Salinas Valley: Upper Valley Aquifer Subbasin
Groundwater Sustainability Plan Amendment 1

VOLUME 1

Prepared for:

Salinas Valley Basin Groundwater Sustainability Agency

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ACRONYMS AND ABBREVIATIONS

$/AF.................. dollar per acre-foot
AF..................... acre-feet or acre-foot
AF/yr................. acre-feet per year
ASR.................. Aquifer Storage and Recovery
Basin .... Salinas Valley Groundwater Basin
Basin Plan .... Water Quality Control Plan for the Central Coastal Basin
BLM.................. U.S. Bureau of Land Management
BMPs................ Best Management Practices
Caltrans............ California Department of Transportation
Cal Water .... California Water Service Company
CASGEM........... California Statewide Groundwater Elevation Monitoring
CCGC............... Central Coast Groundwater Coalition
CCRWQCB .... Central Coast Regional Water Quality Control Board
CDFW............... California Department of Fish and Wildlife
CEQA .... California Environmental Quality Act
cfs..................... cubic feet per second
COC .... constituents of concern
CPE Actions ...... communication and public engagement actions
CSD.................. Castroville Community Services District
CSIP .... Castroville Seawater Intrusion Project
DACs................ Disadvantaged Communities
DDW................. Division of Drinking Water
DEM .... Digital Elevation Model
DMS .... Data Management System
D-TAC .... Drought Operations Technical Advisory Committee
DTSC................ California Department of Toxic Substances Control
DWR................. California Department of Water Resources
EIR .... Environmental Impact Report
EPA .... Environmental Protection Agency
ET..................... evapotranspiration
eWRIMS .... Electronic Water Rights Information Management System
GAMA............... Groundwater Ambient Monitoring and Assessment Program
GDE.................. groundwater-dependent ecosystem
GEMS............... Monterey County Groundwater Extraction Monitoring System
GIS .... Geographic Information System
GMP .... Groundwater Management Plan
GSA.................. Groundwater Sustainability Agency/Agencies
GSP or Plan ...... Groundwater Sustainability Plan
HCM .... hydrogeologic conceptual model
HCP.................. Habitat Conservation Plan
ILRP .... Irrigated Lands Regulatory Program

InSAR .... Interferometric Synthetic Aperture Radar
IRWMP .... Integrated Regional Water Management Plan
ISW .... interconnected surface water
JPA .... Joint Powers Authority
King City .... City of King
LID .... Low Impact Development
MAR .... Managed Aquifer Recharge
MCLs .... Maximum Contaminant Levels
MCWRA .... Monterey County Water Resources Agency
NAVD88 .... North American Vertical Datum of 1988
NCCAG .... Natural Communities Commonly Associated with Groundwater
NEPA .... National Environmental Policy Act
NMFS .... National Marine Fisheries Service
O&M .... Operations and maintenance fees
OSWCR .... Online System for Well Completion Reports
RCDMC .... Resource Conservation District of Monterey
River Series .... Salinas River Discharge Measurement Series
RMA .... Routine Maintenance Agreement
RMS .... Representative Monitoring Sites
RWMG .... Greater Monterey County Regional Water Management Group
SAGBI .... Soil Agricultural Groundwater Banking Index
SDACs .... Severely Disadvantaged Communities
SGMA .... Sustainable Groundwater Management Act
SLOFCWCD ...... San Luis Obispo County Flood Control and Water Conservation District
SMC .... Sustainable Management Criteria
SMCLs .... Secondary Maximum Contaminant Levels
SMP .... Salinas River Stream Maintenance Program
SRDF .... Salinas River Diversion Facility
Subbasin .... Upper Valley Aquifer Subbasin
SVBGSA .... Salinas Valley Basin Groundwater Sustainability Agency
SVIHM .... Salinas Valley Integrated Hydrologic Model
SVOM .... Salinas Valley Operational Model
SWRCB .... State Water Resources Control Board
TAC .... Technical Advisory Committee
TDS .... total dissolved solids
TNC .... The Nature Conservancy
URCs .... Underrepresented Communities
USACE .... U. S. Army Corps of Engineers
USFWS .... U.S. Fish and Wildlife Service
USGS .... U. S. Geological Survey
UWMP .... Urban Water Management Plan

1 INTRODUCTION TO THE UPPER VALLEY AQUIFER SUBBASIN GROUNDWATER SUSTAINABILITY PLAN AMENDMENT 1

1.1 Introduction and Purpose

The 2014 Sustainable Groundwater Management Act (SGMA) requires groundwater basins or subbasins that are designated as medium or high priority to be managed sustainably. In general, satisfying the requirements of SGMA involves 4 activities:

1. Forming 1 or more Groundwater Sustainability Agency(s) (GSAs) in the basin
2. Developing a Groundwater Sustainability Plan (GSP, or Plan)
3. Implementing the GSP and managing to measurable, quantifiable objectives
4. Providing regular reports to the California Department of Water Resources (DWR)

DWR has designated the Salinas Valley Upper Valley Aquifer Subbasin (Upper Valley Subbasin) as a medium priority basin. The Upper Valley Subbasin—1 of 9 subbasins in the Salinas Valley Groundwater Basin—is located along the southern edge of the Salinas Valley (Figure 1-1).

Groundwater levels in the Subbasin have remained generally stable, largely due to regular reservoir releases that recharge it. However, there are also indications of slight long-term declines in groundwater levels. The Subbasin has limited storage capacity, and many wells have been impacted or rendered unusable when Salinas River flows did not provide sufficient recharge. Groundwater quality concerns in the Subbasin include nitrate levels above the Maximum Contaminant Level (MCL) and high total dissolved solids (TDS) recharge from the adjacent Gabilan Range (DWR, 2004). Limited groundwater data exist in much of the Subbasin, particularly for areas farther away from the Salinas River. The purpose of this GSP is to outline how the Salinas Valley Basin GSA (SVBGSA) will maintain groundwater sustainability in the Subbasin and address the primary management concerns: managing the limited groundwater storage capacity and expanding the geographically constrained groundwater data. Maintaining sustainability in the Subbasin will avoid undesirable results for any of the 5 sustainability indicators applicable in the Subbasin: groundwater level declines, groundwater storage reductions, degradation of groundwater quality, land subsidence, and interconnected surface water (ISW) depletion. Sustainability must be achieved by 2042 and maintained for an additional 30 years.

In 2022, SVBGSA submitted the GSP for the Upper Valley Subbasin (original GSP) that outlined how it would adaptively manage groundwater. Also in 2022, SVBGSA submitted GSPs or GSP Amendment for the 5 other Salinas Valley subbasins under its authority. The 6 GSPs are aligned in approach and timing. This GSP Amendment 1 incorporates additional data about the groundwater basin and addresses recommended actions from DWR's review of the original GSP. This GSP Amendment 1 is submitted to DWR according to GSP Regulation § 355.10, and replaces the original GSP. GSP Amendment 1 will be referred to as the GSP or GSP Amendment 1 in this document. It continues to meet all of the GSP regulatory requirements and is submitted with the 2027 Periodic Evaluation of the original GSP, meeting GSP Regulations § 356.4.

This GSP Amendment 1 first describes the stakeholders, plan area, geologic and hydrogeologic data, groundwater conditions, and water budgets necessary to develop an informed and robust plan. This GSP is based on best available data and analyses. As additional data are collected and analyses are refined, GSP Amendment 1 will be modified to reflect changes in the local understanding.

Following the foundational information, the GSP introduces the current agreed-to sustainability goal for the Subbasin. It also locally defines significant and unreasonable conditions, which underpin the quantifiable minimum thresholds, measurable objectives, and interim milestones for each of the corresponding sustainability indicators. Collectively, the sustainability goal, and how conditions are measured relative to the goal, are referred to as Sustainable Management Criteria (SMC). The final chapters detail projects and actions that could be implemented to maintain sustainability. The GSP is intended to include adaptive management that will refine the implementation and direction of this GSP over time.

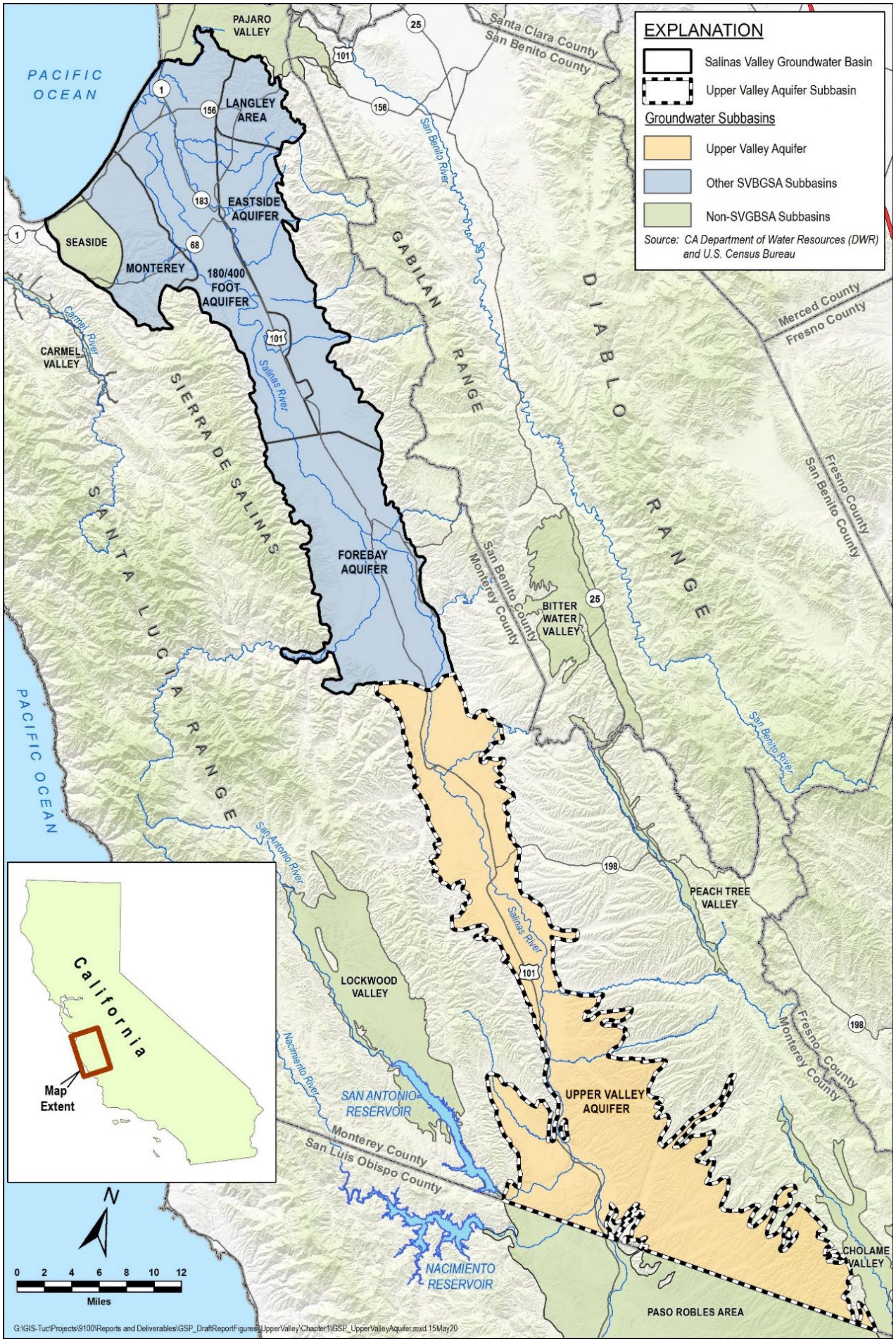


Figure 1-1. Upper Valley Subbasin Location

1.2 Agency Information

The Upper Valley Subbasin falls entirely within the jurisdiction of the SVBGSA. The Subbasin boundary is shown on Figure 1-2.

1.2.1 Agency Name, Mailing Address, and Plan Manager

Pursuant to California Water Code § 10723.8, the name and contact information for the SVBGSA are:

Salinas Valley Basin Groundwater Sustainability Agency
Attn.: Piret Harmon, General Manager
1441 Schilling Place
Salinas, CA 93901
https://svbgsa.org

The Plan Manager and her contact information are:

Ms. Piret Harmon, General Manager
Salinas Valley Basin Groundwater Sustainability Agency
1441 Schilling Place
Salinas, CA 93901 | (831) 471-7518
harmonp@svbgsa.org
https://svbgsa.org

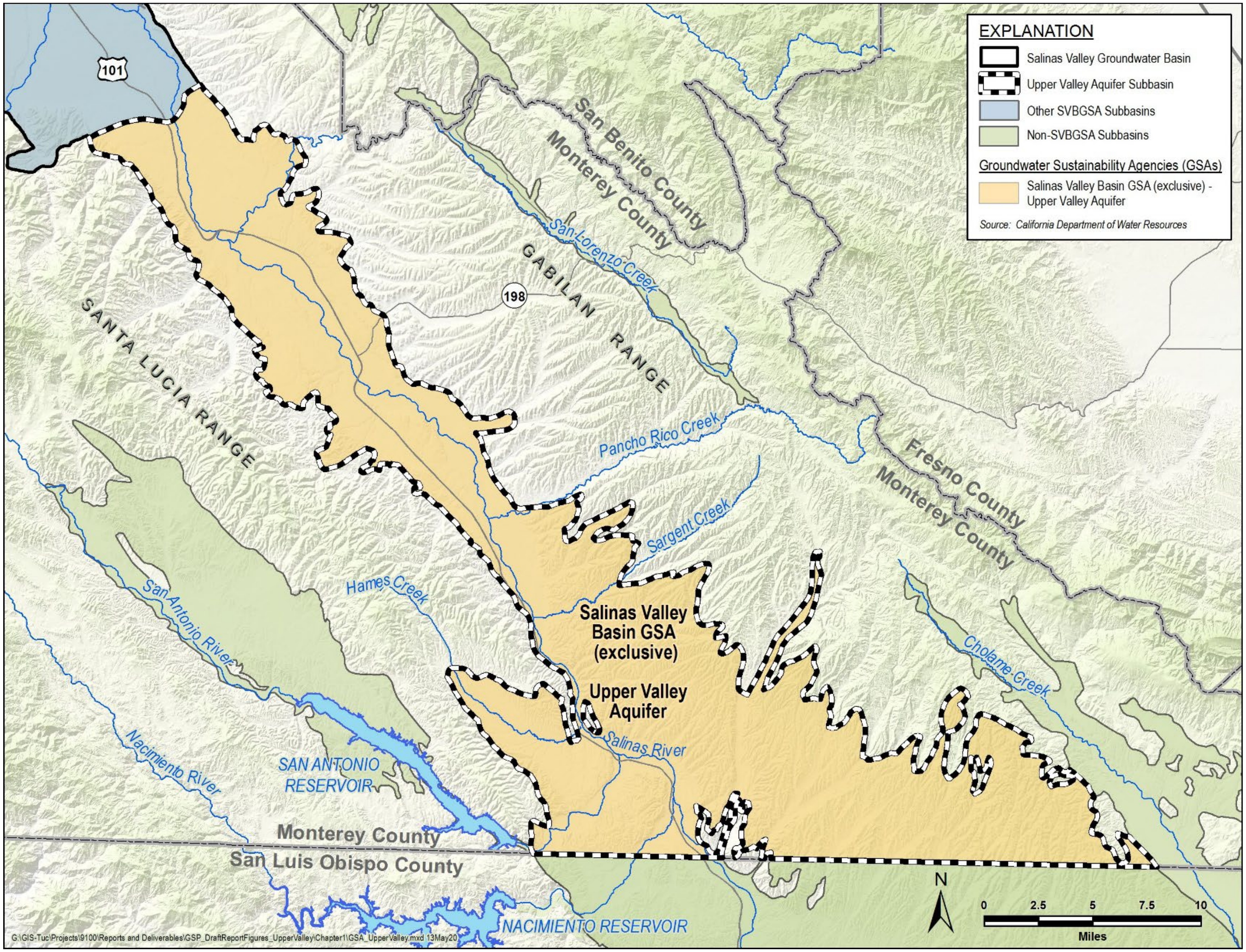


Figure 1-2. Map of Area Covered by the SVBGSA in the Upper Valley Aquifer Subbasin

1.2.2 SVBGSA Organization and Governance

Local GSA-eligible entities formed the SVBGSA in 2017. The SVBGSA represents agriculture, public utility, municipal, county, and environmental stakeholders, and is partially or entirely responsible for developing GSPs in 6 of the Salinas Valley Groundwater Subbasins.

SVBGSA is a Joint Powers Authority (JPA) that was formed for 6 subbasins within the Salinas Valley Groundwater Basin in accordance with the requirements of California Government Code § 6500 *et seq*. The JPA agreement is included in Appendix 1A. In accordance with California Water Code § 10723 *et seq.*, the JPA signatories are all local agencies under California Water Code § 10721 with water or land use authority that are independently eligible to serve as GSAs:

- County of Monterey
- City of Salinas
- City of Gonzales
- City of King
- Monterey County Water Resources Agency (MCWRA)
- City of Soledad
- Monterey One Water (M1W)
- Castroville Community Services District

1.2.2.1 SVBGSA Formation and Authority

The SVBGSA was formed in accordance with the requirements of California Water Code §10723 *et seq*. This section lists its specific authorities for GSA formation and groundwater management. Upon establishing itself as a GSA, the SVBGSA retains all the rights and authorities provided to GSAs under California Water Code § 10725 *et seq*. as well as the powers held in common by the members.

1.2.2.2 SVBGSA Governance

The SVBGSA is governed and administered by an 11-member Board of Directors (Board), representing public and private groundwater interests throughout the Valley, not limited to JPA members. The Board relies on robust science and public involvement for decision-making. Board seats include representatives from the City of Salinas (1), South County Cities (1), DACs/Small Public Water Systems (1), California Public Utility Regulated Water Companies (1), Agriculture (4), Environment (1), and Public Member (1). The Board meets monthly and all meetings are open to the public. The Board is the final decision-making body for adoption and implementation of GSPs completed by the SVBGSA.

SVBGSA governance bodies include a Board of Directors, Budget and Finance Committee consisting of 5 Directors, an Executive Committee consisting of 5 Directors, a Planning Committee consisting of 5 Directors (not currently active), and an Advisory Committee. The SVBGSA's activities are coordinated by a general manager. This section provides an overview of SVBGSA governance.

For Board decision-making, when a quorum is present, a majority vote is required to conduct business. Some business items require a super majority vote or a super majority plus vote. A super majority requires an affirmative vote by 8 of the 11 Board members. A super majority vote is required for:

- GSP approval
- Budget amendment and transfer of appropriations
- Withdrawal or termination of Agency members

A super majority plus requires an affirmative vote by 8 of the 11 Board members, including an affirmative vote by 3 of the 4 agricultural representatives. A super majority plus vote is required for:

- Decisions to impose fees not requiring a vote of the electorate or property owners
- Proposals to submit to the electorate or property owners (as required by law) decisions to impose fees or taxes
- Limitations on well extractions (pumping limits)

In addition to the Board and its committees, SVBGSA has established Subbasin Committees to advise the Board of Directors on each of the 6 subbasins' respective GSPs under its jurisdiction.

Further, SVBGSA coordinates with other GSAs in other subbasins, including Marina Coast Water District GSA (MCWDGSA), Monterey County GSA (MCGSA), and the Arroyo Seco GSA (ASGSA). In the Upper Valley Subbasin, SVBGSA established an SMC Technical Advisory Committee (SMC TAC), as shown on Figure 1-3.

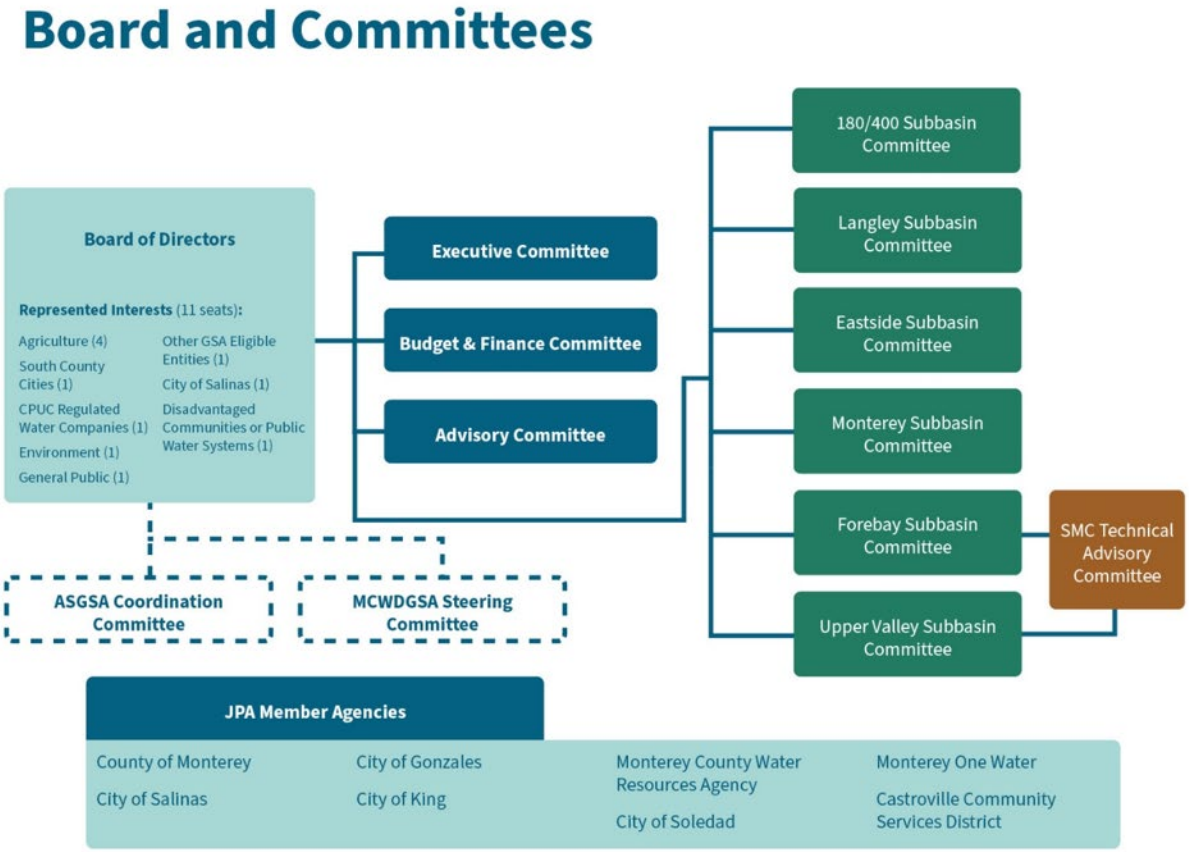


Figure 1-3 SVBGSA Board and Committees

The SVBGSA Advisory Committee provides input and recommendations to the SVBGSA Board. At the request of the Board, the Advisory Committee reviews and provides recommendations to the Board on groundwater-related issues. In 2025, the configuration and role of the Advisory Committee was updated. The Advisory Committee comprises 6 Subbasin Committee seats, 4 Partner Agency seats, and up to 3 of the Board-Designated seats. Collectively, members represent the diverse interests of groundwater users, partner agencies, and subbasin implementation areas. The Advisory Committee strives to include a range of interests in groundwater in the Salinas Valley and outlined in SGMA including:

- Subbasin Committees Representatives – Each subbasin implementation committee (e.g. 180/400, Eastside, Langley, Monterey, Forebay, and Upper Valley) nominates a single individual to serve as its representative on the Advisory Committee. The representative must demonstrate a record of involvement and interest in groundwater management or water-related issues in 1 of the subbasins and be endorsed by the respective subbasin committee.

- Partner Agency/Organization Representatives – The following agencies nominate and endorse 1 representative each:
    - MCWRA
    - Arroyo Seco GSA
    - MCWDGSA
    - M1W
- Board-Designated Appointments – The SVBGSA Board of Directors may appoint up to 3 individuals to serve on the Advisory Committee to fill identified gaps in representation (e.g. environmental, rural residential, tribal, industrial, underserved communities), enhance expertise or geographic balance, and foster collaboration across sectors.

The Advisory Committee was established by Board action and operates according to a Committee Charter that serves as the bylaws of the Advisory Committee. The Committee's charge emphasizes:

- Reviewing groundwater issues relevant to SGMA implementation in the Salinas Valley
- Developing consensus-based recommendations that incorporate community and stakeholder perspectives
- Supporting the Board by identifying areas of agreement and disagreement and presenting clear, well-considered options

The Board established Subbasin Planning Committees in May 2020 to inform and guide planning for the 5 GSPs submitted in January 2022. In July 2021, the SVBGSA Board voted to create Subbasin Committees following GSP submittal to ensure continued involvement during GSP implementation. GSP Amendment 1, as well as GSP implementation, is guided and reviewed by the Upper Valley Subbasin Committee, which is composed of local representatives from the Subbasin. The role of the Subbasin Committees as part of SVBGSA's community and public engagement strategies for GSP preparation and implementation is further discussed in Chapter 2.

Together, the Board, Advisory Committee, and Subbasin Committees are working to implement the 6 GSPs within the SVBGSA jurisdiction and in coordination with other GSAs. For the next phase of GSP implementation, SVBGSA will complete a Salinas Valley-wide Integrated Implementation Strategy (IIS). This strategy will detail project portfolios and groundwater sustainability programs needed to achieve SGMA compliance across all subbasins by 2042 and to maintain sustainability through 2070.

1.2.3 Agency Coordination

1.2.3.1 Coordination Agreements

No coordination agreement is needed for the Upper Valley Subbasin, because the SVBGSA is the only GSA with authority in the Subbasin.

1.2.3.2 Coordination with Other Water Agencies

SVBGSA continues to coordinate with agencies involved in water management within the Upper Valley Subbasin and the adjacent Paso Robles Area Subbasin. SVBGSA has a Memorandum of Understanding with MCWRA related to ongoing coordination and joint activities, as well as a service agreement for data collection under the Groundwater Monitoring Program. Further, MCWDGSA, Arroyo Seco GSA, M1W, and MCWRA have representation on the SVBGSA Advisory Committee.

SVBGSA has also coordinated with the agencies of the basins or subbasins adjacent to the Upper Valley Subbasin and other Salinas Valley subbasins (Pajaro Valley Groundwater Basin, Seaside Basin, and Paso Robles Area Subbasin).

1.2.3.3 Coordination with Land Use Agencies

SVBGSA acknowledges the critical importance of coordinating water management and land use planning. SVBGSA is coordinating with land use authorities within the Subbasin, including the County of Monterey and King City. SVBGSA began coordination with land use agencies through meetings and requesting land use plan information to incorporate into GSP Amendments. SVBGSA will continue to coordinate with the County and cities by convening meetings with each jurisdiction to review the findings of the 5-year periodic evaluations and groundwater conditions, along with the land use plan information provided. This coordination is also described in the Land Use Coordination Program Implementation Action that is included in Chapter 9. This implementation action provides for more robust, ongoing coordination between the GSA and land use agencies during GSP implementation. SVBGSA also solicited input from Monterey County and King City prior to submitting GSP Amendment 1 to DWR, with the periodic evaluation, in January 2027.

1.3 Overview of GSP Amendment 1

The SVBGSA developed this GSP for the entire Upper Valley Subbasin. This GSP is developed in concert with GSPs for 5 other Salinas Valley Groundwater Subbasins in which SVBGSA serves as a GSA: the 180/400-Foot Aquifer Subbasin (180/400 Subbasin), the Forebay Aquifer Subbasin (Forebay Subbasin), the Eastside Aquifer Subbasin (Eastside Subbasin), the Langley Area Subbasin (Langley Subbasin), and the Monterey Subbasin. SVBGSA is the sole GSA in the Eastside and Langley Subbasins; 3 GSAs share jurisdiction over the 180/400 Subbasin; SVBGSA and the Arroyo Seco Groundwater Sustainability Agency (ASGSA) share jurisdiction over the Forebay Subbasin, where ASGSA manages the Arroyo Seco Cone Management Area (ASCMA); and in the Monterey Subbasin, SVBGSA manages the Corral de Tierra Area, and the Marina Coast Water District GSA (MCWDGSA) manages the Marina-Ord Area. While this GSP is focused on the Upper Valley Subbasin, the GSP will be implemented in accordance with SVBGSA's role in maintaining and achieving sustainability for all 6 subbasins within the Salinas Valley in its jurisdiction. The Upper Valley Subbasin is referred to as the Subbasin throughout this GSP, and the collection of Salinas Valley subbasins that fall partially or entirely under SVBGSA jurisdiction are collectively referred to as the Salinas Valley or Valley. All subbasins within the Salinas Valley Groundwater Basin are referred to as the Basin.

The SVBGSA used a collaborative process to develop this GSP. Chapter 2 details the stakeholders that participated, and process followed, to develop this GSP with amendments. Throughout preparation of the original GSP, stakeholders worked together to review existing information, define SMC for the Subbasin, and develop a list of projects and management actions. Throughout preparation of GSP Amendment 1, SVBGSA continued to provide opportunities for public engagement and stakeholder input at its Subbasin Committee, as well as Advisory Committee and Board meetings.

The GSP describes the basin setting, presents the hydrogeologic conceptual model (HCM), and describes historical and current groundwater conditions. It further establishes estimates of the historical, current, and future water budgets based on the best available information. The GSP defines local SMC, details required monitoring networks, and outlines projects and management actions for maintaining sustainability in the Subbasin by 2042.

The SVBGSA developed this GSP Amendment 1 as part of an adaptive management process using improved data, models, and analysis of projects and management actions to achieve sustainability since preparation of the original GSP, which the amended GSP replaces. It may be updated and adapted, and further amended if needed, as new information and even more refined models become available. This includes updating SMC and projects and management actions to reflect updates and future conditions. Adaptive management will be reflected in the required GSP 5-year periodic evaluation and annual reports.

2 COMMUNICATIONS AND PUBLIC ENGAGEMENT

2.1 Introduction

The Salinas Valley Basin Groundwater Sustainability Agency was formed in 2017 to implement SGMA locally within the Salinas Valley. GSA formation and coordination took place from 2015 through 2017. The process included completing a Salinas Valley Groundwater Stakeholder Issues Assessment and resulted in recommendations for a transparent, inclusive process for the local implementation of SGMA and the formation of the SVBGSA. Through the development and implementation of the GSPs, SVBGSA is committed to following the requirements for stakeholder engagement as defined by SGMA:

- Consider the interests of all beneficial uses of water and users of groundwater (§ 10723.2)
- Encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin (§ 10727.8)
- Establish and maintain a list of persons interested in receiving notices regarding plan preparation, meeting announcements and availability of draft plans, maps, and other relevant documents (§ 10723.4)
- Make available to the public and DWR a written statement describing the manner in which interested parties may participate in the development and implementation of the GSP (§ 10723.2)

2.2 Defining and Describing Stakeholders for Public Engagement

The SVBGSA stakeholders are highly diverse. Groundwater supports economic activities from small domestic scale to large industrial scale and is an important supply for over 400,000 people living within the Salinas Valley. Beneficial users in the Valley are the key stakeholders targeted for robust public engagement for GSP development and implementation. Beneficial users in the Valley include the following:

Agriculture. Includes row crops, field crops, vineyards, orchards, cannabis, and rangeland. The Salinas Valley agricultural region supports a $5 billion dollar production value and produces a large percentage of the nation’s produce and healthy foods. Agriculture is the largest user of groundwater in the Valley, accounting for over 200,000 irrigated acres and 94% of pumping in the Valley.

Domestic Water Users. Includes urban water use and related non-agricultural water uses in the cities and census-designated places and rural residential wells used for drinking water. Urban water use includes small local water systems, small state water systems, and small and large public water systems.

Industrial Users. Includes industrial water users, such as coolers, agricultural wash facilities, quarries, and oil production.

Environmental Users. Environmental users include the habitats and associated species maintained by conditions related to surface water flows such as steelhead trout and groundwater dependent ecosystems (GDEs) including brackish and freshwater marsh and riparian habitats. Environmental users include native vegetation and managed wetlands.

Stakeholders associated with these beneficial users and uses are listed below. These users are in many cases also represented on the SVBGSA Board and Advisory Committees as described in Section 1.2.

- **Environmental organizations.** Environmental organizations that are stakeholders include, but are not limited to, Sustainable Monterey County, League of Women Voters of Monterey County, Landwatch Monterey County, Friends and Neighbors of Elkhorn Slough, California Native Plant Society Monterey Chapter, Trout Unlimited, Surfriders, the Nature Conservancy (TNC), Carmel River Steelhead Association, Central Coast Wetlands Group, and the Elkhorn Slough Foundation
- **Underrepresented communities (URCs) and Disadvantaged Communities (DACs).** URCs and DACs and organizations that represent them include, but are not limited to, the Cities of Gonzales, Greenfield, King, Salinas, and Soledad, Castroville Community Services District, San Jerardo Cooperative, San Ardo Water District, San Lucas, San Vicente Mutual Water Company (DWR, 2026), Environmental Justice Coalition for Water, and Community Water Center
- **City and county government.** Cities of Greenfield, Gonzales, King, Marina, Salinas, and Soledad, County of Monterey
- **Land use organizations.** Sustainable Monterey County, League of Women Voters of Monterey County, Landwatch Monterey County, and Friends and Neighbors of Elkhorn Slough
- **Residential well owners.** Represented by public members and members of mutual water companies and local small or state small water systems
- **Water agencies.** MCWRA, Marina Coast Water District, Arroyo Seco Groundwater Sustainability Agency, Castroville Community Services District, M1W, Seaside Groundwater Basin Watermaster, and Monterey Peninsula Water Management District (MPWMD)
- **CPUC-regulated water companies.** Alco Water Corporation, California Water Service Company (Cal Water), and California American Water

2.3 Upper Valley Subbasin GSP Preparation and GSP Amendment

Given the importance of the groundwater and the development of the Upper Valley GSP to the communities, residents, landowners, farmers, ranchers, businesses, and others, inclusive stakeholder input was a primary component of the Upper Valley GSP process. To encourage ongoing stakeholder engagement, SVBGSA deployed the following strategies in the preparation of the Upper Valley Subbasin GSP and GSP Amendment 1:

- Conducted an inclusive outreach and education process that best supports the success of a well-prepared GSP that meets SGMA requirements
- Kept the public informed by distributing accurate, objective, and timely information
- Invited input and feedback from the public at every step in the decision-making process
- Established the Upper Valley Subbasin Planning Committee and completed a comprehensive planning process with this Committee, including engagement on key items with the Board and Advisory Committee. The Subbasin Committee continues to provide input on GSP implementation, including ongoing SGMA compliance and development of projects and management actions
- Followed consistent stakeholder outreach for GSP amendments
- Publicly noticed drafts of the Upper Valley Subbasin GSP and allowed for required public comment periods as required by SGMA. Comments received and responses are included in Appendix 2A

This process ensured that stakeholders had opportunities to review and comment on the development of the chapters.

2.4 Upper Valley Subbasin Committee

Subbasin committees consist of local stakeholders and Board members and are appointed by the Board of Directors following a publicly noticed application process by SVBGSA. The Upper Valley Subbasin Planning Committee was convened in June and July 2020 and completed the original GSP submitted in January 2022; SVBGSA subsequently convened the Upper Valley Subbasin Committee to guide GSP implementation and amendment. In 2024, the Board approved a Subbasin Committee Program that clarified and refined their roles. Subbasin committees do the comprehensive work of reviewing annual reports and monitoring data, providing input on projects and management actions and general GSP implementation, and reviewing plan updates and amendments with assistance and information provided by SVBGSA staff and technical consultants.

These committees include constituencies who are considered important stakeholders to implementing comprehensive subbasin plans for the Salinas Valley. A list of the Upper Valley

Subbasin Committee members at the time of Amendment 1 is included in the Acknowledgements section.

Subbasin committee meetings are Brown Act meetings and noticed publicly on the SVBGSA website and at the meeting locations. Public comment is taken on all posted agenda items. Subbasin committees have been engaged in an iterative planning process that combines education about pertinent technical topics through presentations and agenda packets and receiving GSP chapters for review and comment.

Community engagement and public transparency on SVBGSA decisions is paramount to building a sustainable and productive solution to groundwater sustainability in the Salinas Valley.

2.5 Communication and Public Engagement Actions

SVBGSA is focused on communication and public engagement with the public, including beneficial users, regarding the development of the SVBGSA's GSP for the Upper Valley Subbasin. Communication and public engagement actions (CPE actions) that took place during GSP development continue during implementation of SVBGSA GSPs. CPE actions provide the SVBGSA Board and staff a guide to ensure consistent messaging about SGMA requirements and other related information. CPE actions provide ways for beneficial users and other stakeholders can provide timely and meaningful input into the GSA decision-making process. CPE actions also ensure beneficial users and other stakeholders in the Salinas Valley are informed of milestones and offered opportunities to participate in GSP implementation and plan updates. Appendix 2B includes SVBGSA's communications plan.

Notice and communication, as required by GSP Regulations § 354.10, were focused on providing the following activities during the development of the Upper Valley Subbasin GSP:

- Clear decision-making process on GSP approvals and outcomes
- Robust public engagement opportunities
- Encouragement of active involvement in GSP development

2.5.1 Goals for Communication and Public Engagement

Ultimately, the success of the Upper Valley Subbasin GSP will be determined by the collective action of every groundwater user. To meet ongoing water supply needs for both drinking water and for agricultural and other economic livelihoods, the Subbasin must maintain sustainability into the future. This outreach strategy engages the public early and frequently, and keeps the internal information flow seamless among staff, consultants, committee members, and the Board regarding the goals and objectives of the Upper Valley Subbasin GSP and associated monitoring and implementation activities.

Critical to the success of the Upper Valley GSP implementation will be public understanding of the management actions and projects planned for sustainability, as well as sustainability implementation actions and other groundwater management activities. These important actions are identified in Chapters 9 and 10 of the Upper Valley GSP.

The required annual report due by April 1 every year for the Upper Valley Subbasin is an important and ongoing GSP implementation activity. It covers data collected each water year from October 1 through September 30. The annual report provides an annual benchmark for SVBGSA to provide to the public and stakeholders to assess progress towards sustainability. The annual report also includes assessment of the 6 SMC for the Subbasin. The annual report provides an important opportunity to reengage the Upper Valley Subbasin Committee in its review and to discuss sustainability status and goals.

The 5-year periodic evaluations also present an important opportunity for public engagement. These evaluations assess plan performance and inform adaptive management by reviewing conditions over the previous 5 years, analyzing progress toward sustainability goals, and recommending adjustments as needed.

CPE actions provide outreach during the Subbasin planning and implementation efforts and assist SVBGSA in being receptive to stakeholder needs through communication tools. The CPE actions also forecast how SVBGSA communicates during GSP implementation.

The goals of the CPE actions are to expand audience reach, increase engagement and GSP awareness, and track efforts. Specific objectives include the following:

1. To keep stakeholders informed through the distribution of accurate, objective, and timely information while adhering to SGMA requirements for engagement (noted above)
2. To articulate strategies and create communications channels that foster an open dialogue and increase stakeholder engagement during the planning process
3. To invite input from the public at every step in the decision-making process and provide transparency in outcomes and recommendations
4. To ensure that the Board, staff, consultants, and committee members have up-to-date information and understand their roles and responsibilities
5. To engage the public on GSP implementation progress, especially for projects and management actions and annual reports

2.5.2 Communication and Outreach Objectives

The following are the communications and outreach objectives of the CPE Actions:

- Expand Audience Reach

- Maintain a robust stakeholder list of interested individuals, groups, and/or organizations
    - Secure a balanced level of participants who represent the interests of beneficial uses and users of groundwater
- Increase Engagement
    - Keep interested stakeholders informed and aware of opportunities for involvement through email and/or other preferred method of communication
    - Publish meeting agendas, minutes, and summaries on the SVBGSA website: www.svbgsa.org
    - Inform and obtain comments from the general public through GSP online comment form and hybrid ongoing public meetings
    - Facilitate productive dialogue among participants throughout the GSP planning and amendment process
    - Seek the input of interest groups during the planning and implementation of the GSP and any future planning efforts
- Increase GSP Awareness
    - Provide timely and accurate public reporting of planning and implementation milestones through the distribution of outreach materials and posting of materials on the SVBGSA website for the GSP
    - Seek quality media coverage and create opportunities for SVBGSA staff to author articles
    - Share information with interested persons through monthly email newsletters
    - Utilize social media to engage with and educate the public
    - Create partnerships with local organizations, elected officials and others to share SVBGSA information with their unique audiences
- Track Efforts
    - Maintain an active communications tracking tool to capture stakeholder engagement and public outreach activities and to demonstrate the reporting of GSP outreach activities

2.5.3 Target Audiences and Stakeholders

SVBGSA stakeholders consist of other agencies and interested parties including all beneficial users of groundwater or their representatives. Under the requirements of SGMA, all beneficial uses and users of groundwater must be considered in the development of GSPs, and GSAs must encourage the active involvement of diverse social, cultural, and economic elements of the population.

There are a variety of audiences targeted within the Salinas Valley whose SGMA knowledge varies from high to little or none. Given this variance, SVBGSA efforts are broad and all-inclusive. Target audiences include:

- SVBGSA Board of Directors, Advisory Committee, and Subbasin Committees
- SVBGSA Groundwater Sustainability Fee payers
- Partner agencies including other GSAs, County of Monterey, MCWRA, and other agency participants in the Greater Monterey County Integrated Regional Water Management Group (RWMG)
- Municipal and public water service providers
- Private and local small or state small water system providers
- Local municipalities and communities
- Elected officials within the Salinas Valley
- Beneficial uses and users of groundwater including agriculture, domestic wells, and environmental uses such as wetlands, including non-profit organizations and industry groups that represent them
- Diverse social, cultural, and economic segments of the population within the Salinas Valley including URCs
- The general public

Stakeholder involvement and public outreach is critical to the GSP development because it helps promote the plan based on input and broad support. The following activities summarize involvement opportunities and outreach methods to inform target audiences and stakeholders. It is important to note that levels of interest will evolve and shift according to the GSP's implementation opportunities and priorities.

2.5.4 Stakeholder Database

SVBGSA maintains a database of persons and organizations that includes stakeholders who represent the region's broad interests, perspectives, and geography. It is developed and maintained by leveraging existing stakeholder lists and databases and by conducting research of potential stakeholders that may be interested in 1 or all of the following categories: municipal users and groundwater users including agricultural, urban, industrial, commercial, institutional, rural, environmental, URCs, state lands and agencies, and integrated water management.

2.5.5 Key Messages and Communications

SVBGSA develops its communications and key messages focused on getting to know your GSA, providing overviews of groundwater sustainability planning for our community, and continued outreach through implementation. These messages are guided by the underlying statements:

- The GSP process, both planning and implementation, is transparent and direct about how the GSP will impact groundwater users.
- SVBGSA represents the groundwater interests of all beneficial uses/users of the basin equitably and transparently to ensure that the basin achieves and maintains sustainable groundwater conditions.
- SVBGSA is committed to working with stakeholders using an open and transparent communication and engagement process.
- As the overall GSP process is comprehensive with an engaged group of stakeholders providing useful information, SVBGSA creates as many opportunities as possible to educate stakeholders and obtain their feedback on the GSP implementation and plan updates.

These messages are the basis for effective engagement and communication with audiences (Appendix 2C).

2.5.6 Engagement Strategies

SVBGSA uses a variety of tactics to achieve broad, enduring, and productive involvement with stakeholders during the development and implementation of the GSPs. Below are activities that SVBGSA uses to engage the public:

- Develop and maintain a list of interested parties
- Develop and maintain a list of interested parties.
- Hold Board, Advisory Committee, Subbasin Committees and other Committee Meetings
  - Publish regular public notices and updates (Brown Act compliance)
  - Offer public informational sessions and subject-matter workshops
  - Provide hybrid meeting access online via Zoom or other appropriate platform.
- Provide SVBGSA website resources for topics including SGMA, SVBGSA, GSPs, Projects and Management Actions, annual reports, groundwater models, hydrogeology

and educational resources, and annual budget and Groundwater Sustainability Fee information, including:

  - SVBGSA web map: provides access to visualize, search and export data
  - StoryMaps include how water moves through the Salinas Valley, groundwater challenges, sustainability goals and the current status

- Utilize social media platforms, including Facebook, Instagram and YouTube to share information, communicate with stakeholders and grow engagement
- Publish email newsletters to communicate directly with interested parties
- Garner earned media coverage through the use of press releases, media pitching and relationship-building with local reporters (appendix 2D includes SVBGSA's media policy)
- Publish op-eds in local newspapers
- Create and share engaging video content
- Place advertising in local media (including digital, print, radio and audio streaming)
- Post fliers/posters in public locations to share key initiatives
- Utilize co-promotional opportunities and existing channels with agencies, committees, and organizations including email newsletters, social media, board meetings and mailings to key audiences
- Provide talks and presentations to various stakeholder groups, associations, community organizations, and educational institutions
- Host workshops on key topics
- Make materials bilingual and provide interpretation services

2.5.7 CPE Actions Timeline and Tactics

CPE Actions and GSP milestone requirements by phase include:

- Prior to initiating plan development: Share how interested parties may contact the GSA and participate in development and implementation of the plan submitted to DWR. (23 California Code of Regulations § 353.6)
- Prior to GSP development: Establish and maintain an interested persons list (California

Water Code § 10723.4).

- Prior to and with GSP submission:
  - Record statements of issues and interests of beneficial users of basin groundwater including types of parties representing the interests and consultation process
  - Lists of public meetings
  - Inventory of comments and summary of responses
  - Communication section in GSP (23 California Code of Regulations § 354.10) that includes agency decision-making process, identification of public engagement opportunities and response process, description of process for inclusion, and method for public information related to progress in implementing the plan (status, projects, actions)
- Supporting tactics to be used to communicate messages and supporting resources available through GSP development and GSP implementation described in section 2.6.6.

2.5.8 CPE Actions – Annual Evaluation and Assessment

Annually SVBGSA will summarize annual conditions and GSA activities to gather input for annual reports. A summary of CPE actions will be included within annual reports. Development of the subsequent fiscal year work plan happens in parallel with annual reporting. The GSA reviews community outreach activities and their effectiveness and considers the appropriate CPE actions for the upcoming year in its annual work plan and budget.

2.6 Underrepresented Communities and Disadvantaged Communities Strategic Engagement and Communications

During development of the 2022 GSPs, SVBGSA scoped an engagement strategy for URCs and DACs that provided both an assessment of how URCs and DACs may be engaged with the GSA and how to develop GSA materials that are accessible and culturally responsive (visual and in Spanish). These materials communicate impacts of groundwater management on local water conditions to engage URCs and DACs in GSA plan reviews and develop pathways for future involvement.

2.6.1 Underrepresented Communities and Disadvantaged Communities in the Salinas Valley

In this GSP, URCs and DACs are considered communities that currently have little or no representation in water management, or who historically have had disproportionately less representation in public policy decision making. URCs and DACs are inclusive of Severely Disadvantaged Communities (SDACs), Economically Distressed Areas (EDAs) and other communities that are traditionally underrepresented.

The Salinas Valley has well documented DAC designations encompassing 50 Census Block Groups, 18 Census Tracts and 5 Cities or Census Designated Places, including Gonzales, King City, Bradley, Chualar, and San Lucas, according to 2019-2023 5-Year American Community Survey (ACS) data published on the Climate Bond S(DAC) Tool and CA DWR's DAC Mapping Tool websites (DWR, 2026; CNRA, 2026). The Salinas Valley's EDAs are inclusive of these DACs and further encompass Greenfield and Boronda and parts of Marina, Soledad, and Prunedale.

A proportional analysis of the area and population of Census Blocks suggests that roughly 52.3% of the population of the Upper Valley Subbasin live in a DAC, 38.1% live in an SDAC, and 74.8% live in an EDA. Considering Census Tracts, this analysis suggests that roughly 77.7% of the Subbasin's population live in a DAC, 46.8% live in an SDAC; and 85.1% live in an EDA.

Error! Reference source not found. shows where DACs, SDACs, and EDAs are located within the Salinas Valley, and Appendix 2E further describes DACs and EDAs. Census block groups were not included in the map because they are excluded from the newer Climate Bond (Proposition 4) (S)DAC Mapping Tool due to high margins of error and data privacy concerns.

SVBGSA seeks to constructively engage with URCs and DACs in the subbasin planning processes and GSP implementation. During development of the original GSP, SVBGSA hired the Consensus Building Institute (CBI) to conduct an assessment with URC and DAC community leaders via formal interviews. The purpose of the assessment was to capture insights and recommendations to inform an engagement strategy for URCs and DACs. CBI conducted 14 interviews and summarized findings from the assessment to identify initial strategic steps for work with URCs and DACs for GSP planning and implementation. These actions continue to be a focus of community engagement activities with residents in DAC or URCs during implementation of the GSP. The Spectrum of Community to Ownership is one guide in further shaping SVBGSA work with URCs and DACs communities in the Basin in consultation with community leaders. In 2025 and 2026, SVBGSA co-sponsored the Salinas Valley Water Leadership Institute with the Environmental Defense Fund and others, focused on local water education and leadership and skill development for participating in the public processes for water management and decision making.

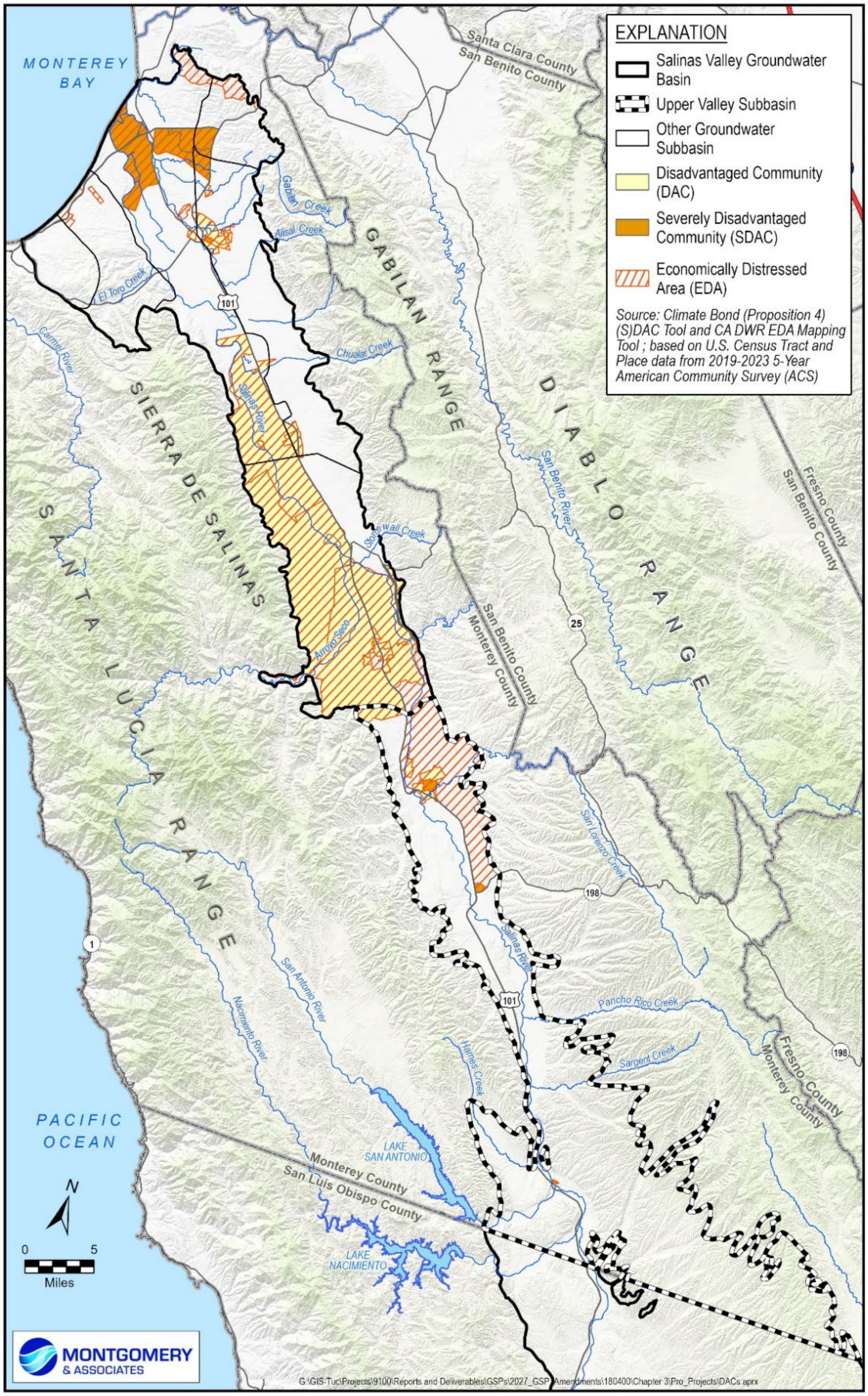


Figure 2-1. Disadvantaged Communities in the Salinas Valley

2.6.2 Activities for engagement of Underrepresented Communities and Disadvantaged Communities

Activities for engagement of URCs and DACs include:

- Conducting workshops with partners on importance of water and groundwater sustainability
- Identifying URC and DAC concerns and needs for engagement
- Planning listening sessions around GSA milestones
- Coordinating with partner organizations to develop a “resource hub” where people can go for support
- Identifying community allies in groundwater engagement work and reduce barriers for participation
- Considering particular URC and DAC impacts during routine GSA proceedings
- Convening a working group on domestic water, including URCs and DACs

3 PLAN AREA

This GSP covers the entire Upper Valley Subbasin, as shown on Figure 3-1. It lies in southeastern Monterey County and the southern portion of the Salinas Valley Groundwater Basin. The Subbasin encompasses an area of approximately 237,670 acres. The Upper Valley Subbasin is bounded by the Gabilan Range to the east, the Forebay Subbasin (DWR subbasin number 3-004.05) to the north, the Santa Lucia Range to the west, and the Paso Robles Area Subbasin (DWR Subbasin number 3-004.06) to the south. The Upper Valley Subbasin encompasses, and extends well beyond, all of MCWRA's Upper Valley Subarea.

The Upper Valley Subbasin has several tributaries that drain from the western slopes of the Gabilan Range and flow westward across the Subbasin. Most tributaries drain into the Salinas River. Releases from San Antonio Reservoir drain into the San Antonio River, which is a tributary to the Salinas River. Releases from Nacimiento Reservoir drain into the Salinas River and enter into the Subbasin through the Paso Robles Subbasin. The Upper Valley Subbasin contains the municipality of King City. United States Highway 101 runs generally north-south roughly following the path of the Salinas River. Rivers and streams, urban areas, and major roads are shown on Figure 3-1.

This description of the GSP area has been prepared in accordance with the GSP Regulations § 354.8. Information from existing water resource monitoring, management, and regulatory programs have been incorporated into this GSP Amendment 1 to inform the development of the sustainability goal, SMC, and projects and management actions. This GSP Amendment 1 is designed to align with the principles outlined in existing local plans, programs, and policies, and builds upon these efforts to support effective GSP implementation.

3.1 Summary of Adjudicated and Jurisdictional Areas

3.1.1 Adjudicated Areas, Other GSAs, and Alternatives

The Upper Valley Subbasin is not adjudicated. The only adjudicated area in the Salinas Valley Groundwater Basin is the Seaside Subbasin (DWR subbasin number 3-004.08), which is not adjacent to the Upper Valley Subbasin.

No alternative plans have been submitted for any part of the Subbasin or for any other Salinas Valley subbasins.

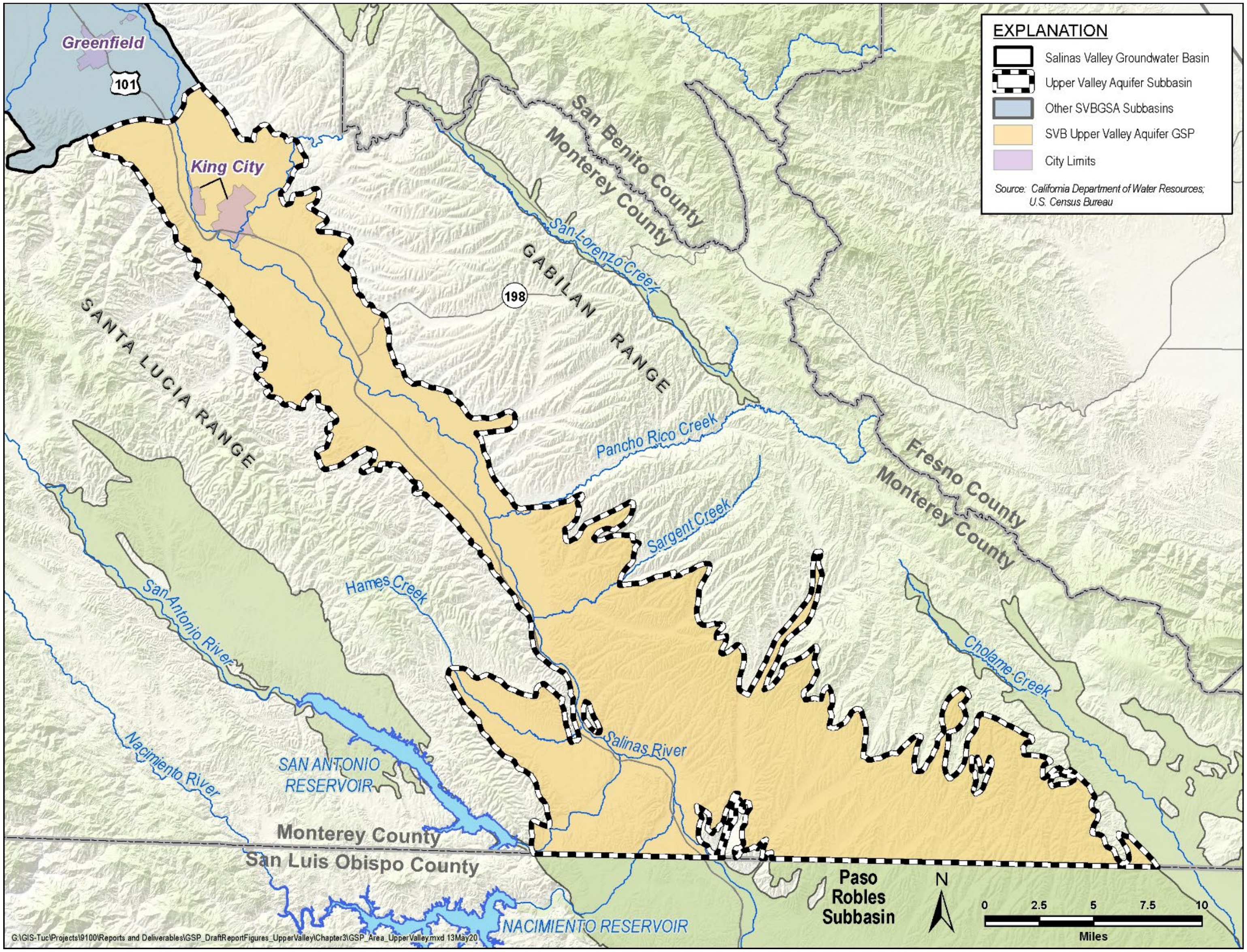


Figure 3-1. Upper Valley Aquifer Subbasin Area Covered by GSP

3.1.2 Jurisdictional Areas

3.1.2.1 Federal and State Jurisdictional Areas

Maps of federal and state jurisdictional areas are based on data from the U.S. Bureau of Land Management National Surface Management Agency National Geospatial Data Asset (BLM, 2020). Camp Roberts National Guard Camp is located on the southern edge of the Subbasin. Near Camp Roberts, the California Department of Fish and Wildlife (CDFW) has jurisdiction over the Big Sandy Wildlife Area. Although the Subbasin does not contain any federal tribal-owned lands, several recognized Tribes represent the area, and contacts are maintained through California's Native American Heritage Commission.

3.1.2.2 County Jurisdiction

Pursuant to Article XI, section 7 of the California Constitution, the County of Monterey has authority to adopt and enforce ordinances and regulations not in conflict with state laws to protect and promote the public health, safety, and welfare of its citizens. Specifically, with regard to the Subbasin, the County has authority over well permitting and land use authority in the unincorporated areas outside city limits. Specific lands managed by the County include San Lorenzo Park, shown on Figure 3-2 (BLM, 2020).

3.1.2.3 Monterey County Water Resources Agency

MCWRA is a Special District with broad water management authority in Monterey County. Its jurisdiction is countywide and covers the entire Upper Valley Subbasin, as shown on Figure 3-2.

Pursuant to MCWRA's enabling legislation, the MCWRA Act (Agency Act, California Water Code App. § 52-1, *et seq*), MCWRA has broad authority regarding groundwater regulation. This is specifically called out in Sections 8, 9(n), 21 and 22 of the Agency Act. Section 8 states the purposes of the MCWRA Act, which includes control of groundwater extractions as required to prevent or deter the loss of usable groundwater. Likewise, Section 9 covers the powers of MCWRA and subsection (n) states that MCWRA may "Develop and distribute water to persons in exchange for ceasing or reducing groundwater extractions, and prevent groundwater extractions which are determined to be harmful to the groundwater basin." Section 21 allows MCWRA to seek injunctive relief against the export of water from the Salinas Valley Groundwater Basin. Section 22 of the Agency Act explicitly provides MCWRA with the ability to prohibit groundwater extraction when appropriate studies determine a portion of the groundwater basin to be threatened by loss of usable supply as a result of seawater intrusion after a noticed public hearing by the Board of Supervisors. The Agency Act was enacted prior to the development of SGMA, which requires groundwater sustainability to be achieved according to 6 sustainability criteria.

Key assessment zones that provide revenues for capital, operations, and maintenance of various projects and programs administered by MCWRA are shown on Figure 3-3. MCWRA is governed by a 9-member Board of Directors who are appointed by the 5-member MCWRA Board of Supervisors. The Board of Supervisors of the County is ex officio the Board of Supervisors of MCWRA (MCWRA Act, Sec. 15).

3.1.2.4 City and Other Local Jurisdictions

The jurisdictional boundaries of cities and local jurisdictions are shown on Figure 3-2 (U.S. Census Bureau, 2018). King City is located within the Subbasin and has water management authority. King City is served by 1 private water supplier: Cal Water.

3.1.2.5 CPUC Regulated Utility

Cal Water provides water within King City and the surrounding area.

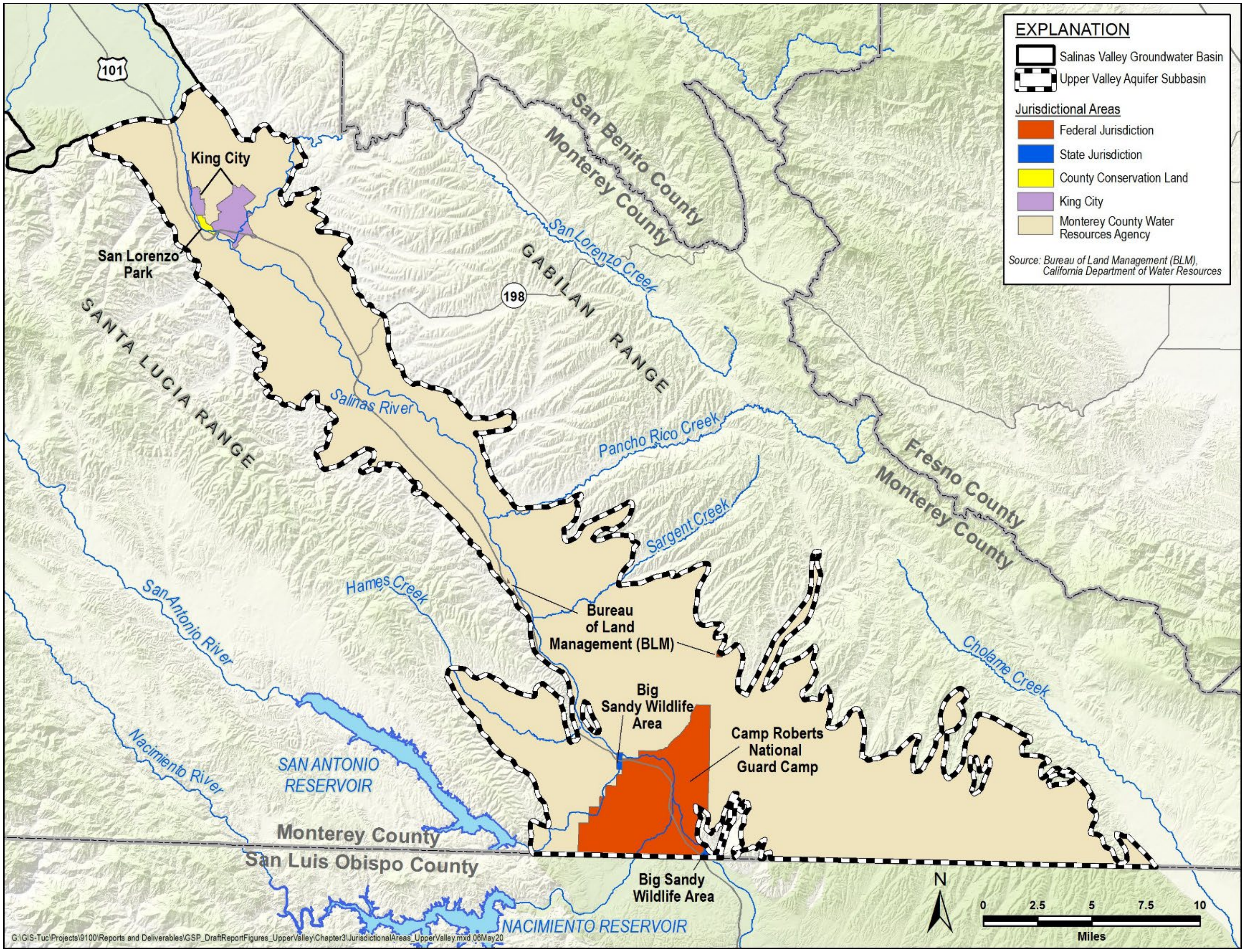


Figure 3-2. Federal, State, County, City, and Local Jurisdictional Areas

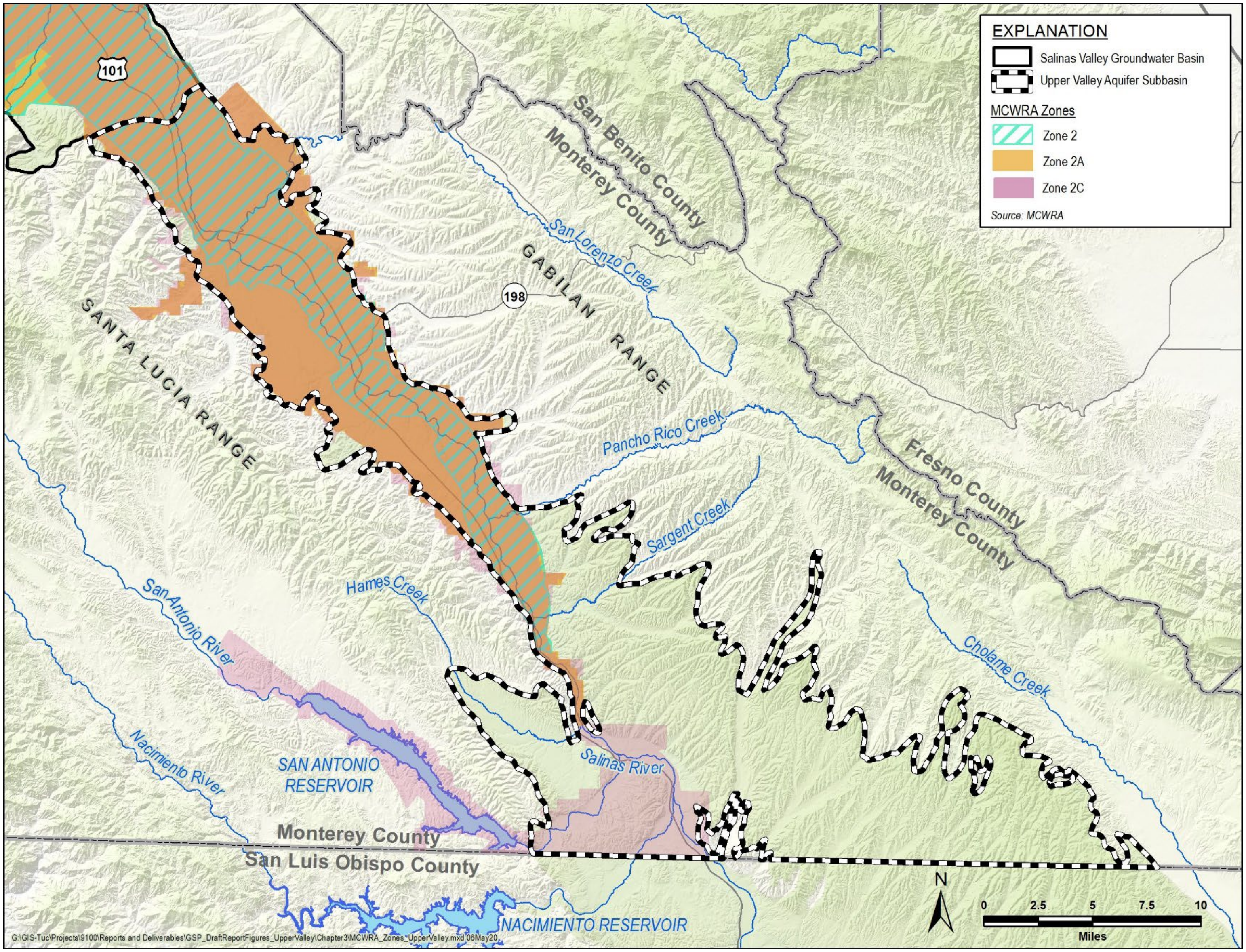


Figure 3-3. MCWRA Zones in the Upper Valley Aquifer Subbasin

3.2 Land Use

3.2.1 Overview of Land Uses

The Monterey County Assessor's Office maintains a Geographic Information System (GIS) database of land use at the parcel level. Land use in the Upper Valley Subbasin, as classified by the Assessors' land use codes in 2024, is shown on Figure 3-4 and summarized by major category in Table 3-1.. The difference between the land use area in Table 3-1 and the total Subbasin area of 237,670 acres is the result of: 1) some parcels having null land use values; and 2) small gaps between parcels that are not counted.

Table 3-1. Land Use Summary

Category	Area in Subbasin (acres)
Agriculture (Irrigated)	72,606
Agriculture (Dry)	136,265
Commercial	154
Industrial	462
Institutional	18,201
Miscellaneous	215
Multi-Family	85
Residential (Urban)	137
Rural	5,757
Not Classified	688
Total	**234,570**

Source: Monterey County Assessor's Office 2024 parcel data

Actual land uses may vary from year to year. The County Assessor parcel database is periodically updated, and current Assessor's land use data may be utilized in periodic evaluations and/or updates to the SVBGSA Web Map. SVBGSA annually estimates cropped acreage as reported by DWR's most recent crop mapping, rather than relying on the Assessors coding for irrigated acreage for its annual fee development. City and County general plans and planned land uses and zoning designations may also differ from the Assessor's land use codes in some cases.

The majority of land in the Subbasin is used for agriculture; the top 3 crops by value in Monterey County in 2025 were strawberries, leaf lettuce, and head lettuce (Monterey County Agriculture Commissioner, 2025). Vineyards have been a major irrigated agriculture land use in Monterey County.

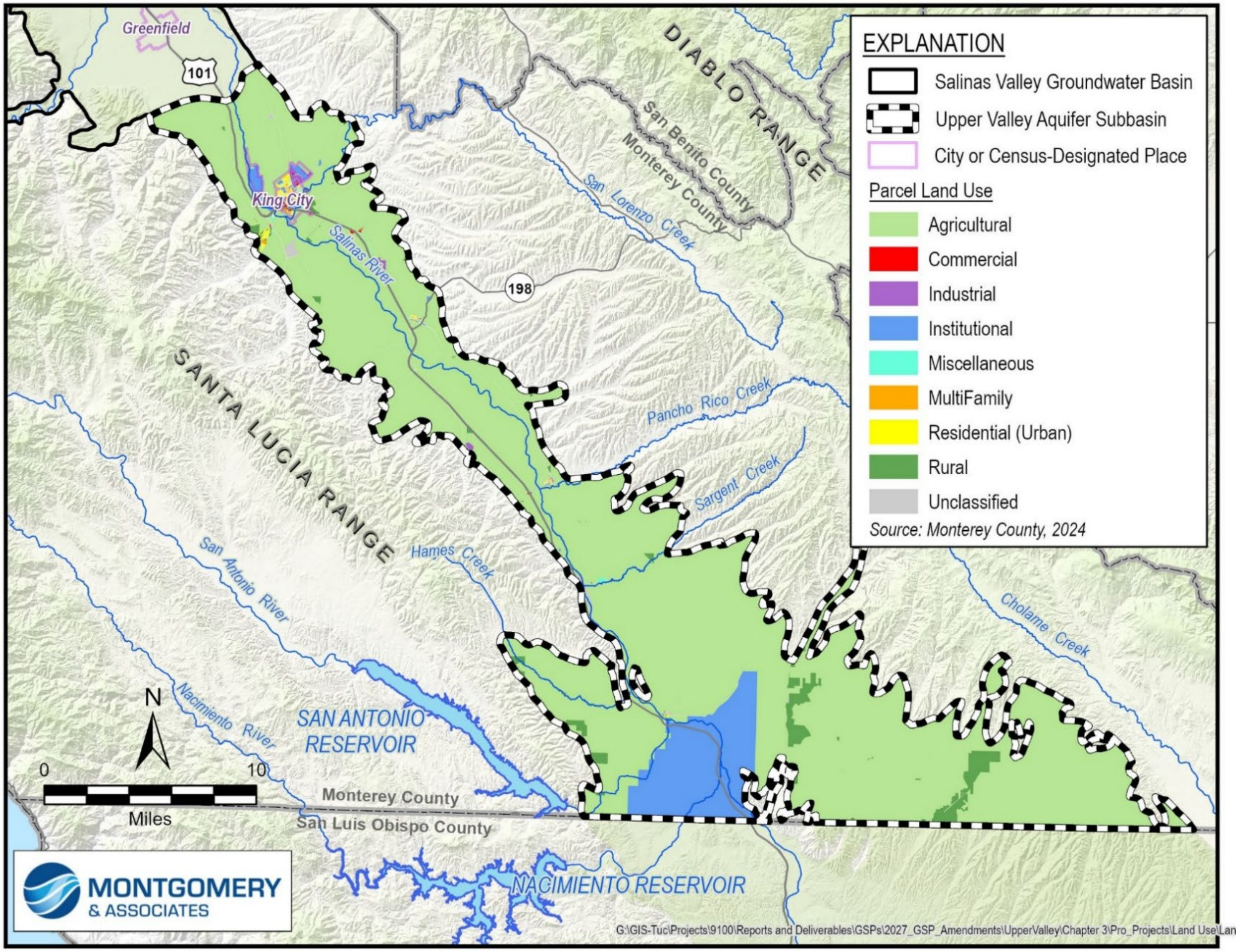


Figure 3-4. 2024 Land Use

3.2.2 Land Use Planning

Under SGMA, GSPs do not supersede the land use authority of cities and counties, including a city or county general plan, within the overlying basin. However, the GSA will coordinate with the cities and the County on general plans and land use planning/zoning as needed when implementing GSPs. SGMA also calls for processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity. Planning agencies must review and consider groundwater sustainability plans, groundwater management plans, or groundwater management court order, judgment, or decree.

Land use is an important factor in water management. The County of Monterey and City of King City have land use authority over all or portions of the Upper Valley Subbasin. Each of these entities has adopted a general plan that guides land use within the Subbasin, along with other types of specific plans or community plans within their jurisdictional areas. General descriptions of the land use plans and how implementation may affect groundwater management in the Upper Valley Subbasin are included in Appendix 3A.

The County of Monterey 2010 General Plan was prepared and adopted prior to SGMA and includes policies related to water supplies and construction of wells. The Public Services Element includes a goal for long-term water supply and related policies considered in the review of discretionary development permits. The policies include, but are not limited to, requiring proof of a long-term supply (PS-3.1); criteria for that proof for discretionary permits for new development (PS-3.2); criteria for the adequacy of domestic wells (PS-3.3); assessments for high-capacity wells (PS-3.4); wells in areas of known saltwater intrusion (PS-3.5); coordination with other water management agencies (PS-3.6); and a program to eliminate overdraft of basins, with strategies including water banking, groundwater and aquifer recharge and recovery, desalination, pipelines to new supplies, and/or a variety of conjunctive use techniques (PS-3.7).

The County faced litigation after adoption of its 2010 General Plan. As part of General Plan-related settlement agreement made prior to the statewide adoption of SGMA, the County conducted a Salinas Valley Basin Investigation pursuant to Policy PS-3.1 to develop a study of the groundwater basin within MCWRA's Zone 2C, which largely overlaps the Salinas Valley subbasins and includes, among other items:

- An assessment of whether the total water demand for all uses designated in the General Plan for the year 2030 are likely to be reached or exceeded
- An evaluation and conclusions regarding future expected trends in groundwater elevations
- An evaluation and conclusions regarding expected future trends in seawater intrusion

The study finds that water demand trends in Zone 2C have diverged significantly from earlier 2010 General Plan Environmental Impact Report (EIR) projections. Instead of declining by 2030 as originally expected, total water demand has already increased, driven primarily by higher-than-anticipated agricultural use. Estimates at the time of the study (around 2017–2020), total demand reached about 485,000 acre-feet (AF)—exceeding both the EIR baseline and its projected 2030 level—and is projected to rise further to roughly 518,000 AF by 2030 under a medium-growth scenario. Urban demand has remained relatively stable, while agricultural demand has grown substantially, reversing assumptions about land contraction, crop shifts, and efficiency gains.

Based on data through 2021, these higher demands have led to increased groundwater pumping, resulting in measurable declines in groundwater levels and continued seawater intrusion. Declines have been most pronounced in coastal subareas that overlap with the 180/400, Eastside, Monterey, and Langley Subbasins. Looking ahead to 2030, the study projected additional declines under average conditions.

The study also projected that seawater intrusion was expected to persist at rates comparable to the past decade, particularly in the area overlapping with the 180/400 and Monterey Subbasins, affecting about 210–240 acres per year through 2030. While some localized improvements have occurred—such as near Castroville due to recharge projects—overall basin conditions are projected to worsen under continued demand pressures.

The study concludes that without further intervention, groundwater depletion and seawater intrusion will continue, though impacts will vary by location. It highlights the importance of coordinated groundwater management, conservation, and land use planning to mitigate these trends. The study recommends the County support groundwater sustainability efforts that are already underway associated with SGMA implementation.

In response to the study, the County Board of Supervisors directed County staff to coordinate with groundwater sustainability agencies on appropriate amendments to the 2010 General Plan and other regulatory actions. The County's implementation actions in response to the study and GSP implementation are parallel efforts, and the results of the County's response to the study will be considered during GSP implementation.

The County chose to retain the USGS to develop the Salinas Valley Integrated Hydrologic Model (SVIHM) and Montgomery & Associates to develop the Salinas Valley Seawater Intrusion Model. A provisional version of the SVIHM was used for the Basin Investigation, and the USGS subsequently published the model in 2025.

Updated versions of these models are used for the development of this GSP Amendment. The projected baseline modeling in Chapter 6 includes population growth in the cities and some unincorporated communities, based on projections by the Association of Monterey Bay Area Governments.

3.2.3 Effects of GSP Implementation on Water Supply Assumptions

Implementation of this GSP may affect water supply assumptions of relevant land use plans over the planning and implementation horizon. Implementation of GSP management actions and projects may be needed to avoid undesirable results and mitigate overdraft, including the potential for demand management if needed. Changes in the cost of groundwater may affect whether surface water or groundwater is used. Land use changes may occur as a result of these activities and based on financial decisions by individual growers.

3.3 Water Use

3.3.1 Sources

In the San Ardo Oil Field, Chevron U.S.A. Inc. operated a reverse osmosis plant that was used to treat a portion of the water generated during production. After oil separation, some of the produced water is sent directly to Class II injection wells permitted for injection by the California Geologic Energy Management Division. The remaining produced water was treated by the reverse osmosis plant and constructed wetlands prior to discharge to a groundwater recharge basin pursuant to a permit issued by the Central Coast Regional Water Quality Control Board (CCRWQCB). The plant was decommissioned in 2025.

Surface water diversions within the Salinas River watershed are reported to the State Water Resources Control Board (SWRCB). The Electronic Water Rights Information Management System (eWRIMS) was replaced by the California Water Accounting, Tracking, and Reporting System (CalWATRS). Initial analysis in the original GSP and subsequent analysis found that some water use is reported to the SWRCB as surface water diversions and are also reported to MCWRA as groundwater extractions. With the intention of preventing double counting of surface water and groundwater, starting in WY 2025, MCWRA asked GMP extraction reporters if groundwater extractions were also reported as surface water diversions.

As described further in section 3.4, MCWRA operates 2 reservoirs with consideration of multiple factors, 1 of which is groundwater recharge. Groundwater resources reflect a mix of recharged surface water and groundwater, generally referred to as groundwater in this GSP. Groundwater is the primary water source for all water use sectors in the Subbasin. Communities that depend on groundwater are shown on Figure 3-5. The large public water systems shown on this figure are derived from data provided by Tracking California (2020), updated with boundaries directly from the water purveyors where possible. Monterey County provided the boundaries for the small public water systems and the local small or state small water systems shown on Figure 3-5. More information on these water systems can be found on SVBGSA's Web Map, accessible at https://portal.elmontgomery.com. Groundwater is also used for rural residential areas, small community systems, and small commercial operations such as wineries and schools. The complete list of water systems and their number of connections, if available, are listed in Appendix 3B.

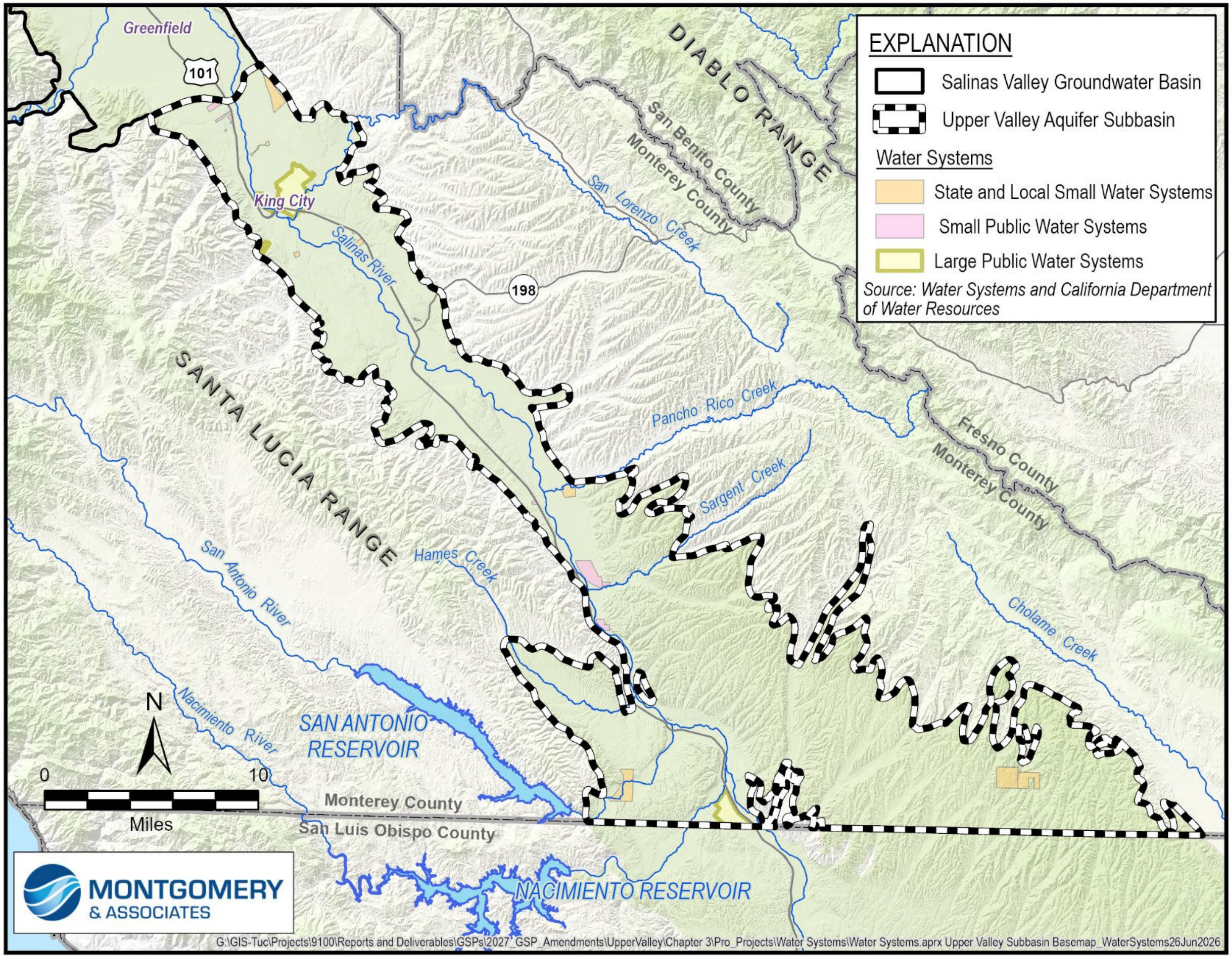


Figure 3-5. Communities Dependent on Groundwater

3.3.2 Water Use Sectors

Groundwater demands in the Subbasin are classified into the 6 water use sectors identified in the GSP Regulations. The water use sectors are shown on Figure 3-6, based on data available as of 2019. Groundwater demand categories include:

- **Urban.** Urban water use is assigned to non-agricultural water uses in the cities and census-designated places. Domestic use outside of census-designated places is not considered urban use.
- **Industrial.** There is limited industrial use in the Subbasin.
- **Agricultural.** This is the largest water use sector in the Subbasin and includes grazing land.
- **Managed wetlands.** DWR land use records indicate that there are no managed wetlands in the Upper Valley Subbasin.
- **Managed recharge.** MCWRA operates the Nacimiento and San Antonio Reservoirs for flood control and surface water storage. Stored surface water is released for many purposes including managed groundwater recharge.
- **Native vegetation.** Groundwater use by native vegetation is minimal. Potential groundwater dependent ecosystems are mapped and described in Section 4.4.5.2.
- **Other.** This includes rural residential water use and any water use not captured in the other water use sectors.

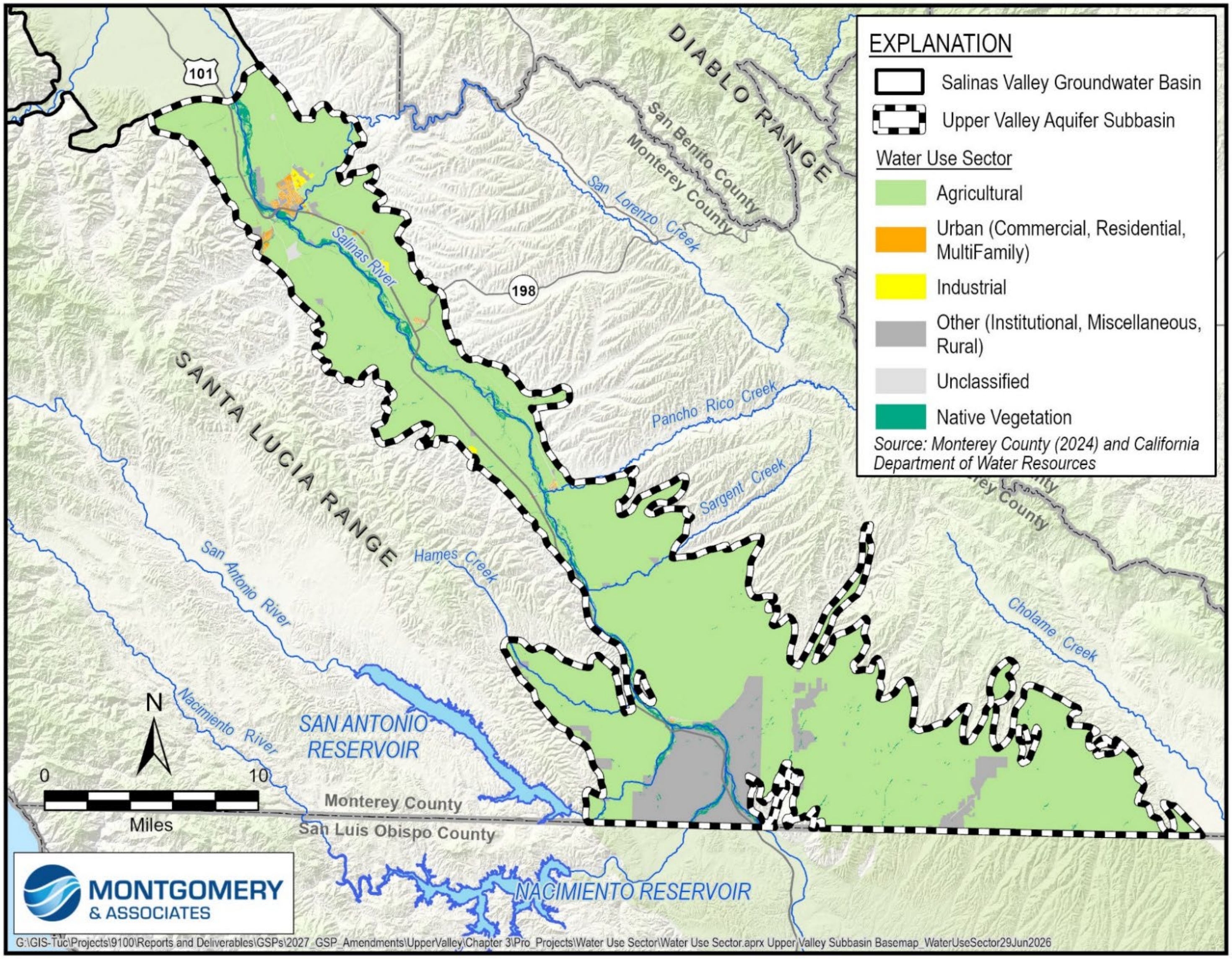


Figure 3-6. Map of Water Use Sectors

3.4 Conjunctive Uses

Groundwater, surface water, and recycled water management in the Salinas Valley is fundamentally shaped by a long history of groundwater overdraft and seawater intrusion, as formally documented in California's 1946 Bulletin 52. In addition, flood control was needed. In response, MCWRA constructed the Nacimiento and San Antonio Reservoirs, which formed the basis for operation of a conjunctive management system.

Nacimiento Reservoir (License 7543, priority date November 4, 1954) and San Antonio Reservoir (License 12624, priority date December 2, 1955) form the backbone of this system. Nacimiento is authorized to collect up to 350,000 AF annually, with a maximum annual withdrawal of 180,000 AF based on storage change, supplemented by an additional 27,900 AF under Permit 21089. San Antonio holds up to 335,000 AF, and MCWRA is allowed annual withdrawals of up to 210,000 AF. Both reservoirs are operated to meet water rights requirements, environmental compliance requirements, and settlement agreements, while also meeting flood control requirements regulated by the California Division of Safety of Dams and Federal Energy Regulatory Commission. Additional operational considerations include public safety, infrastructure limitations, dam safety and incidental hydropower generation.

As part of the Salinas Valley Water Project (SVWP), MCWRA constructed and began to operate the Salinas River Diversion Facility (SRDF) in 2010. SVWP also resulted in reoperation of the reservoirs to release additional stored water during the summer when it is needed for irrigation and re-diversion at the SRDF. The SVWP represents the primary conjunctive use program integrating reservoir operations with groundwater and surface water supplies.

MCWRA operates the reservoirs with consideration of multiple factors including groundwater recharge, re-diversion of surface water at the SRDF, recreational use at the reservoirs, and incidental power generation. Reservoir operations also consider flood control and environmental considerations such as fish and wildlife habitat and migration. Releases are highly variable—ranging from 70 cubic feet per second (cfs) to roughly 550 thousand cfs, or approximately 4,100 to 33,000 AF per month—reflecting hydrologic conditions and the need to respond to system demand.

MCWRA adjusts releases dynamically to meet flow targets associated with environmental bypass requirements at downstream compliance points, using the river as a managed recharge conveyance system. These releases support stream infiltration and recharge into the groundwater basin, directly linking surface water operations with groundwater conditions. MCWRA is currently developing the Salinas River Operations Habitat Conservation Plan (SROHCP) to obtain federal Endangered Species Act (ESA) permits for its water management activities.

Within the Upper Valley Subbasin, these reservoir releases support stream infiltration and managed recharge along the Salinas River; however, no dedicated conjunctive use facilities are located within the Subbasin.

Together, the multiple subbasins that comprise the Salinas Valley represent a highly managed, conjunctive use framework in which surface water infrastructure, groundwater extraction, and recycled water supplies are closely integrated to mitigate long-term basin impacts and sustain agricultural productivity.

3.5 Existing Well Types, Numbers, and Density

Well density data in the original GSP came from DWR's Online System for Well Completion Report (OSWCR) Map Application (DWR, 2020a). However, the OSWCR database contains many well records with missing information and does not consistently reflect well abandonment, replacement, or destruction.

To develop a more accurate and complete dataset of active wells in the Salinas Valley, MCWRA conducted a desktop analysis and established a well registration program under Ordinance 5426, which requires all wells to be registered with MCWRA. As part of the desktop analysis, MCWRA reviewed well records from OSWCR, the Monterey County Environmental Health Bureau and its own records. Through the registration program, well owners now submit or verify well information via an online portal or form.

The registration process collects general information on well ownership, construction specifications, location and well status. Location and depth data, in particular, support analysis of the relationship between wells and groundwater conditions.

The data used in GSP Amendment 1 reflect the first 6 months of well registration. Table 3-2 summarizes the number and types of wells, including those identified through the desktop analysis and registration process with sufficient information (location, depth, and ownership). MCWRA will continue the registration program, assess spatial data to determine where there may be missing registrations, and continue outreach to well owners. In addition, Table 3-2 also includes the well counts from the OSWCR database. It classifies wells as domestic, production, and public supply; production wells include wells that are designated as irrigation, municipal, public, or industrial, and only exclude those designated as domestic. Public supply wells are subtracted from the production category to avoid double counting. Some of the domestic wells identified by DWR may be classified as *de minimis* extractors, defined as pumping less than 2 AF/yr for domestic purposes.

As of the first GSP Amendment, 388 wells in the Upper Valley Subbasin have sufficient information. Production and public supply well counts are similar to those reported in the OSWCR database in the original GSP; however, domestic well counts are much lower than the

286 wells included in the OSWCR database. Some of the domestic wells identified by DWR may not be reflective of active wells in the Subbasin, as some wells may have been abandoned or are inactive. Alternatively, some of the domestic wells may not have adequate location information to be considered registered for MCWRA's purposes. However, this discrepancy suggests that future registration efforts may be most effective if focused on domestic well owners. Figure 3-7, Figure 3-8, and Figure 3-9 show the density of domestic, production, and public supply wells, respectively, in the Subbasin according to the OSWCR dataset.

Table 3-2. Well Count Summary

Category	MCWRA Well Counts	OSWCR Well Counts
Domestic	27	286
Production	347	341
Public Supply	14	21
Total	**388**	**648**

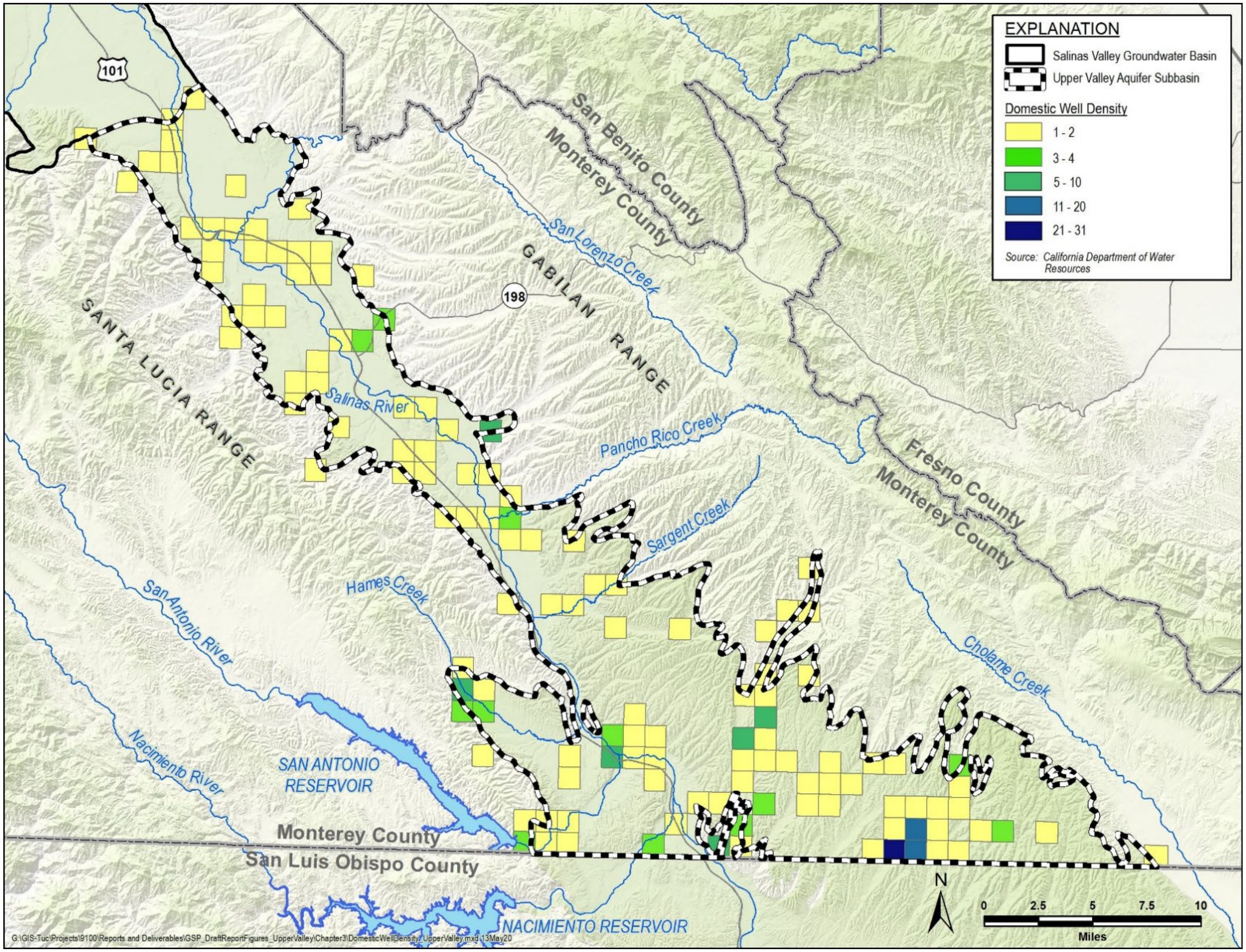


Figure 3-7. Density of Domestic Wells (Number of Wells per Square Mile)

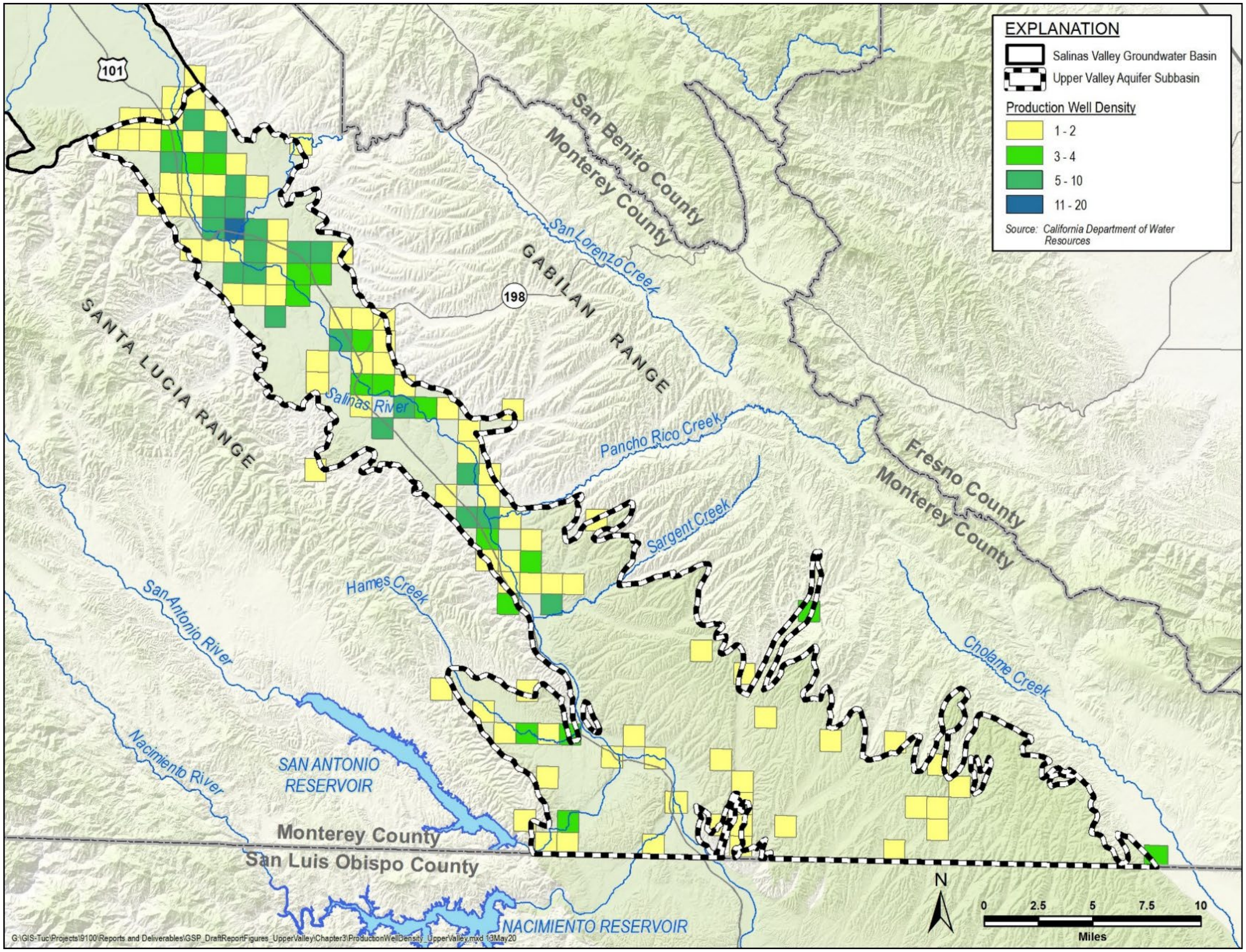


Figure 3-8. Density of Production Wells (Number of Wells per Square Mile)

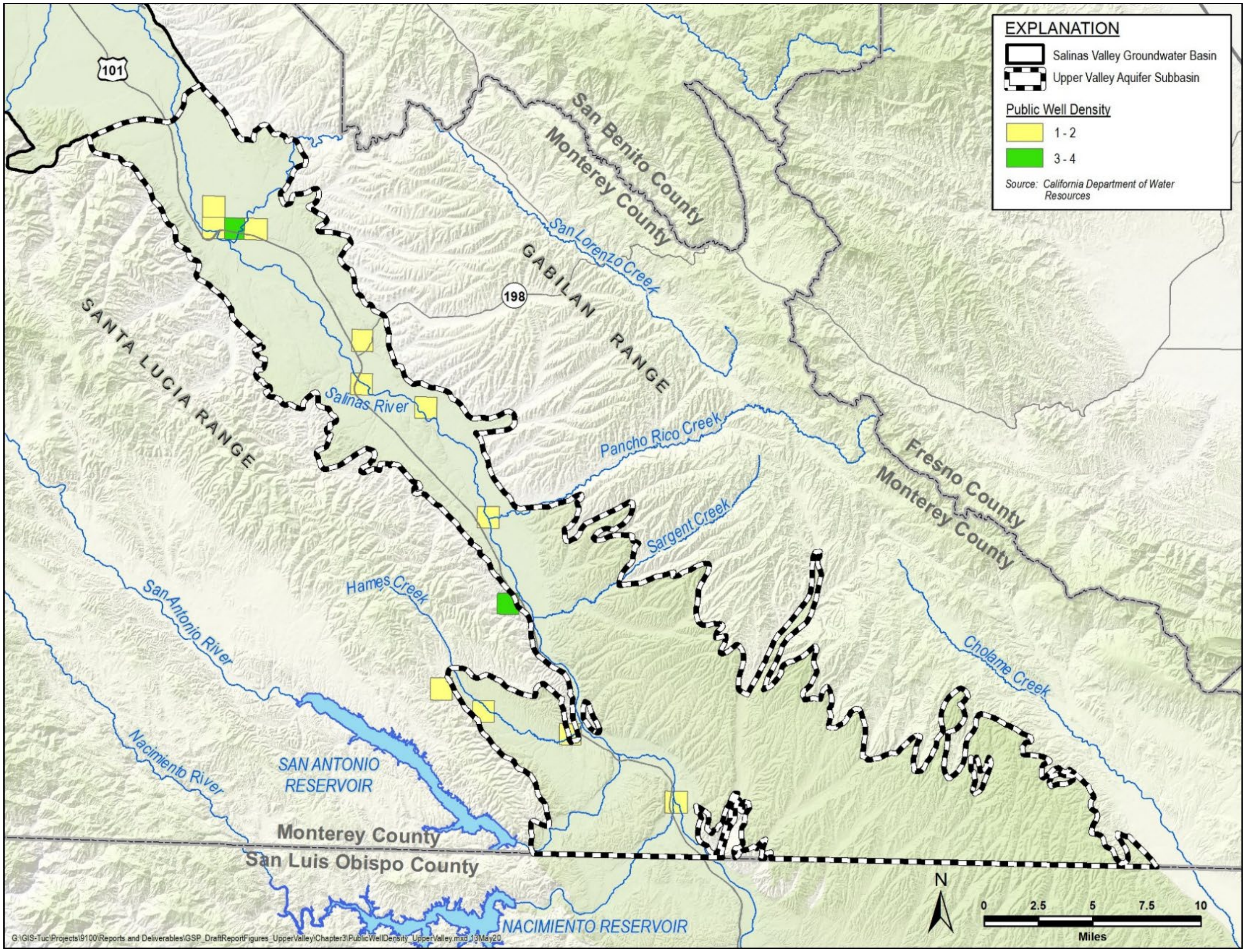


Figure 3-9. Density of Public Supply Wells (Number of Wells per Square Mile)

3.6 Existing Monitoring Programs

3.6.1 Groundwater Monitoring Program

In 2024, SVBGSA and MCWRA established a Groundwater Monitoring Program (GMP) for the Salinas Valley Groundwater Basin, adopted by MCWRA under MCWRA Ordinance No. 5426. The GMP integrates well registration, groundwater level monitoring, groundwater extraction reporting, and groundwater quality monitoring into a single coordinated program. The existing monitoring programs described below are being incorporated into and expanded under the GMP.

3.6.2 Groundwater Elevation Monitoring

MCWRA operates existing and expanded groundwater elevation monitoring programs in the Salinas Valley, which are incorporated into the monitoring plan of this GSP Amendment as appropriate. MCWRA has annual fall (November/December), August, and monthly groundwater elevation monitoring programs. The existing groundwater elevation monitoring programs will be updated and improved to document the avoidance of undesirable results in the principal aquifer in the Subbasin.

MCWRA historically monitored 4 wells within the Upper Valley Subbasin as part of the CASGEM network. The CASGEM wells were migrated to the SGMA monitoring network and are supplemented with additional wells that are also monitored by MCWRA. In 2024, MCWRA shifted the monitoring of these wells to the GMP with MCWRA Ordinance No. 5426. MCWRA monitors groundwater elevations. Groundwater elevation data from all wells in the monitoring network are publicly available through the SVBGSA Web Map. This network is used for groundwater elevation monitoring under this GSP, as described further in Chapter 7.

3.6.3 Groundwater Extraction Monitoring

MCWRA collects groundwater extraction information from non-de minimis extractors within Zone 2C and/or the 180/400, Eastside, Forebay, Langley, Monterey, and Upper Valley Subbasins. The Groundwater Extraction Monitoring System (GEMS) was established in 1993 and updated in 2024 as part of the GMP to meet SGMA requirements. Historically, GEMS required all wells located in Zones 2, 2A, and 2B with discharge pipes of 3 inches or greater in diameter to report extraction. These zones only overlap with the northern half of the Upper Valley Subbasin as illustrated on Figure 3-3. As a result, MCWRA has not collected groundwater extraction data throughout the entire Upper Valley Subbasin until the extent was updated in 2024. However, most of the extraction in the Subbasin occurs along the river corridor which mainly overlaps with Zones 2, 2A, and 2B.

The GMP is used for groundwater extraction reporting under this GSP, as described in Chapter 7.

3.6.4 Groundwater Quality Monitoring

Groundwater quality is monitored under several different programs and by different agencies including the following:

- Municipal and community water purveyors must collect water quality samples on a routine basis for compliance monitoring and reporting to the SWRCB Division of Drinking Water (DDW). These purveyors include municipal systems; community water systems; non-transient, non-community water systems; and non-community water systems that provide drinking water to at least 15 service connections or serve an average of at least 25 people for at least 60 days a year.
- Local small or state small water system wells are regulated by the Monterey County Department of Public Health. Local small water systems serve 2 to 4 service connections and state small water systems serve 5 to 14 connections.
- To fulfill the groundwater quality regulatory requirements of the Irrigated Lands Program (ILP), the CCRWQCB requires monitoring of both on-farm domestic wells and agricultural wells for irrigation and livestock supply.
- In addition to the ILP, the CCRWQCB conducts groundwater quality monitoring at multiple sites as part of investigation or compliance monitoring programs. These sites are discussed further in Chapter 5.

For this GSP, groundwater quality data is downloaded and reviewed from SWRCB's DDW for municipal public water system supply wells and the ILP irrigation supply wells and on-farm domestic wells monitored under the CCRWQCB's Agricultural Order, as described in Section 3.6.2.

3.6.5 Surface Water Monitoring

One streamflow gage operated by the U.S. Geological Survey (USGS) within the Upper Valley Subbasin: the Salinas River gage near Bradley (USGS Site #11150500). The location of this stream gage surface-water monitoring facility is depicted on Figure 3-10.

In years when there are conservation releases from the Nacimiento and San Antonio Reservoirs, the MCWRA and USGS conduct the Salinas River Discharge Measurement Series (River Series) to monitor changes in streamflow along different river reaches. Reservoir releases are held constant for 5 days to ensure that the discharge measurements account for losses to the aquifer, stream vegetation, or evapotranspiration (ET).

The SWRCB CalWATRS is used to summarize the total reported surface water diversions. This includes monthly surface water diversions from the Salinas River and its tributaries. In addition, starting in WY 2025, MCWRA asked GMP extraction reporters if groundwater extractions were also reported as surface water diversions.

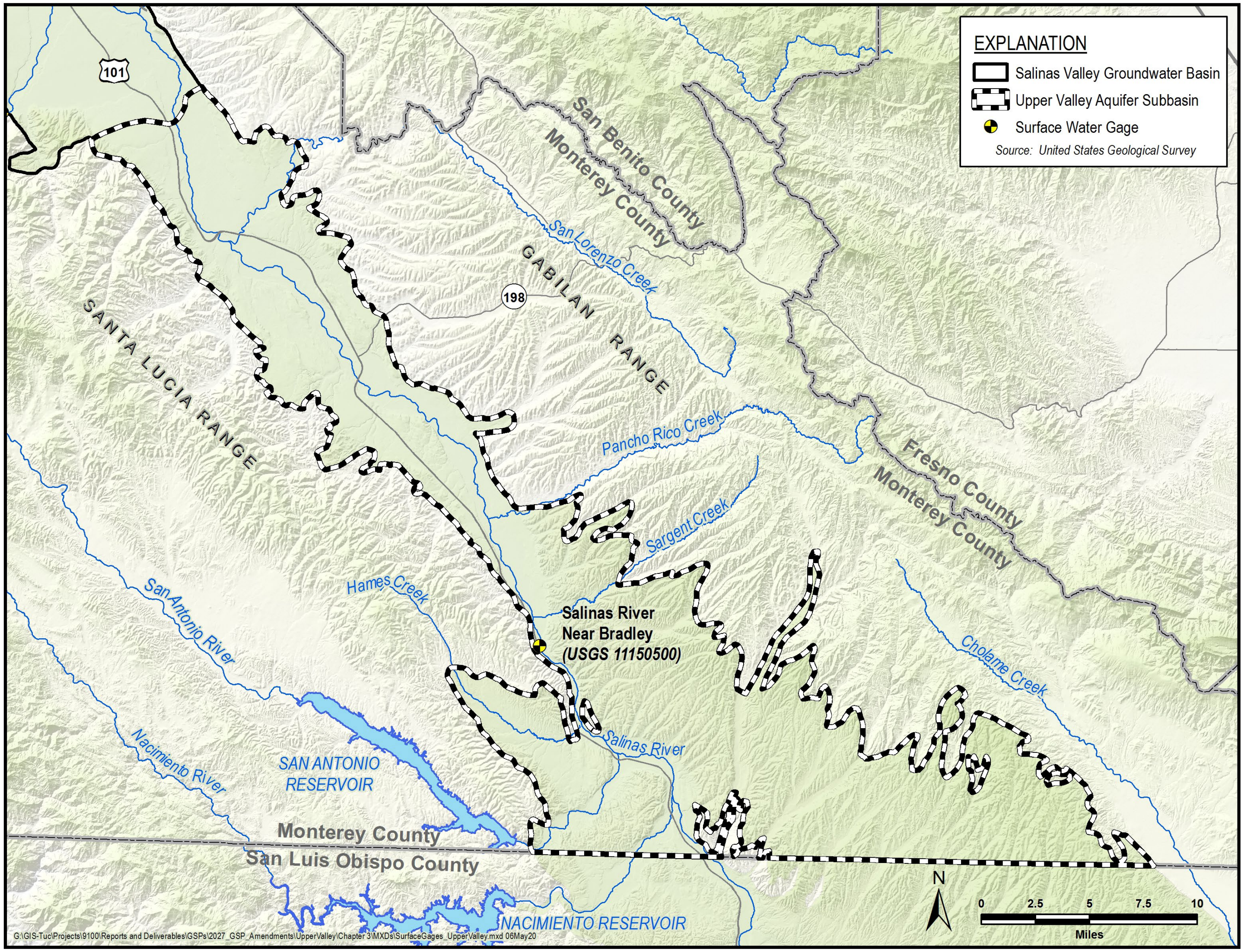


Figure 3-10. Surface Water Gage Location

3.7 Existing Water Management Plans

3.7.1 Monterey County Groundwater Management Plan

MCWRA developed a Groundwater Management Plan that is compliant with AB3030 and SB1938 legislation (MCWRA, 2006). This Groundwater Management Plan exclusively covered the Salinas Valley Groundwater Basin in Monterey County. The original 2022 GSP succeeded the Groundwater Management Plan as the management plan for the Subbasin, and this GSP Amendment replaces the original GSP.

The Groundwater Management Plan identified 3 objectives for groundwater management:

Objective 1: Development of Integrated Water Supplies to Meet Existing and Projected Water Requirements

Objective 2: Determination of Sustainable Yield and Avoidance of Overdraft

Objective 3: Preservation of Groundwater Quality for Beneficial Use

To meet these 3 objectives, the Groundwater Management Plan identified elements that should be implemented by MCWRA. These included groundwater monitoring; monitoring of surface water storage, flow, and quality; determination of basin yield and overdraft; continuation of conjunctive use operations; water quality management; identification of well construction, abandonment, and destruction policies; and continuation of public education and water conservation programs. Since the GSP replaces the Groundwater Management Plan as the management plan for the Subbasin, the GSP incorporates and refines the elements of the Groundwater Management Plan to comply with SGMA.

3.7.2 Integrated Regional Water Management Plan

The Integrated Regional Water Management Plan (IRWMP) for the Greater Monterey County Region was developed by the Greater Monterey County RWMG, which consists of government agencies, nonprofit organizations, educational organizations, water service districts, private water companies, and organizations representing agricultural, environmental, and community interests.

The Upper Valley Subbasin falls within the IRWM Plan area. The IRWM Plan consists of a set of goals and objectives that were identified by the RWMG as being critical to address water resource issues within the planning area related to the following topics:

- Water Supply
- Water Quality

- Flood Protection and Floodplain Management
- Environment
- Regional Communication and Cooperation
- Disadvantaged Communities
- Climate Change

The IRWM Plan includes more than 25 projects that could assist regional groundwater management (RWMG, 2018).

3.7.3 Urban Water Management Plans

Cal Water provides water service to King City in the Upper Valley Aquifer Subbasin. Its 2025 UWMP (California Water Service, 2026) describes the service area; reports historical and projected population; identifies historical and projected water demand by category such as single-family, multi-family, commercial, industrial, institutional/government, and other; and describes the distribution system and identifies water losses, and water supply reliability. To maintain system reliability and accommodate future growth, the UWMP describes extracting an additional 120 AF/yr. by 2050.

The UWMP describes Cal Water's reliance on groundwater and Cal Water's support for the development and implementation of GSPs. The UWMP concludes that groundwater supplies are expected to be sufficient to meet projected demand through 2050. Cal Water has an active well maintenance program and is advancing additional well projects to support reliability and growth, although the UWMP does not identify a quantifiable increase in supply from specific future projects. The UWMP recognizes SGMA and implementation of the Upper Valley Aquifer Subbasin GSP as factors in long-term water supply reliability. Cal Water coordinated with local agencies, relevant GSAs, and the public during preparation of the UWMP, and is active in the Upper Valley Aquifer Subbasin committee. Cal Water also identifies groundwater sustainability considerations under SGMA as a driver for its ongoing conservation planning and resource management.

The 2025 UWMP addresses groundwater quality as a potential constraint on supply reliability. Cal Water routinely monitors wells and treated water for compliance with drinking-water standards, tracks changes in constituent concentrations, and can take affected sources offline and implement treatment if necessary. Cal Water also evaluates groundwater contamination when siting new wells and avoids areas of known contamination. Based on these practices, water quality is not expected to affect the reliability of Cal Water's groundwater supplies through 2050.

Groundwater is expected to remain Cal Water's sole supply through the planning horizon. The UWMP does not identify any planned alternative supply sources that would provide a quantifiable increase in supply. Given the inland location, desalination is not considered an available supply option, and Cal Water is not currently pursuing water exchanges or transfers for the King City District. Cal Water also states that it continues to investigate opportunities outside King City for potential participation in conjunctive-use programs or other efforts to expand supplies; however, the UWMP does not identify a specific project or quantify any additional supply from these efforts. The UWMP incorporates climate change into its water demand and supply reliability analyses. Demand is projected to be somewhat higher during dry periods, but the UWMP concludes that available groundwater supplies are expected to remain sufficient to meet projected demands through 2050.

3.8 Existing Water Regulatory Programs

3.8.1 Well Permitting

The Monterey County Code Chapter 15.08 contains the County's regulations for the construction, repair, destruction, and reconstruction of all water wells. The Chapter sets forth certain technical requirements that appear to be purely ministerial in their application; however, the Chapter also refers to DWR Bulletin Nos. 74-81 and 74-1 and gives the Health Officer discretion to impose unspecified conditions on a permit, grant variances, and deny an application if in his/her judgment it would defeat the purposes of the Chapter. Permit review considers whether a well would be located in an area where groundwater quality programs are known to exist or where a well will intersect more than 1 aquifer, among other things.

On August 29, 2018, the State Third Appellate District Court of Appeal published an opinion in *Environmental Law Foundation v. State Water Resources Control Board* (26 Cal.App.5th 844), a case that may impact future permitting of wells near navigable surface waters to which they may be hydrologically connected. The Court of Appeal found that while groundwater itself is not protected by the public trust doctrine, the doctrine does protect navigable waters from harm caused by extraction of groundwater if it adversely affects public trust uses. Further, it found that Siskiyou County, as a subdivision of the State, shares responsibility for administering the public trust. Similarly, the County is responsible for well permitting. Therefore, it has a responsibility to consider the potential impacts of groundwater withdrawals on public trust resources when permitting wells near areas where groundwater may be interconnected with navigable surface waters.

Moreover, California Supreme Court's decision in *Protecting Our Water and Environmental Resources v. County of Stanislaus* (10 Cal.5th 4792020)) held that Stanislaus County could not categorically classify its issuance of groundwater well construction permits as ministerial decisions exempt from environmental review under the CEQA. The Monterey County Health

Department, Environmental Health Bureau issues well permits and does in-house CEQA review on all well application in consultation when need with County Counsel. If the well application is in conjunction with a building permit, EHB receives input from the County of Monterey Housing & Community Development. Although the Monterey County Code has not yet been amended in response to these cases, discretionary well permit review, where determined to be needed, may require analyses of the effects of pumping from new wells, including factors such as both the total volume and seasonal timing of extraction, how the new wells may affect nearby wells and regional groundwater levels, and whether the wells are located in an area with overdraft conditions. GSPs have established SMC that provide quantifiable minimum thresholds that can be used in these evaluations.

As in the land use discussion, the Public Service element of the County's 2010 General Plan addresses permitting of individual wells. Table 3-3 summarizes the 2010 General Plan's water supply guidelines for the creation of new residential or commercial lots (County of Monterey Housing and Community Development, 2010, Table PS-1). Table 3-4 depicts the decision matrix from the Monterey County General Plan for permitting new residential or commercial wells for existing lots (County of Monterey Housing and Community Development, 2010, Table PS-2).

Table 3-3. County of Monterey Water Supply Guidelines for the Creation of New Residential or Commercial Lots

Major Land Groups	Water Well Guidelines
Public Lands	Individual Wells Permitted in Areas with Proven Long-Term Water Supply
Agriculture Lands	Individual Wells Permitted in Areas with Proven Long-Term Water Supply
Rural Lands	Individual Wells Permitted in Areas with Proven Long-Term Water Supply
Rural Centers	Public System; Individual Wells Allowed in limited situations
Community Areas	Public System

Table 3-4. County of Monterey Well Permitting Guidelines for Existing Residential and Commercial Lots

Characteristics of Property	Water Connection Existing or Available from the Water System	Not Within a Water System or a Water Connection Unavailable
Greater than or equal to 2.5 Acres connected to a Public Sewage System or an on-site wastewater treatment system	Process Water Well Permit	Process Water Well Permit
Less than 2.5 Acres and connected to a Public Sewage System	Process Water Well Permit	Process Water Well Permit
Less than 2.5 Acres and connected to an on-site wastewater treatment system	Do not Process Water Well Permit	Process Water Well Permit

3.8.2 Groundwater Export Prohibition

The MCWRA Act, § 52.21 prohibits the export of groundwater for uses outside the Salinas Valley Groundwater Basin from any part of the Basin, including the Upper Valley Subbasin. In particular, the Act states:

> *For the purpose of preserving [the balance between extraction and recharge], no groundwater from that basin may be exported for any use outside the basin, except that use of water from the basin on any part of Fort Ord shall not be deemed such an export. If any export of water from the basin is attempted, the Agency may obtain from the superior court, and the court shall grant, injunctive relief prohibiting that exportation of groundwater.*

3.8.3 Agricultural Order

In 2021, the CCRWQCB issued Agricultural Order No. R3-2021-0040, the Proposed General Waste Discharge Requirements for Discharges from Irrigated Lands (CCRWQCB, 2021). The permit requires that growers implement practices to reduce nitrate leaching into groundwater and improve receiving water quality. Specific requirements for individual growers are structured into 3 phases based on the relative risk their operations pose to water quality. Each of the 3 phases encompasses a different area of the Central Coast Basin. Monitoring results from this new Agricultural Order (Ag Order 4.0) will be incorporated into this GSP Amendment's groundwater quality data.

3.8.4 Water Quality Control Plan for the Central Coast Basins

The Water Quality Control Plan for the Central Coastal Basin (Basin Plan) was most recently updated in June 2019 (CCRWQCB, 2019). The objective of the Basin Plan is to outline how the quality of the surface water and groundwater in the Central Coast Region should be managed to provide the highest water quality reasonably possible. Water quality objectives for both groundwater and surface water are provided in the Basin Plan.

The Basin Plan lists beneficial users, describes the water quality that must be maintained to allow those uses, provides an implementation plan, details SWRCB and CCRWQCB plans and policies to protect water quality, and describes statewide and regional surveillance and monitoring programs. Present and potential future beneficial uses for waters in the Basin are municipal supply; agricultural supply; groundwater recharge; recreation; sport fishing; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species habitat; and spawning, reproduction, and/or early development of fish.

3.8.5 Title 22 Drinking Water Program

The SWRCB DDW regulates public water systems in the State to ensure the delivery of safe drinking water to the public. A public water system is defined as a system for the provision of water for human consumption that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. Private domestic wells, wells associated with drinking water systems with fewer than 15 residential service connections, industrial, and irrigation wells are not regulated by the DDW.

The DDW enforces the monitoring requirements established in Title 22 of the California Code of Regulations for public water system wells, and all the data collected must be reported to the DDW. Title 22 also designates the MCLs and Secondary Maximum Contaminant Levels (SMCLs) for various waterborne contaminants including volatile organic compounds, non-volatile synthetic organic compounds, inorganic chemicals, radionuclides, disinfection byproducts, general physical constituents, and other parameters.

3.8.6 County Public Policy of Safe and Clean Water

In December 2018, the County Board of Supervisors adopted Resolution No. 18-385 recognizing the human right to safe and clean drinking water. The resolution established a public policy recognizing that all residents of Monterey County have the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes, including disadvantaged individuals and groups and communities in rural and urban areas. The intent of the policy is to inform the County when implementing policies and regulations affecting water supply and usage and to help the County focus on the issue of drinking water pollution in certain Monterey County domestic wells and water systems. The policy also serves to identify potential future threats due to drought and a lack of available drinking water, without impacting water rights or expanding or creating new County obligations.

3.9 Incorporating Existing Programs into the GSP and Limits on Operational Flexibility

Information from existing water resource monitoring, management, and regulatory programs have been incorporated into this GSP. They are taken into consideration during the preparation of the sustainability goal, when establishing SMC, and when developing management actions and projects. This GSP has been developed to reflect the principles outlined in those existing local plans and builds on existing plans during GSP implementation. Some of the existing management plans and ordinances may limit operational flexibility. These potential limits to operational flexibility have already been incorporated into the management actions and projects included in this GSP, as amended. Examples of limits on operational flexibility include:

- The groundwater export prohibition included in the MCWRA Act prevents export of water out of the Salinas Valley Groundwater Basin. This prohibition is not expected to adversely affect SVBGSA’s ability to reach sustainability.
- The Basin Plan and the Title 22 Drinking Water Program restrict the quality of water that can be recharged into the Subbasin.
- The Habitat Conservation Plan (HCP) being developed by MCWRA on the Salinas River will guide operations for Nacimiento and San Antonio reservoir releases which provide groundwater recharge, among other purposes.

The other monitoring, management, and regulatory programs do not limit the operational flexibility in this Subbasin.

4 HYDROGEOLOGIC CONCEPTUAL MODEL

The HCM characterizes the geologic and hydrologic framework of the Subbasin in accordance with the GSP Regulations §354.14. It is based on best available data, technical studies, and qualified maps that characterize the physical components and surface water/groundwater interaction in the Subbasin. This HCM provides comprehensive written descriptions and illustrated representations of subsurface conditions. The chapter describes the Subbasin characteristics and processes that govern the flow of water across the Subbasin boundaries, and outlines the general groundwater setting that may be encountered in the subsurface environment. Current and historical groundwater conditions are discussed in greater detail in the subsequent chapter. This current HCM in this GSP will be part of an iterative process where current conditions and data gaps are described, investigated, and then updated accordingly.

This HCM has been updated with newly available data and technical studies and incorporated in GSP Amendment 1 (Montgomery & Associates, 2025a). These updates help strengthen the understanding of the Subbasin by focusing on key areas where new information indicated a revised interpretation was needed. Key updates to the HCM include:

- Revised what constitutes the bedrock and delineated the respective surface to define the bottom of the Subbasin
- Refined the extents and character of the Paso Robles Formation within the expanded Subbasin boundary
- Incorporated the Unnamed Sandstone into the geologic framework for the Subbasin and made accommodations to guide the groundwater modeling framework

4.1 Subbasin Setting and Topography

The Upper Valley Subbasin is in the upper portion of the Salinas Valley Groundwater Basin—an approximately 90-mile long alluvial basin underlying the elongated, intermountain valley of the Salinas River. The Subbasin is oriented southeast to northwest, with several streams draining both the Gabilan and the Santa Lucia Ranges. These streams flow into the Salinas River, which then drains toward the northwest into the Pacific Ocean at Monterey Bay (Figure 4-1).

The colored bands on Figure 4-1 show the topography of the Subbasin, derived from the USGS 30-meter Digital Elevation Model (DEM). The Subbasin slopes at an average grade of approximately 30 feet/mile, generally from the southeast to the northwest along the Salinas River. The steepest portions of the subbasin are along the southern portion of the Gabilan Range where the land slopes northeast to southwest toward the Salinas River. Land surface elevations in the Subbasin range from approximately 2,750 feet along the southern border to approximately 250 feet where the Subbasin meets the Forebay Subbasin southeast of the City of Greenfield.

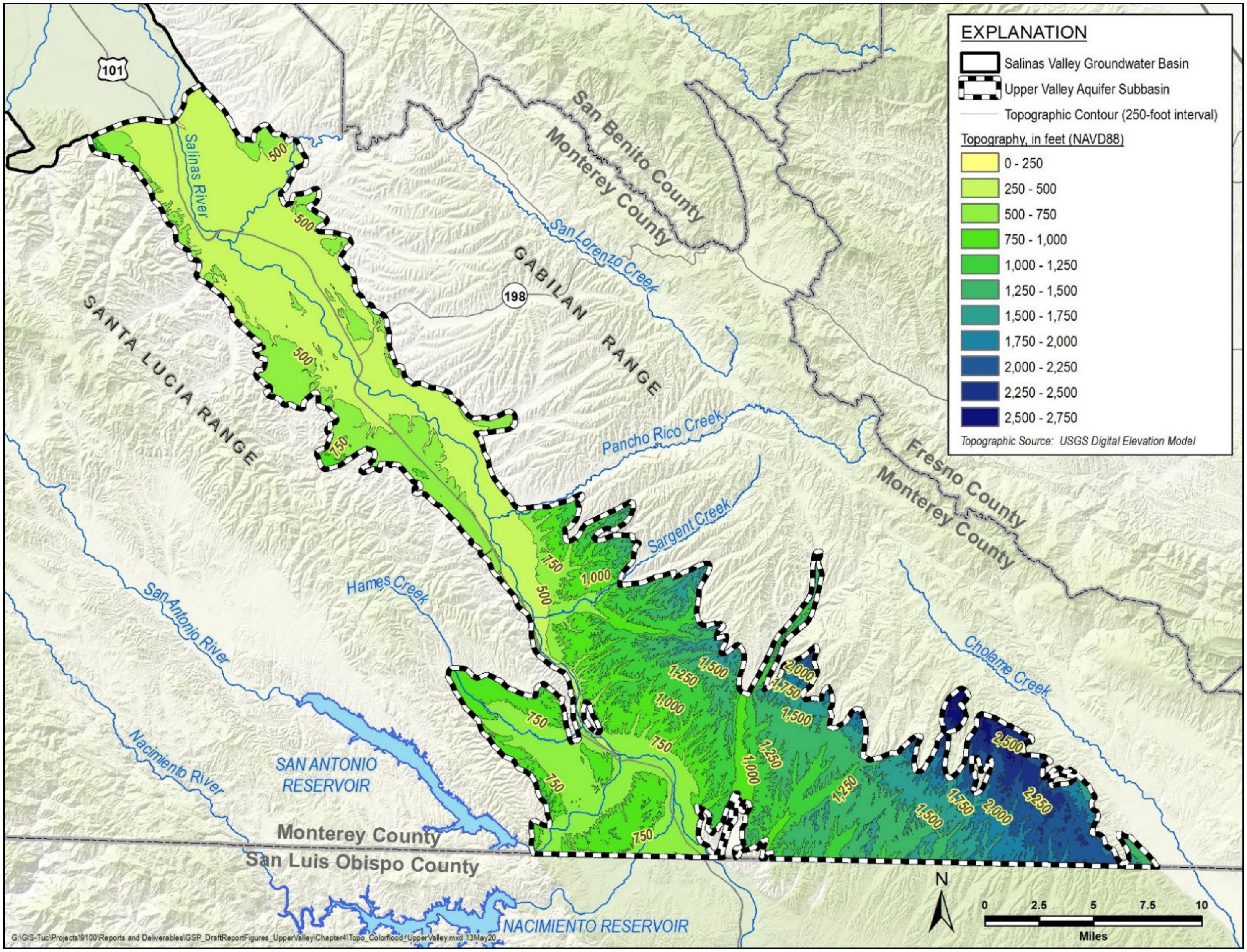


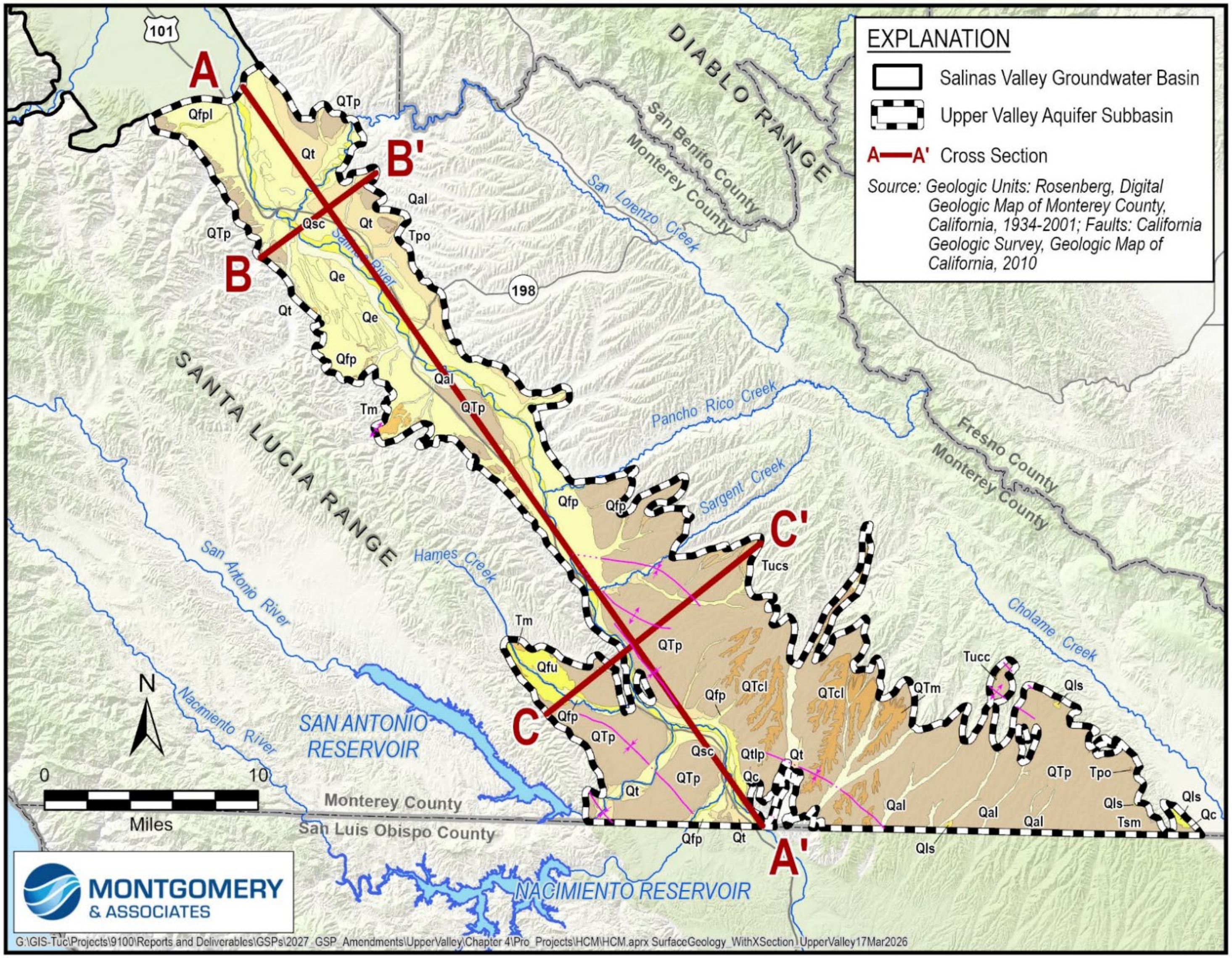
Figure 4-1. Upper Valley Aquifer Subbasin Topography

4.2 Subbasin Geology

The subbasin geology describes the physical framework in which groundwater occurs and moves. It controls the locations and depths of aquifers and aquitards, as well as of the subbasin boundaries. The geologic descriptions included here are derived from previously published scientific reports and from investigations conducted by the USGS, State of California, and academic institutions.

The Subbasin was formed through periods of structural deformation and marine and terrestrial sedimentation in a tectonically active area on the eastern edge of the Pacific Plate. Figure 4-2 presents a geologic map of the Subbasin and vicinity, which was adopted from the California Geologic Survey's 2010 statewide geologic map and the surface geology map of Monterey County (Jennings *et al.*, 2010; Rosenberg, 2001). The locations of cross-sections used to define principal aquifers in Section 4.4 are also shown on Figure 4-2. The legend on the figure presents the age sequence of the geologic materials from the youngest unconsolidated Quaternary sediments to the oldest pre-Cambrian basement rock.

The geology of the Upper Valley Subbasin is characterized by alluvium, terrace deposits, the Paso Robles Formation, and the Unnamed Sandstone (DWR, 2004; Montgomery & Associates, 2025a). These features are in contact with the more consolidated sedimentary rocks and crystalline rocks that comprise the Santa Lucia and the Gabilan Ranges that mark the western and eastern boundaries of the Subbasin, respectively.



(from Jennings, et al., 2010; Rosenberg 2001)

Figure 4-2. Subbasin Geology

FIGURE 4-2. EXPLANATION

QUATERNARY

Qal	Alluvial deposits, undifferentiated
Qhf	Alluvial fan deposits, Holocene
Qfp	Flood-plain deposits, undifferentiated
Qsc	Stream channel deposits
Qc	Colluvium
Qls	Landslide deposits
Qe	Eolian deposits
Qfu	Pleistocene alluvial fans, undifferentiated
Qfpl	Alluvial fans, late Pleistocene
Qt	Fluvial terrace deposits, undifferentiated
Qtlp	Fluvial terrace deposits, late Pleistocene

QUATERNARY-TERTIARY

QTp	Paso Robles Formation, undifferentiated
QTcl	Paso Robles Formation, clay
QTm	Paso Robles Formation, marl
QTpc	Paso Robles Formation, clay and gravel

TERTIARY

Tucc	Unnamed clastic sedimentary unit
Tucs	Unnamed clastic sedimentary unit
Tpo	Pancho Rico Formation, mudstone
Tpi	Pancho Rico Formation, siltstone
Tpd	Pancho Rico Formation, diatomite
Tps	Pancho Rico Formation, sandstone
Tsm	Santa Margarita Sandstone
Tmi	Monterey Formation, siltstone
Tm	Monterey Formation, siliceous
Tml	Monterey Formation, semi-siliceous
Tms	Unnamed clastic sediments, marine sandstone
Tn	Unnamed clastic sediments, red beds

GEOLOGIC FEATURES

- fault, approx. located
- fault, certain
- fault, concealed
- anticline, certain
- fold axis, certain
- fold axis, concealed
- syncline, certain

4.2.1 Geologic Formations

Major geologic units present in the Upper Valley Subbasin are described below, starting at the surface and moving through the geologic layers from youngest to oldest. Geologic descriptions are derived from a combination of sources (Jennings *et al.*, 2010; DWR, 2004). The corresponding designations on Figure 4-2 are provided in parentheses. The predominant units are alluvium, terrace deposits, the Paso Robles Formation, and the Unnamed Sandstone.

Quaternary Deposits

- *Alluvium from streams and small drainages (Qal, Qsc, and Qfp)* – These youngest units are the loose sediment in and along streams and drainages, or where streams have recently flooded. Qsc fills the bed of the Salinas River. Qal is found in more minor drainages. Both are moderately sorted and consist mostly of silt and sand with some areas of gravel. Salinas River floodplain deposits (Qfp) are the dominant feature of the northern subbasin, stretching all the way across the valley in places. These loose sand and silt deposits are the foundation for the Subbasin's fertile agricultural lands.
- *Sediments not transported by water (Qc, Qls, and Qe)* – Colluvium (Qc) and landslides (Qls) are the result of gravity alone. Colluvium collects gradually, landslides occur suddenly. These small, isolated deposits are found on the edges of the Subbasin, where the topography is steeper. They consist of loose, poorly to moderately sorted silt, sand, and gravel. Eolian deposits (Qe) are transported by the wind and form irregular patches over the widest, flattest part of Upper Valley, between King City and San Lucas. Eolian deposits are exclusively sand and finer grains, as gravel is too heavy to be carried by the wind.
- *Alluvial fans (Qhf, Qfpl, and Qfu)* – Alluvial fans are sediments deposited in a distributary manner at the base of mountain fronts where streams emerge (Kennedy/Jenks, 2004). They consist of moderately to poorly sorted sand, silt, and gravel. Holocene alluvial fans (Qhf) tend to be weakly consolidated, whereas late Pleistocene alluvial fans (Qfpl) can be moderately consolidated. Some fans are of unknown age (Qfu).
- *Terrace deposits (Qtlp and Qt)* – Terrace deposits are the remains of ancient floodplains. They are partially consolidated and consist mostly of sand mixed with silt and gravel. Some are known to be from the late Pleistocene (Qtlp). Others are of indeterminate age (Qt).

Quaternary-Tertiary Deposits

- *Paso Robles Formation (QTp, QTcl, QTm, and QTpc)* – This Pliocene to lower Pleistocene (1.6 million to 5.3 million years ago) unit is composed of loosely consolidated continental sandstone, shale, and gravel deposits (Jennings *et al*., 2010;

Rosenberg, 2001). These deposits are found as lenticular beds of sand, gravel, silt, and clay from terrestrial deposition (Thorup, 1976, Durbin *et al.*, 1978). The depositional environment is largely fluvial (Durbin, 1974) but also includes alluvial fan, lake, and floodplain deposition (Thorup, 1976; Greene, 1977). The alternating beds of fine and coarse materials typically have bed thicknesses of 20 to 60 feet (Durbin *et al.*, 1978).

Tertiary Deposits

- *Unnamed Clastic Sedimentary Units, also called Unnamed Sandstone (Tucc, Tucs)* – This (likely) Pliocene unit is a clastic sedimentary unit deposited between the Paso Robles Formation and the Monterey Formation or Pancho Rico Formation, depending on location. This unit was mapped by Dibblee (1971), and amalgamated into the Digitized Geologic Map of Monterey County by Rosenberg (2001). This unit was described as low-permeability and assumed to be non-water bearing in the 2005 Paso Robles Groundwater Basin Study for modeling purposes, but was acknowledged to have the potential to yield water to domestic wells, which extract relatively small volumes of groundwater compared to other types of production wells. Although the Unnamed Sandstone is not as extensive on the surface as other formations within the Upper Valley Subbasin, AEM and surface mapped data indicate that it is present in more areas in the Subbasin than previously understood.
- *Pancho Rico Formation (Tpo, Tpi, Tpd, and Tps)* – This Pliocene (2.6 million to 5.3 million years ago) unit consists of sandy marine strata and interbedded finer grained rocks (Durham and Addicott, 1965). This unit conformably underlies the Paso Robles formation (Durham and Addicott, 1965). This unit crops out near the Arroyo Seco tributary, along Reliz Canyon, and ranges from approximately 20 feet to more than 1,000 feet in thickness (Durham and Addicott, 1965). The contact of the Paso Robles Formation with this unit also marks several of the lateral boundaries for the Subbasin shown on Figure 4-2 (DWR, 2004; Jenning *et al.*, 2010).
- *Santa Margarita Sandstone (Tsm)* – The Santa Margarita Sandstone is exposed at the surface in only a couple locations along the southern edge of the Subbasin. Conformably overlying the Monterey Formation, it is a white, arkosic sandstone made of very fine to coarse sand. It has very thick beds and some localized crossbedding.
- *Monterey Formation (Tmi, Tm, Tml)* – This Miocene (5.3 million to 23 million years ago) unit consists of shale and mudstone deposited in a shallow marine environment (Greene, 1977). This unit typically underlies the Salinas Valley Groundwater Basin and acts as a boundary for vertical groundwater flow. It also marks some lateral boundaries for the Subbasin shown on Figure 4-2 (DWR, 2004; Jenning *et al.*, 2010).

4.2.2 Structural Restrictions to Flow

The Upper Valley Subbasin overlies the axis of a northwest-plunging synclinal flexure in the bottom of the Subbasin (Durbin, 1978). This fold is evident in both Figure 4-4 and Figure 4-5 where the shallower depths to the basin bottom are shown along the Subbasin eastern and western peripheries, and across the Subbasin approximately where State Highway 198 meets State Highway 101. This fold causes the depth of the basin bottom to decrease sharply from approximately 800 feet to 300 feet near the center of the Subbasin where Sargent Creek meets the Salinas River (Durbin, 1978). The bottom continues to shallow as it approaches the southern boundary of the Subbasin, however, the current information on the depths to the basin bottom are limited in this area (Figure 4-4 and Figure 4-5). There is also a structural feature called the San Miguel Dome along the Monterey and San Luis Obispo County Line. The dome follows a northwest-southeast trending anticline, which plunges downward to the northwest and southeast, and uplifts the low-permeability Monterey Formation to the surface and likely precludes groundwater flow (Fugro West *et al*, 2005). This Dome is excluded from the subbasin along the southern boundary, as seen on Figure 4-2.

4.2.3 Soils

The soils of the Subbasin are derived from the underlying geologic formations and influenced by the historical and current patterns of climate and hydrology. Soil types can influence groundwater recharge and the placement of recharge projects. Productive agriculture in the Subbasin is supported by deep, dark, fertile soils. The arable soils of the Subbasin historically are classified into 4 groups (Carpenter and Cosby 1925): residual soils, old valley-filling soils, young valley-filling soils, and recent-alluvial soils.

More recent surveys classify the soils into categories based on detailed soil taxonomy (U.S. Department of Agriculture, 2018). Figure 4-3 is a composite soil map of soils in the Subbasin from the USDA Natural Resources Conservation Service (NRCS) and the Gridded Soil Survey Geographic (gSSURGO) Database that is produced by the National Cooperative Soil Survey (NCSS).

The Subbasin is dominated by 4 soil orders: mollisols, entisols, alfisols, and vertisols. Minor soils include histosols and inceptisols. The 4 major soil orders are described below.

- **Mollisols** are the most widespread soil order in the Upper Valley Subbasin. Mollisols are characterized by a dark surface horizon, indicative of high organic content. The organic content often originates from roots of surficial grasses or similar vegetation. They are highly fertile and often alkaline rich (calcium and magnesium). Mollisols can have any moisture regime, but typically have enough available moisture to support perennial grasses.

- **Entisols** are the predominant soil order along the river corridor. Entisols are mineral soils without distinct soil horizons because they have not been in place long enough for distinct horizons to develop. These soils are often found in areas of recent deposition such as active flood plains, river basins, and areas prone to landslides. Nearly all the soils along the active river corridor are entisols.
- **Alfisols** are present along in portions of the Subbasin. Alfisols are known to have natural fertility both from the tapering of clay in the subsurface horizons and from leaf litter when under forested conditions. This order of soils is commonly associated with high base minerals such as calcium, magnesium, sodium, and potassium.
- **Vertisols** are relatively rare in the Subbasin. Vertisols are predominantly clayey soils with high shrink-swell potential. Vertisols are present in climates that have distinct wet and dry seasons. During the dry season, these soils commonly have deep, wide cracks; in the wet season, these soils trend to have water pooling on the surface due to the high clay content.

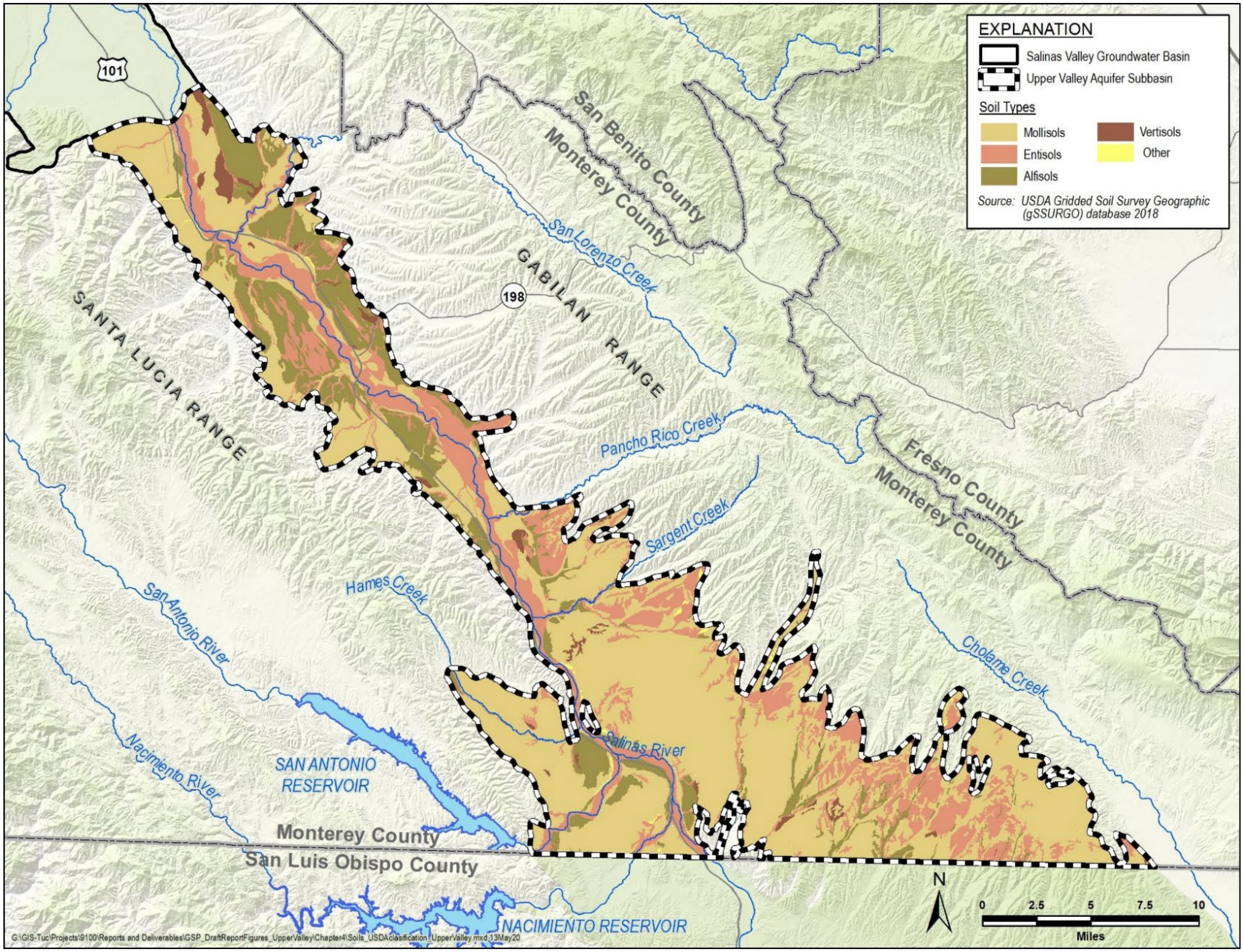


Figure 4-3. Composite Soils Map

4.3 Subbasin Extent

The subbasin extents describe both the lateral and vertical extents of the Subbasin. The Subbasin extents are defined by the DWR and are documented in Bulletin 118, (DWR, 2003; DWR, 2016a). Figure 4-1 illustrates the extent of the Subbasin.

4.3.1 Lateral Subbasin Boundaries

The Upper Valley Subbasin is laterally bounded by a combination of Subbasin boundaries and physical boundaries of the Salinas Valley Groundwater Basin, all shown on Figure 1-1.

4.3.1.1 Boundaries with Adjacent Subbasins

- **Forebay Subbasin.** The Subbasin's northwestern boundary with the adjacent Forebay Subbasin is near the town of Greenfield (DWR, 2004). It generally coincides with the southern limit of the regional clay layers above the 400-Foot Aquifer in the 180/400 Subbasin that exist intermittently in the Forebay Subbasin (DWR, 2004). There is also a constriction of the boundary's Valley floor caused by encroachment from the west by the Arroyo Seco Cone and Monroe Creek (DWR, 2004). Additionally, the boundary marks the shallowing of the base of the groundwater basin. Because there are no reported hydraulic barriers separating these subbasins, the GSP needs to consider potential for groundwater flow between these adjacent subbasins.
- **San Luis Obispo County/Paso Robles Area Subbasin.** The southern boundary with the San Luis Obispo County and the Paso Robles Area Subbasin represents a jurisdictional divide between Monterey County and San Luis Obispo County. The GSAs follow the county lines. There are no reported hydraulic barriers separating these subbasins and therefore the GSP needs to consider potential for groundwater flow between these adjacent subbasins.

4.3.1.2 Physical Basin Boundaries

The Upper Valley Subbasin is bounded by the following physical features:

- **The Gabilan Range.** The eastern boundary of the Subbasin is generally the contact between the unconsolidated Alluvium and semi-consolidated Quaternary Paso Robles Formation with the consolidated rocks of the southern Gabilan Range. In this portion of the Gabilan Range, the consolidated rocks are the Pancho Rico Formation and the Monterey Formation shown on Figure 4-2 (DWR, 2004; Jennings *et al.*, 2010; Rosenberg, 2001). Groundwater flow across this boundary has not been studied extensively, and some reports indicate groundwater recharge for this Subbasin is primarily through the stream channels originating in the Gabilan Range. There are no stream channels originating in the Gabilan Range. There are no published mapped faults or significant fracture sets that could contribute to mountain block recharge for the Subbasin.

- **The Santa Lucia Range.** The western boundary of the Upper Valley Subbasin is the contact between the unconsolidated Alluvium with the sedimentary rocks of the Santa Lucia Range. In this portion of the Santa Lucia Range, the consolidated rocks are the Monterey Formation shown on Figure 4-2 (DWR, 2004; Jennings *et al.*, 2010; Rosenberg, 2001). Groundwater flow across this boundary has not been studied extensively.

4.3.2 Vertical Subbasin Boundaries

The previous conceptualization of the bedrock surface of the Subbasin was based on the work of Durbin *et al.,* (1978), which focused on the "usable" portion of the groundwater basin and constrained the Upper Valley to a narrow corridor along the Salinas River. The updated conceptual understanding brings together the previous sources of information with newly available AEM data to redefine the bedrock surface across the whole Subbasin. The base, or bottom, of the Subbasin is now defined as the contact with low-permeable rocks. These are the marine Pancho Rico Formation, Monterey Formation, or the crystalline rocks of the Gabilan Range.

The northernmost areas of the Subbasin define the bedrock surface as the contact with either the Monterey Formation along the Santa Lucia Range or the crystalline rocks of the Gabilan Range. Both of these formations are low permeability and generally non-water bearing, thereby comprising a combined bedrock to define the Basin bottom. This aligns with the combined bedrock layer in the SVIHM which comprises the Monterey Formation and Gabilan granites (Sweetkind, 2023). The southernmost areas of the Subbasin rely on the work conducted by Fugro West *et al.,* (2005) in the adjacent Paso Robles Subbasin, which defines the Basin bottom as the contact with the Pancho Rico Formation. The Paso Robles Subbasin geologic and numerical models do not include the Pancho Rico Formation as part of its water-bearing formations because of its low permeability and high saline content if groundwater is present (Fugro West *et al.*, 2005). Therefore, for the Upper Valley Subbasin, the base, or bottom, of the Subbasin is defined as the contact with low-permeable rocks, which are the marine Pancho Rico Formation, the Monterey Formation, or the crystalline rocks of the Gabilan Range.

Elevation contours defining the bottom of the Basin from Paso Robles Groundwater Basin Study Phase II by Fugro West *et al.* (2005) were adjusted based on AEM data for an updated Basin bottom surface. Additionally, the previously used Durbin contours were updated with the latest AEM data as well, so the whole Subbasin now has a consistent, cohesive Basin bottom. This was challenging due to structural deformation in the area. Fugro West *et al (2005)* noted that "The Paso Robles Formation has been folded and faulted, resulting in significant variations in the base of the aquifer." The geologic map presented in this GSP (Figure 4-2) shows structural folding in the updated hydrogeologic cross-sections. While Fugro West *et al.* (2005) contours defining the bottom of the basin do not extend into Hames Valley, some wells reach over 1,000 feet below land surface in this part of the Subbasin, as shown in the next section. South of the Subbasin boundary in the Paso Robles Subbasin, the bedrock deepens.

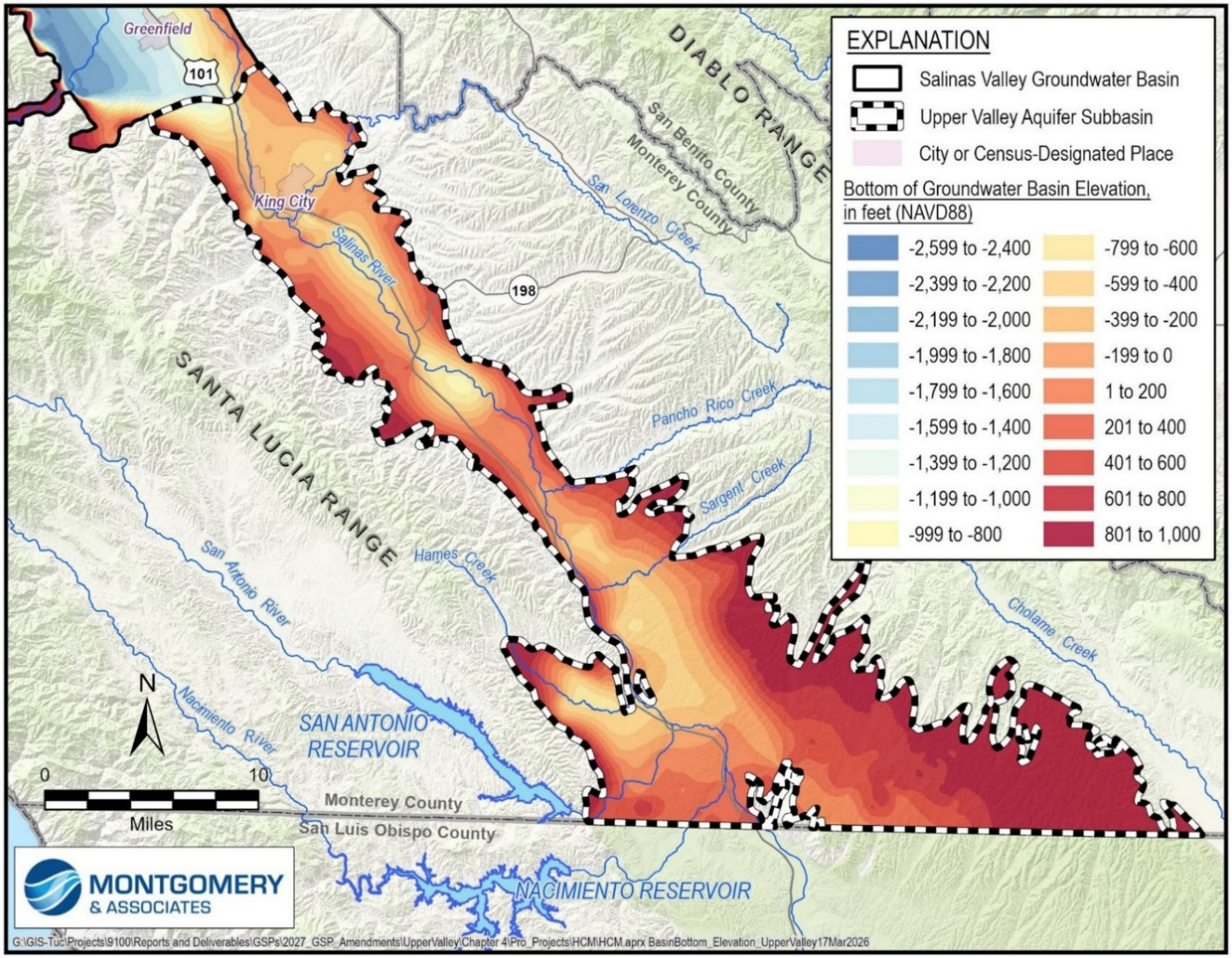


Figure 4-4. Elevation of the Bottom of the Upper Valley Aquifer Subbasin

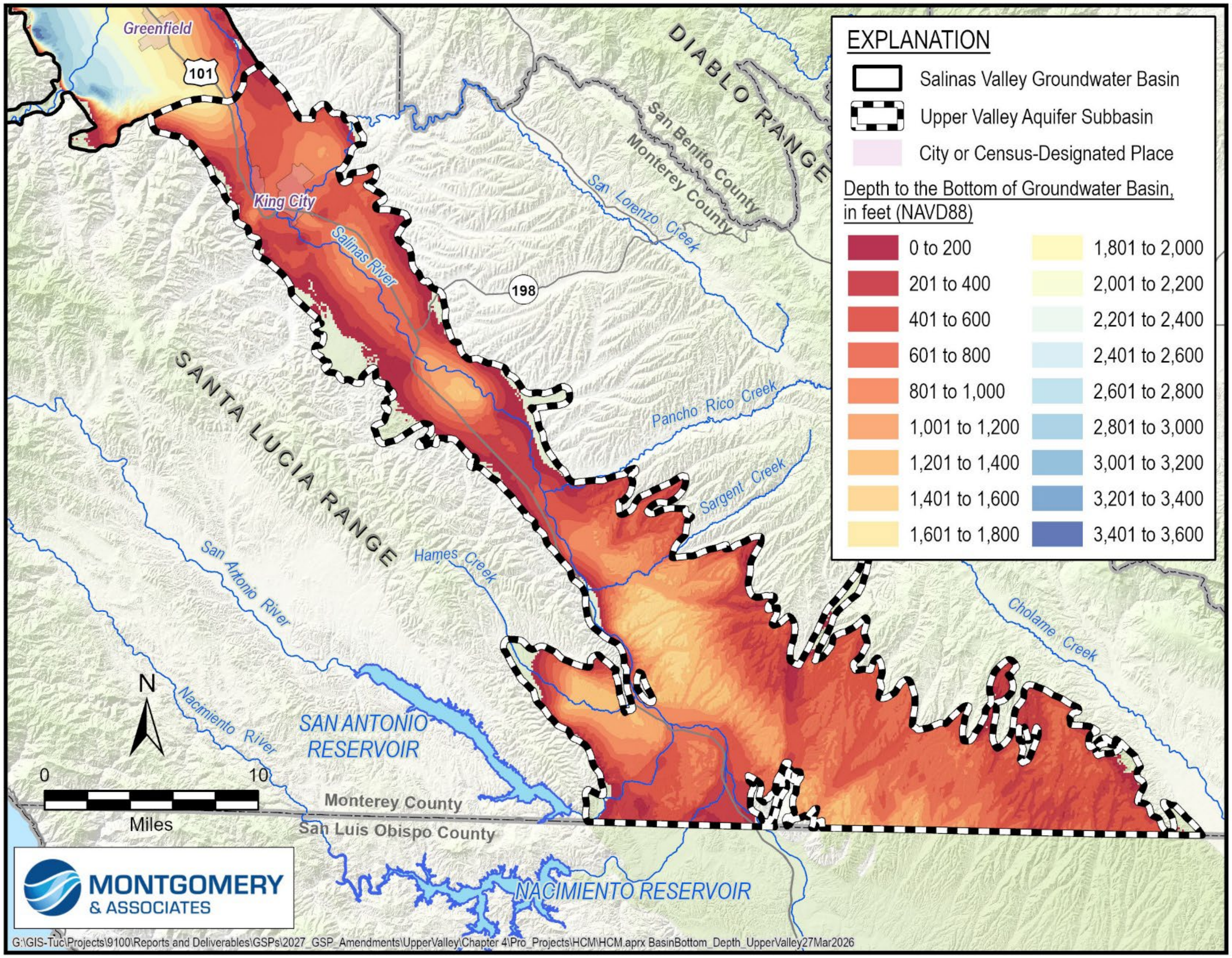


Figure 4-5. Depth to Bottom of the Upper Valley Aquifer Subbasin

4.4 Subbasin Hydrogeology

The Subbasin hydrogeology details the principal aquifers and aquitards that occur in the Subbasin, inventories known aquifer properties, and identifies naturally occurring groundwater inputs and outputs which will be incorporated into the groundwater budgets described in Chapter 6. This section also includes cross-sections which give graphical representations of what is described in the following subsections.

4.4.1 Principal Aquifers and Aquitards

SGMA defines a principal aquifer as "…aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems" (23 California Code of Regulations § 351 (aa)). Groundwater in the Upper Valley Subbasin occurs primarily in a single, unconfined aquifer. Most wells are screened within the river alluvium; however, the aquifer is also composed of the Unnamed Sandstone, the Paso Robles Formation, and minor alluvial fan deposits. These units may have varying consolidation and hydraulic connectivity between them, but no laterally extensive clay aquitard to separate them. Therefore they are grouped together to represent a single, unconfined aquifer of the Upper Valley Subbasin. The aquifer sediments west of the Salinas River are generally coarser than those to east of the River.

The most recent, detailed hydrostratigraphic analysis of the Upper Valley Subbasin was conducted in 2024 as part of the HCM update effort for the 2027 GSP amendments. Hydrogeologic cross-sections for the Subbasin are shown on Figure 4-6 through Figure 4-7.

These cross-sections were created by integrating the 2020 DWR AEM Survey with the other existing and new data. The AEM survey provided significantly more spatial coverage than any previously published reports and available data. The distinct geologic formations present in the Subbasin were more easily traceable with the more continuous AEM data, which allowed the units to be delineated for the HCM update.

The analysis of AEM data provided the most complete view of the subsurface in the Upper Valley Subbasin to date, and interpretation was supported by the 2001 Rosenberg Monterey County Surface Geology Map, published hydrogeologic cross-sections, and some WCRs. The analysis focused on aligning the AEM data with the surface geology map because fine/coarse distinctions (high/low resistivity) within the subsurface did not provide as much clarity as in other subbasins, and the structural deformation in the Subbasin juxtaposed different facies in close proximity. Furthermore, the Paso Robles Formation is a notable mixed texture formation, with varying fine and coarse deposition. The Unnamed Sandstone stood out as a higher resistivity/coarser unit. The surface geology map was consistent with the varied AEM profiles, and the recorded strikes and dips supported tracing the various units into the subsurface.

The cross-sections on Figure 4-6 and Figure 4-8 below show that the river alluvium is relatively shallow and most of the wells are screened within those sediments. The river alluvium typically rests on the Paso Robles Formation, which has variable clay content and may not have consistent water production throughout the Subbasin. The Paso Robles Formation overlays the Unnamed Sandstone, which also appears to have variable clay content based on recent AEM surveys. Few wells are screened in the Paso Robles Formation or Unnamed Sandstone. The cross-sections show both the varied topography and groundwater basin structure. Figure 4-6 shows the outcrop of the Unnamed Sandstone just before the southern boundary; however, to either side of the outcrop along the boundary, the Paso Robles is beginning to dip down toward the center of the Paso Robles Subbasin. Figure 4-8 shows how the groundwater basin dips under the Salinas River, comes back up to the west, and then dips down again in the Hames Valley.

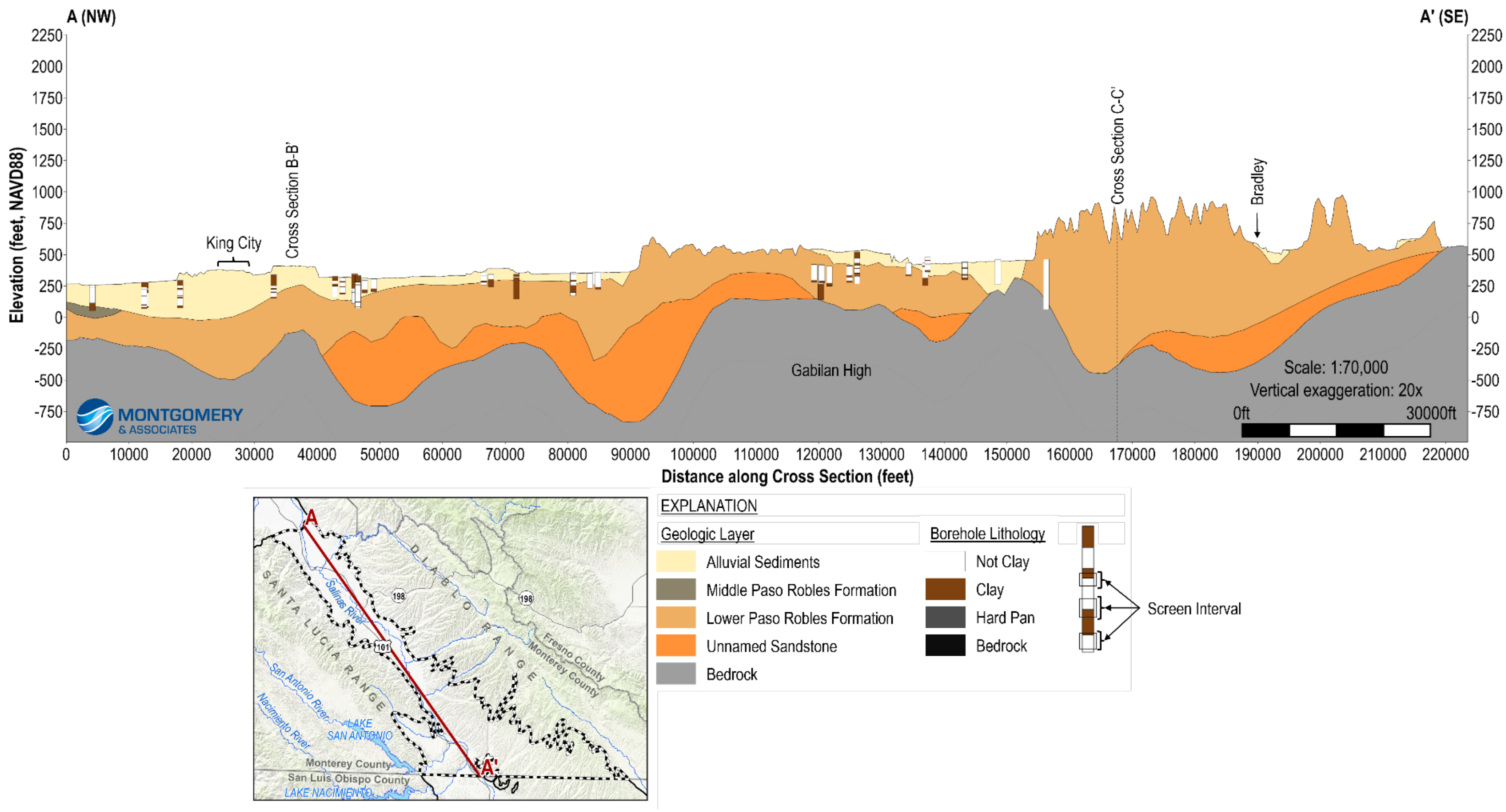


Figure 4-6. Cross-section A-A'

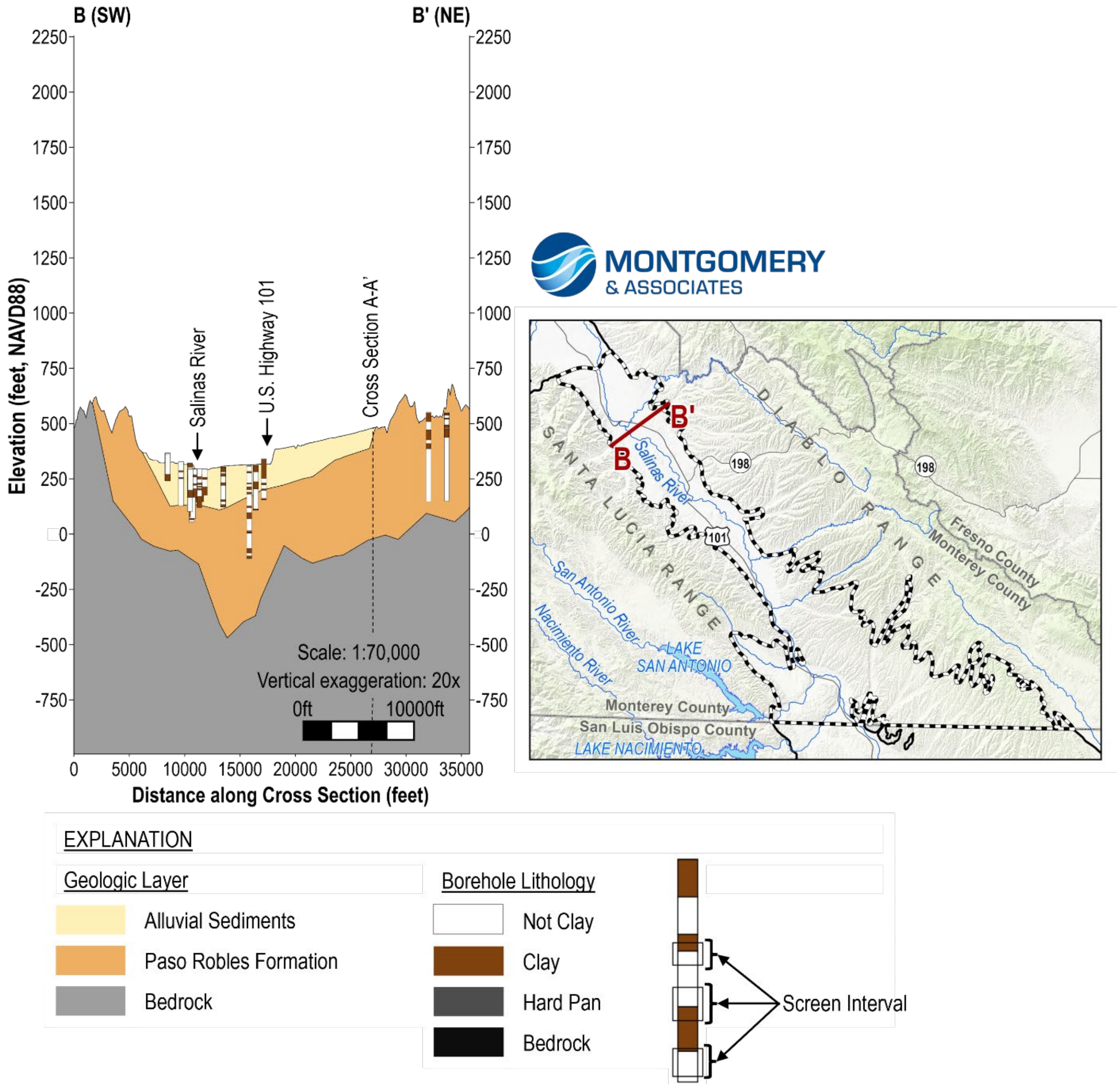


Figure 4-7. Cross-section B-B’

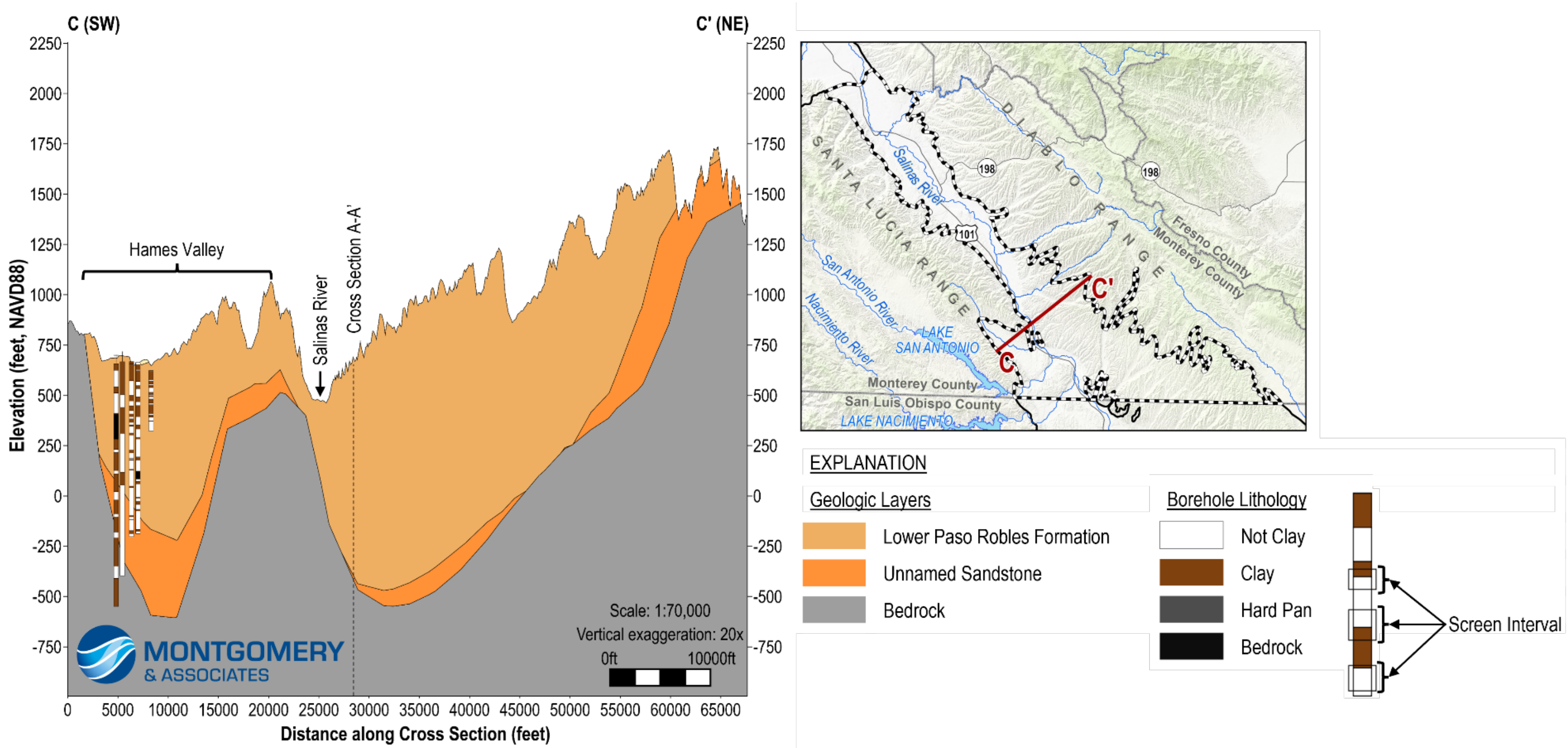


Figure 4-8. Cross-section C-C'

4.4.2 Aquifer Properties

Aquifer properties define how groundwater is stored and how groundwater moves in the subsurface. This information is needed to understand current groundwater conditions, to predict future groundwater conditions, and to assess strategies for maintaining sustainability.

The values and distribution of aquifer properties in the Upper Valley Subbasin have not been well characterized and documented. The relatively limited number of measured aquifer properties throughout the Subbasin is considered a data gap that will be addressed during implementation of the GSP. To address this data gap, SVBGSA subsequently conducted a comprehensive search for additional existing data and conducted 4 aquifer tests in the Subbasin.

In addition to the aquifer test measurements, aquifer properties have been estimated through the process of numerical model calibration. Aquifer property calibration has been completed for numerous published modeling studies including studies by Durbin (1974), Yates (1988), WRIME (2003), and the SVIHM (Henson *et al.*, 2025; Montgomery & Associates, 2025a) that is used to develop this GSP.

There are 2 general types of aquifer properties relevant to groundwater management:

- **Aquifer storage properties.** These properties control the relationship between the volume of groundwater stored in the aquifer and the groundwater elevations measured in the aquifer.
- **Groundwater transmission properties.** These properties control the relationship between hydraulic gradients and the rate of groundwater flow.

4.4.2.1 Aquifer Storage Properties

The aquifer properties that characterize the relation between groundwater elevation and amount of water stored in an aquifer are specific yield for unconfined aquifers and specific storage for confined aquifers. Storativity, or storage coefficient, is equal to specific storage multiplied by the thickness of the aquifer for confined aquifers. Both specific yield and specific storage are measured in units of cubic feet of water per cubic feet of aquifer material. These ratios are often expressed as a percentage.

- **Specific yield** is the amount of water that drains from pores when an unconfined aquifer is dewatered. Often, specific yield values range from 8% for the northern Subbasin to 15% for the southern Subbasin (Yates, 1988). Fugro West *et al.* (2005) defined the specific yield for the Paso Robles Formation as 0.05 to 0.17, which is in the same expected range as the Yates study. No new aquifer tests were conducted in the unconfined alluvium sediments in the Subbasin.

- **Specific storage** is the amount of water derived from a unit volume of a confined aquifer due to a unit decline in pressure change in the aquifer. There are no estimated specific storage values published for the Upper Valley Aquifer because it is generally considered unconfined. However, results of an aquifer test conducted for SVBGSA at wells installed in the Paso Robles Formation in Hames Valley indicate confined or semi-confined aquifer conditions. Specific storage is estimated to be 9×10^{-7} 1/ft from that aquifer test and storage coefficient is estimated to be 0.0003. This estimated storage coefficient is slightly smaller than previous estimates. Fugro West *et al* (2005) estimated a storage coefficient of 0.0005 to 0.015 for the Paso Robles Formation as it is generally confined in the Paso Robles Groundwater Basin.

4.4.2.2 Groundwater Transmission Properties

Hydraulic conductivity measures the ability of an aquifer to transmit water. Hydraulic conductivity is expressed in units of length per unit time, such as feet per day. Materials with higher hydraulic conductivities, such as sands and gravels, transmit groundwater more readily than units with lower hydraulic conductivities, such as clay. Transmissivity is equal to the hydraulic conductivity multiplied by the aquifer thickness and will vary based on the saturated thickness of the aquifer. The calibrated SVIHM (Montgomery & Associates, 2025b) estimated horizontal hydraulic conductivities between 100 and 260 feet per day (ft/day) for the Paso Robles Formation, which extends into the Upper Valley Subbasin (Fugro West *et al*, 2005), and between 4 and 60 ft/day for shallow sediments (including river alluvium). Hydraulic conductivity estimates from the aquifer tests conducted for SVBGSA for wells installed in the Paso Robles Formation range from about 3 to 8 ft/day, which is substantially smaller than the range of simulated values from the SVIHM. These aquifer test data were not available during model calibration and will be informative for future model updates.

Specific capacity of a well is sometimes used as a surrogate for estimating aquifer transmissivity. The specific capacity of a well is the ratio between the well pumping rate in gallons per minute (gpm), and the drawdown in the well during pumping measured in feet. Specific capacity is moderately well correlated, and approximately proportional to, aquifer transmissivity. Specific capacities of wells in the Upper Valley Subbasin range from 80 to 200 gal/min/ft (Yates, 1988). These high specific capacities demonstrate very transmissive sediments.

4.4.3 Primary Aquifer Uses

The primary uses of groundwater from this single aquifer include domestic, agricultural, and municipal water supply uses (DWR, 2004).

4.4.4 Natural Recharge Areas

Natural recharge areas allow rainfall, local runoff, and streamflow to replenish aquifers by percolating through the subsurface. Identifying areas of potentially significant natural recharge can inform water budgets and help government planners promote good groundwater management by incorporating recharge areas into land use plans. This section only identifies areas of natural recharge; quantitative information about all natural and anthropogenic recharge is provided in Chapter 6.

Natural groundwater recharge occurs through the following processes:

- Recharge of surface water from the Salinas Rivers and its tributary streams originating in the Gabilan and Santa Lucia Ranges
- Deep percolation of infiltrating precipitation
- Subsurface inflow from the adjacent Paso Robles Subbasin

Recharge of surface water and deep percolation of precipitation are both surficial sources of natural groundwater recharge. An area's capacity for surficial groundwater recharge is dependent on a combination of factors, including steepness of grade, soil surface conditions such as paving or compaction, and ability of soil to transmit water past the root zone. To assist agricultural communities in California with assessing groundwater recharge potential, a consortium of researchers at University of California, Davis developed a Soil Agricultural Groundwater Banking Index (SAGBI) and generated maps of recharge potential in agricultural areas of California (O'Geen *et al.*, 2015). Figure 4-10 presents the SAGBI index map for the Upper Valley Subbasin. This map ranks soil suitability for augmented groundwater recharge based on 5 major factors including: deep percolation, root zone residence time, topography, chemical limitations, and soil surface condition. Areas with excellent recharge properties are shown in green. Areas with poor recharge properties are shown in red. Not all land is classified, like in the southern part of the Subbasin where the boundaries of the Subbasin expand into the Gabilan Range. Mountainous areas are more likely to contribute to recharge through mountain front recharge. Although limited, this map provides helpful guidance on where artificial recharge from surface ponding would have the greatest likelihood of success.

Areas with the highest potential for augmented recharge are along the Salinas River. Many of the other soils are classified as having moderate potential for recharge, which means some water applied at the surface might make it into the aquifer. This map should not be used exclusively to identify recharge areas that will directly benefit the aquifers in the Upper Valley Subbasin. Rather, it should be used in conjunction with additional research and investigation tools.

Subsurface recharge is primarily from percolation through the Salinas River's channel deposits and drainage from its tributaries (DWR, 2004).

Again, it is important to note the map does not display the information for the entire Subbasin. This is due to a recent DWR boundary revision. The information shown on Figure 4-10 is for the MCWRA Subarea boundary.

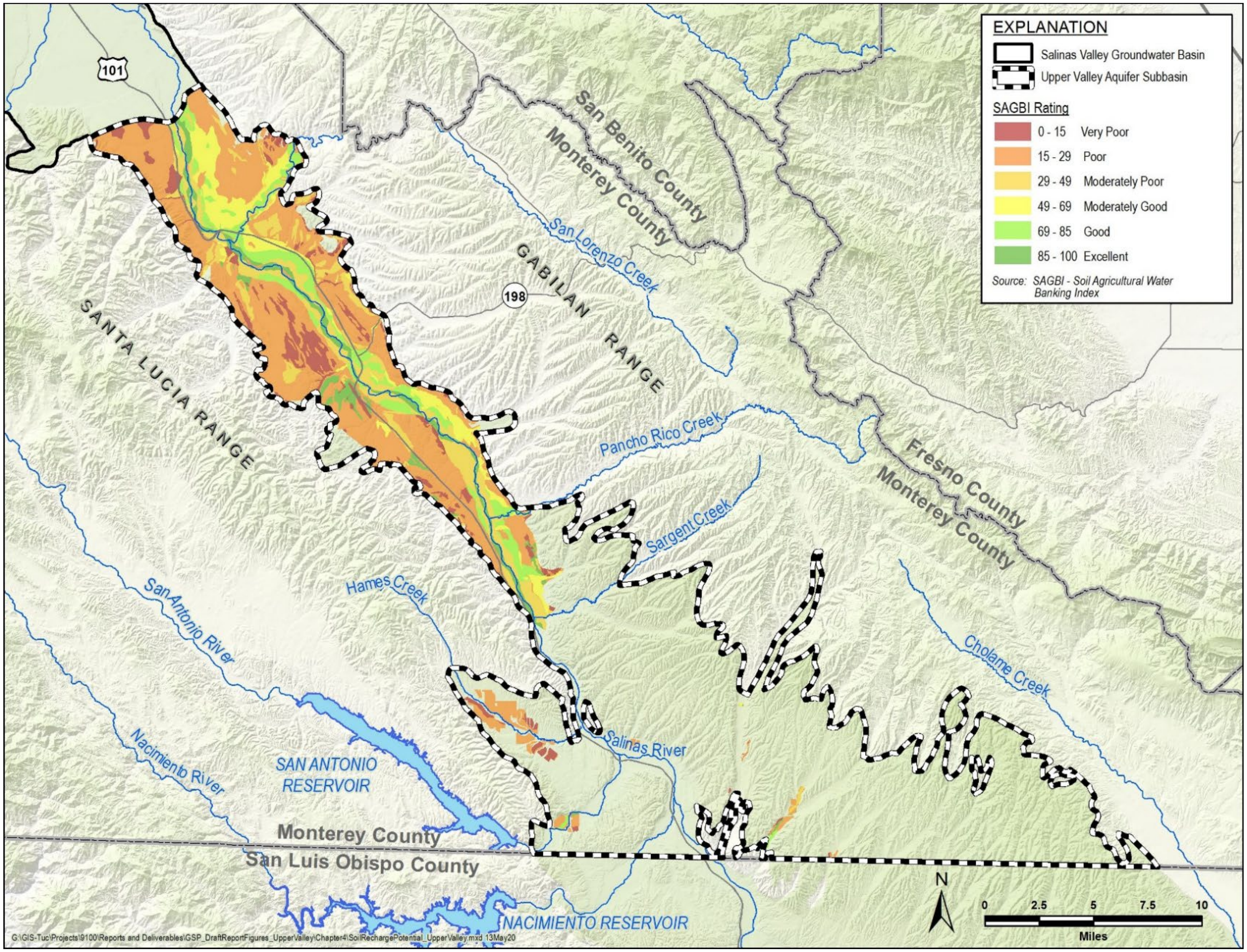


Figure 4-9. SAGBI Soils Map for the Upper Valley Aquifer Subbasin

4.4.5 Natural Discharge Areas

Natural discharge areas are areas where groundwater naturally leaves aquifers through flow to adjoining basins or percolation to the ground surface. Identifying areas of potentially significant natural discharge can inform water budgets and help locate important environmental uses of groundwater. Quantitative information about all natural and anthropogenic discharge is provided in Chapter 6.

Natural groundwater discharge areas within the Subbasin include wetlands and other surface water bodies that receive groundwater discharge and ET by vegetation types commonly associated with the sub-surface presence of groundwater. There are no springs and seeps in the Subbasin as identified in the National Hydrology Dataset (NHD). Natural groundwater discharge to streams–primarily, the Salinas River and its tributaries–has not been mapped to date. Natural groundwater discharge includes subflow to adjacent subbasins.

4.4.5.1 Potential Interconnected Surface Water

Figure 4-11 shows locations of potential interconnected surface water (ISW), in the Upper Valley Subbasin evaluated on a monthly basis over the entire model period from 1968 to 2022. This analysis includes the full year. The conservation release period (from April 1 to October 31) and non-release period (from November 1 to March 31) were compared and were not substantially different. During conservation release period, the majority of flow in Salinas River is from conservation releases from the reservoirs. The blue cells on Figure 4-11 indicate areas where surface water is connected to groundwater for more than 10% of the number of months in the model period and are designated as areas of interconnected surface water. The orange cells indicate areas where surface water is connected to groundwater for less than 10% of the number of months in the model period. The clear cells represent areas classified as not connected to groundwater based on spatial, physical, and hydrogeologic constraints. These disconnected reaches include locations outside the SVBGSA boundary, areas just outside the groundwater model boundary, regions underlain by the Salinas Valley Aquitard, and artificial conveyances (canals, drains, or connectors) identified in the 2022 GSP. The extent of the interconnection between surface water and groundwater, which can vary both in time and space, is evaluated in Chapter 5 and is not shown on Figure 4-11. These ISW locations are based on simulated results from the updated SVIHM, which is calibrated to measured groundwater levels and stream flows. Although seepage along the ISW reaches is based on assumed channel and aquifer parameters as model inputs, the preliminary SVIHM is the best available tool to estimate ISW locations. Although seepage along the ISW reaches is based on assumed channel and aquifer parameters as model inputs, the SVIHM is the best available tool to estimate ISW locations. The model construction and uncertainty are described in Chapter 6 of this GSP and in a model summary report by Montgomery & Associates (2025a). See Appendix 4a for more information on the ISW location analysis.

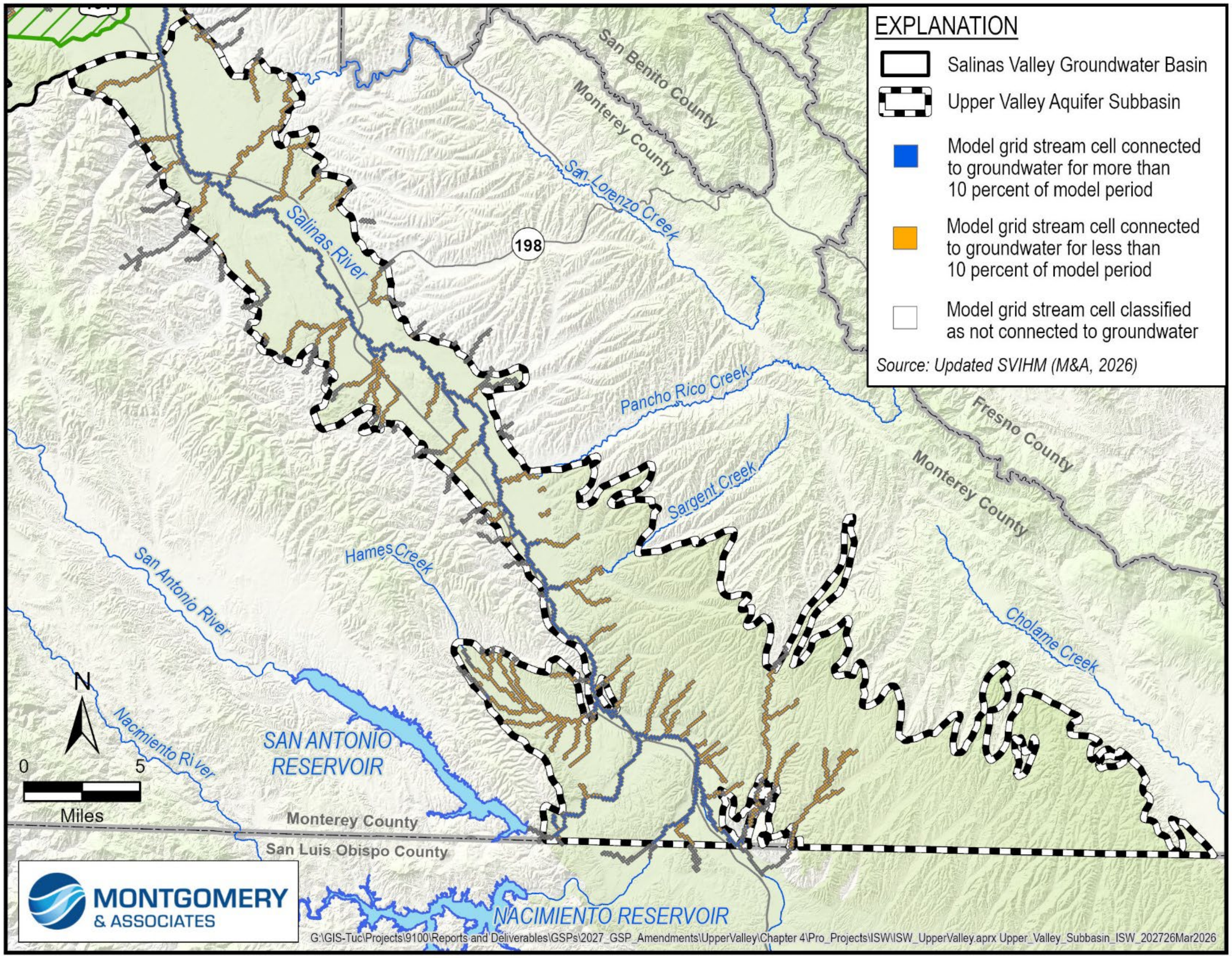


Figure 4-10. Locations of Interconnected Surface Water

4.4.5.2 Groundwater Dependent Ecosystems

GDEs refer to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. Two main types of ecosystems are commonly associated with groundwater: wetlands associated with the surface expression of groundwater and vegetation that typically draws water from a shallow water table (phreatophytes).

GDEs may provide critical habitat for threatened or endangered species. Areas designated as critical habitat for threatened or endangered species contain the physical or biological features that are essential to the conservation of these species, and may need special management or protection (USFWS, 2017). A list of threatened and endangered species that might rely on GDEs in the Subbasin was compiled using information from the U.S. Fish and Wildlife Service (USFWS), CDFW, and TNC. Several steps were taken to determine which threatened and endangered species could be found in the Subbasin and of those, which could potentially rely on GDE habitat. A list of threatened and endangered species for Monterey County was downloaded from the USFWS website and cross-referenced to species identified in the CDFW California Natural Diversity Database. The threatened and endangered species for Monterey County was further cross-referenced with the TNC Critical Species LookBook to identify which species are likely to directly depend on groundwater, and some species with unknown dependence on groundwater, as indicated in Table 4-1. Species with an indirect potential dependence on groundwater were not included. Species were only included in Table 4-1 if the Upper Valley Subbasin is within the mapped range of occurrence for that species and the specific habitat requirements for that species are likely present in the Forebay.

Two threatened species—South-central Coast Steelhead and California Red-legged Frog—were identified as likely to rely directly on groundwater and could be present in the Upper Valley Subbasin. Three species identified have an unknown dependence on GDEs or groundwater (tiger salamander, yellow-legged frog and San Joaquin kit fox). The salamander and fox are not strongly associated with riparian habitat or groundwater-supplied wetlands but might use those habitats occasionally. The frog prefers streams with a rocky substrate, which is absent or rare along the Salinas River and Arroyo Seco.

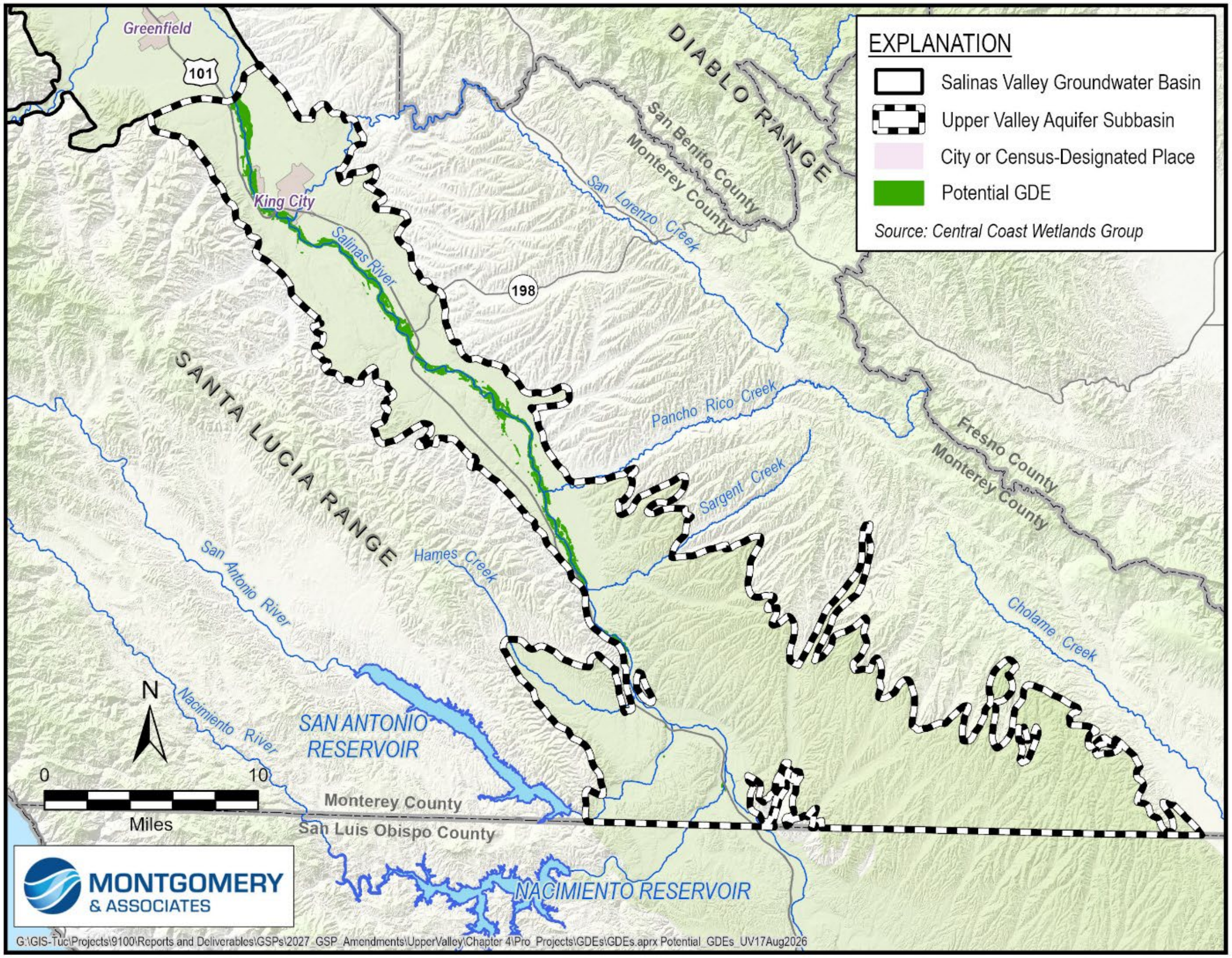
Species that use riparian vegetation during at least part of their life cycle might or might not be groundwater dependent. In the Upper Valley Subbasin, riparian vegetation and potential GDEs are present along the Salinas River. In identifying potential GDEs in the Upper Valley Subbasin, the analysis does not distinguish between groundwater and surface water sources.

Table 4-1. Federal and State Listed Threatened and Endangered Species with Direct or Unknown and Groundwater Dependence for Upper Valley Subbasin

Groundwater Dependence*	Common Name	Habitat	Federal Status	State Status
Direct	California red-legged frog	Quiet pools of streams, marshes, and occasionally ponds	Threatened	
Direct	Steelhead: south-central Coast distinct population segment	Rivers and large streams from Watsonville to Arroyo Grande	Threatened	
Unknown	California tiger salamander	Tiger salamanders breed and lay eggs primarily in vernal pools and other temporary rainwater ponds	Threatened	Threatened
Unknown	Foothill yellow-legged frog	In or near rocky streams in a variety of habitats.		Endangered
Unknown	San Joaquin kit fox	Annual grasslands or grassy open stages of vegetation dominated by scattered brush, shrubs, and scrub.	Endangered	Threatened

* Groundwater Dependence as defined by TNC is related to species type. The distinction between groundwater and surface water dependence is not determined in the Salinas Valley GDE identification where the groundwater level is close enough to the ground surface to reasonably support the overlying ecosystem.

The process for identifying and mapping potential GDEs in the Salinas Valley was developed by Central Coast Wetlands Group (CCWG) with guidance from documents developed by The Nature Conservancy (TNC) (Rhode et al. 2018, Rhode et al. 2020), TNC staff and San Francisco Estuary Institute (SFEI) staff with subject matter expertise, and Dr. Melissa Rhode. Additionally, feedback from local stakeholders was incorporated from the Groundwater Dependent Ecosystem Working Group. The goal of the identification and mapping process was not to identify endangered animal species, or every plant and waterbody dependent on groundwater, but rather ensure there was representative identification of potential GDEs across the Forebay Subbasin. GDE identification provides the basis for monitoring and assessment.Figure 4-12 shows the distribution of potential GDEs within the Subbasin based on the Natural Communities Commonly Associated with Groundwater (NCCAG) Dataset (DWR, 2020b) where the depth to groundwater table is high enough to support the above ecosystems (CCWG, 2026). The NCCAG dataset maps vegetation, wetlands, springs, and seeps in California that are commonly associated with groundwater. These include 1) wetland features commonly associated with the surface expression of groundwater under natural, unmodified conditions; and 2) phreatophytes. NCCAG data need to be verified for accuracy. If the groundwater table is greater than 30 feet (9.14 meters) below the ground surface, the ecosystem at the surface is likely not reliant on groundwater. This is because most vegetation does not have roots deep enough to reach the water table below 30 feet (9.14 meters) (Rhode et al. 2018). Oak trees are an exception to this generalized rule, as oak trees have been shown to have roots that reach up to 80 feet (24.38 meters) below the ground surface (Howard 1992). For this reason, in areas mapped as having oak trees as the dominant plant species, the depth to groundwater cutoff for including the ecosystem as a potential GDE was 80 feet (24.38 meters). For all other areas the cutoff was 30 feet. Potential GDEs were grouped into units based on shared hydrogeology and association with the same aquifer, this resulted in 1 GDE unit for the Upper Valley Subbasin.



(CCWG, 2026)

Figure 4-10. Potential Groundwater Dependent Ecosystems using NCCAG Dataset and Where the Depth to Groundwater Table is High Enough to Support the Above Ecosystems

4.5 Surface Water Bodies

The primary surface water bodies in the Subbasin are the Salinas River and its tributaries (Figure 4-13). Significant, named tributaries in the Upper Valley Subbasin include the San Antonio River, the Nacimiento River, and the following intermittent streams that drain the Gabilan Range and Santa Lucia Range and contribute to the Salinas River:

- San Lorenzo Creek
- Pancho Rico Creek
- Sargent Creek
- Hames Creek

Two reservoirs are located outside of the subbasin but are important controls on the rate and timing of Salinas River flows in the subbasin.

- Nacimiento Reservoir, in San Luis Obispo County, was constructed in 1957 and has a storage capacity of 377,900 AF (MCWRA, 2015).
- San Antonio Reservoir, in Monterey County, was constructed in 1967 and has a storage capacity of 335,000 AF (MCWRA, 2015).

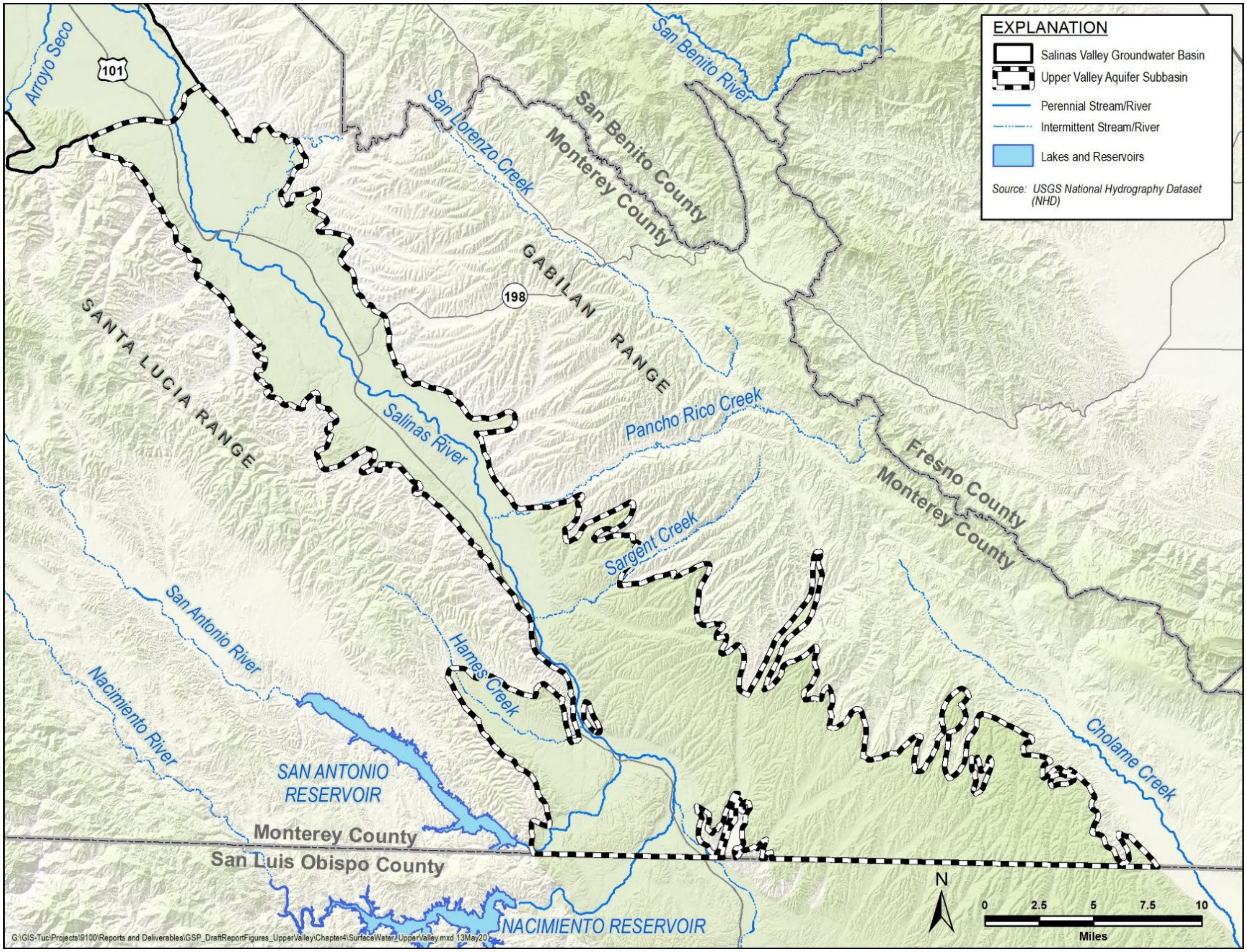


Figure 4-11. Surface Water Bodies in the Upper Valley Aquifer Subbasin

4.5.1 Watersheds

Figure 4-14 show several watersheds that contribute small tributary streams to the Salinas River in the Upper Valley Subbasin. From the boundary with the Paso Robles Area Subbasin to the Forebay Subbasin from the Gabilan to Santa Lucia Range, the HUC12 watersheds within the Upper Valley Subbasin are as follows:

- 180600040205
- Shimmin Canyon
- Pine Creek-Estrella River
- Mason Canyon
- Keyes Canyon-Estrella River
- Hog Canyon
- Town of Estrella-Estrella River
- Ranchito Canyon
- San Jacinto Creek
- Portuguese Canyon-Salinas River
- 180600050611-Nacimiento River
- Kemp Canyon-San Antonio River
- Upper Cholame Creek
- Headwaters Cholame Creek
- Vineyard Canyon
- Lower Big Sandy Creek
- Los Lobos Springs-Salinas River
- Hames Creek
- Upper Big Sandy Creek
- Sheehee Spring
- Sargent Creek
- Lynch Canyon
- Garrissere Canyon-Salinas River
- Pancho Rico Creek
- Pine Creek
- Coyote Canyon-Salinas River
- Espinosa Canyon-Salinas River
- Long Valley
- Wildhorse Canyon
- Hamilton Canyon-Salinas River
- Quinado Canyon
- Pine Canyon
- Sweetwater Canyon
- Lower San Lorenzo Creek
- Monroe Creek-Salinas River
- Agua Grande Canyon-Salinas River

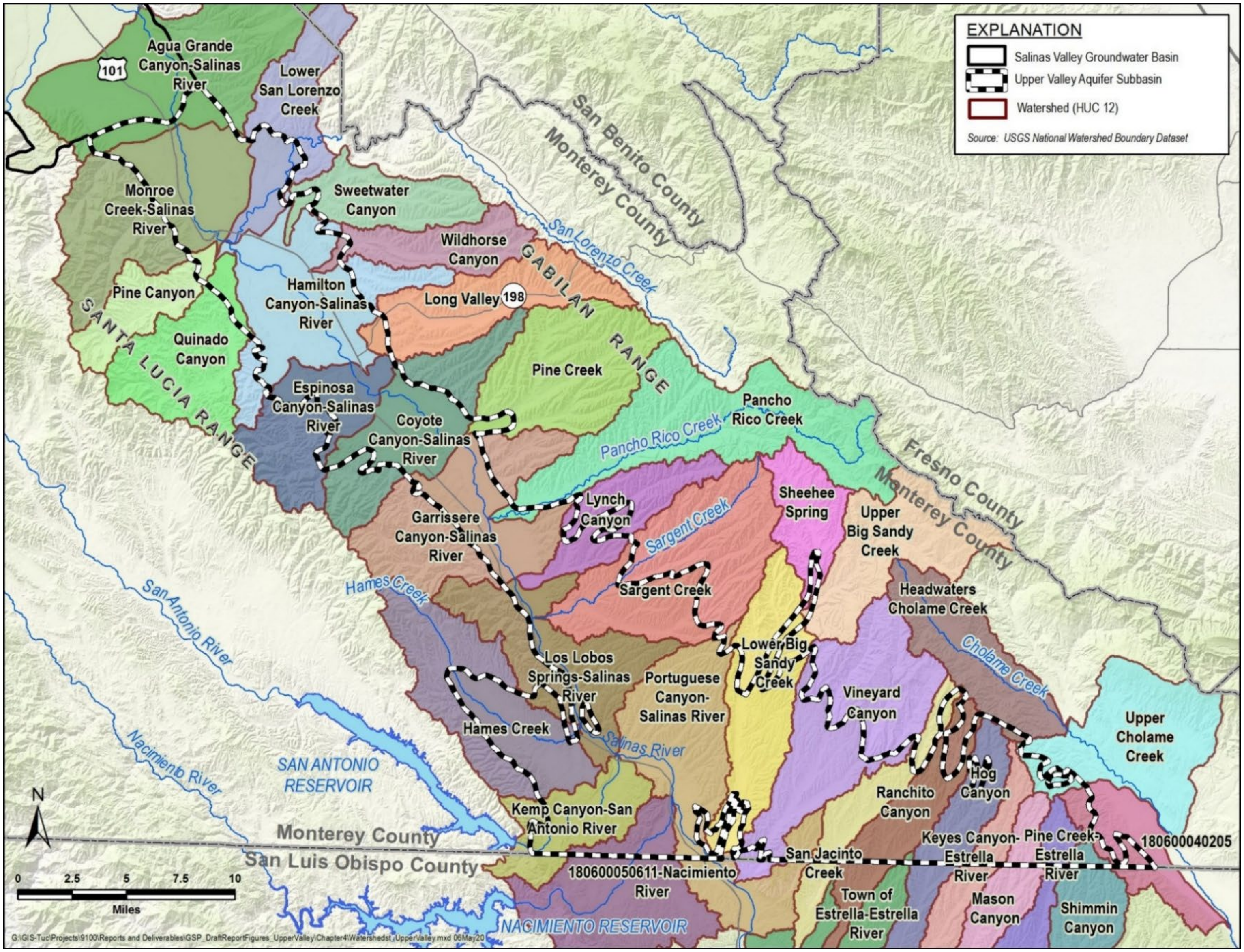


Figure 4-12. HUC12 Watersheds within the Upper Valley Aquifer Subbasin

4.5.2 Imported Water Supplies

There is no water imported into the Upper Valley Subbasin.

4.6 Water Quality

Natural groundwater quality can determine how much treatment may be needed prior to being used for municipal uses, or how the water may impact crop production. This chapter presents a general discussion of the natural groundwater quality in the Subbasin, focusing on general minerals. This discussion is based on data from previous reports. Discussion of the distribution and concentrations of specific constituents of concern (COC) is presented in Chapter 5.

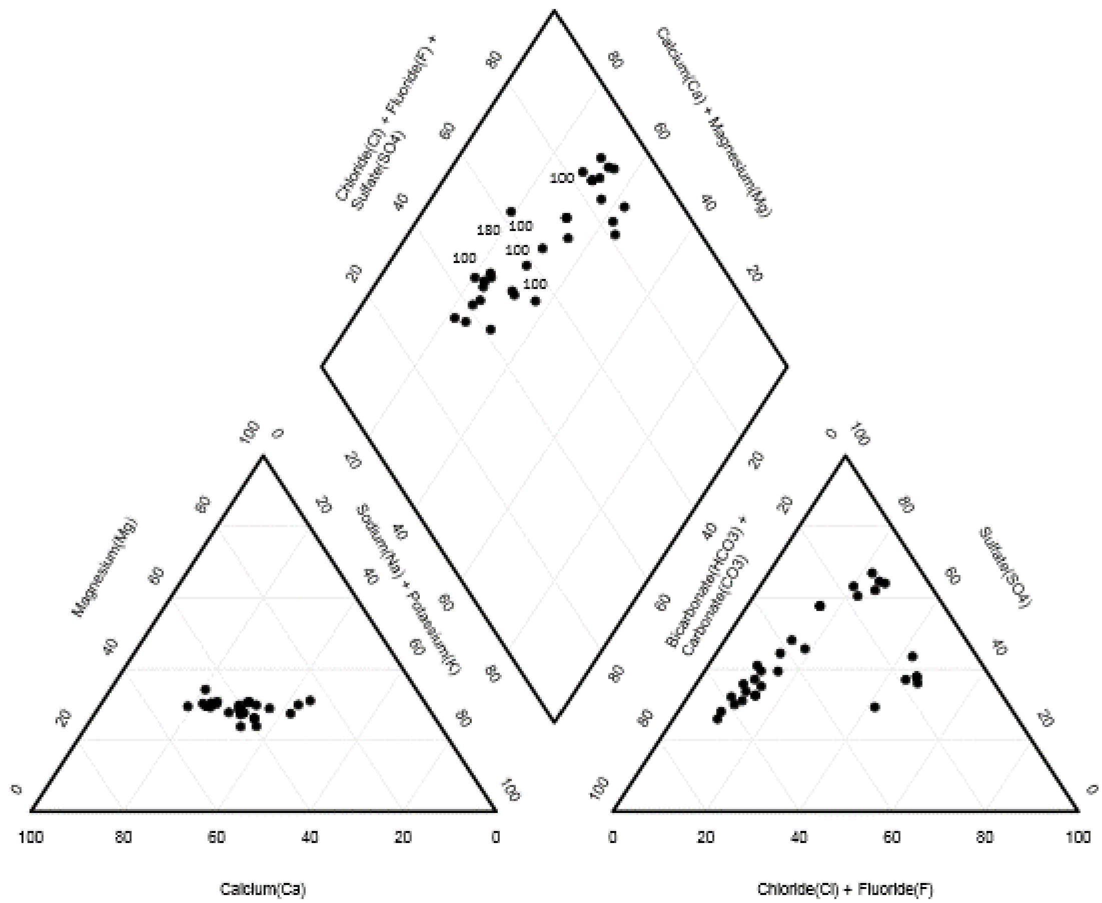
4.6.1 General Mineral Chemistry

The major ion chemistry of the Salinas Valley Groundwater Basin groundwater is summarized on the Distribution of Groundwater Nitrate Concentrations, Salinas Valley, California report, prepared for the Central Coast Groundwater Coalition (CCGC) (HydroFocus, 2014). This report was a response to the CCRWQCB requirement for monitoring elevated nitrate concentrations near drinking water supply wells. The report included the results of extensive groundwater quality sampling and thus provided a good characterization of the Subbasin's general mineral water quality.

General water chemistry provides a baseline of understanding of the water by showing major ions that are dissolved in the groundwater. The major ions that are dissolved can inform users if the water is more alkaline or more acidic. In many areas with more alkaline water, which has more dissolved cations such as calcium, magnesium, and sodium, many users report their water as being "hard."

Figure 4-15 presents a Piper diagram from the CCGC report that plots major ion data from within and near the Subbasin. The diagram provides a means of representing the proportions of major anions and cations in water samples. The lower left triangle of the piper diagram plots the relative abundance of cations in groundwater samples. The lower right triangle of the piper diagram plots the relative abundance of anions in groundwater samples. The diamond in the middle of the diagram combines the cation and anion abundances into a single plot. Groundwater samples with similar general mineral chemistries will group together on these diagrams. The data plotted on Figure 4-15 show that the groundwater samples cluster in a similar area.

Sodium and chloride may be abundant in groundwater in the southeastern part of the Forebay Subbasin near King City due to potential connection with the Pancho Rico Formation. The Pancho Rico Formation is a marine sandstone with notable high chloride levels that crops out along the Gabilan Range side of the Salinas Valley near King City, and naturally saline water from that formation may seep into the alluvial deposits in the Salinas Valley (Durham and Addicott, 1965; Staal, Gardner & Dunne, 1994; Fugro West, 2005).



Note: Well depths indicated when available.
(from CCGC, 2015)

Figure 4-13. Piper Diagram of Upper Valley Aquifer Subbasin Representing Major Anions and Cations in Water Samples

4.6.2 Seawater intrusion

intrusion is occurring. Furthermore, the groundwater elevations in the Upper Valley Subbasin remain above sea level, maintaining a groundwater gradient toward the coast.

4.7 Uncertainties of the HCM

The HCM updates included in this GSP Amendment 1 address the HCM data gaps in the GSP, particularly with regards to the geology and stratigraphy. While opportunities for conducting additional aquifer testing were limited by well availability, landowner participation, and construction constraints, the data collected represent a meaningful step toward reducing uncertainty and informing future groundwater modeling and groundwater management decisions.

As described in Chapter 7, the GSP will include ongoing data collection and monitoring recommendations that will allow continued refinement and quantification of the groundwater system.

Installing monitoring wells to fill data gaps identified an area where additional analysis may be needed, depending on the results of groundwater level data collection over time: the hydraulic relationship between the river alluvium and the underlying Paso Robles Formation along the Salinas River corridor and groundwater level relationship to the Paso Robles Subbasin. Few extraction wells are drilled into the Paso Robles Formation in the Upper Valley Subbasin; however, significant extraction from the Paso Robles Formation occurs in the adjacent Paso Robles Subbasin. SVBGSA has installed groundwater level monitoring wells into the Paso Robles Formation in the southern part of the Upper Valley Subbasin and will monitor changes in groundwater levels over time.