pdf. Accessed: January 14, 2021.

California Water Boards. 2016. *State Water Board 2016 Water Transfers*. https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/2016transfertable.pdf. Accessed: July 19, 2021.

California Water Boards. 2018. *State Water Board 2018 Water Transfers*. https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/2018transfertable.pdf. Accessed: July 19, 2021.

California Water Boards. June 2019. *SWAMP – Sacramento River Basin*. https://www.waterboards.ca.gov/centralvalley/water_issues/swamp/sacramento_river_basin/. Accessed: January 13, 2021.

California Water Boards. 2020. *State Water Board 2020 Water Transfers*. https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/2020transfertable.pdf. Accessed: July 19, 2021.

California Water Boards. June 2020. *Storm Water Grant Program (SWGP) – Storm Water Resource Plans*.

https://www.waterboards.ca.gov/water_issues/programs/grants_loans/swrp/. Accessed: January 13, 2021.

California Water Boards. July 2020. *GAMA – About*. https://www.waterboards.ca.gov/water_issues/programs/gama/about.html. Accessed: January 13, 2021.

California Water Boards. December 2020(a). *GAMA Online Tools*. https://www.waterboards.ca.gov/water_issues/programs/gama/online_tools.html. Accessed: January 13, 2021.

California Water Boards. December 2020(b). *Surface Water Ambient Monitoring Program (SWAMP) – Statewide Monitoring Programs*. https://www.waterboards.ca.gov/water_issues/programs/swamp/monitoring/statewide_monitoring_programs.html. Accessed: January 13, 2021.

California Water Boards. 2021. State Water Board 2021 Water Transfers. https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/2021transfertable_rev2.pdf. Accessed: July 19, 2021.

California Water Boards. n.d. *California Environmental Data Exchange Network*. https://ceden.waterboards.ca.gov/AdvancedQueryTool. Accessed: January 13, 2021.

Carollo Engineers, Pueblo Water Resources, and ASR Systems. November 2010. *Aquifer Storage Recovery Feasibility Assessment Report Prepared for City of Yuba City, California*.

Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS). December 2016. *Central Valley Region Salt and Nitrate Management Plan – Final Document for Central Valley Water Board Consideration*. https://www.cvsalinity.org/docs/central-valley-snmp/final-snmp.html. Accessed: January 13, 2021.

CH2M Hill. 2012. *Reclamation District No. 1500 Groundwater Management Plan*. February.

CH2M Hill. March 2016. *Groundwater Trend Monitoring Workplan and Data Gap Assessment Plan – Prepared for Central Valley Regional Water Quality Control Board On Behalf of California Rice Commission*. https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality/coalitions_submittals/california_rice_commission/ground_water/2016_03_rice_gar.pdf. Accessed: January 13, 2021.

CH2M Hill and MBK Engineers. October 2016a. *Sacramento River Settlement Contactors Drought Management Plan*. https://wuedata.water.ca.gov/public/awmp_attachments/6089756608/Drought%20Mgmt%20Plan.pdf. Accessed: January 13, 2021.

CH2M Hill and MBK Engineers. October 2016b. *Water Balance Summary Prepared for Sacramento River Settlement Contractors*. https://wuedata.water.ca.gov/public/awmp_attachments/6360883414/Water%20Balance%20Summary_12.29.16.pdf. Accessed: January 13, 2021.

City of Live Oak. n.d. City of Live Oak 2030 General Plan. https://www.liveoakcity.org/Home/ShowDocument?id=494. Accessed: January 13, 2021.

City of Yuba City. 2004. Yuba City General Plan. https://www.yubacity.net/UserFiles/Servers/Server_239174/File/Development%20Services/Planning/Plans/General/YC-GPAC-APR-04-FINAL.pdf. Accessed: January 13, 2021.

Ducks Unlimited and The Trust for Public Land. 2021. National Conservation Easement Database. https://www.conservationeasement.us/interactivemap/. Accessed: February 5, 2021.

EcoLogic. 2009. City of Live Oak Water Master Plan.

GEI. 2016. *Alternative Submittal to a Groundwater Sustainability Plan for Sutter Subbasin, Sutter County, California*. 19 December.

GreenInfo Network. 2021. California Protected Areas Database, Version 2020b. http://www.mapcollaborator.org/cpad/?base=map&y=37.50973&x=-123.94775&z=6&layers=mapcollab_cpadng_cpad_ownlevel%2Cnotes%2Cpolygons%2Cuploads&opacs=50%2C100%2C25%2C90. Accessed: February 5, 2021.

Jacobs and Montgomery & Associates. May 2020. *2020 Rice-Specific Groundwater Assessment Report Update – Prepared for Central Valley Regional Water Quality Control Board On Behalf of California Rice Commission*.

Luhdorff & Scalmanini Consulting Engineers (LSCE). July 2018. *Groundwater Quality Trend Monitoring Workplan Addendum for the Sacramento Valley Water Quality Coalition*. https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality/coalitions_submittals/sacramento_valley/ground_water/2018_0731_svwqc_gqtmp_add.pdf. Accessed: January 13, 2021.

MBK Engineers. October 2016. Sutter Mutual Water Company SBx7-7 Water Measurement Compliance Program. https://wuedata.water.ca.gov/public/awmp_attachments/3454450309/SMWC%20Water%20Measurement%20Program.pdf. Accessed: January 13, 2021.

No author. 1995. *Sutter Extension Water District Groundwater Management Plan*. August.

No author. 1996. *Butte Water District Groundwater Management Plan*. May.

No author. 2005. *Groundwater Management Plan of Feather Water District*. November.

No author. 2012. *2012 Sacramento Valley Regional Water Management Plan Annual Update*. https://wuedata.water.ca.gov/public/awmp_attachments/8930585563/2012%20RWMP%20Annual%20Update%209.6.13.pdf. Accessed: January 13, 2021.

Northern California Water Association (NCWA). September 2016. *Feather River Regional Agricultural Water Management Plan - Volume II: Supplier Plan Components Sutter Extension Water District*. https://wuedata.water.ca.gov/public/awmp_attachments/8171979606/II.6.%20SEWD%20AWMP%20Final.pdf. Accessed: January 13, 2021.

Northern California Water Association (NCWA). December 2016. *Feather River Regional Agricultural Water Management Plan – Volume II: Supplier Plan Components Butte Water District*. https://wuedata.water.ca.gov/public/awmp_attachments/2549176871/Butte%20WD%202016%20AWMP.pdf. Accessed: January 13, 2021.

Northern California Water Association (NCWA). April 2021. *Feather River Regional Agricultural Water Management Plan – Volume I: Regional Plan Components*. https://static1.squarespace.com/static/56f3336d9f7266fac154ef8b/t/609c3443b381117ad8bd97d6/1620849749379/I.1-7+Regional+AWMP_final.pdf. Accessed: August 5, 2021.

Northern Sacramento Valley Integrated Regional Water Management Group. March 2020. *2014 Northern California Sacramento Valley Integrated Regional Water Management Plan, Updated March 2020*. https://nsvwaterplan.org/mdocuments-library/#. Accessed: January 13, 2021.

Sacramento River Watershed Data Program. n.d. *About the Sacramento River Coordinated Monitoring Program*. https://data.sacriver.org/explore_data_custom/sacramento-river-watershed-cmp. Accessed: January 14, 2021.

Sutter County. 2011. *Sutter County General Plan – Policy Document*. https://www.suttercounty.org/assets/pdf/cs/ps/General_Plan_Policy_Document_Dec_2015_Amended_Sep2019.pdf. Accessed: January 13, 2021.

Sutter County. n.d. *Sutter County Code of Ordinances, 700 – Health and Sanitation, Chapter 768 Water Wells*. https://library.municode.com/ca/sutter_county/codes/code_of_ordinances?nodeId=n700HESA_CH765WAWE. Accessed: January 13, 2021.

Sutter County Environmental Health Division (SCEHD). July 2013. *Water Well Permit Application*.

https://www.suttercounty.org/assets/pdf/cs/ehs/well_permit_application.pdf. Accessed: January 13, 2021.

Tully & Young. 2021. *City of Yuba City 2020 Urban Water Management Plan*. https://wuedata.water.ca.gov/public/uwmp_attachments/8303815543/Yuba%202020%20UWMP%20%28Final%29.pdf. Accessed: August 5, 2021.

United States Bureau of Reclamation (USBR). July 2004. *Evaluation of Groundwater Potential for Incremental Level 4 Refuge Water Supply*. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=92276&inline. Accessed: November 11, 2021.

United States Department of the Interior, Bureau of Land Management. 2018. BLM National Surface Management Agency Area Polygons shapefiles. https://catalog.data.gov/dataset/blm-national-surface-management-agency-area-polygons-national-geospatial-data-asset-ngda. Accessed: November 30, 2020.

United States Geological Survey (USGS). n.d. *National Water Information System: Web Interface*. https://waterdata.usgs.gov/nwis. Accessed: January 13, 2021.

West Yost Associates. 2018. *Yuba City Basin Storm Water Resource Plan*. https://www.yubacity.net/UserFiles/Servers/Server_239174/File/Public%20Works/Engineering/Stormwater%20Management/SWRP/SWRP%20Final/Yuba%20City_FINAL%20Storm%20Water%20Resource%20Plan%20July%202018_reduced.pdf. Accessed: January 13, 2021.

West Yost Associates. 2019. *City of Yuba City Water Treatment Plant and Distribution System Master Plan – Volume I and Volume II*. https://www.yubacity.net/UserFiles/Servers/Server_239174/File/Public%20Works/Utilities/Water/City%20of%20Yuba%20City%20WMP_Vol%201.pdf and https://www.yubacity.net/UserFiles/Servers/Server_239174/File/Public%20Works/Utilities/Water/City%20of%20Yuba%20City%20WMP_Vol%202.pdf. Accessed: January 13, 2021.

Wood Rodgers. 2012. *Sutter County Groundwater Management Plan*. Available at: https://www.suttercounty.org/contents/pdf/pw/wr/gmp/Sutter_County_Final_GMP_20120319.pdf. Accessed: January 12, 2021.

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CHAPTER THREE

Governance & Administration

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3. GOVERNANCE AND ADMINISTRATION

This chapter includes information pursuant to Article 5. Plan Contents, Subarticle 1. Administrative Information, § 354.6 (Agency Information), as well as Subarticle 8. Interagency Agreements (§ 357.2 Interbasin Agreements and § 357.4 Coordination Agreements), as required by the Groundwater Sustainability Plan (GSP) Emergency Regulations. Agency Contact information for the Sutter Subbasin GSP and the plan manager is included herein. The organization and management structure, as well as the legal authority of each Groundwater Sustainability Agency (GSA) in the Sutter Subbasin, is detailed and accompanied by a GSA boundary map and a description of agreements in place for development of the Sutter Subbasin GSP and associated costs.

3.1 Agency Contact Information

This GSP was prepared in a cooperative manner by nine GSAs in the Sutter Subbasin. The following GSAs submitted a Notification of Intent to the California Department of Water Resources (DWR) to develop a single GSP for the Sutter Subbasin on May 29, 2020:

- Butte Water District GSA – Sutter
- City of Live Oak GSA
- City of Yuba City GSA
- County of Sutter GSA – Sutter
- Reclamation District No. 70 GSA
- Reclamation District No. 1500 GSA
- Reclamation District No. 1660 GSA
- Sutter Community Services District GSA
- Sutter Extension Water District GSA

The location and proximity of these GSAs are shown in **Figure 3-1**.

The GSP Emergency Regulations require the GSP to designate a plan manager to serve as a point of contact with DWR. Contact information for the Sutter Subbasin GSP is as follows:

Mr. Guadalupe Rivera, Plan Manager
Sutter County Public Works
1130 Civic Center Blvd
Yuba City, CA 95993
Phone: (520)-822-7400 / Fax: (530)-822-7457
grivera@co.sutter.ca.us

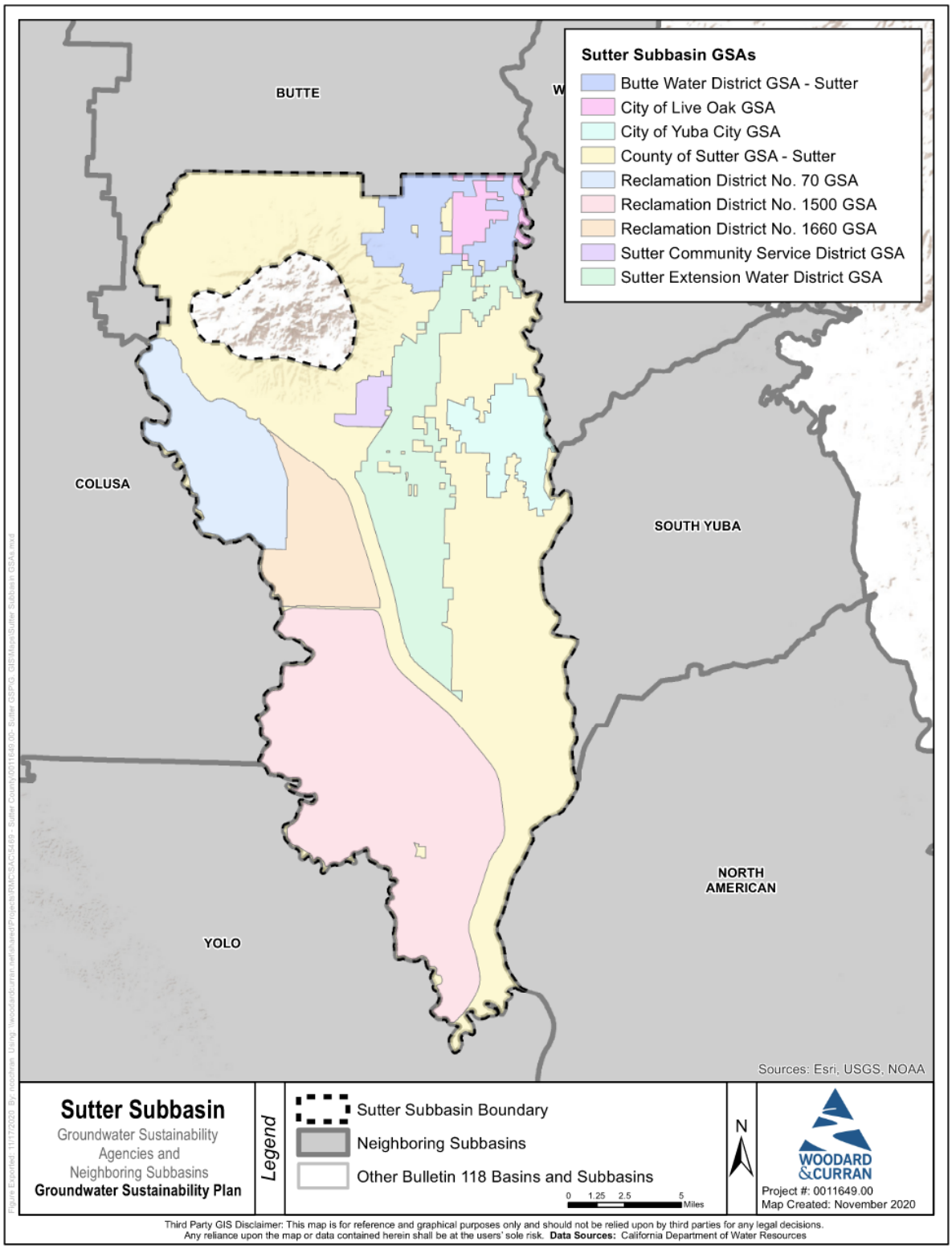

Figure 3-1. Sutter Subbasin GSA Boundaries

3.2 Sutter Subbasin Groundwater Sustainability Agencies

The nine Sutter Subbasin GSAs each have their own individual organization and management structures as well as legal authority under which they operate. The following subsections include a description of the organization and management structure and persons with management authority to implement the GSP; the legal authority of the GSA setting forth the duties, powers, and responsibilities of the GSA to implement the GSP; and the name and mailing address for the GSA (also included in **Table 3-1**). **Figure 3-1** shows the boundaries of the nine GSAs.

3.2.1 Butte Water District GSA - Sutter

The Butte Water District GSA – Sutter operates within its current organization and management structure under the Butte Water District Board of Directors, as well as its legal authority as a special district. Butte Water District exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained on the Butte Water District website at buttewaterdistrict.org.

3.2.2 City of Live Oak GSA

The City of Live Oak GSA operates within its current city organization and management structure. Its legal authority as a City is described in the City Charter. The City of Live Oak has the ability to exercise all relevant duties, powers, and responsibilities to implement the Sutter Subbasin GSP. Public noticing and records regarding decisions made to support the Sutter Subbasin GSP are maintained as part of City Council records in accordance with City ordinances and protocols. Public notices and permanent records are maintained on the City's website at www.liveoakcity.org.

3.2.3 City of Yuba City GSA

The City of Yuba City GSA operates within its current city organization and management structure. As with the City of Live Oak, the City of Yuba City's legal authority is described in the City Charter. The City of Yuba City has the ability to exercise all relevant duties, powers, and responsibilities to implement the Sutter Subbasin GSP. Public noticing and records regarding decisions made to support the Sutter Subbasin GSP are maintained as part of City Council records in accordance with City ordinances and protocols. Public notices and permanent records are maintained on the City's website at www.yubacity.net.

3.2.4 County of Sutter GSA – Sutter

The County of Sutter GSA – Sutter represents communities, water districts, and other entities within Sutter County which are outside of the other GSA boundaries but within the county limits of the Sutter Subbasin. The County of Sutter GSA operates within its current organization and management structure under the Sutter County Board of

Supervisors. Public notices and permanent records are maintained on Sutter County's website at suttercounty.org. The County-default provision in the Sustainable Groundwater Management Act (SGMA) (Section 10724) is used to provide coverage in the Subbasin for the "white areas" or other areas of non-GSA coverage within Sutter County.

3.2.5 Reclamation District No. 70 GSA

The Reclamation District No. 70 GSA operates within its current organization and management structure under the Reclamation District No. 70 Board of Trustees, as well as its legal authority as a special district and provisions of the California Reclamation District Law (California Water Code Division 15). Reclamation District No. 70 exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained at the District's office.

3.2.6 Reclamation District No. 1500 GSA

The Reclamation District No. 1500 GSA operates within its current organization and management structure under the Reclamation District No. 1500 Board of Trustees, as well as its legal authority as a special district and provisions of the California Reclamation District Law (California Water Code Division 15). Reclamation District No. 1500 exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained at the District's office.

3.2.7 Reclamation District No. 1660 GSA

The Reclamation District No. 1660 GSA operates within its current organization and management structure under the Reclamation District No. 1660 Board of Trustees, as well as its legal authority as a special district and provisions of the California Reclamation District Law (California Water Code Division 15). Reclamation District No. 1660 exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained at the District's office.

3.2.8 Sutter Community Services District GSA

The Sutter Community Services District GSA operates within its current organization and management structure under the Sutter Community Services District Board of Directors, as well as its legal authority as a special district. Sutter Community Services District exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained on the Sutter Community Services District website at sutterwater.com.

3.2.9 Sutter Extension Water District GSA

The Sutter Extension Water District GSA operates within its current organization and management structure under the Sutter Extension Water District Board of Directors, as well as its legal authority as a special district. Sutter Extension Water District exercises all relevant duties, powers, and responsibilities as a GSA to implement the Sutter Subbasin GSP. Public notices and permanent records are maintained on the Sutter Extension Water District website at sutterewd.com.

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Table 3-1. Sutter Subbasin GSAs Contact Information

GSA	Point of Contact	Mailing Address	Phone Number	Email
Butte Water District	Mark Orme	735 Virginia St Gridley, CA 95948	(530) 846-3100	MOrme@buttewater.net
City of Live Oak	Nicole Rosser	1129 D St P.O. Box A Marysville, CA 95901	(530) 742-5982	NDelerio@yubasutterlaw.com
City of Yuba City	Katherine Willis	302 Burns Dr Yuba City, CA 95991	(530) 645-6346	kwillis@yubacity.net
County of Sutter	Guadalupe Rivera	1120 Civic Center Blvd Yuba City, CA 95993	(530) 822-7400	GRivrea@co.sutter.ca.us
Reclamation District No. 70	Andy Duffey	P.O. Box 129 Meridian, CA 95957	(530) 696-2456	aduffey@succeed.net
Reclamation District No. 1500	Jon Scott	P.O. Box 96 Robbins, CA 95676	(530) 738-4423	jscott@sutterbasinwater.com
Reclamation District No. 1660	Andy Duffey	P.O. Box 35 Meridian, CA 95957	(530) 696-0349	aduffey@succeed.net
Sutter Community Services District	Leland Correll	P.O. Box 710 Sutter, CA 95982	(530) 755-1733	Sutterwater@aol.com
Sutter Extension Water District	Lynn Phillips	4525 Franklin Rd Yuba City, CA 95993	(530) 870-1712	LPhillips@sutterewd.com

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3.3 GSA Coordination and Governance

The Sutter Subbasin GSAs are coordinating with each other to develop a single GSP for the Subbasin under a Memorandum of Understanding (MOU), included in **Appendix 3-A** *Memorandum of Understanding for Sustainable Groundwater Management* of this GSP.

3.3.1 Memorandum of Understanding for Sustainable Groundwater Management

Effective April 27, 2021, the County of Sutter GSA, Butte Water District GSA, City of Live Oak GSA, Sutter Extension Water District GSA, Sutter Community Services District GSA, City of Yuba City GSA, Reclamation District No. 70 GSA, Reclamation District No. 1500 GSA, and Reclamation District No. 1660 GSA (collectively referred to as the Sutter Subbasin GSAs) entered into a MOU for sustainable groundwater management. Referred to as the Coordination Agreement, the purpose of the MOU/Coordination Agreement is to:

- Cooperatively carry out the purposes of SGMA;
- Provide for coordination among the GSAs to develop and implement a GSP and/or facilitate a Coordination Agreement;
- Develop, adopt, and implement a legally-sufficient GSP covering those portions of the Subbasin that are within the jurisdictional boundaries of the GSAs; and
- Satisfy the requirements of SGMA for coordination among GSAs.

Key principles of the Coordination Agreement include:

1. The GSAs working together in mutual cooperation to develop one GSP in compliance with SGMA for the sustainable management of groundwater in the Subbasin.
2. The designation of a Plan Manager for the GSP and delegation of management authority to that person for submitting the Plan and any subsequent documents required under SGMA and for serving as the point of contact between the GSAs and DWR.
3. Mutual cooperation to the extent possible to jointly implement the GSP within the Subbasin.
4. The ability of a GSA to implement the GSP within its boundaries and to coordinate such implementation in accordance with the requirements of SGMA.

The Coordination Agreement does not limit or interfere with the right and authority of any GSA over its own internal matters, nor does it limit a GSA's legal rights to surface water supplies and assets, groundwater supplies and assets, facilities, operations, water management and water supply matters. However, the Sutter Subbasin GSAs intend, through the Agreement, to cooperate to identify mechanisms for the expected

Subbasin management and to use the same data and consistent methodologies for developing and implementing a GSP.

Activities performed under the Coordination Agreement will be guided by the Sutter Subbasin Groundwater Management Coordination Committee (SSGMCC). The Committee contains one representative from each GSA, with a pre-determined alternate. Through the Coordination Committee, the GSAs are working collaboratively under the terms of the Agreement to develop recommendations for the technical and substantive Subbasin-wide issues. Recommendations are reached primarily by consensus; but if a vote is required, a simple majority vote of the Coordination Committee is conducted and the recommendation is submitted to each GSA's governing board for final approval. The governing body of each GSA must approve the recommendations of the Coordination Committee prior to them becoming effective.

Coordination Committee activities may include, but are not limited to, the following:

1. Providing technical direction for GSP development, including development of sustainable management criteria (SMC);
2. Identifying projects and management actions to be included for GSP implementation;
3. Recommending budget(s) and appropriate cost sharing for any project or program that requires funding;
4. Providing guidance and options for obtaining grant funding;
5. Recommending adoption of rules, regulations, policies, and procedures related to the Agreement;
6. Recommending approval of any contracts with consultants or subcontractors that would undertake work on behalf of the GSAs;
7. Reporting to GSA respective governing boards when dispute resolution is needed to resolve an impasse or inability to make a consensus recommendation;
8. Recommending action and/or approval of a GSP.

3.4 Interbasin Agreements

The Sutter Subbasin GSAs have not entered into any formal agreements with other GSAs in adjacent groundwater subbasins to date. Existing collaborative relationships between the Sutter Subbasin GSAs and GSAs in adjacent subbasins are maintained through ongoing voluntary participation in meetings of the SGMA Coordination - Sacramento River Basin group convened by the Northern California Water Association (NCWA). These relationships will be maintained and fostered throughout GSP development and implementation to establish compatible sustainability goals and understanding regarding fundamental elements of each GSP as they related to sustainable groundwater management.

3.5 Coordination Agreements

A single GSP will be developed and implemented by the nine GSAs in the Sutter Subbasin; therefore, a coordination agreement, as defined under § 357.4 of the GSP Emergency Regulations, is not required. The Sutter Subbasin GSAs have entered into an MOU for sustainable groundwater management, which is described in **Section 3.3.1**.

3.6 Estimated Cost Share of Implementing the GSP

An estimated cost of implementing the Sutter Subbasin GSP and a general description of how the Sutter Subbasin GSAs plan to meet these costs are discussed in **Chapter 8** *Plan Implementation*.

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CHAPTER FOUR

Outreach & Communication

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4. OUTREACH AND COMMUNICATION

This chapter includes information pursuant to Article 5. Plan Contents, Subarticle 1. Administrative Information, §354.10 (Notice and Communication), as required by the Groundwater Sustainability Plan (GSP) Emergency Regulations.

The outreach strategies and communication methods presented in this chapter were developed to support the preparation and implementation of a well-informed GSP through effective communication with stakeholders during the GSP development. The desired outcome was, and continues to be, to consider the interests of all beneficial uses and users of groundwater in addition to the diverse social, cultural, and economic elements of the population within the Sutter Subbasin. This includes stakeholder input and coordination with adjacent subbasins.

4.1 Description of Beneficial Uses and Users in Plan Area

Pursuant to Section 10723.2 of the California Water Code, each Groundwater Sustainability Agency (GSA) must consider the interests of all beneficial uses and users of groundwater within the Subbasin, as well as those responsible for implementing GSPs. These interests include the following:

- Agricultural users (including farmers, ranchers, and dairy professionals)
- Domestic well owners
- Municipal well operators
- Public water systems
- Local land use planning agencies
- Environmental users of groundwater
- The federal government (not limited to the military and managers of federal lands)
- California Native American tribes
- Disadvantaged communities
- Adjacent subbasins

A list of beneficial users identified is included in **Table 4-1**.

Table 4-1. Beneficial Users

Category of Interest	Stakeholder Group/ Organization
Agricultural Users	• Holders of overlying groundwater rights • Small farms throughout the County • County Farm Bureau • County Agricultural Commission • Agricultural district representatives
Domestic Well Owners	• Domestic wells overlying the Subbasin; most well owners are *de minimis users* as defined by SGMA.
Municipal Well Operators and Public Water Systems	• City of Live Oak • City of Yuba City • Sutter Community Services District • East Nicolas Mutual Water Company • Golden State Water Company
Local Land Use Planning Agencies	• Sutter County • City of Live Oak • City of Yuba City • Adjacent GSAs with land use planning authority
Environmental Users of Groundwater	• American Rivers • The Audubon Society • The Nature Conservancy • South Yuba River Citizens League
Surface Water Users	• City of Yuba City • Butte Slough Irrigation Company • Garden Highway Mutual Water Company • Pelger Mutual Water Company • Meridian Farms Water Company • Tisdale Irrigation District • Tudor Mutual Water Company • Sutter Bypass Butte Slough Water Association • Sutter Extension Water District • Butte Water District • Feather Water District • Sutter Mutual Water Company • Individual water rights holders

Category of Interest	Stakeholder Group/ Organization
	• Sutter National Wildlife Refuge • Butte Sink Wildlife Management Area
Federal Government Agencies	• United States Department of Agriculture Farm Services Agency • United States Fish and Wildlife Service
California Native American Tribes	• Estom Yumeka Maidu Tribe of the Enterprise Rancheria • Mooretown Rancheria of Maidu Indians • Shingle Springs Band of Miwok Indians • Pakan'yani Maidu of Strawberry Valley Rancheria • United Auburn Indian Community of the Auburn Rancheria • Yocha Dehe Wintun Nation
Disadvantaged Communities	• Yuba City • Meridian • Robbins • Live Oak
Adjacent Subbasins	• Butte • Colusa • North American • North Yuba • South Yuba • Wyandotte Creek • Yolo
Additional Stakeholders	State and Local Agencies • California Department of Water Resources • State Water Resources Control Board • California Department of Fish and Wildlife • California Department of Parks and Recreation • California Wildlife Conservation Board • California Natural Resources Agency Business Interests • Workers and laborers in Sutter County • Colusa Produce Corporation • California Rice Commission

Category of Interest	Stakeholder Group/ Organization
	Local Communities and Community Organizations • Shady Creek Outdoor Education Foundation • Community Alliance with Family Farmers • Local Government Commission Environmental Interests and Organizations • American Rivers • Union of Concerned Scientists • Audubon California • Sierra Club • Sutter Buttes Regional Land Trust • The Nature Conservancy • Sacramento Valley Quality Coalition • California Rice Commission

4.1.1 Human Right to Water

Assembly Bill (AB) 685 was signed on September 25, 2012 and made California the first state to legislatively recognize the human right to water. California Water Code (CWC) Section 106.3 recognizes that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." This right extends to all Californians, including disadvantaged, rural, and urban communities. Senate Bill (SB) 200 was signed on July 24, 2019 and established an ongoing fund to help communities access safe drinking water. In accordance with SB 200, the State Water Board developed the Aquifer Risk Map to help prioritize areas where domestic wells and state small water systems may be accessing groundwater that does not meet primary drinking water standards.

The Aquifer Risk Map includes a combined risk layer that melds a water quality risk layer and a well density layer to assign percentile scores to each Census block group. Areas with high risk of exceeding water quality standards and high well densities receive higher scores, indicating high risk, while areas with low risk of exceeding water quality standards and low densities receive lower scores, indicating low risk (SWRCB, 2021). Results of the Aquifer Risk Map for the Sutter Subbasin indicate high combined risk in the eastern portion of the Subbasin, particularly in areas in and near Yuba City (**Figure 4-1**).

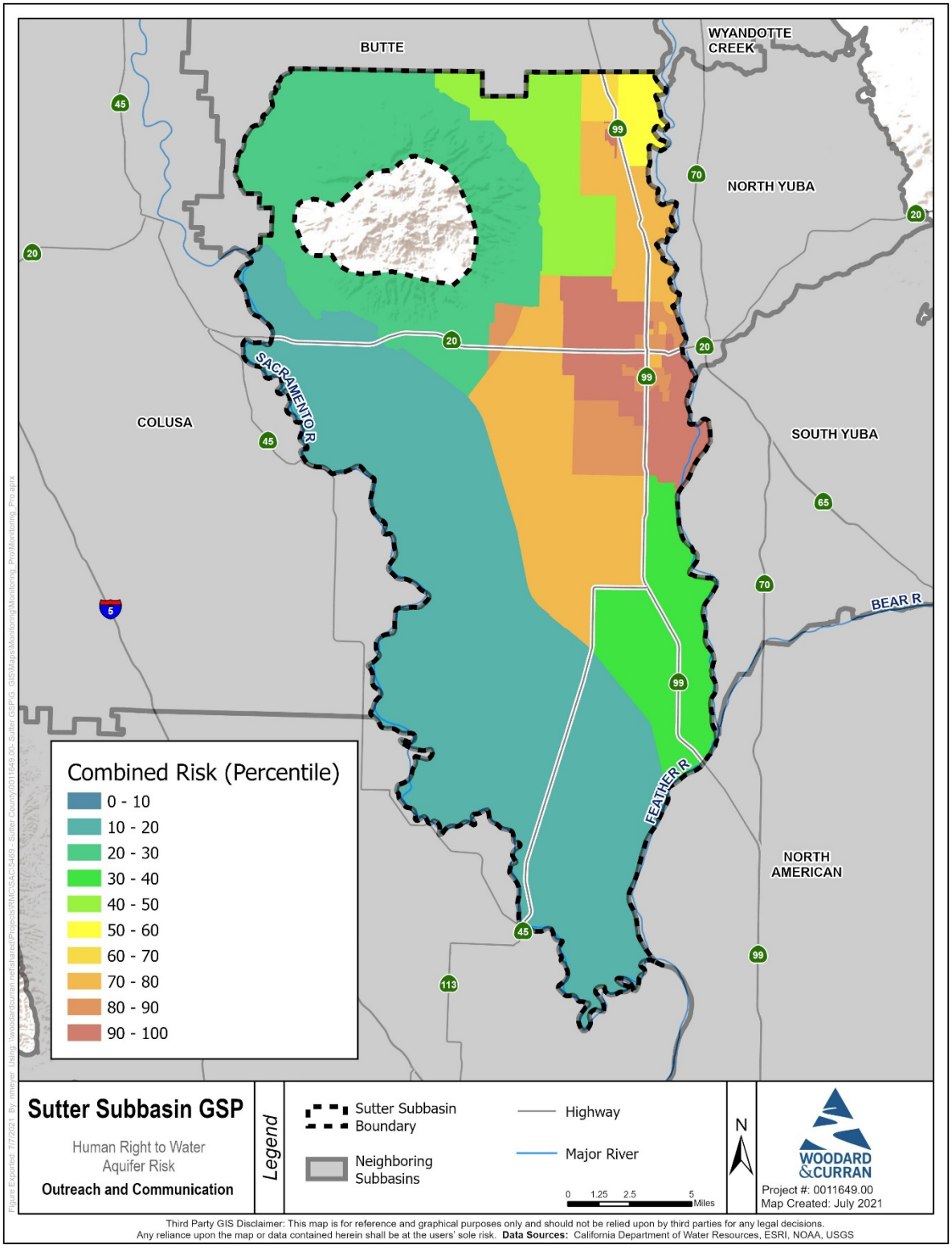

Figure 4-1. Combined Aquifer Risk

4.1.2 Underrepresented Communities

Underrepresented Communities consist of Disadvantaged Communities (DACs), Severely Disadvantaged Communities (SDACs), Economically Distressed Areas (EDAs), Environmentally Disadvantaged Communities (EnvDACs), and/or Fringe Communities in the Sutter Subbasin. DACs, SDACs, and EDAs in the Sutter Subbasin are defined and mapped using American Community Survey data from the U.S. Census (consistent with the DAC and EDA mapping tools). EnvDACS and Fringe Communities in the Sutter Subbasin are defined based on CalEnviroScreen 4.0 Pollution Burden and Population.

4.1.2.1 Disadvantaged and Severely Disadvantaged Communities

DACs are defined by the California Department of Water Resources (DWR) as areas with a median annual household income (MHI) less than 80% of the Statewide annual MHI. SDACs are defined as areas with a MHI less than 60% of the Statewide annual MHI (DWR, n.d.). The most recent dataset used by the DWR DAC Mapping Tool is the U.S. Census Bureau's American Community Survey (ACS) 2014-2018 dataset. According to the ACS 2014-2018 dataset, the MHI in California was $71,228. Communities in the Sutter Subbasin with MHIs of $56,982 (80% of $71,228) or less are therefore considered DACs, and communities with an MHI of $42,737 (60% of $71,228) or less are therefore considered SDACs.

Communities defined as DACs and SDACs make up a large portion of the Sutter Subbasin, covering the entire southern portion of the Subbasin, and include the communities of Yuba City, Meridian, Robbins, and Live Oak (**Figure 4-2**). A significant portion of the geographic area of the Subbasin (67.8%) contains DACs and SDACs. **Table 4-2** includes the proportion of DACs and SDACs in the Subbasin based on geographic area.

Table 4-2. DACs and SDACs as a Percentage of the Sutter Subbasin Geographic Area

Area	Geographic Area (Square Miles)	% Based on Geographic Area
SDAC	14.6	3.3%
DAC (including SDAC)	302.8	67.8%
Sutter Subbasin	*446.6*	*100%*

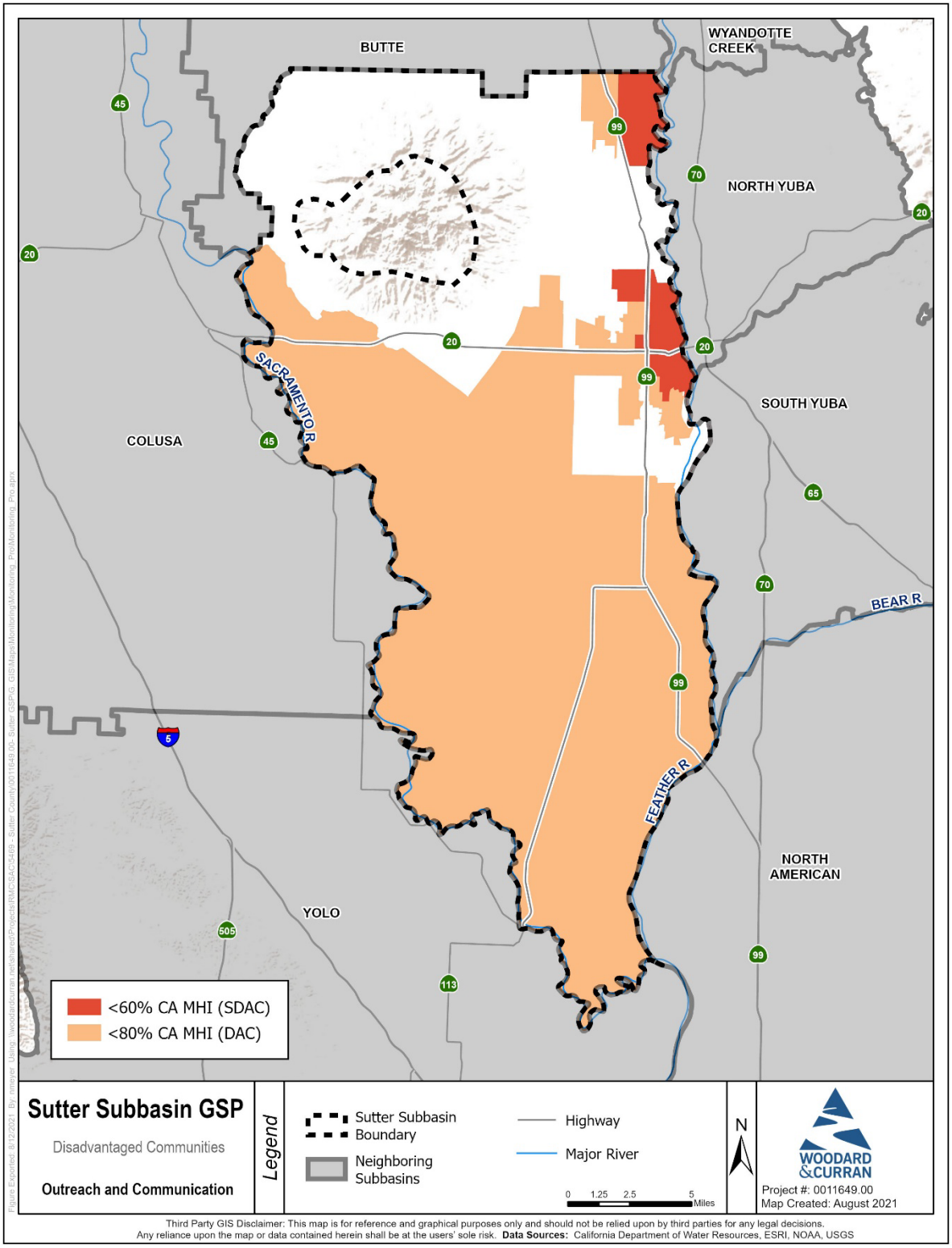

Figure 4-2. Disadvantaged Communities

4.1.2.2 Economically Distressed Areas

EDAs are defined as a municipality or isolated and divisible segment of a larger municipality with a population of 20,000 persons or less, an annual median household income that is less than 85% of the Statewide median household income, and with one or more of the following conditions:

1. Financial hardship;
2. Unemployment rate at least 2% higher than the Statewide average; or
3. Low population density (100 people/mi^2 or less).

The most recent dataset used by the DWR EDA Mapping Tool is the U.S. Census Bureau's ACS 2012-2016 dataset. According to the ACS 2012-2016 dataset, the MHI in California was $63,783. Communities in the Sutter Subbasin with MHIs of $54,215 or less are considered EDAs if paired with one other criterion listed above and has a population of less than 20,000 people.

Using the ArcGIS Map Package from the DWR EDA Mapping Tool, an EDA analysis was performed for the Sutter Subbasin. The results from that analysis were compiled in a figure representing a combination of census place, tract, and block group level geography. As shown in **Figure 4-3**, Criterion 2 (unemployment rate at least 2% higher than Statewide average) and Criterion 3 (low population density) were used to determine EDAs within the Sutter Subbasin.

A significant portion of the geographic area of the Subbasin contains EDAs. In all, 63.8% of the geographic area within the Subbasin consists of areas considered to meet either EDA Criterion 2 or Criterion 3. **Table 4-3** includes the proportion of EDAs in the Subbasin based on geographic area.

Table 4-3. EDAs as a Percentage of the Sutter Subbasin Geographic Area

Area	Geographic Area (Square Miles)	% Based on Geographic Area
EDA Criterion 2	284.9	63.8%
EDA Criterion 3	224.0	50.2%
EDA Criterion 2 or 3	284.9	63.8%
Sutter Subbasin	*446.6*	*100%*

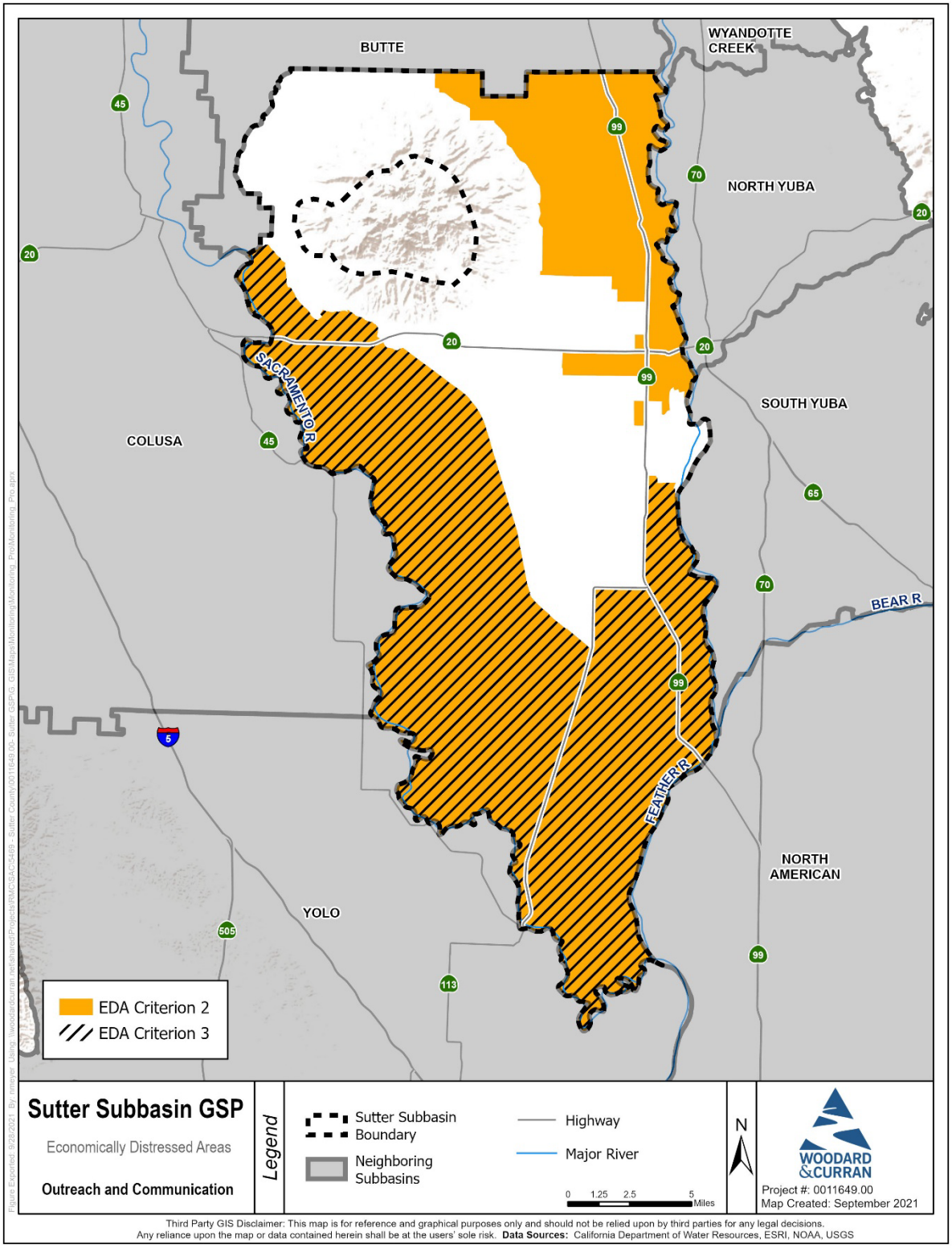

Figure 4-3. Economically Distressed Areas

4.1.2.3 Environmentally Disadvantaged Communities

As defined in DWR's Sustainable Groundwater Management Program, an environmentally disadvantaged community (EnvDAC) is a census tract that scores in the top 25% of CalEnviroScreen version 4.0 scores, or a census tract that scores in the highest 5% of Pollution Burden scores but does not have an overall CalEnviroScreen score because of unreliable socioeconomic or health data.

Figure 4-4 shows the results from the EnvDAC analysis performed for the Sutter Subbasin. **Table 4-4** includes the proportion of EnvDACs in the Subbasin based on geographic area.

Table 4-4. EnvDACs as a Percentage of the Sutter Subbasin Geographic Area

Area	Geographic Area (Square Miles)	% Based on Geographic Area
EnvDAC	5.2	1.2%
Sutter Subbasin	*446.6*	*100%*

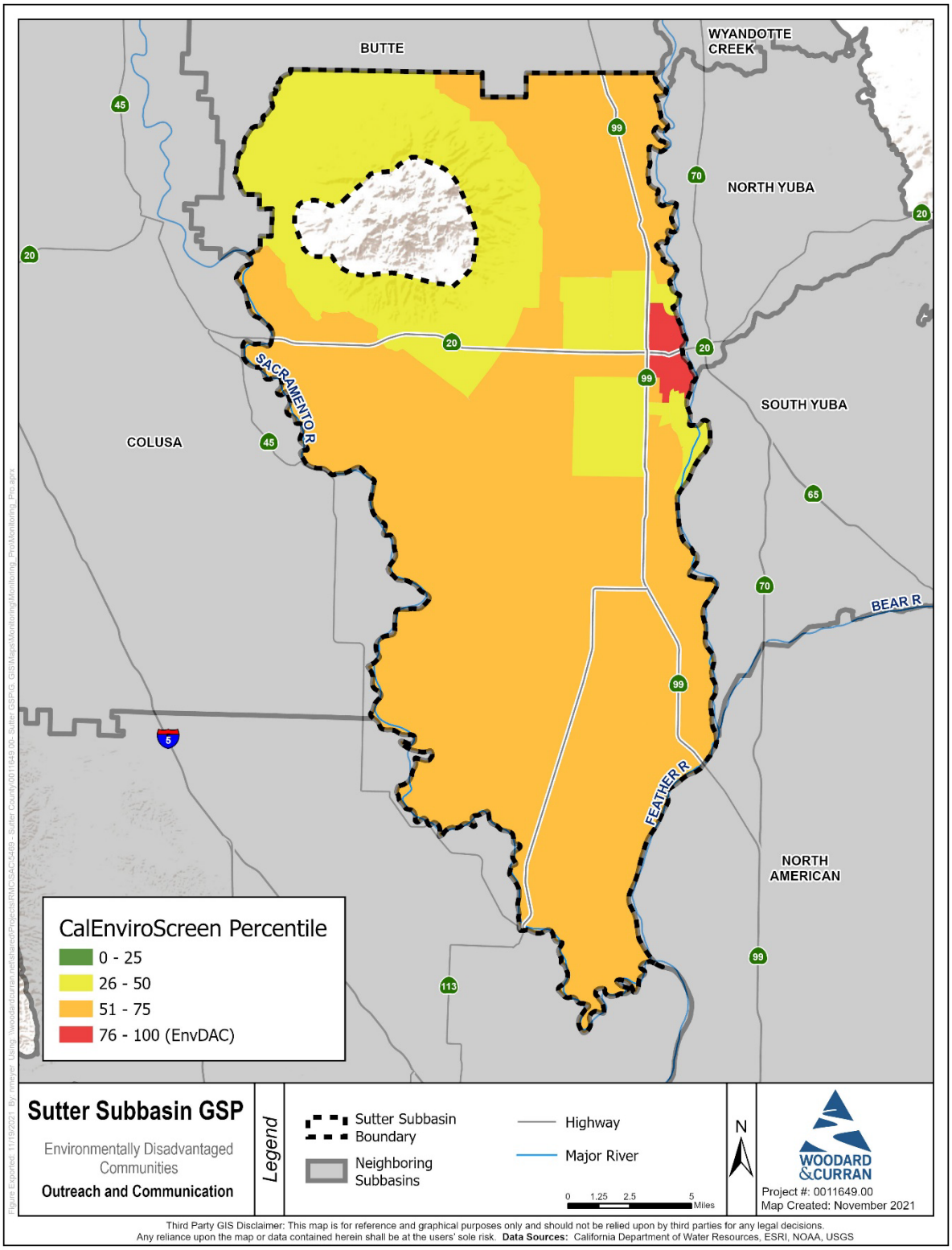

Figure 4-4. Environmentally Disadvantaged Communities

4.1.2.4 Fringe Communities

As defined in DWR's Sustainable Groundwater Management Program, a "Fringe Community" is a community that does not meet the established DAC, SDAC, and EDA definitions but can show that they score in the top 25% of either the Pollution Burden or Population Characteristics score using the CalEnviroScreen version 4.0.

All areas in the Sutter Subbasin that score in the top 25% of the Pollution Burden or Population Characteristics score using the CalEnviroScreen version 4.0 meet established DAC, SDAC, and/or EDA definitions. Therefore, no areas defined as Fringe Communities exist in the Sutter Subbasin.

4.1.2.5 California Native American Tribes

The GSAs contacted the Native American Heritage Commission (NAHC) to obtain a tribal contact list. The NAHC identified four tribes with potential cultural and traditional affiliation to the Sutter Subbasin (as noted in **Table 4-1**). Tribal representatives were invited to participate in the GSP development process. However, there were no tribal interests or water issues specific to Native American Tribal Communities identified through this outreach process.

4.2 Plan Development

The Sutter Subbasin Groundwater Management Coordination Committee (SSGMCC) and the GSA Boards worked with Contributing Parties and Stakeholders during the GSP development (**Figure 4-5**). These groups are defined in more detail in the sections below.

Figure 4-5. Levels of Engagement

4.2.1 Decision Making Process / Governance

4.2.1.1 GSA Boards

The GSA Boards are the designated decision-making entities for the GSP development and implementation process. Only applicable Board meetings affecting the Subbasin in its entirety are noticed on the Sutter Subbasin website, including for the adoption of the final GSP; individual board meetings are noticed on their individual websites.

The respective GSA's Boards assigned their SSGMCC members to work on the day-to-day development of the GSP and to conduct stakeholder communication and engagement. The GSA Boards are responsible for:

- Ensuring appropriate communication and engagement is executed per the approved Communication and Engagement (C&E) Plan on behalf of their GSAs (included herein as **Appendix 4-A**)
- Approving interim milestones to meet the mandated schedule for sustainability as set forth in the final GSP
- Being informed about the GSP development by their designated SSGMCC members
- Providing their respective SSGMCC members with their insights, perspectives, and opinions
- Ultimately adopting the final GSP prior to submittal to DWR by January 31, 2022

4.2.1.2 Sutter Subbasin Groundwater Management Coordination Committee

The SSGMCC acts as the primary body for providing input relative to GSP development, briefing the GSAs Boards, and assisting with stakeholder engagement throughout the Subbasin. The SSGMCC hosted public workshops periodically throughout the GSP development process, in addition to holding open regular meetings noticed according to Brown Act requirements. Both the public workshops and the SSGMCC meetings were noticed a minimum of 72 hours in advance, and agendas, meeting materials, and minutes were made available on the Sutter Subbasin website (http://suttersubbasin.org/). SSGMCC members include:

- Guadalupe Rivera, Sutter County GSA
- Mark Orme, Butte Water District GSA
- Scott Rolls, City of Live Oak GSA
- Lynn Phillips, Sutter Extension Water District GSA
- Leland Correll, Sutter Community Services District GSA
- Kathy Willis, City of Yuba City GSA
- Andy Duffey, Reclamation District No. 70 GSA & Reclamation District No. 1660 GSA
- Jon Scott, Reclamation District No. 1500 GSA

The SSGMCC was originally formed to support development of the Subbasin's Alternative Plan. With the preparation of the GSP, the SSGMCC prepared a memorandum of understanding (MOU), adopted on April 27, 2021, to guide development and implementation of the GSP.

The SSGMCC is comprised of voting representatives from each of the nine GSAs within the Subbasin along with non-voting representatives from non-GSA entities contributing to the development of the GSP. The SSGMCC generally follows a consensus-based decision-making structure where each representative receives an equal voice; however, voting members provide the final decision-making structure and generally follows a simple majority vote process. The SSGMCC held publicly-noticed regular coordination meetings to discuss GSP technical development and public outreach and engagement activities in order to prepare a GSP for ultimate adoption by the respective GSA Boards. Meeting notices and materials are posted on the Subbasin's website (http://suttersubbasin.org).

The SSGMCC agreed to a set of principles for engagement and operation intended to provide a framework of commitments among the members to work collaboratively, efficiently, and with the necessary dedication to promote the development, adoption, and submission of a SGMA compliant GSP by the statutory deadline of January 31, 2022.

The SSGMCC is responsible for:

- Sharing feedback from their respective GSA's related to GSP development
- Making recommendations to their respective GSA Boards regarding the consideration and adoption of the GSP
- Providing or ensuring the provision of timely responses and supporting information related to GSP development to the consultants preparing the GSP upon request in order to meet the state-mandated deadline
- Performing and supporting appropriate and coordinated outreach to stakeholders within the Subbasin
- Ultimately delivering an acceptable GSP to all GSA Boards for adoption

4.2.1.3 Contributing Members

Contributing Members supported the SSGMCC and GSP development and implementation. These members include:

- Andy Duffey, Meridian Farms Water Company, Butte Slough Irrigation Company, and Tisdale Irrigation and Drainage Company
- Jon Munger, Garden Highway Mutual Water Company & Sutter Bypass Butte Slough Water Users Association
- Todd Duncan, Tudor Mutual Water Company

- Dan Duncan, Feather Water District
- Paul Schubert, Golden State Water Company

4.2.1.4 Stakeholders

Stakeholders, which include interested parties and members of the public, were invited to review and provide input at important stages throughout the GSP development process. A full list of stakeholders and interested parties is attached as **Appendix 4-B** and include both environmental, regulatory, and local stakeholders.

4.2.2 Comments Received Regarding the Plan

During the development of the GSP development, individual public draft chapters were posted to the project website to allow for public review and comment (**Table 4-5**). In addition, the full Public Draft GSP was released on October 1, 2021 for review and comment period through November 12, 2021. With each release, notice was provided via an E-blast and an announcement was placed on the project website.

In total, the Sutter Subbasin GSAs received 75 comments. All comments received have been compiled in a comment matrix. This summary table, as well as copies of the original comments, are attached as **Appendix 4-C**. The Sutter Subbasin GSAs have made note of all comments received and will provide responses to public review period comments along with responses to comments received during DWR's 75-day public comment period following GSP submittal and comments received from DWR as a result of evaluation of the Sutter Subbasin GSP.

Table 4-5. Public Review and Comment Periods

Public Draft	Public Review and Comment Period
Plan Area Chapter	April 16, 2021 to May 17, 2021
Governance Chapter	April 16, 2021 to May 17, 2021
Hydrogeologic Conceptual Model Section	July 9, 2021 to August 9, 2021
Groundwater Conditions Section	August 2, 2021 to August 27, 2021
Public Draft GSP	October 1, 2021 to November 12, 2021

4.3 Outreach

Public outreach includes both stakeholder coordination and general public involvement. The goal of the public engagement effort is to understand the needs of stakeholders and groundwater users in the Subbasin, increase awareness and understanding of SGMA and the purpose and goals of the GSP, solicit feedback on draft sections of the GSP, and to promote active involvement in the process to achieve and maintain sustainability. Many outreach types and efforts were utilized to support this goal, as described in the sections below.

4.3.1 Noticing

Pursuant to GSP Emergency Regulations §357.2(a), the Sutter Subbasin GSAs submitted notice to DWR stating their intent to develop a GSP on May 29, 2020 (included herein as **Appendix 4-D**). Upon completion of the GSP, notice was provided to the counties and cities within the Subbasin regarding Plan adoption. This notice was distributed on October 5, 2021, and is included herein as **Appendix 4-E**.

Following the initial notice to DWR, outreach related to major project junctions and milestones was conducted. Notices for public workshops were sent at least 30 days in advance via email, with reminders sent approximately 72 hours in advance, and were also promoted via social media posts, flyers, and informational materials in local water bill inserts as summarized in **Table 4-6**.

Table 4-6. Communication Log

Date	Description of Communication
January 24, 2020	Update to Justine Dutra, Yuba-Sutter Farm Bureau
February 2, 2020	Presentation to Natural Resource & Land Use Committee
October 7, 2020	Update at Yuba-Sutter Farm Bureau Meeting
October 7, 2020	Follow up with Lisa Herbert, Ag Commissioner, following Farm Bureau meeting
October 9, 2020	Stakeholder List E-blast 1
October 19, 2020	Stakeholder List E-blast 2
October 20, 2020	Update at Tisdale Irrigation and Drainage Company Board Meeting by Andy Duffey
October 27, 2020	Update at Butte Slough Irrigation Board Meeting by Andy Duffey
November 4, 2020	Update at Reclamation District 70 Board Meeting by Andy Duffey
November 10, 2020	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
November 13, 2020	Public Workshop #1 E-blast
November 18, 2020	Sutter County Facebook Post for Public Workshop #1
November 18, 2020	Agricultural Commissioner shared Facebook Post for Public Workshop #1
November 30, 2020	Update to Justine Dutra to share at Yuba-Sutter Farm Bureau meeting
December 2, 2020	Update at Reclamation District 70 Board Meeting by Andy Duffey
December 3, 2020	Public Workshop #1 E-blast – Tribes
December 8, 2020	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
December 10, 2020	Public Workshop #1 E-blast – Reminder
December 11, 2020	City of Yuba City Facebook Post
December 11, 2020	City of Live Oak Facebook Post and website banner with link to GSP website

Date	Description of Communication
January 6, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
January 12, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
January 12, 2021	Public Workshop #2 E-blast
January 15, 2021	Public Workshop #2 E-blast – Follow up to bounces
January 19, 2021	Update at Tisdale Irrigation and Drainage Company Board Meeting by Andy Duffey
January 21, 2021	Bill Insert Mailing: Sutter County – Community of Robbins
January 24, 2021	Update to Justine Dutra, Yuba-Sutter Farm Bureau meeting
January 26, 2021	Update at Butte Slough Irrigation Board Meeting by Andy Duffey
February 3, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
February 4, 2021	Public Workshop #2 E-blast – Reminder
February 9, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
March 3, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
March 3, 2021	Live Oak City Council Presentation
March 9, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
April 7, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
April 13, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
April 13, 2021	Public Workshop #3 E-blast
April 15, 2021	Bill Insert Mailing: Montna Farms to Sutter Bypass Slough Association Members
April 16, 2021	Notice of Plan Area and Governance Chapters for Public Review

Date	Description of Communication
April 20, 2021	Update at Tisdale Irrigation and Drainage Company Board Meeting by Andy Duffey
April 20, 2021	Public Workshop #3 E-blast – Tribes and Adjoining Basins
April 27, 2021	Update at Butte Slough Irrigation Board Meeting by Andy Duffey
May 5, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
May 11, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
May 17, 2021	Bill Insert Mailing: City of Live Oak GSA
June 2, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
June 7, 2021	Public Workshop #3 E-blast – Reminder
June 8, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
June 11, 2021	Invitation to Submit Projects and Management Actions
July 7, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
July 8, 2021	Notice of Hydrogeologic Conceptual Model Section for Public Review
July 9, 2021	Public Workshop #4 E-blast
July 13, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
July 20, 2021	Update at Tisdale Irrigation and Drainage Company Board Meeting by Andy Duffey
July 21, 2021	Bill Insert Website Posting: Sutter Extension Water District
July 27, 2021	Update at Butte Slough Irrigation Board Meeting by Andy Duffey
August 2, 2021	Notice of Groundwater Conditions Section for Public Review
August 4, 2021	Update at Reclamation District 70 Board Meeting by Andy Duffey
August 6, 2021	Public Workshop #4 E-blast – Reminder

Date	Description of Communication
August 10, 2021	Update at Reclamation District 1660 and Meridian Farms Water Company Board Meetings by Andy Duffey
August 10, 2021	Public Workshop #4 Yuba City Facebook Post
September 21, 2021	Public Workshop #5 E-blast
October 1, 2021	Notice of Public Draft GSP for Public Comment
October 1, 2021	Press Release Notice of Public Draft to Media Outlets
October 4, 2021	Public Workshop #5 Yuba City Facebook Post
October 6, 2021	The Appeal Democrat – Groundwater Sustainability Plan Available for Public Comment
October 12, 2021	Public Workshop #5 E-blast – Reminder
November 1, 2021	Reminder Notice of Public Draft GSP for Public Comment

4.3.2 Public Engagement

Public outreach and engagement is an integral part of developing and implementing the GSP and consists primarily of open meetings of the SSGMCC, information and updates to the project website, and public workshops held at important stages of the groundwater sustainability planning process to present key aspects of the GSP and to seek feedback on the proposed draft GSP chapters.

4.3.2.1 Public Workshops

Public workshops give residents and stakeholders of the Sutter Subbasin and adjoining subbasins the opportunity to learn about the condition and future of the Subbasin, participate in the GSP development process, understand what needs to be done to protect the quality and availability groundwater, and learn why maintaining a sustainable groundwater subbasin matters to the economy, environment, and quality of life of all communities in the Subbasin. The workshops also allow decision-makers to better consider the variety of beneficial uses and users of groundwater, as well as the diverse social, cultural, and economic elements of the population within the Sutter Subbasin.

Public workshops were held approximately quarterly to update interested residents and stakeholders about the GSP development process. Due to the ongoing COVID-19 pandemic, and as authorized by the Governor's Executive Order N-29-20 and Assembly Bill 361 allowing local legislative bodies to hold meetings via teleconferencing while still meeting state transparency requirements, all meetings were held virtually. Public workshop noticing was distributed in English, Spanish, and Punjabi, and was distributed via email blasts, postings on the Sutter Subbasin website and GSA websites, and through public platform postings (Facebook and Twitter). The workshops included presentations on data, information, and analyses completed for the planning process, as well as activities to solicit input and feedback from participants on plan direction; the content of these public workshops is summarized in **Table 4-7**. All interested residents, businesses, and public agencies were invited to join and provide input at the public workshops. All public workshops were recorded, and the workshop recordings were posted on the Sutter Subbasin website with closed captions in English, Spanish, and Punjabi.

Table 4-7. Summary of Public Workshop Content

Meeting Date	Workshop Content
Workshop 1: December 14, 2020	• Overview of SGMA • Water management planning in the Sutter Subbasin • Development of Sutter Subbasin GSP • Basin Conditions
Workshop 2: February 8, 2021	• Review of Basin Conditions • Hydrogeologic Conceptual Model • Introduction to Groundwater Flow Modeling • Significant and Unreasonable Undesirable Results • Preliminary List of Projects and Management Actions
Workshop 3: June 15, 2021	• Hydrogeologic Conceptual Model Update • Basin Conditions Update • Mapping Groundwater Dependent Ecosystems and Interconnected Surface Water • Water Budgets • Projects and Management Actions
Workshop 4: August 11, 2021	• Sustainable Management Criteria • Sustainable Yield Estimate • Monitoring Networks • GSP Implementation
Workshop 5: October 19, 2021	• Public Draft GSP

4.3.2.2 Other Public Engagement Opportunities

Two online surveys were made available through the project website and used to solicit stakeholder feedback and input. The Stakeholder Engagement Survey was posted on the project website in advance of Workshop #1 and was open for four months. The Project and Management Action Survey was posted on the project website in advance of Workshop #2 on February 8, 2021 and was open and available for responses through Workshop #3 on June 15, 2021. One Project and Management Action Submittal Form was submitted to the GSAs for consideration. Responses to the surveys were compiled and are attached herein as **Appendix 4-F**.

4.3.3 Outreach to Diverse Social, Cultural, and Economic Areas of the Population

As not all Sutter Subbasin residents have access to email and the internet, outreach methods included both online access and traditional means of hard copy information dissemination (e.g., utility bill inserts). Identified underrepresented communities were targeted with mailers. Copies of mailers and additional documentation distributed as part of the public review process are included in **Appendix 4-G**. Sutter County also has a substantial population that only speak Spanish or Punjabi; therefore, supporting materials (online and hard copy) were prepared in both languages in addition to English. As noted above, workshops were recorded and dubbed via closed captioning in English, Spanish, and Punjabi. Additional translation services were offered to GSAs, including direct translation at public workshops.

4.3.4 Methods for Disseminating Information

The Sutter Subbasin GSAs use a variety of communications and engagement tools to keep the public informed and engaged in the GSP planning process.

4.3.4.1 Website

The GSP website (http://suttersubbasin.org/) houses information about SGMA, the GSP process, the GSA Boards, SSGMCC, public meetings, project newsletters, project reports and studies, and groundwater data and information. The website provides options for contacting the planning team via email or in writing. The website also provides information in Spanish (http://suttersubbasin.org/espanol) and Punjabi (http://suttersubbasin.org/punjabi).

The website includes landing pages with a general overview of SGMA, information on outreach, scheduled meetings, SGMA resources (including links to completed deliverables and workshop materials), and the GSAs' contact information. Each page of the website includes an opportunity to sign-up for project emails.

4.3.4.2 Interested Parties List

The SSGMCC maintains a list of interested persons and routinely distributed meeting notices and relevant information to the stakeholders who requested to be included.

E-mail notices, the primary method of communication, were sent to announce the availability of new materials on the website, project milestones, and workshop dates. Announcements were distributed in English, Spanish, and Punjabi as appropriate.

4.3.4.3 Informational Materials

The SSGMCC developed a range of materials to successfully educate interested parties and circulate consistent, accurate information. These materials, made available on the website and included in **Appendix 4-G**, included:

- **Fact Sheets and Flyers** were used to describe the GSP planning process, including, “What is SGMA” at the beginning of the GSP planning process.
- **Links** to other publicly available materials about SGMA and the GSP process were included on the Subbasin website.
- **Press Releases** were used as a method of correspondence in local newspapers to notice for the release of the Public Draft GSP for public review and comment. Media contacts contacted as part of the GSP public review process included:
  - ABC 10
  - Appeal-Democrat
  - CBS
  - FOX 40
  - Gridley Herald
  - KUBA Radio
  - Sutter County News Center
  - Territorial Dispatch Online Newspaper

4.3.4.4 Mailings, Utility Bill Notifications and Public Media noticing

Bill inserts and flyers were used to notify the public about the GSP Planning process in addition to upcoming workshops to encourage engagement. These bill inserts were distributed in utility bill notifications. Notices were also included in feeds to media platforms such as Twitter and Facebook.

4.3.4.5 Public Workshops

Information was disseminated at public workshops, as described in **Section 4.3.2.1**.

4.4 References

California Department of Water Resources (DWR). n.d. DAC Mapping Tool. https://gis.water.ca.gov/app/dacs/. Accessed: August 4, 2021.

California Department of Water Resources (DWR). n.d. EDA Mapping Tool. https://gis.water.ca.gov/app/edas/. Accessed: August 4, 2021.

California State Water Resources Control Board (SWRCB). 2021. 2021 Aquifer Risk Map. https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=17825b2b791d4004b547d316af7ac5cb. Accessed: August 4, 2021.

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CHAPTER FIVE

Basin Setting

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5. BASIN SETTING

The Basin Setting chapter contains three sections as follows:

- **Hydrogeological Conceptual Model** – The Hydrogeologic Conceptual Model (HCM) section (**Section 5.1**) provides the geologic and hydrogeologic information needed to understand how water moves through the Sutter Subbasin. This section includes information about geologic formations, aquifers, structural features, and topography.
- **Groundwater Conditions** – The Groundwater Conditions section (**Section 5.2**) describes historic groundwater conditions in the Sutter Subbasin, including data from January 1, 2015 to current conditions. Groundwater trends, groundwater levels, hydrographs, contour maps, estimated change in groundwater storage, groundwater quality issues, land subsidence, identification of interconnected surface water systems over historic conditions through present day are presented in this section. Identification of groundwater dependent ecosystems within the Sutter Subbasin is also presented in this section.
- **Water Budget** – The Water Budget section (**Section 5.3**) describes the data used to develop the required historic water budget, current water budget, and projected water budgets. This section also discusses how the water budgets were calculated as well as the sustainable yield estimate for the Sutter Subbasin.

The Basin Setting chapter serves as a basis for defining and assessing reasonable sustainable management criteria and projects and management actions. This chapter addresses required elements of the GSP Emergency Regulations Article 5. Plan Contents, Subarticle 2. Basin Setting (§354.12 – 354.18). Management areas were not established for this GSP and therefore are not addressed (GSP Emergency Regulations §354.20).

5.1 Hydrogeologic Conceptual Model

This section describes the HCM for the Sutter Groundwater Subbasin (Sutter Subbasin or Subbasin) in accordance with Section 354.14 of the Groundwater Sustainability Plan (GSP) Emergency Regulations. The HCM is a “big picture” framework that represents (and visualizes) the current understanding of the general physical characteristics related to regional hydrology, land use, geology and geologic structure, water quality, principal aquifers, and principal aquitards of the basin setting. The HCM also provides the context for developing water budgets, mathematical (analytical or numerical) models, and monitoring networks, and provides a tool for stakeholder outreach and communication. Specific objectives of the HCM are to:

- Provide the information necessary to evaluate sustainability within the Sutter Subbasin with regards to the six sustainability indicators.

- Provide the framework and information needed to conduct additional analyses for GSP preparation, such as development of water budget, construction of mathematical (analytical or numerical) models, and development of monitoring systems and management actions and projects.
- Develop an understanding and description of the Sutter Subbasin, specifically the structural and physical characteristics that control the flow, storage, and quality of surface and groundwater.
- Identify data gaps towards evaluation of sustainability indicators that will be used to develop investigations and data collection programs during the implementation period of the GSP.

The HCM presented in this GSP provides the current understanding of water movement and water quality through the Sutter Subbasin based on current publicly-available information as well as the Sutter Subbasin Alternative Plan (GEI, 2016). Updates to the HCM should be conducted as new information is obtained to ensure that sustainability of the Subbasin is maintained.

For this GSP, data supporting development of the HCM are available to the public from a variety of local, state, and federal agencies, as well as from non-governmental entities. The data presented herein were compiled from numerous studies conducted in the Subbasin. Information from several online databases that support ongoing monitoring and development of the groundwater resources within the Sutter Subbasin and throughout California was amassed, evaluated, and reconfigured in support of the HCM. The following subsections present the information as outlined in the GSP Regulations.

5.1.1 Regional Geologic Structural Setting

GSP Regulations state that the HCM shall include a description of the regional and structural setting of the basin, including the immediate surrounding area, as necessary for geologic consistency. **Figure 5-1** shows the geologic map of the Sutter Subbasin.

The regional geology of the Sutter Subbasin is similar to that of the greater Sacramento Valley with the exception of the volcanic rocks of the Sutter Buttes. The Sutter Subbasin consists of unconsolidated and consolidated freshwater bearing sediments that are underlain by marine sediments and igneous or metamorphic rocks. The freshwater bearing sediments consist of the volcanoclastic rocks of the Sutter Buttes and sediments weathered from the Sierra Nevada to the east. The sediments derived from the Sutter Buttes consist of debris (sand to boulder size blocks) and sedimentary deposits of the volcanic apron that extends radially about 10 miles to the north and to 8 to 10 miles to the south from the Sutter Buttes (Springhorn, 2008).

The Subbasin lies within the Sacramento Valley Groundwater Basin, which is a north-south trending structural trough that is filled with marine and non-marine sediments. The

oldest and deepest sediments were emplaced under a marine sedimentary depositional environment. Marine sediments in the deepest portions of the basin generally range in age from Late Jurassic to early Miocene (160 million years ago to 24 million years ago; Wood Rodgers, 2012). Younger nonmarine sediments and volcanic rocks are of early Miocene to Holocene age (Harwood and Helley, 1987). Within the greater Sacramento Valley Groundwater Basin, the deposits have been disrupted by deformational stresses derived from east-west compressional forces associated with regional uplift along the western margin of the valley and extensional forces to the east, within the Basin and Range Province (Harwood and Helley, 1987). These forces have created fold and fault structures.

The Willows Fault, discovered in the 1950s during the development of a nearby gas field, is the primary fault structure within Sutter County, and lies to the southwest and west of the Sutter Buttes. The fault is classified as active and northwest-trending with a 74 degree or steeper dip to the northeast. The fault exhibits approximately 1,610 feet of reverse displacement, indicating the ground east of the fault has moved up relative to the west side (Redwine, 1972). **Figure 5-2** presents a cross-section developed by Harwood and Helley (1987) showing off-set of the Willows Fault within the Subbasin. As shown in **Figure 5-1**, the Willows Fault enters into the Subbasin from Colusa County southwest of the Sutter Buttes and extends to the southeast portion of the Subbasin towards Sacramento, presumably following the boundary between the ophiolite basement of the west and the Sierra basement to the east (Harwood and Helley, 1987). **Figure 5-1** also shows several quaternary faults identified within the area of the Sutter Buttes.

The Sutter Buttes is the prominent topographic feature in Sutter County, rising from the valley floor to an elevation of 2,100 feet, over 2,000 feet higher than the valley floor in the northern part of the basin. The Sutter Buttes themselves are not within the boundaries of the Subbasin, as shown in **Figure 5-1**. The Sutter Buttes are composed of late Cenozoic volcanic rocks emplaced between 2.4 and 1.4 million years ago over a northwest-trending tectonic boundary that juxtaposes a basement of dense magnetic, presumed oceanic crust on the west against metamorphic and plutonic rocks of the Sierra basement on the east (Harwood and Helley, 1987). When the volcanic rocks rose, they folded upward and exposed at ground surface older marine sediments, including the Ione and Capay Formations. They also created an apron of volcanic sediments, the Sutter Buttes Rampart Formation, which extends outward in a shield-like apron.

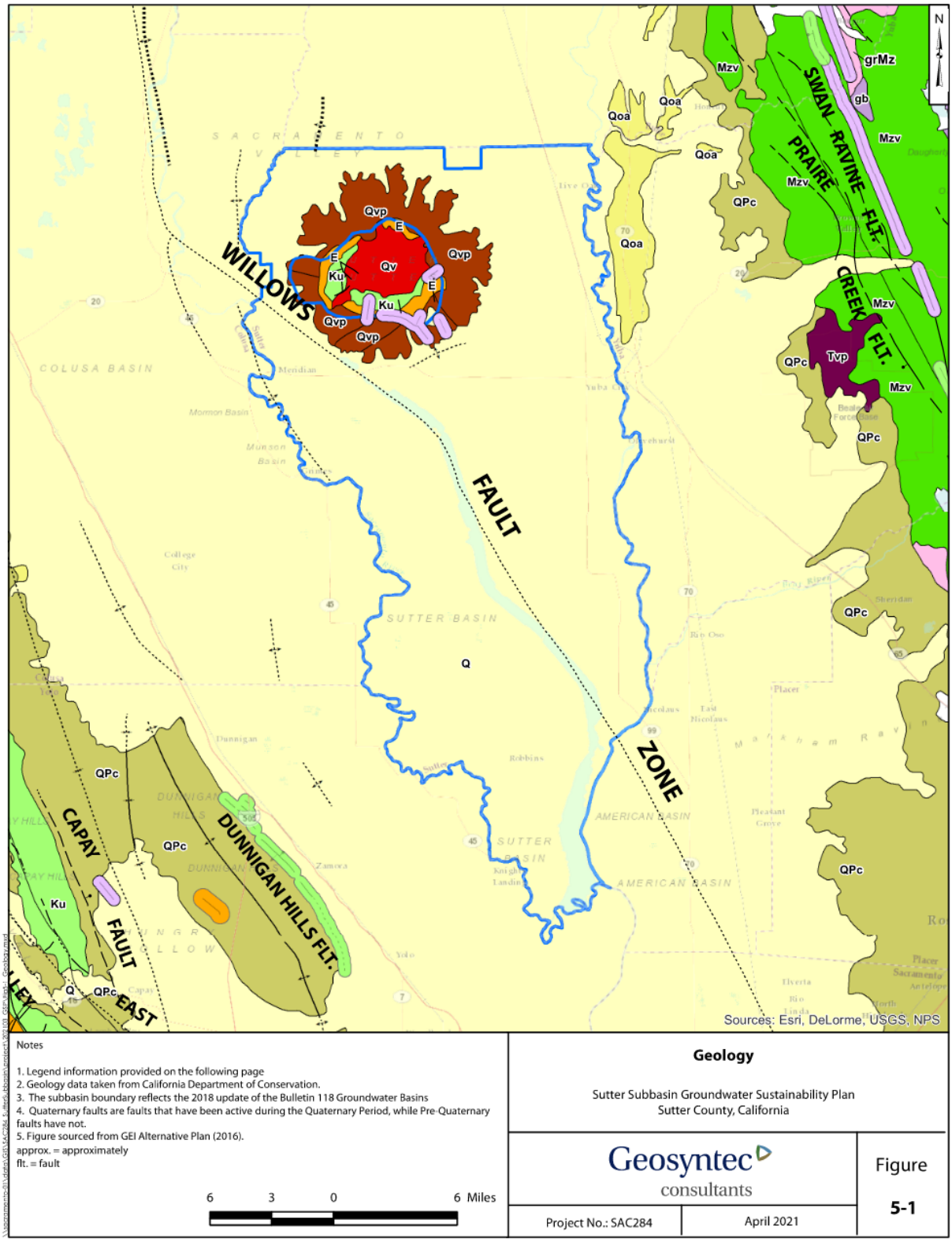

Figure 5-1. Surface Geology, Sutter Subbasin

Figure 5-1

Geology

Sutter Subbasin Groundwater Sustainability Plan
Sutter County, California

Geosyntec consultants

Legend

Sutter Subbasin Boundary (2018)

Pre-Quaternary Faults

- fault, certain
- fault, approx. located
- fault, concealed
- fault, certain (ball and bar)
- fault, approx. located (ball and bar)

Quaternary Faults

- fault, approx. located
- fault, certain
- fault, concealed
- fault, approx. located (ball and bar)
- reverse fault, certain

Age of Last Known Activity

- Holocene
- Late Quaternary
- Quaternary

Folds

- anticline, certain
- anticline, concealed
- anticline, concealed, double plunge
- syncline, certain
- syncline, concealed

Geologic Units

- Qoa — Pleistocene Alluvium, Lake, Playa, and Terrace Deposits
- QPc — Pliocene-Pleistocene Sandstone, Shale, and Gravel Deposits
- Q — Quaternary Terrace Alluvium
- Qv — Quaternary Volcanic Flow Rocks; Minor Pyroclastic Deposits
- Qvp — Quaternary Pyroclastic and Volcanic Mudflow Deposits
- E — Eocene Shale, Sandstone, and Conglomerate; Minor Limestone
- Tvp — Tertiary Pyroclastic and Volcanic Mudflow Deposits
- Ku — Upper Cretaceous Sandstone, Shale, and Conglomerate
- Mzv — Mesozoic Volcanic and Metavolcanic Rocks
- gb — Mesozoic Gabbro and Dark Dioritic Rocks
- grMz — Mesozoic Granite, Quartz Monzonite, Grandodiorite, and Quartz Diorite

Figure 5-1. Surface Geology, Sutter Subbasin (continued)

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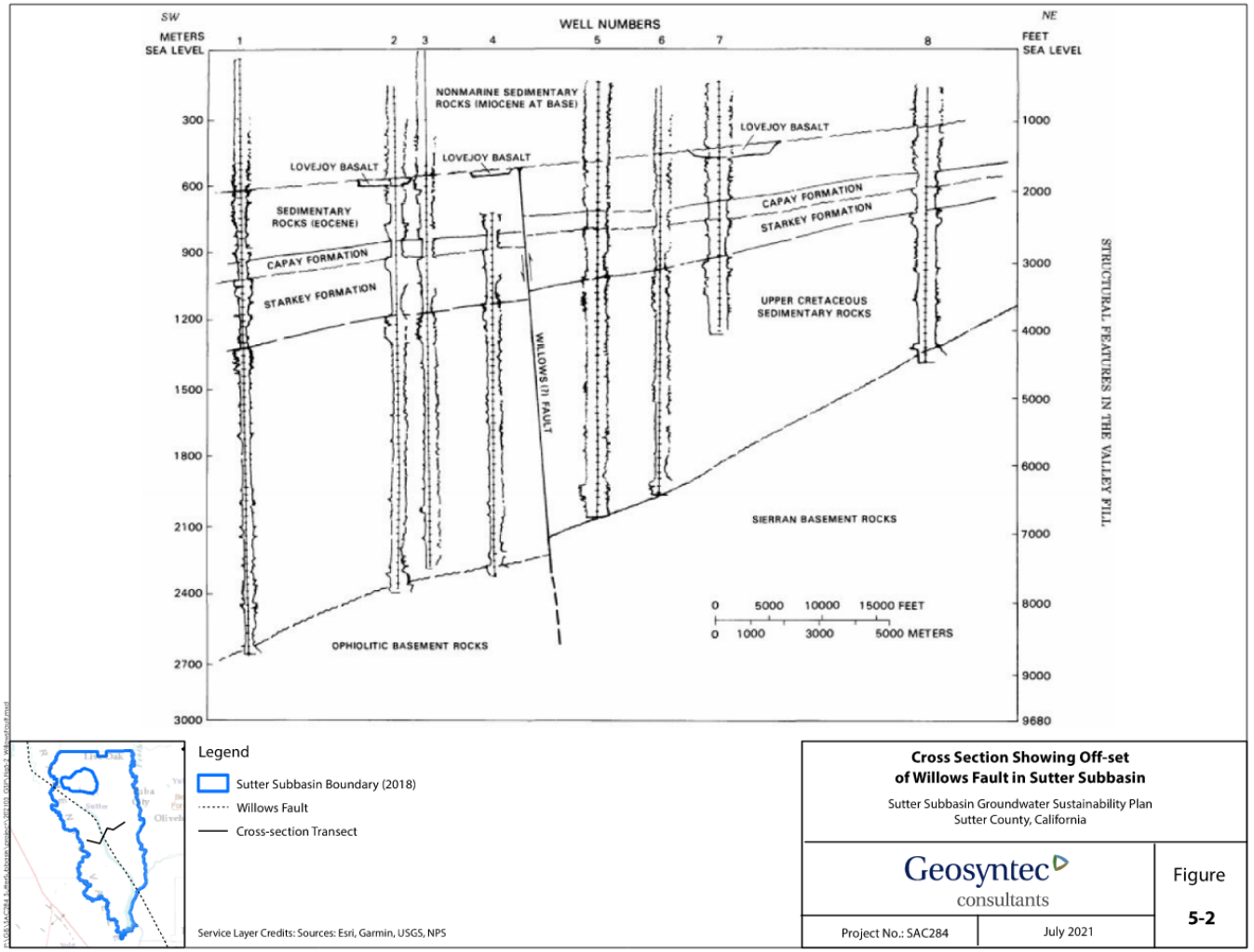

Figure 5-2. Willows Fault Cross-Section

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5.1.1.1 Topography

With the exception of the Sutter Buttes, the topography of the Sutter Subbasin is comprised primarily of the gentle flatlands of the Sacramento River Valley with elevations decreasing from the northeast to south ranging from 80 feet above mean sea level (MSL) in the northeast corner to 20 feet above MSL in the south. The Sutter Buttes is the only prominent topographic feature in the northern part of the Subbasin, a Pliocene volcanic plug which rises abruptly 2,000 feet above the surrounding valley floor. **Figure 5-3** shows the topography of the Sutter Subbasin.

5.1.1.2 Soils

Soil characteristics play a major role in cropping patterns and farming practices, and influences the retention and infiltration of water and nutrients/pesticides through the subsurface. In general:

- The soils in the Subbasin mainly consist of clay and clay loam soils; but, near the rivers, loam to sandy loam may be present.
- Most of the soils consist of poorly and very poorly drained soils. Along the rivers, soils are well drained.

Hydrologic grouping of the soil types and their distribution are provided in **Figure 5-4**. About 70 percent of the soils in the Subbasin are characterized as having slow to very slow infiltration.

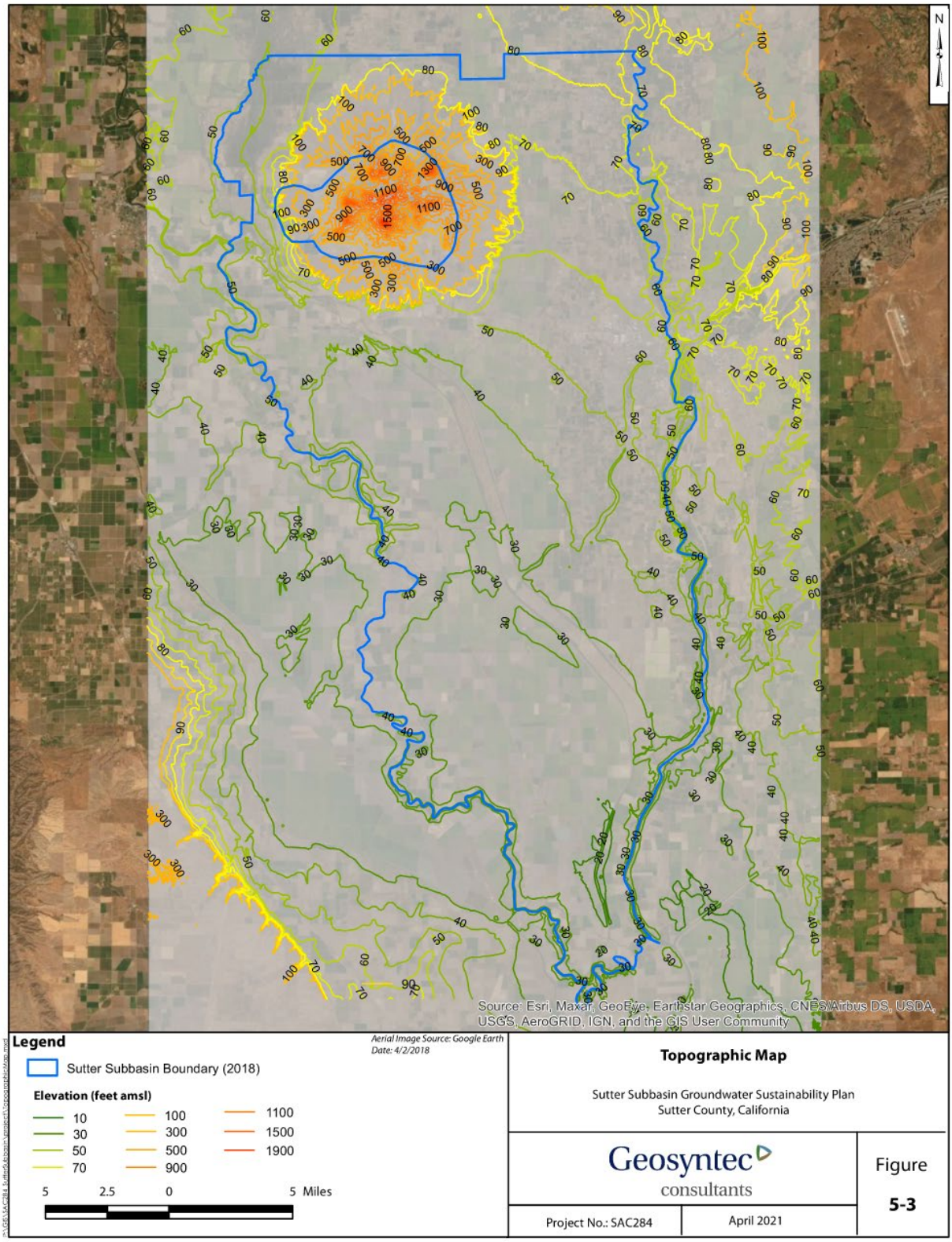

Figure 5-3. Topographic Map, Sutter Subbasin

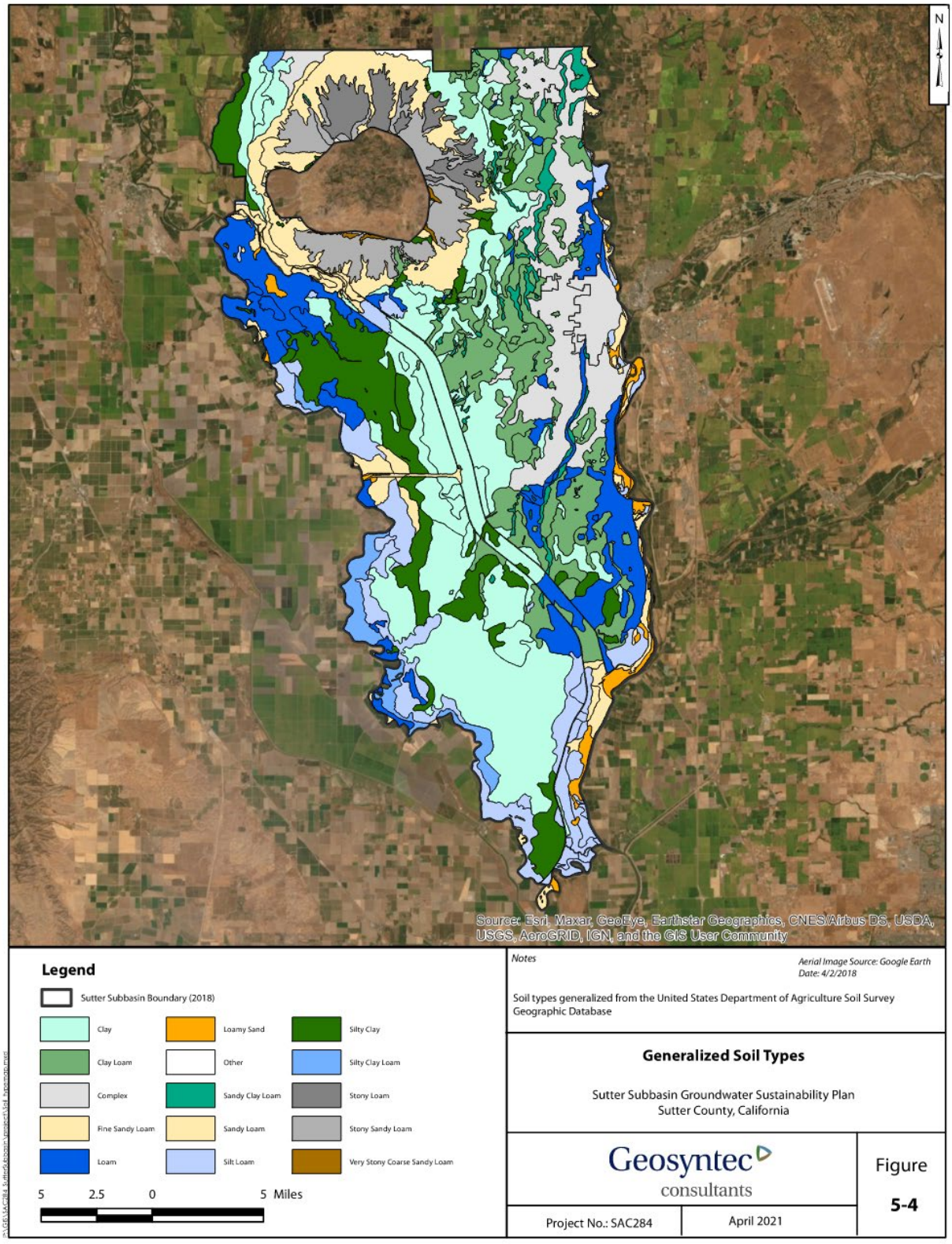

Figure 5-4. Generalized Soil Types, Sutter Subbasin

5.1.2 Lateral Basin Boundaries

The Sutter Subbasin lies in the eastern central portion of the Sacramento Valley Groundwater Basin. As shown in **Figure 2-1**, it is bounded on the north by the boundary with Butte County (except for the portion of Biggs-West Gridley Water District within Sutter County included in the Butte Subbasin), on the west and south by the Sutter County boundary shared with Yolo and Colusa Counties, and on the east by the shared Sutter County and Yuba County boundary to its terminus just north of Nicolaus where Feather River then forms the boundary until the river reaches the Yolo County line. The Sutter Buttes forms an elliptical lateral boundary just south of the Sutter County-Butte County line (**Figure 2-1**).

The Subbasin lies entirely within the Sacramento River watershed, with the most notable hydrological features being the Sacramento and Feather Rivers. Other notable features are Tisdale Bypass and Sutter Bypass. The manmade Sutter Bypass acts as a flood control overflow for the Sacramento River. The boundary of the Sutter Subbasin is coincident with the seven adjacent subbasins and is not separated by any distinct geologic features. Adjacent basins include Butte, Wyandotte Creek, North Yuba, South Yuba, North American, Yolo, and Colusa Subbasins (**Figure 2-1**).

The majority of the Subbasin consists of sedimentary deposits except for the Sutter Buttes. The Sutter Buttes are composed of a prominent set of hills and are a remnant of an old volcanic center that intruded the Central Valley between 2.4 and 1.4 million years ago (Harwood and Helley, 1987). Volcanic deposits consist of two major deposits: (1) a rhyolite and andesite core surrounded by coarse vent tuff-breccia; and (2) alluvial fans caused by erosion (Harwood and Helley, 1987). The Buttes divert groundwater around their flanks, and marine sediments surrounding them have been flushed of their saline water by precipitation to great depths. This flushing action may be related to the shallow connate water found in the Sutter Subbasin to the south (California Department of Water Resources [DWR], 1980). There are no indications that the Willows Fault controls groundwater flow in the Sutter Subbasin and, as shown in **Figure 5-2**, offset on this fault does not appear to occur in sediments younger than Eocene.

5.1.3 Definable Bottom of Basin

The bottom of the basin is the base of fresh water (Berkstresser, 1973) below which the water is brackish and not suitable without treatment for either agriculture or potable water use, as illustrated in **Figure 5-5**. This definition was presented in the 1978 Bulletin 118 publication that shows the base of fresh water occurring between 400 to 1,600 feet below MSL. The approximate bottom of the basin is also illustrated in the geologic cross sections discussed in **Section 5.1.5**.

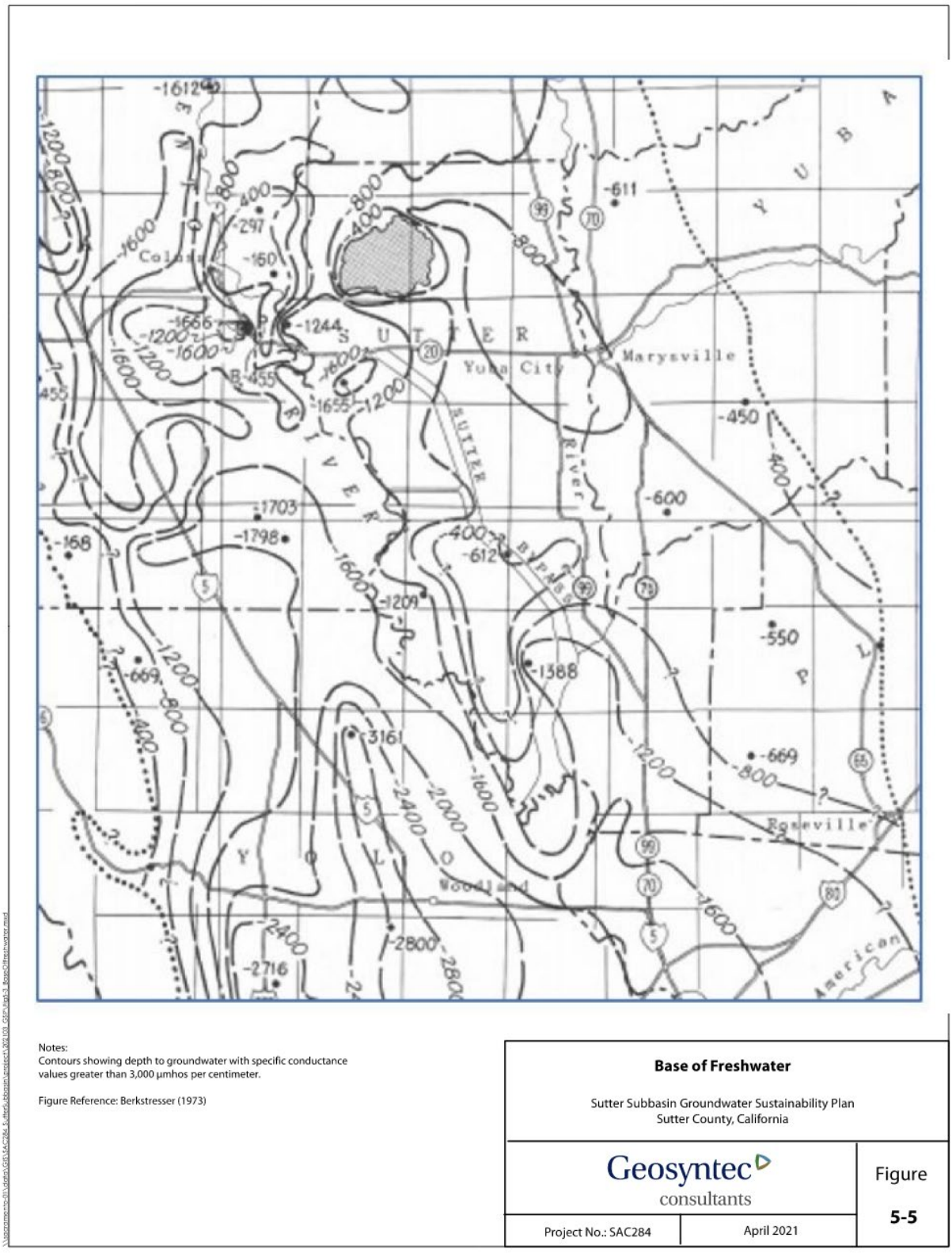

Figure 5-5. Base of Freshwater (Berkstresser, 1973)

5.1.4 Geologic Formations and Stratigraphy

As part of GSP development, the identification of both geologic and hydrogeologic units is critical to the overall understanding of how groundwater flows through the environment. Identification of geologic formations, such as the Laguna Formation, is based on explicit practices for classifying and naming all formally defined geologic units as presented in the North American Stratigraphic Code (North American Commission on Stratigraphic Nomenclature [NACSM], 2005). Specifically, the geologic formation, always capitalized when used for recognized geologic units (e.g., Laguna Formation), is the fundamental unit in lithostratigraphic (layers of rock in the ground) classification. As defined by the NACSM (2005), “a formation is a body of rock identified by lithic (rock or stone) characteristics and stratigraphic position; it is prevailingly, but not necessarily, tabular and is mappable at the Earth’s surface or traceable in the subsurface.” The key portion of this definition for this GSP is mappable, or easily identified, at the Earth’s surface or traceable in the subsurface.

Prior to passage of the Sustainable Groundwater Management Act (SGMA), most drilling programs for groundwater wells did not develop criteria for identifying geologic formations. Identification of geologic formation boundaries from existing well logs is difficult. As such, for this GSP, the nomenclature and cross sections produced for Sutter Basin Alternative Plan (GEI, 2016) were used. However, for successful future groundwater management of the Sutter Subbasin, it is recommended that a program to standardize the identification of geologic formations from drill cuttings collected during the drilling of future groundwater wells be completed similar to the program developed by Blair et al. (1991) for the area around the Wyandotte Creek and Vina Subbasins. Further, it is recommended that an initial identification of geologic boundaries should be completed during the drilling of wells and included on the geologic well logs.

Figure 5-6 shows the geologic map of the project area, location of geologic cross-sections, and well borings used for the geologic cross-sections. The following sections provide a description of the geologic formations identified in the basin for water bearing units and non-water bearing/non-fresh water bearing units.

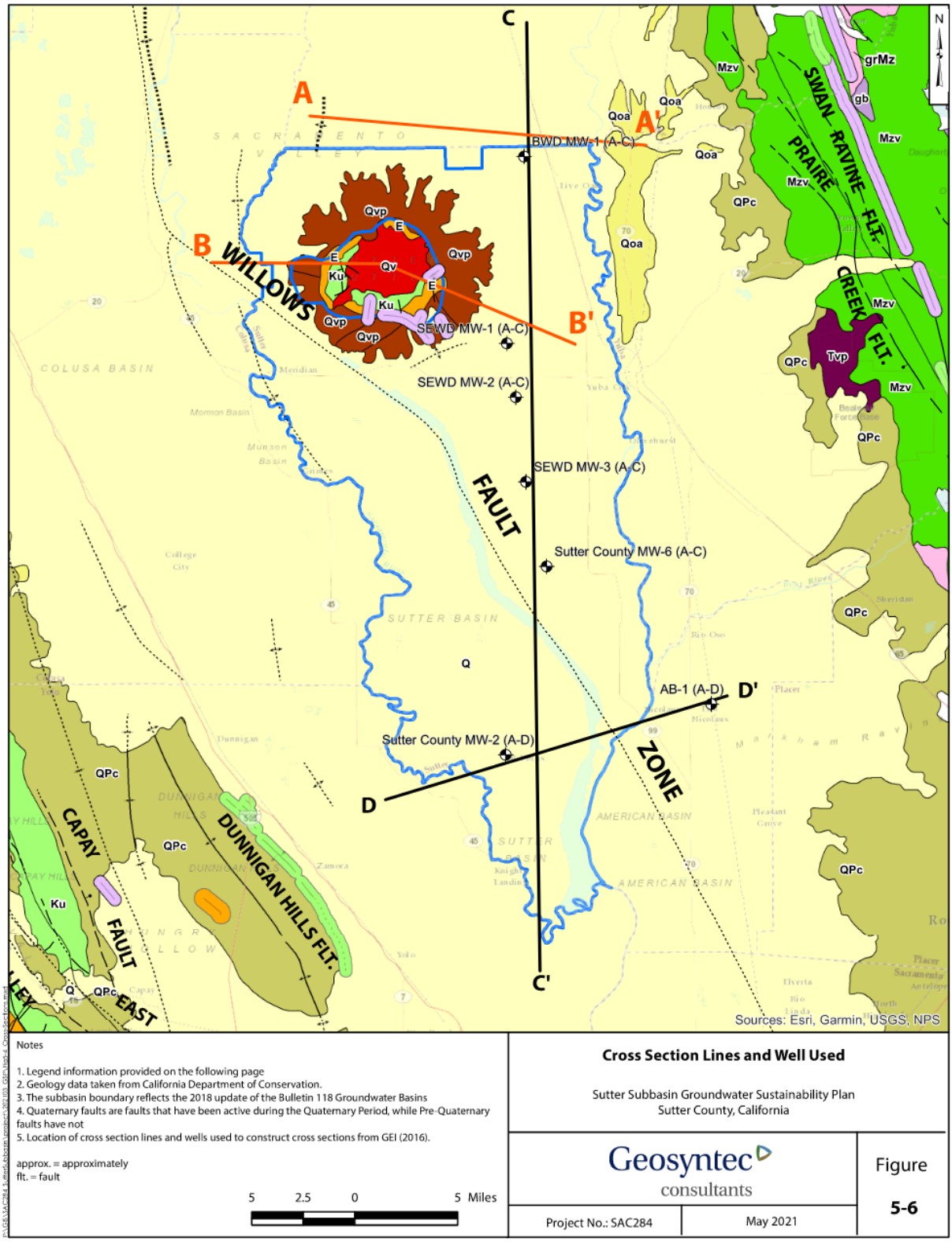

Figure 5-6. Cross-Section Lines and Well Boring Locations

5.1.4.1 Water Bearing Formations

Various reports from the 1960s through present describe the stratigraphic units within the east-central Sacramento Valley. In these different reports, numerous formations have described sedimentary deposits during the Quaternary and Tertiary periods. Stratigraphic units identified in these reports are described below and are referenced from the DWR Bulletin 118 description for the Sacramento Valley Groundwater Basin, Sutter Subbasin.

DWR Bulletin 118 (2006 Update) for the Suter Subbasin classified sediments up to 100 feet as **Alluvium** (Holocene Stream Channel and Floodplain Deposits). This unit consists of coarse sand and gravel deposited from the present-day Yuba, Feather, and Sacramento Rivers. Sediments are up to about 100 feet thick near the riverbeds (Harwood and Helley, 1987). Deposits further from the riverbeds thin in thickness and become finer gained. These sediments are highly permeable and provide areas where groundwater can be recharged. Wells in these areas can yield from 2,000 to 4,000 gallons per minute (gpm; DWR, 2006).

Underlying the Alluvium is older alluvium (Pleistocene Floodplain Deposits) that consists of units designated as the **Modesto, Riverbank**, and **Victor** Formations. The numerous Quaternary formations others have proposed are based on geomorphic or buried-soil information rather than on criteria by which formal formations are distinguished as discussed above. More importantly, the criteria used by others cannot be easily distinguished in drill cuttings. The Alternative Plan recognized this issue and grouped these units together in the cross-sections. As stated in **Section 5.1.3**, it is recommended that a program to standardize identification of geologic formations from drill cuttings collected during the drilling of future groundwater wells be completed.

Within the Subbasin, the **Modesto** Formation is characterized mostly by gravels, cobbles, and sand with some silt and clay. GEI (2016) designated sediments representing this formation from the ground surface to about 70 to 120 feet below ground surface (bgs) just to the west of Yuba City near SEWD MW-1 and indicated the formation is thicker to the south and thins to the north, with beds that are generally flat-lying.

The **Riverbank** Formation underlies the Modesto Formation and is also sedimentary in origin. This formation is composed of silts and clays with 10- to 20-foot-thick sand and gravel layers. The sand and gravel beds of the Riverbank Formation are thinner and less laterally extensive than those of the overlying Modesto Formation, and are therefore more difficult to identify where they may occur. Similar to the Modesto Formation, the Riverbank Formation is thicker to the south, and thins closer to the Sutter Buttes, with beds that are generally flat (GEI, 2016).

The **Victor** Formation is approximately 100 feet of Sierran alluvial fan deposits consisting of a mix of sand, silt, and clay deposited by shifting streams that drained the

Sierra Nevada during Pleistocene age. Grain size and clay content vary considerably both laterally and vertically within the formation, and the yield from wells indicates this variability. Deposits of this formation thin with distance to the west of the Yuba River and the foothills, and wells can yield up to 1,000 gpm.

The **Laguna** Formation occurs above the **Sutter Buttes Rampart** and is unconformably overlain by the Riverbank Formation. The formation consists of sandy gravel channel facies, sandy channel facies, and sandy clay to clay floodplain facies (Blair et al., 1991). The Alternative Plan placed the **Nomlaki Tuff Member**, an upper Pliocene, white, pumice-rich, water lain vitric tuff, as the base of the Laguna Formation, consistent with Busacca et al. (1989). As cited in Blair et al. (1991), others have placed the Nomlaki Tuff as the top of the Mehrten or Tuscan Formations. Blair et al. (1991) isolated this unit as a formal formation because it is easily identifiable in drilling samples and separates the Laguna Formation from the underlying volcanic rich sediments of the Mehrten and Tuscan Formations. The Laguna Formation in the Sutter Subbasin is thinner to the north and thickens to the south, with the thickness ranging from about 80 feet in the north to almost 700 feet to the south.

The **Sutter Buttes Rampart** geologic unit is mapped as lying beneath the Alluvium around the Sutter Buttes. This unit consists of volcanic debris shed off the Sutter Buttes in a radial pattern. The volcanic debris consists of sand to boulder size material which slopes and thins to the south, away from the Buttes. The gamma log signature of the Sutter Butte Rampart has a recognizable and correlative “kick,” which was more distinct near the Sutter Buttes. Few wells in the area use this formation for water supply.

The **Sutter** Formation is generally characterized by black, blue, gray, and greenish gray, angular to sub-rounded sand gravel. As presented in the Alternative Plan, the Sutter formation (as such lower case “formation”) is an informal unit and consists of sediments interpreted to be the distal portion of the upper Princeton Valley Fill, Mehrten Formation, Nomlaki Tuff, and Tuscan Formation (Springhorn, 2008). The presence of either of these units varies with the relative location of the Sutter formation with the Sutter Buttes. Cross-sections presented in this GSP list these units as part of the Sutter formation.

The Alternative Plan has interpreted the presence of a unit referred to as the **Upper Princeton Valley Formation.** As defined by Redwine (1972), the Princeton Submarine Valley System is a morphological feature of the ancestral Sacramento River Basin and contains the geologic formations described below. For example, the Ione Formation is used by Redwine (1972) to separate the lower and upper Princeton Valley fills, and the Lovejoy Basalt is interpreted to represent the rimrock of the upper Princeton Valley Fill. As stated above, the Sutter formation has also been designated to consist of several of these units. For this GSP, the nomenclature of Upper Princeton Valley Formation or Fill is not used unless referring to the morphological feature defined by Redwine (1972).

The **Mehrten** Formation and its stratigraphic correlative to the north **Tuscan** Formation consist of purple volcanic debris-flow deposits and interbedded water lain fluvial deposits rich in volcanic detritus but also containing Sierran crystalline basement-derived clasts and rare tuff beds (Blair et al., 1991). The occurrence of both channel-lain, clast supported, gravel-facies and interbedded volcanic rich debris flows in these formations suggests that debris flows, probably related to volcanic events, episodically choked the ancestral river systems in the area.

The **Valley Springs** Formation of the Sierra Nevada, located greater than 2,000 feet deep in the Sacramento Valley or found shallower near the eastern margin of the valley, consists of tan, white, and green rhyolitic fragments and is the equivalent to the Princeton Valley Fill defined by Springhorn (2008). The Valley Springs Formation was originally included in the Ione Formation as the "clay rock or tuff," the highest of three subdivisions of the Ione (United States Geological Society [USGS], 2007). Bartow (1992) recognized the fundamental lithologic difference between the Ione proper and the "clay rock and tuff," and noted that the two units are separated by a disconformity. The Valley Springs Formation was formally defined by Gale et al. (1939) from a type section near the town of Valley Springs in Calaveras County.

The Alternative Plan did not include the Ione Formation within the water-bearing formations of the Sutter Subbasin due to the occurrence of brackish water in this unit in several areas. However, the Ione Formation has been observed to contain fresh water in many areas around the Sutter Subbasin including in the Butte, Vina, and Wyandotte Subbasins (Brown and Caldwell, 2013). As such, a description of the geologic unit is also presented herein. The name "Ione Formation" was first used by Lindgren (1894) for the beds of clay and sand containing layers of lignite that crop out along the foothills of the Sierra Nevada; the name derives from the town of Ione in Amador County. The Ione Formation consists of variably cemented, fine to coarse sandstone, siltstone, lignite, and claystone with variegated colors including red, yellow, white, blue, gray, orange, and black. Interbedded lenticular pebble-and-cobble “auriferous” or “greenstone” gravels are locally present and become more abundant eastwardly. The Ione Formation has long been considered to be composed of the deposits of a fluvial-deltaic system formed under a humid, subtropical climate on the basis of the occurrence of lignite and carbonaceous shale, the identified flora, and the presence of kaolinite cement (Blair et al., 1991).

5.1.4.2 Non-Water or Non-Fresh Water Bearing Geologic Formations

The Princeton Submarine Valley (Redwine, 1972) was filled with various marine and near continental formations. All these formations have been folded and faulted by both regional tectonics and intrusion of the Sutter Buttes volcanic. **Figure 5-1** shows the locations of recognized faults and folds within the Sutter Subbasin.

Tertiary formations include the Eocene **Capay, Ione**, and **Lovejoy Basalt**. The Ione Formation underlies the Sutter formation. For most of the area, this boundary marks the base of the fresh water; however, while the Ione Formation typically has brackish water, as discussed above, this unit contains fresh water just south of the Sutter Buttes. Underlying the Ione Formation, the Capay Formation consists predominantly of a black to greenish black to greenish-gray marine claystone and shale with fossiliferous intervals (Springhorn, 2008).

Upper Cretaceous formations and units include the **Forbes, Kione, Sacramento Shale, Winter Sands and Shales**, and the **Starsky Sands**. Many of these formations are the source of natural gases. The locations of gas exploration borings and wells are shown in **Figure 5-7**. Many of these formations are exposed in a circular pattern around Sutter Buttes due to the folding and faulting associated with the emplacement of the Buttes. The Starsky Sands are not exposed at ground surface but are projected to be in contact with the freshwater aquifer within the Sutter Subbasin. All the formations and sediments mentioned above are underlain by igneous rocks from the Sutter Buttes or igneous and metamorphic rocks, potentially like those exposed in the Coast Ranges and in the Sierra Nevada.

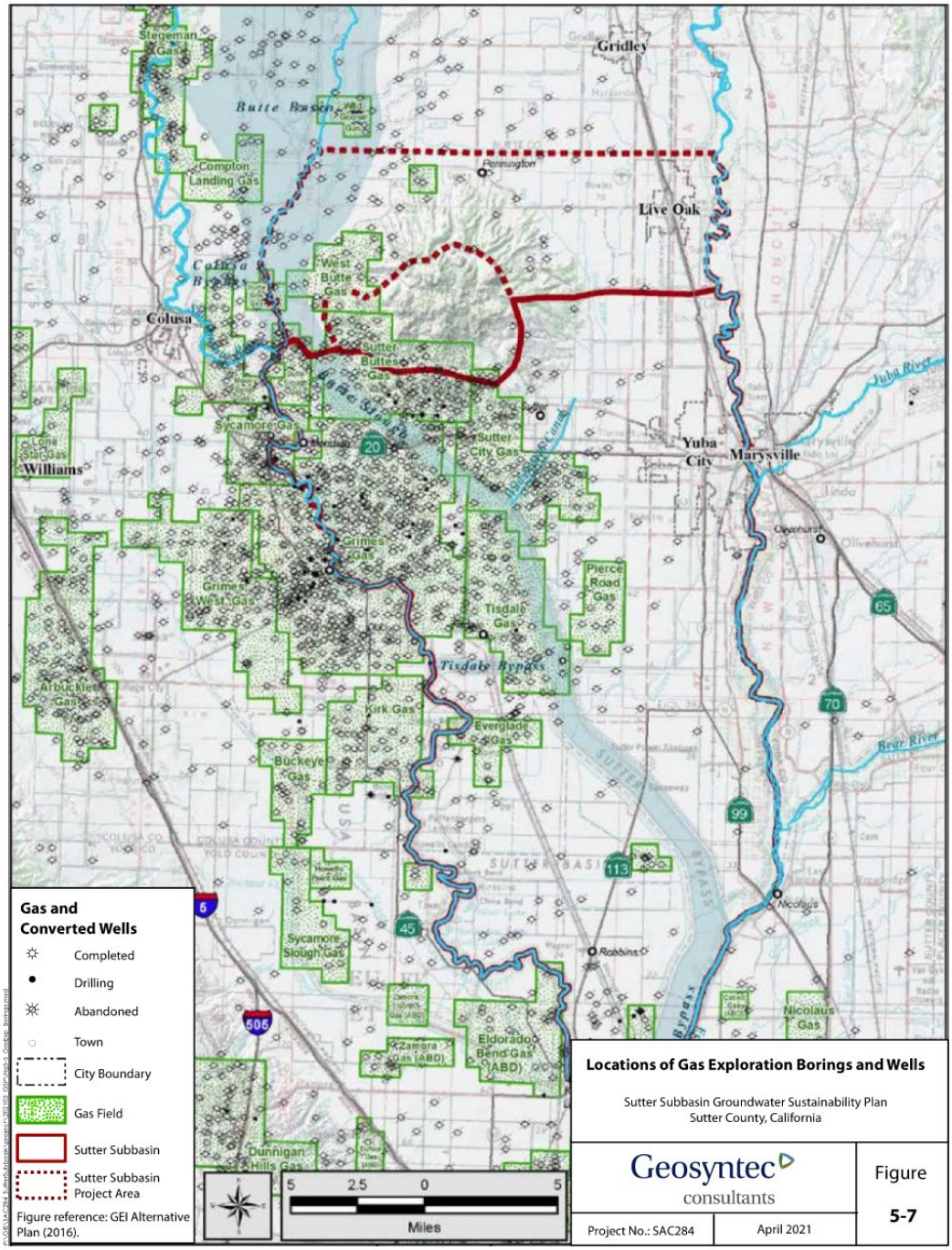

Figure 5-7. Gas Exploration Borings and Wells Locations[1]

[1] Figure sourced from Sutter Subbasin Alternative Plan (GEI, December 2016), reflecting basin boundaries as of Alternative Plan development. A Basin Boundary Modification Request was approved by DWR in 2019 consolidating the East Butte Subbasin ("Sutter Subbasin Project Area") with the Sutter Subbasin as well as minor jurisdictional boundary modifications. Such boundary modifications have not resulted in material changes that would alter understanding of basin conditions.

5.1.5 Geologic Profiles

Geologic profiles (cross-sections) have been developed for the Subbasin by many authors. Pertinent profiles are discussed and presented to illustrate the relationships and distribution of the formations and coarse-grained sediments that will constitute principal aquifers. The locations of these profiles are shown in **Figure 5-6**.

More regional geologic sections have been prepared across the Sutter Subbasin that show the geologic formation names and some lithologic indications. East-west geologic profiles (Springhorn, 2008) across the northern Subbasin boundary and along the Sutter and Butte County lines where inflow to the Subbasin occurs are provided in **Figure 5-8** and **Figure 5-9**.

Basin-level profiles that show sediment types and formation were developed that cross the entire Subbasin. **Figure 5-10** shows a regional northwest-southeast profile. **Figure 5-11** shows a regional east-west profile. **Appendix 5-A** contains the well logs used to create these geologic profiles.

In addition to these geologic profiles, geotechnical investigations (to depths of up to 140 feet) have been performed along significant portions of the Feather and Sacramento River levees, along the east and west sides of the Subbasin. Profiles were developed along the Sutter Bypass levees, located in the central portion of the basin. The investigations show sediment types where groundwater and surface water interactions occur, and where the river (bathometric elevations) has incised partially or entirely through coarse-grained sediments that make up the shallow aquifer zone. They also show where slurry walls have been constructed and where they are planned. **Appendices 5-B** through **5-D** provide these geologic profiles for each of the rivers and the bypass. These sections do not contain a breakout of the geologic formations but in general, dependent upon the location, would include Alluvium and Older alluvium.

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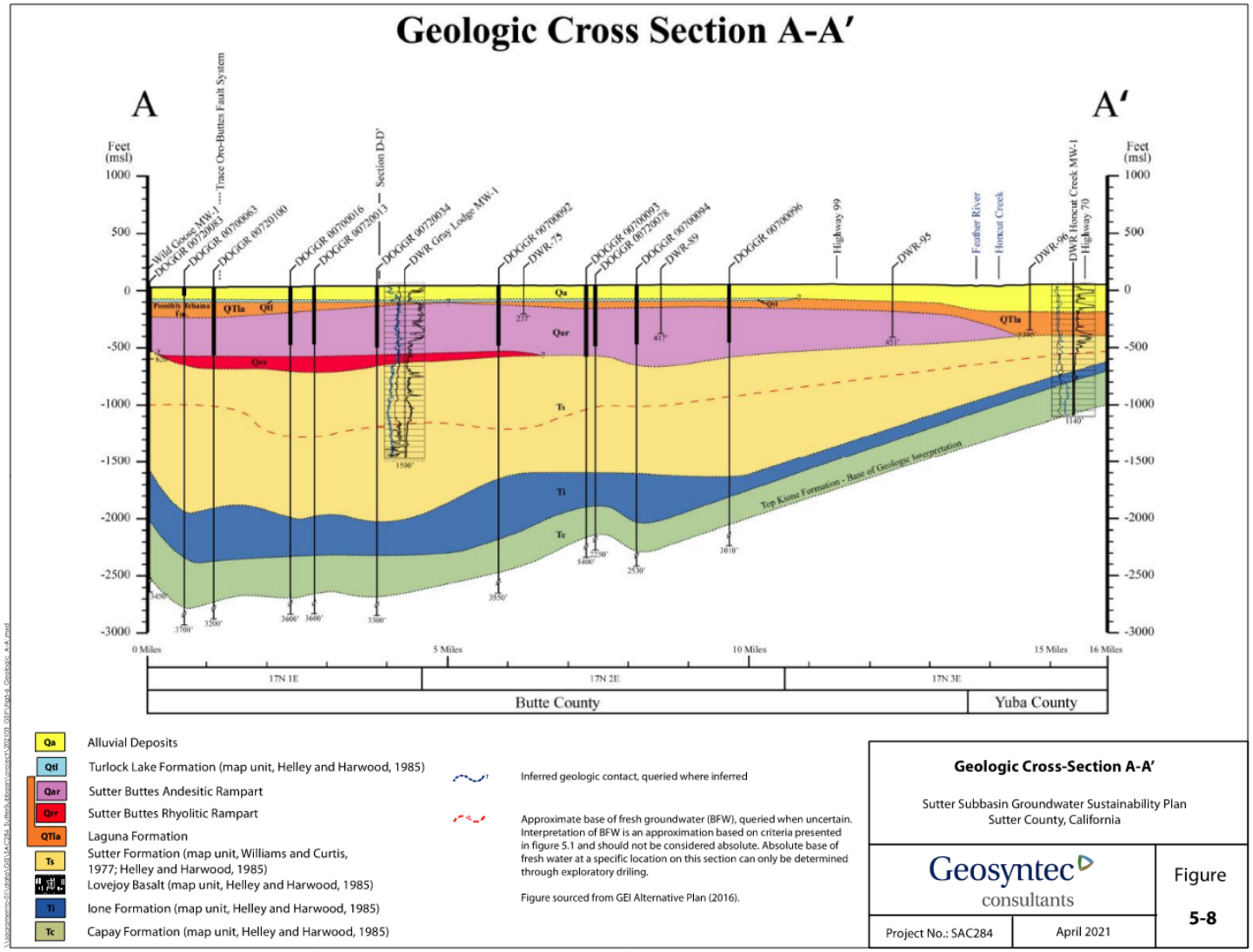

Figure 5-8. Geologic Cross-Section A-A'

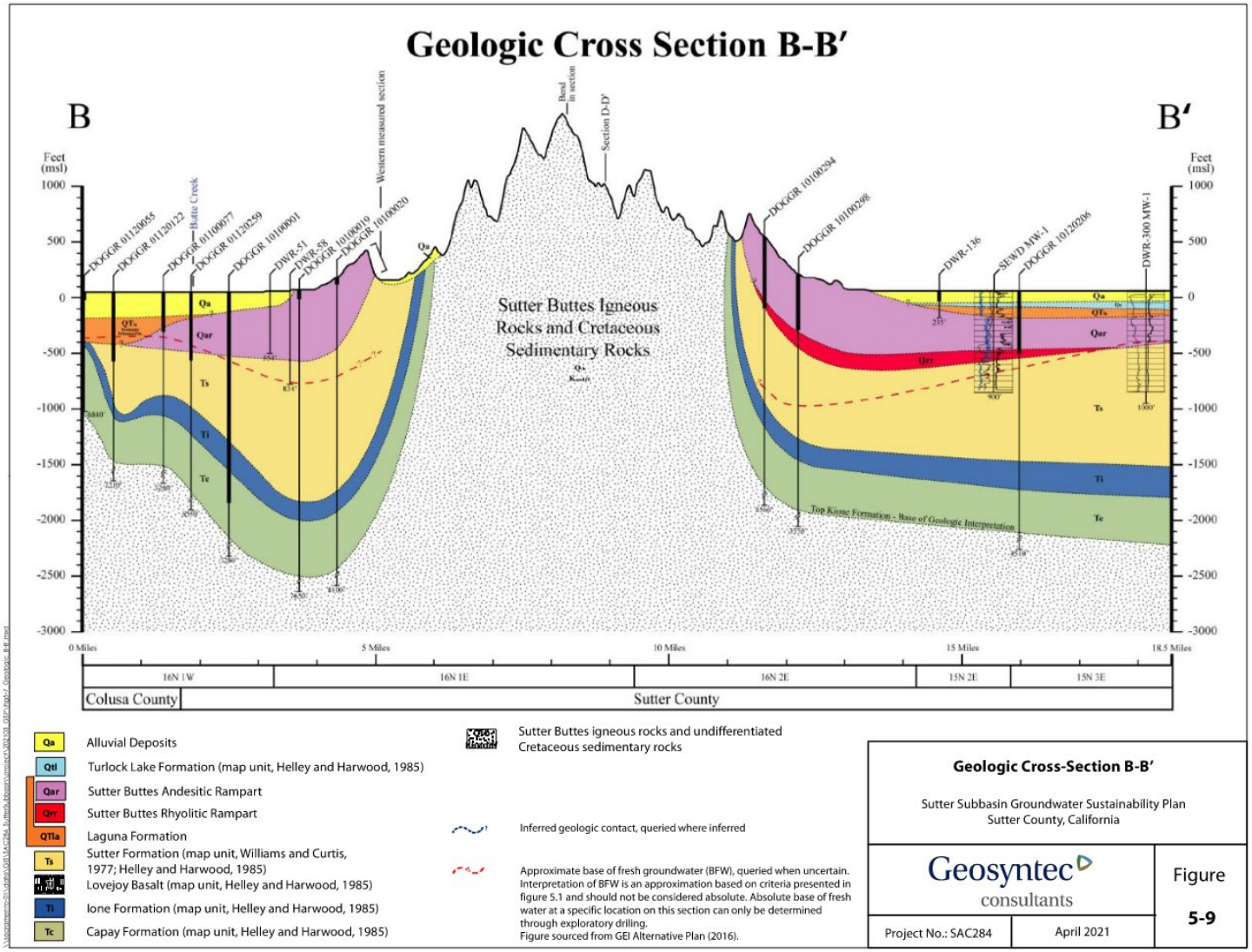

Figure 5-9. Geologic Cross-Section B-B'

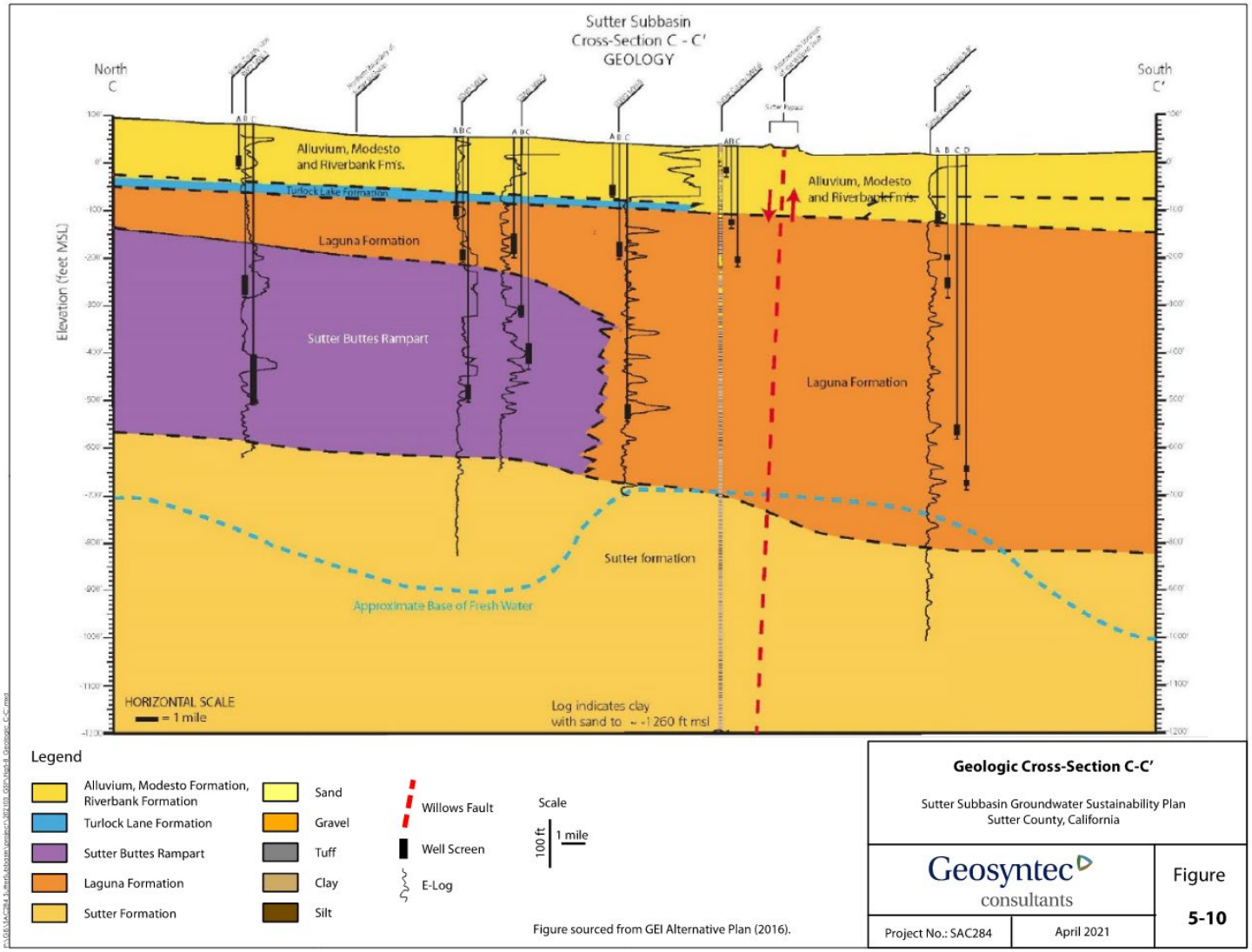

Figure 5-10. Geologic Cross-Section C-C'

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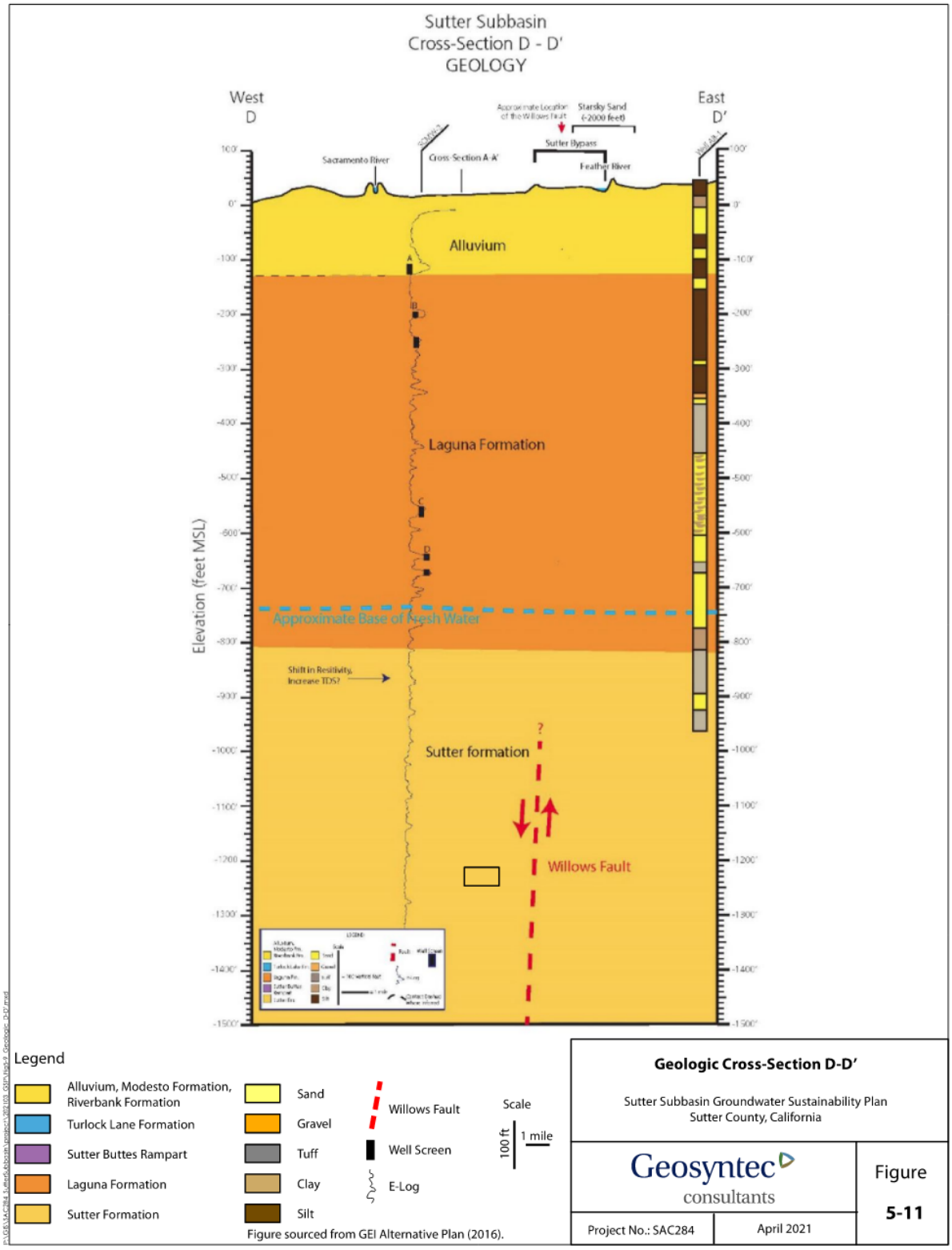

Figure 5-11. Geologic Cross-Section D-D'

5.1.6 Principal Aquifers and Aquitards

As stated in the GSP Regulations, the HCM is to include a description of the principal aquifers and aquitards including the following information:

- Formation names.
- Physical properties of aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity, and storativity.
- Structural properties of the basin that restrict groundwater flow within the principal aquifers, including information regarding stratigraphic changes, truncation of units, or other features.
- General water quality of the principal aquifers.
- Identification of the primary use or uses of each aquifer, such as domestic, irrigation, or municipal water supply (discussed in **Section 2.1.3.1**).

The following sections provide this information.

5.1.6.1 Formation Names

The Sutter Subbasin groundwater system is comprised of a single principal aquifer composed of the Modesto Formation, Riverbank Formation, Sutter Buttes Rampart, Victor Formation, and Laguna Formation. These formations create various zones with different hydrogeologic properties with both unconfined and semi-confined conditions. This leaky aquifer system has resulted in varied hydraulic connectivity between different depth zones in different areas of the Subbasin.

The Alternative Plan recognized three aquifer zones within the principal aquifer that are designated in this GSP as Aquifer Zones (AZ) 1, 2, and 3. Each of these aquifer zones is separated over portions of the Subbasin by single or multiple layers of silt and clay (or aquitards) that slow the vertical movement of groundwater within the overall aquifer. Geologic units identified within the shallow AZ-1 includes the Modesto Formation and Riverbank Formation. Geologic units identified within the intermediate AZ-2 include the Sutter Buttes Rampart and Laguna Formation. The AZ-2 has been further subdivided into 2A for the area within the Sutter Buttes Rampart and 2B for the area within the Laguna Formation. Units identified within the deep AZ-3 include the Laguna Formation, Sutter Buttes Rampart, and Sutter formation.

5.1.6.2 Aquifer Interactions

Figure 5-12 and **Figure 5-13** provide hydrostratigraphic cross-sections constructed as part of the Alternative Plan that illustrate the vertical and lateral extent of each of the AZs interpreted from the geology, electric log responses, groundwater levels, and water quality. As shown in these cross-sections, the shallow AZ-1 extends from the ground surface to depths ranging from 120 feet to 150 feet bgs at MW-1, nearest the Sutter Buttes in the north, to a depth of about 150 to 200 feet at MW-3, furthest south from the

Sutter Buttes. Although, as discussed below, there are no known aquifer tests conducted in this aquifer, it is believed to be unconfined to semiconfined, a conclusion supported by the response of hydrographs as discussed below.

The intermediate AZ-2 slopes away in a radial pattern from the Sutter Buttes and extends from about 180 to 450 feet bgs, as illustrated in **Figure 5-12** and **Figure 5-13**. The deep AZ-3 extends from about 480 to about 700 feet or more beneath the Subbasin. The low permeability zone between AZ-1 and AZ-2 ranges in thickness from 20 to 60 feet, and the low permeability zone between AZ-2 and AZ-3 ranges in thickness from 30 to 80 feet.

To further assess the interactions between the three aquifer zones, hydrographs for 12 nested monitoring wells (contain multiple separate wells at same location) within the Subbasin were assessed. The locations of these wells are shown in **Figure 5-14**. Nine of these wells (shown as red in **Figure 5-14**) are equipped with pressure transducers and record water levels hourly. The following presents the results of the assessment for the nine wells equipped with pressure transducers going from north to south. The complete hydrographs for each of the nested wells are presented in **Appendix 5-E**. **Figure 5-15** through **Figure 5-23** provide hydrographs for individual years from each of the nine wells with pressure transducers. This smaller scale allows for observations of differences in responses to yearly stresses on the aquifer zones, such as from seasonal pumping, and provides more insight for interactions between the aquifer zones. For each of these hydrographs, AZ-1 wells hydrographs are in green, AZ-2 in blue, and AZ-3 in red. Where a nested well has two screens within the same aquifer zone, the deeper well hydrograph is dashed.

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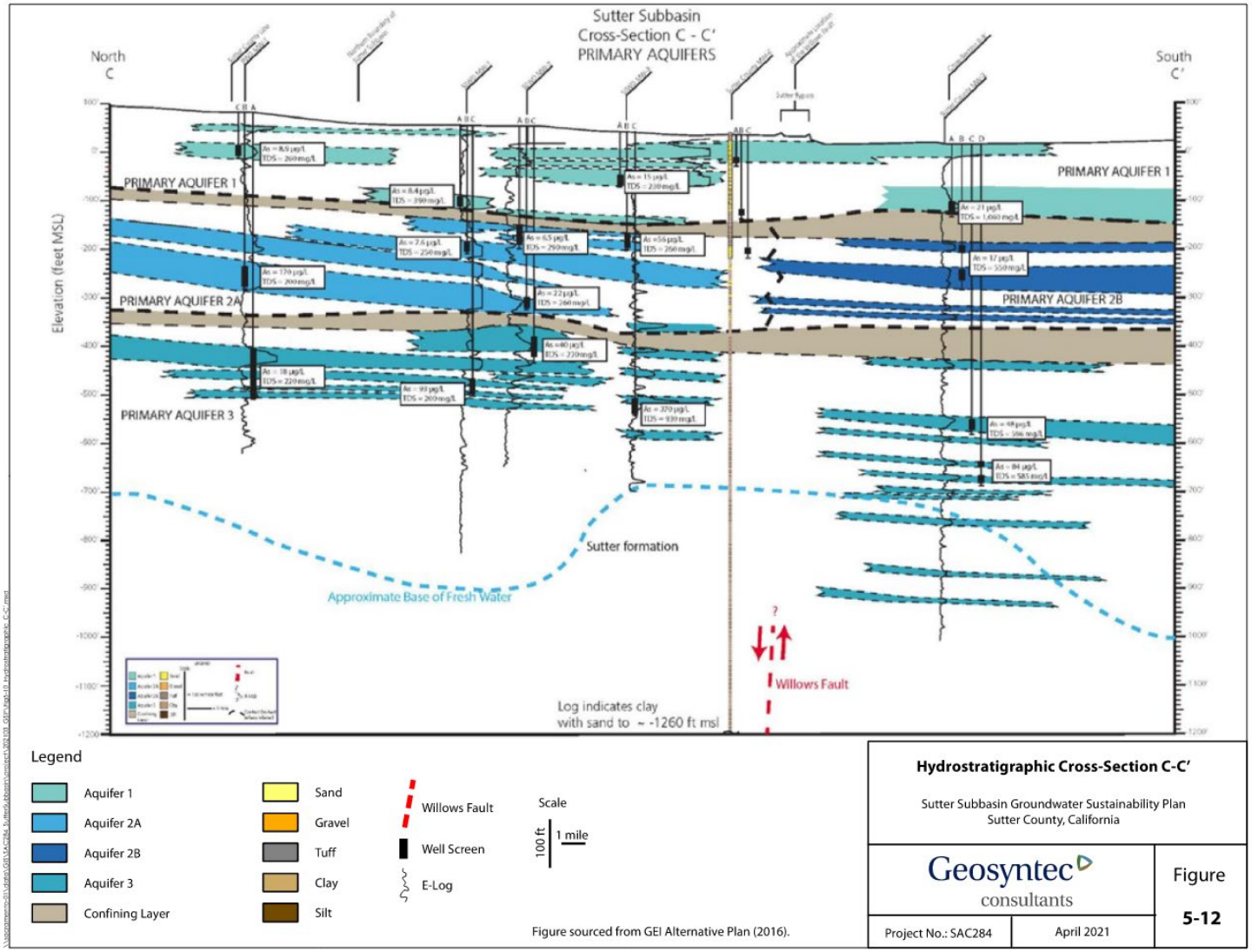

Figure 5-12. Hydrostratigraphic Cross-Section C-C'

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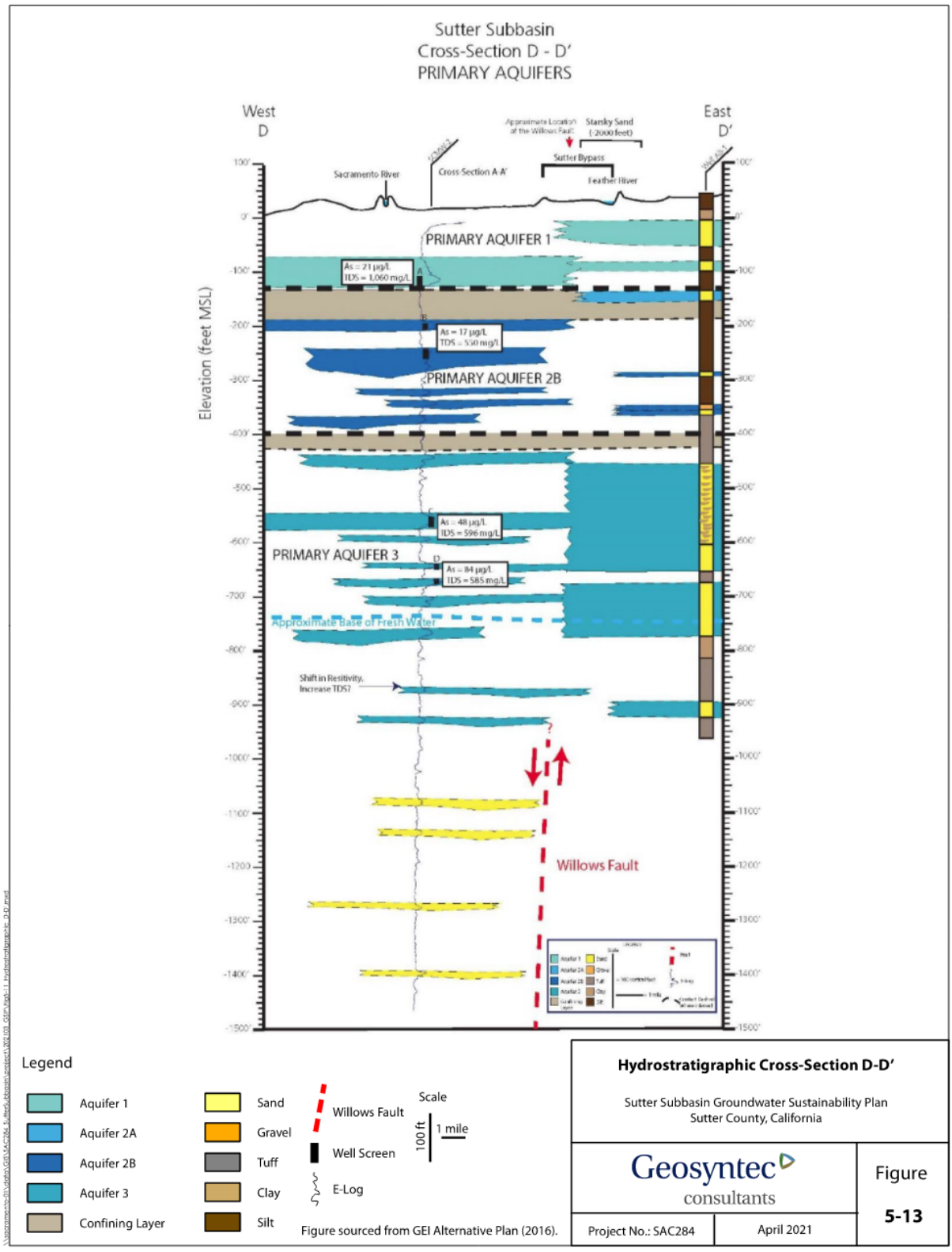

Figure 5-13. Hydrostratigraphic Cross-Section D-D'

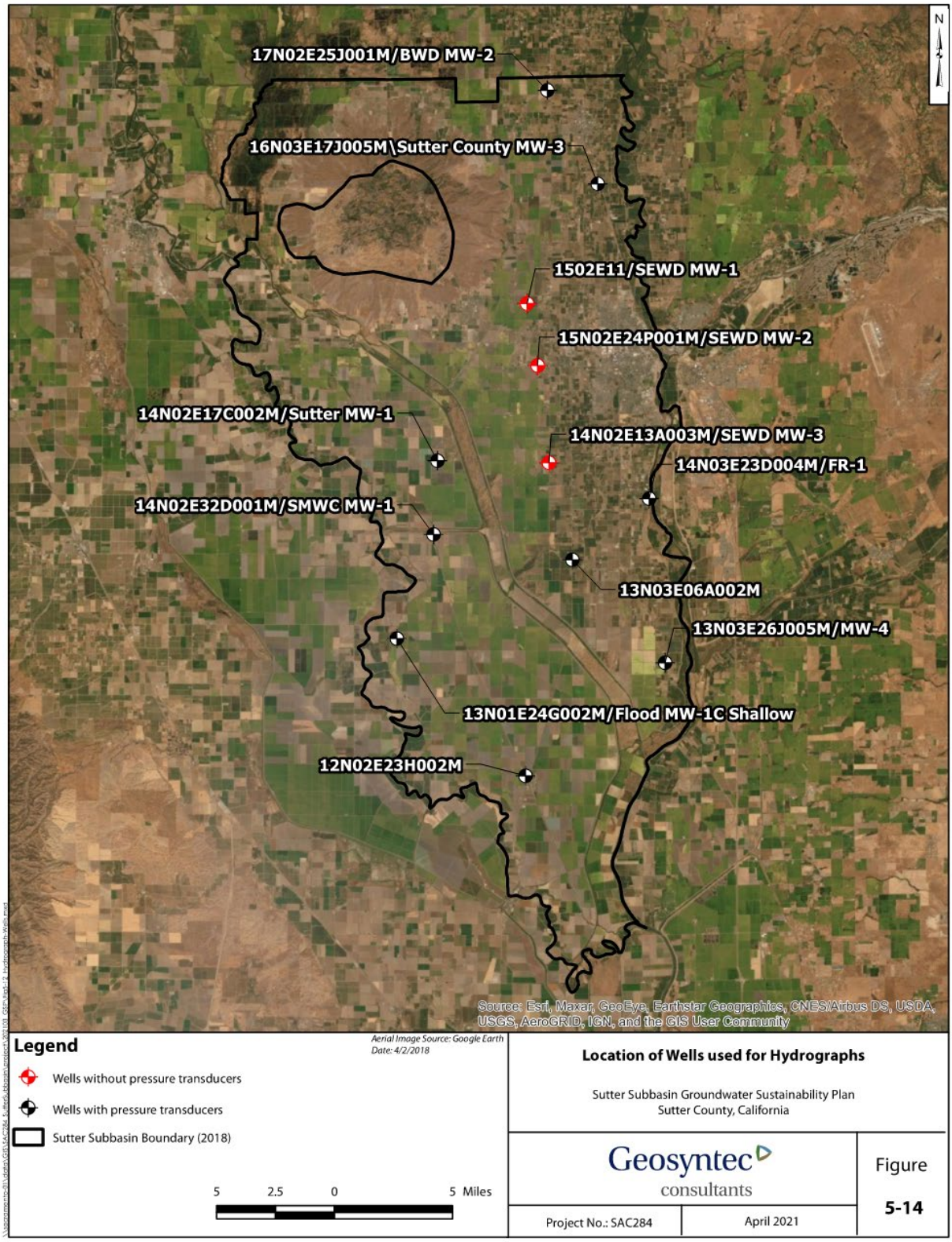

Figure 5-14. Location of Wells Used for Hydrographs

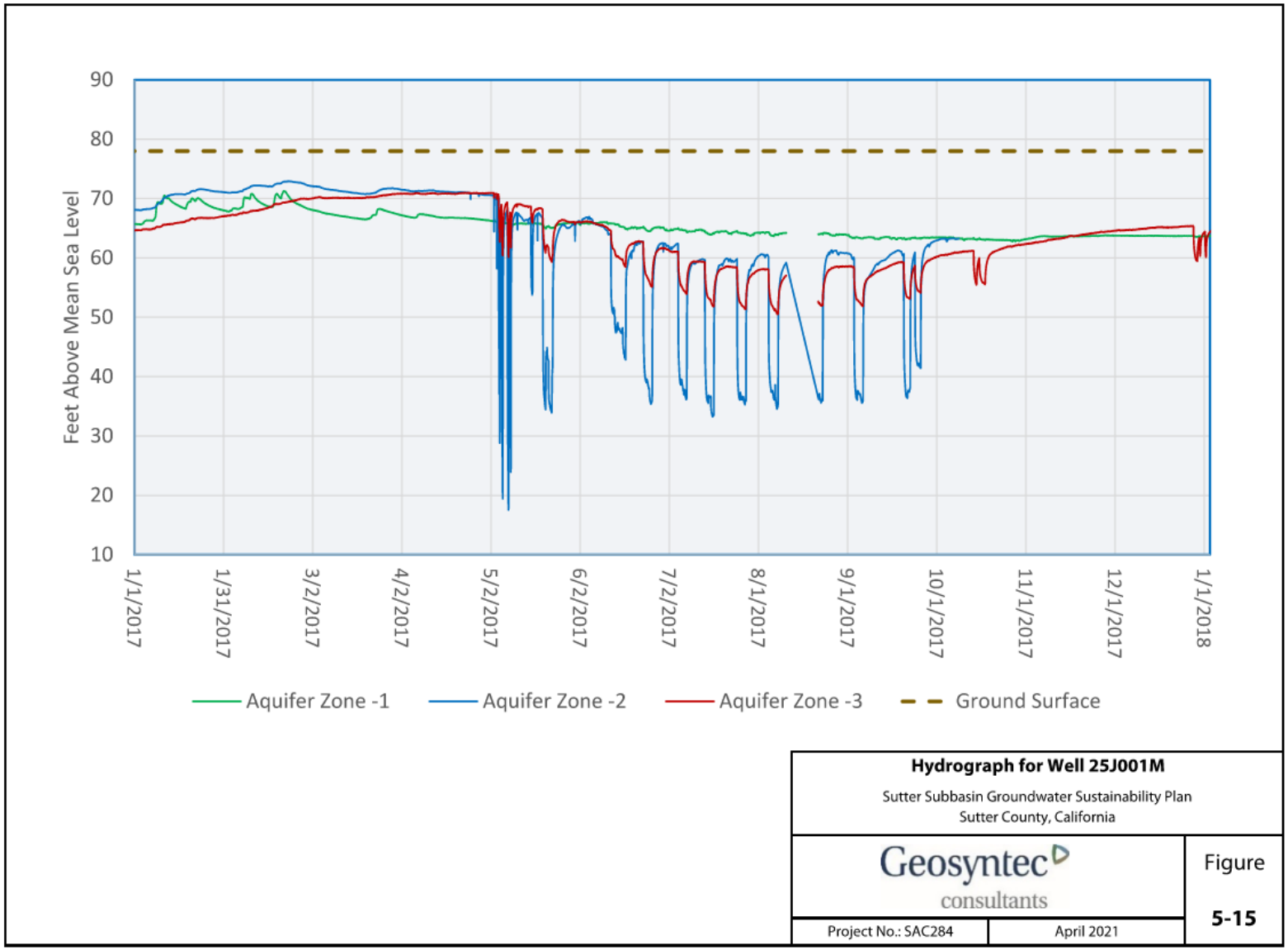

Figure 5-15. Hydrograph for Well 25J001M

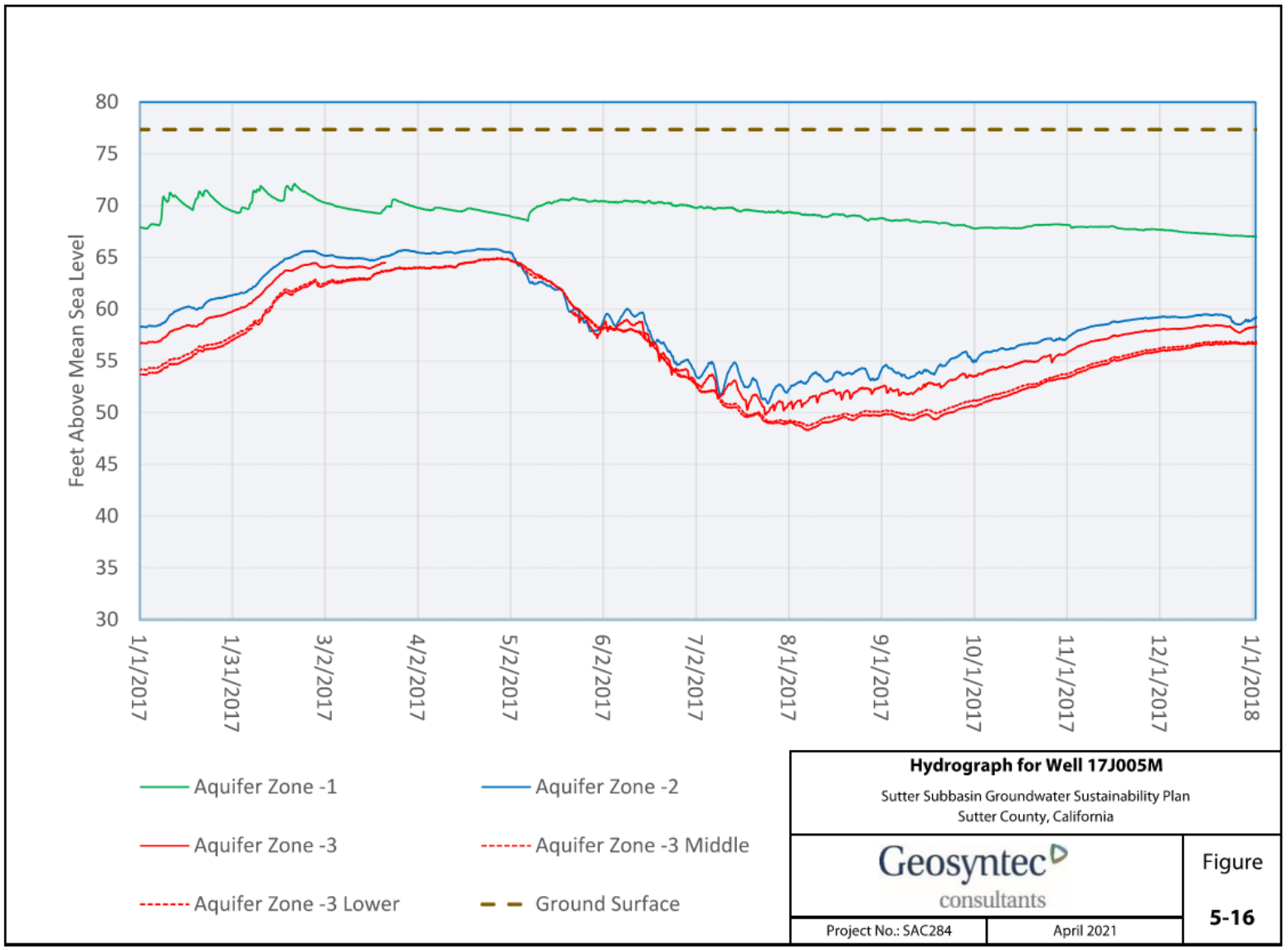

Figure 5-16. Hydrograph for Well 17J005M

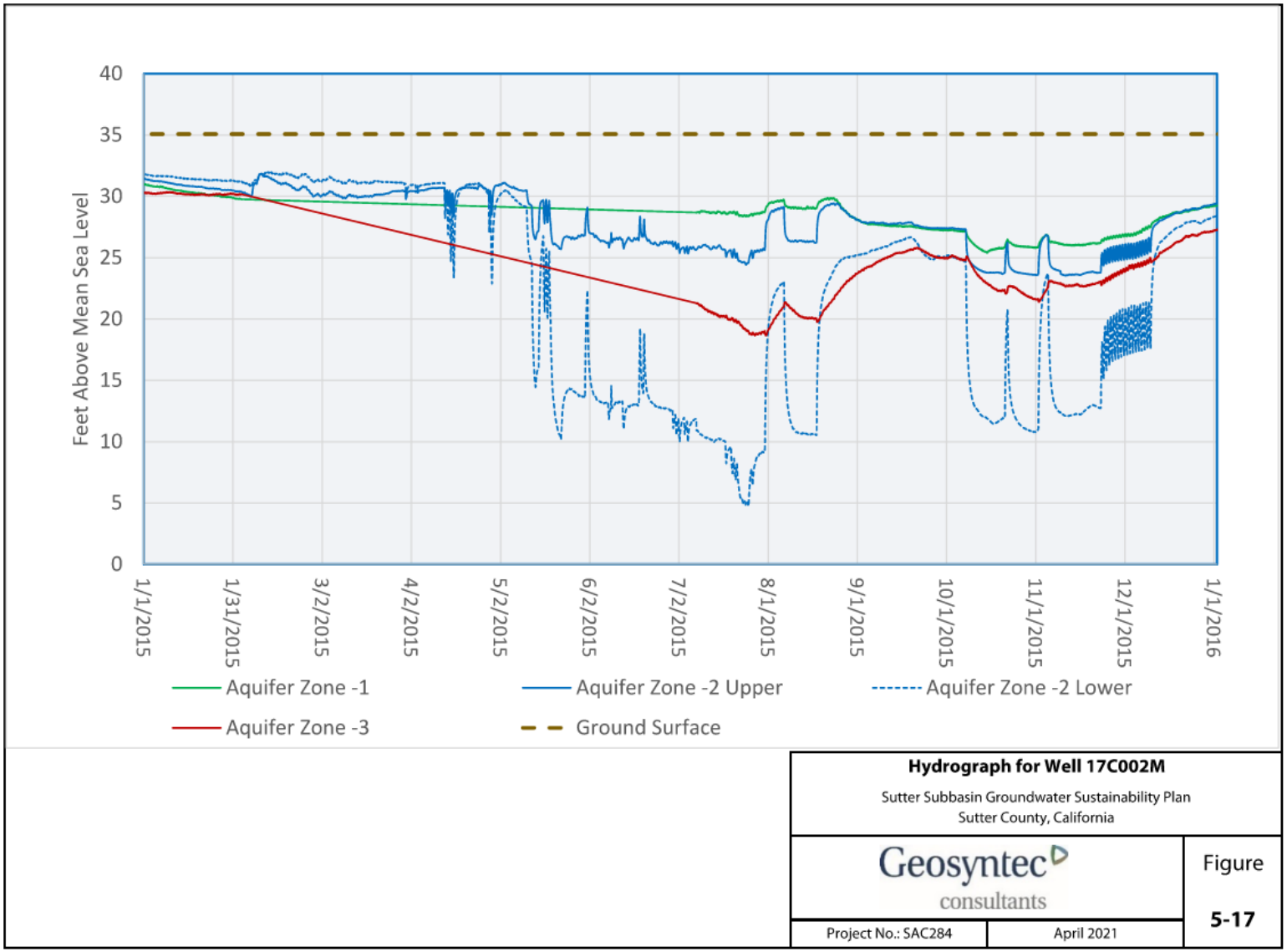

Figure 5-17. Hydrograph for Well 17C002M

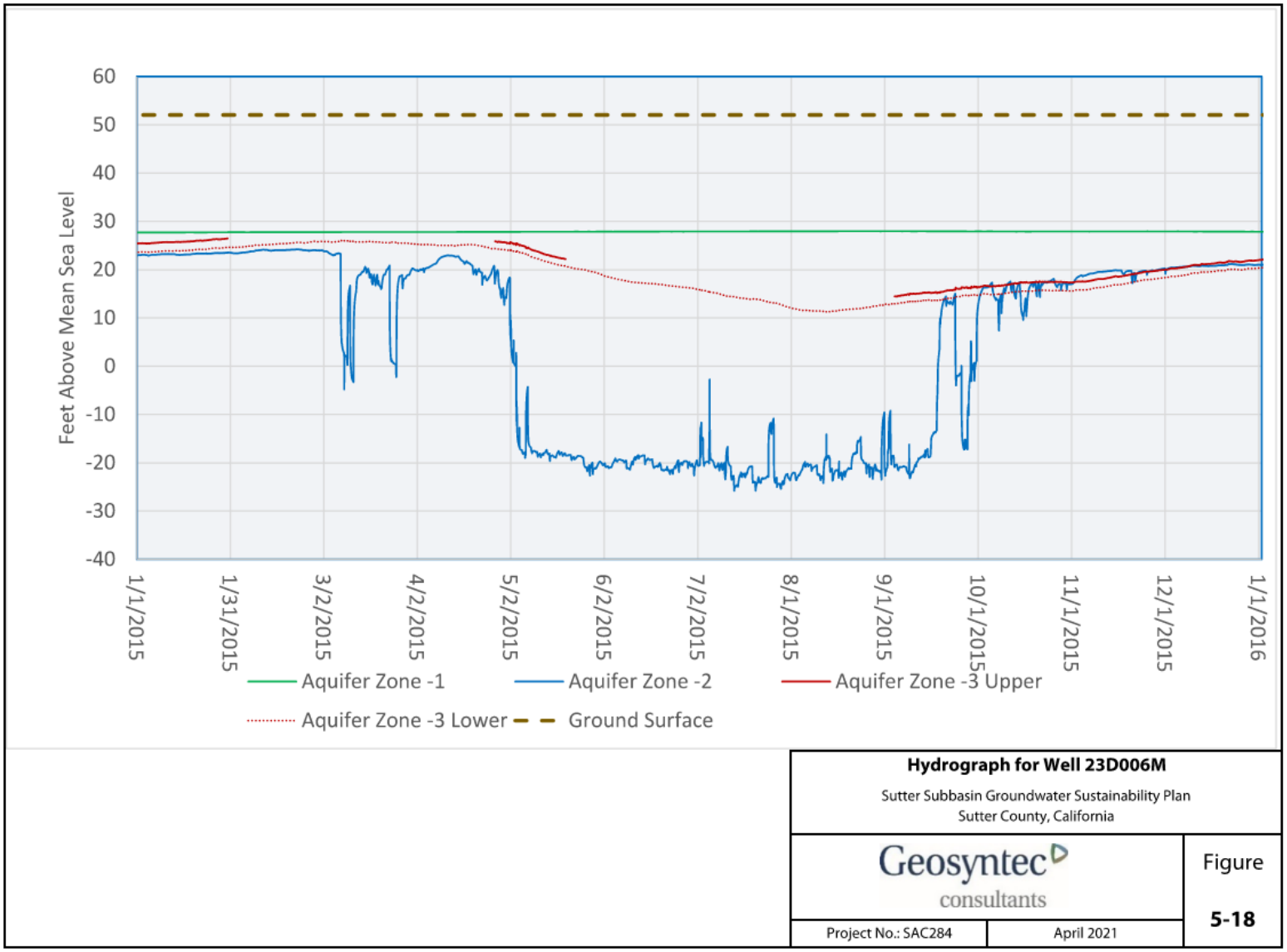

Figure 5-18. Hydrograph for Well 23D006M

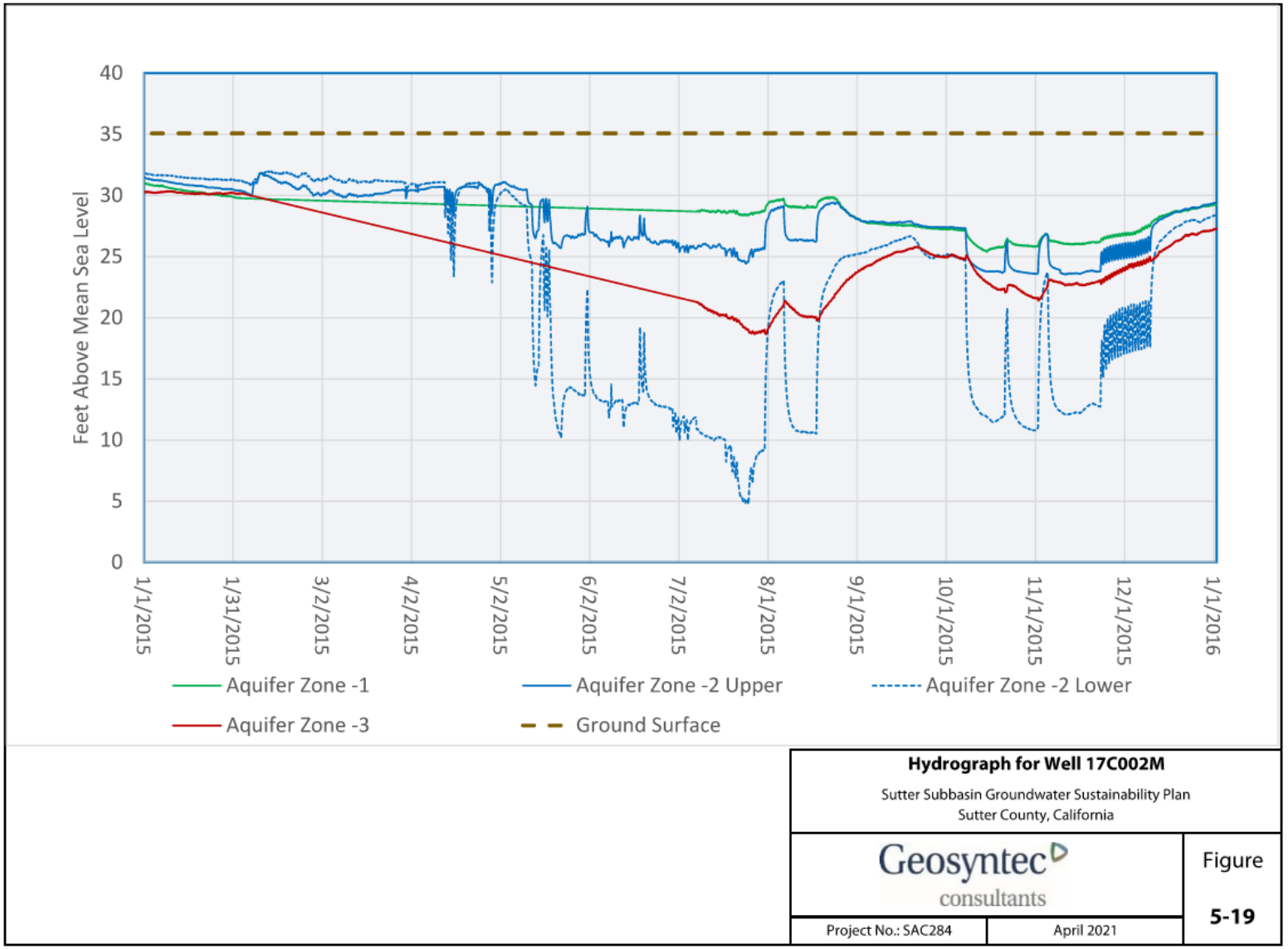

Figure 5-19. Hydrograph for Well 17C002M

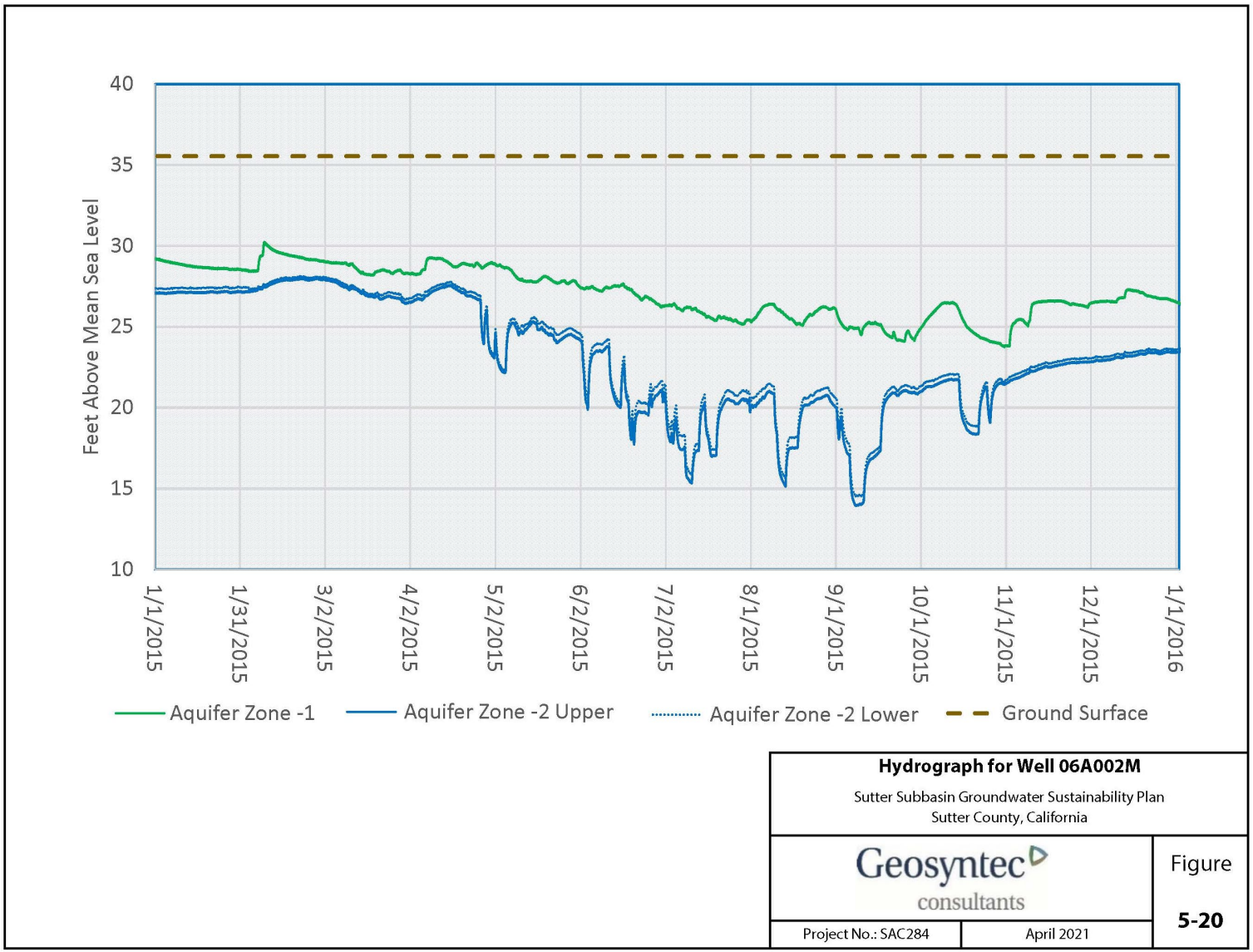

Figure 5-20. Hydrograph for Well 06A002M

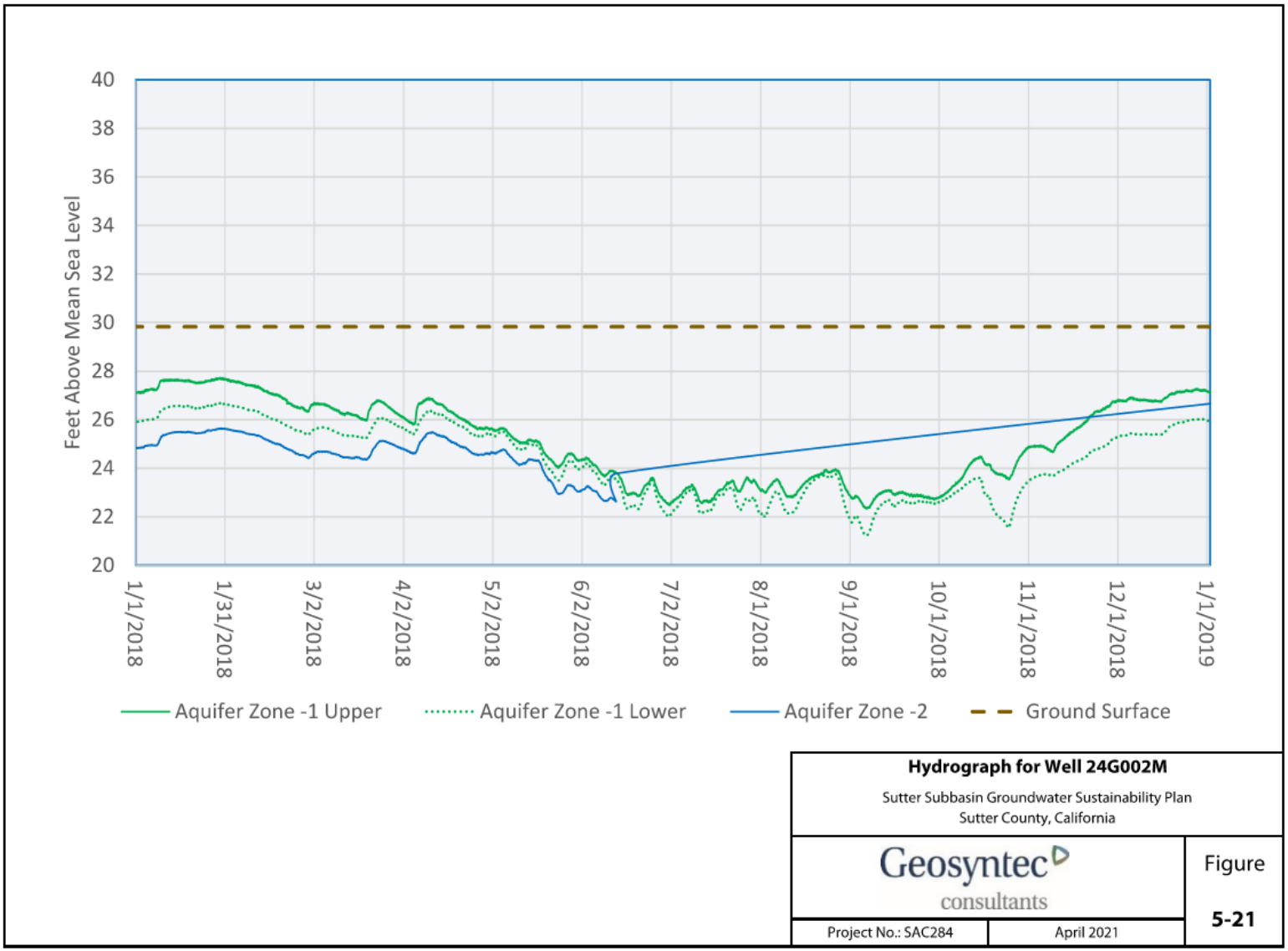

Figure 5-21. Hydrograph for Well 24G002M

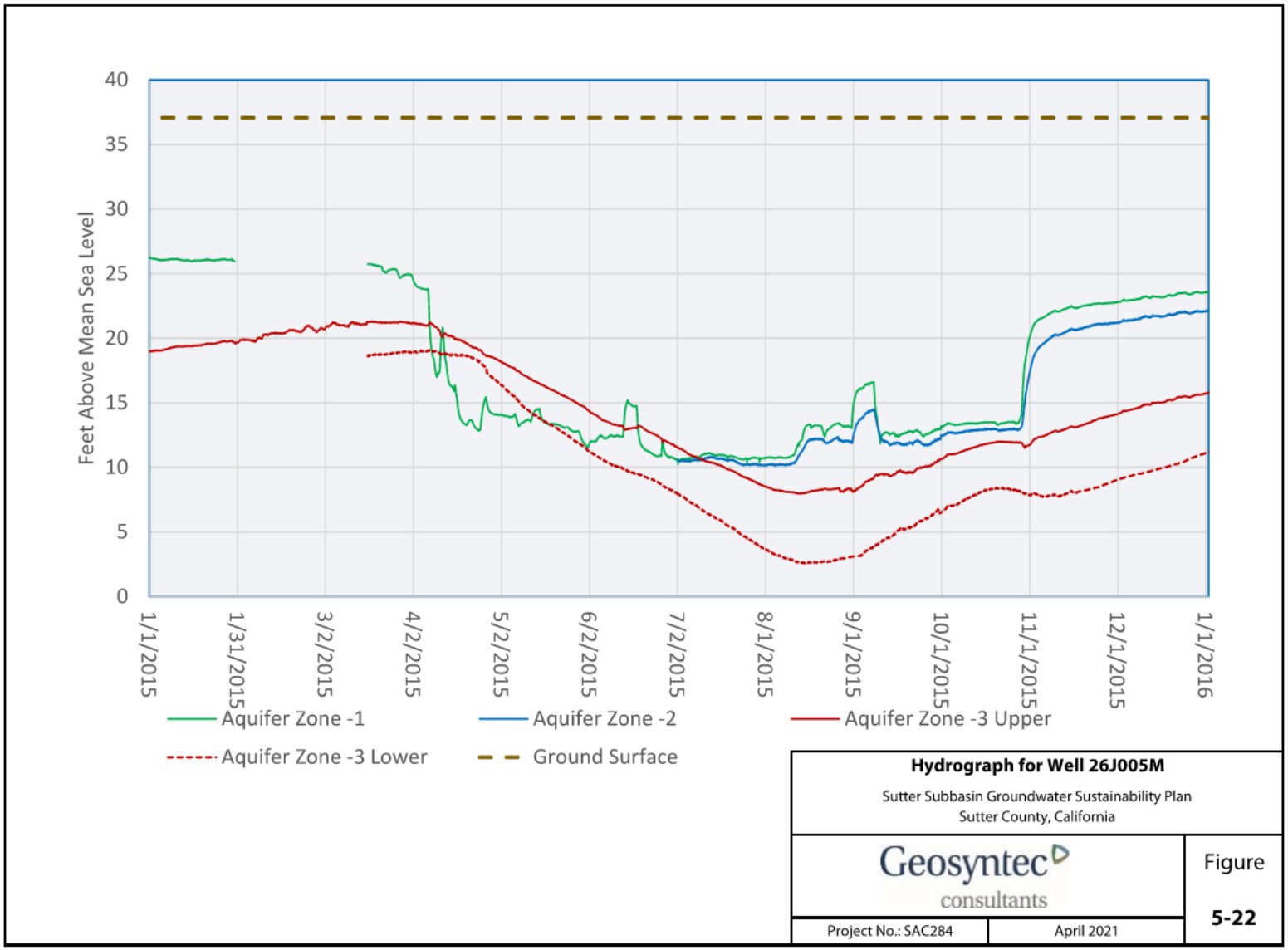

Figure 5-22. Hydrograph for Well 26J005M

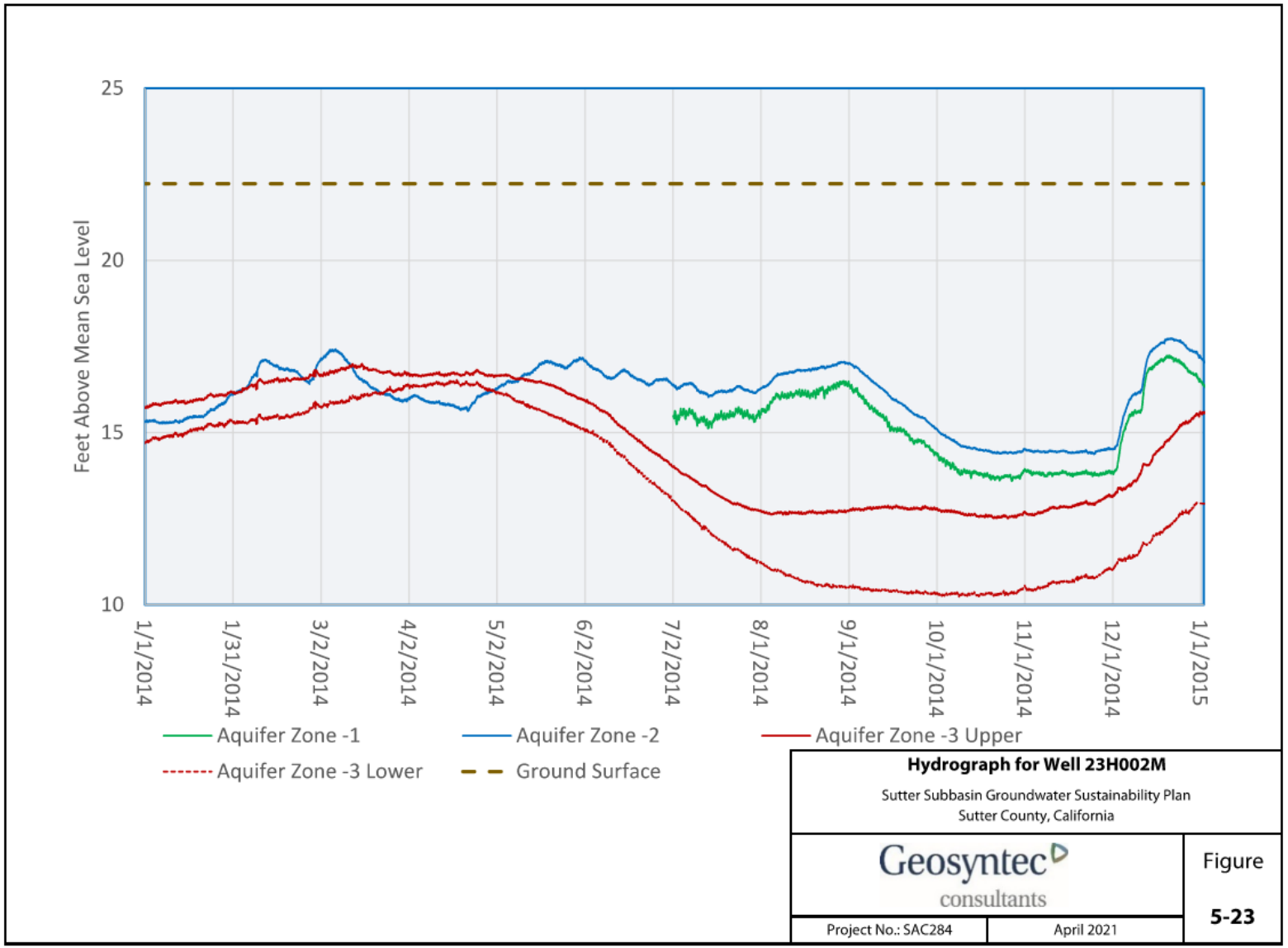

Figure 5-23. Hydrograph for Well 23H002M

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Well BWD-MW-2 (17N02E25J001M): This well contains separate screen zones within each of the aquifer zones. **Figure 5-15** shows the hydrograph for the year 2017. Observations from this hydrograph are summarized below:

- Primary pumping appears to occur within AZ-2, where significant drawdown occurs in this zone during the period from May through October. The pattern shown for AZ-2 indicates the well is within the zone of influence of pumping wells in the area.
- Drawdowns in the AZ-3 well mimic the same pattern as the AZ-2 well, suggesting a hydraulic connection between these two aquifer zones. The drawdown within this zone is significantly less than the AZ-2 drawdowns with a slight delay in response that suggests the low permeability zone between units limits the direct hydraulic connection.
- The drawdown curves for both AZ-2 and AZ-3 are indicative of a confined aquifer.
- AZ-1 is not hydraulically connected to the lower aquifer zones. There does appear to be some response in this aquifer during the cycling of pumping observed in AZ-2, suggesting leakage through the underlying aquitard.
- The pattern for AZ-1 in January and February of this year suggests response to increase flows in surface water or reduced groundwater pumping in the area. AZ-2 shows a similar muted response during this period, suggesting leakage between these zones.
- During periods of non-pumping, an upward vertical gradient occurs between lower zones and AZ-1.

Sutter County Well MW-3 (16N03E17J005M): This well contains five separate screen zones: one within AZ-1, two within AZ-2, and two within AZ-3. **Figure 5-16** shows the hydrograph for the year 2017. Observations from this hydrograph are summarized below:

- AZ-1 is not in direct hydraulic connection with lower zones. The pattern of this hydrograph also shows no indication of leakage to the lower zones.
- The response for the two AZ-2 wells and two AZ-3 wells indicates drawdown from May to September due to regional pumping.
- The AZ-2 wells and AZ-3 wells indicate direct hydraulic communication within the individual aquifer zones. Both aquifer zones indicate downward vertical gradients.
- The patterns indicate that there is not a direct hydraulic connection between AZ-2 and AZ-3, but there is leakage through the aquitard separating the two zones.

Sutter County Well MW-1 (14N02E17C002M): This well contains four separate screen zones: one within AZ-1, two within AZ-2, and one within AZ-3. **Figure 5-17** shows the hydrograph for the year 2015. Observations from this hydrograph are summarized below:

- Primary pumping appears to occur within the deeper of the two AZ-2 wells (screened from 395 to 415 feet bgs), where significant drawdown occurs in this zone during the period from May through December. The pattern shown for AZ-2 indicates the well is within the zone of influence of pumping wells in the area.
- Drawdowns in the upper AZ-2 well mimic the pattern of the deeper AZ-2 well, indicating hydraulic connection between within the overall AZ-2. The drawdown within this upper part is significantly less than the lower AZ-2 well drawdowns, indicating that there are lower permeability units between the two zones. During the observed pumping, there is a downward vertical gradient. When pumping is not occurring, there are periods where there is an upward vertical gradient within AZ-2.
- The drawdown curves observed in the AZ-2 wells during pumping indicate confined conditions.
- The hydrographs for the wells within both AZ-1 and AZ-3 indicate limited hydraulic connection through leakage of the aquitards.

Feather River (FR) Well 1 (14N03E23D006M): This well contains four separate screen zones: one within AZ-1, one within AZ-2, and two within AZ-3. **Figure 5-18** shows the hydrograph for the year 2015. Observations from this hydrograph are summarized below:

- Primary pumping appears to occur within AZ-2, where significant drawdown occurs in this zone during the period from March through October. The pattern shown for AZ-2 indicates the well is within the zone of influence of pumping wells in the area and that AZ-2 is confined.
- The hydrographs for both the AZ-1 and AZ-3 wells indicate no hydraulic connection with AZ-2. However, both patterns indicate that there is leakage through aquitards, with a stronger connection between AZ-1 and AZ-2.
- AZ-3 has a slight downward vertical gradient.

Sutter Mutual Water Company (SMWC) Well MW-1 (14N02E32D002M): This well contains three separate screen zones: one within AZ-1, one within AZ-2, and one within AZ-3. **Figure 5-19** shows the hydrograph for the year 2015. Observations from this hydrograph are summarized below:

- The hydrographs for AZ-1 and AZ-2 indicate these aquifer zones are hydraulically connected and may be the same aquifer to a depth of 200 feet (bottom of AZ-2 well) in this area. Both wells show patterns during this year that may be in response to surface water flow within the adjacent Tisdale Bypass.
- For 2015, there is an upward vertical gradient within AZ-1 and AZ-2. During periods when there are artesian conditions (e.g., 2017; **Appendix 5-E**), the vertical gradient is downward.