

Salinas Valley: 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan Amendment 2

VOLUME 1

**Chapter 1. Introduction to the 180/400-Foot Aquifer Subbasin
Groundwater Sustainability Plan**

Chapter 2. Communication and Public Engagement

Chapter 3. Description of Plan Area

Chapter 4. Hydrogeologic Conceptual Model

Prepared for:

Salinas Valley Basin Groundwater Sustainability Agency

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ACRONYMS AND ABBREVIATIONS

\$/AF	dollar per acre-foot
AF	acre-foot or acre-feet
AF/yr.	acre-feet per year
Alco	Alisal Water Service
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
CCC.....	California Coastal Commission
CCGC.....	Central Coast Groundwater Coalition
CCRWQCB....	Central Coast Regional Water Quality Control Board
CCWG.....	Central Coast Wetlands Group

CDFWCalifornia Department of Fish and Wildlife
 CEQA.....California Environmental Quality Act
 cfs.....cubic feet per second
 COCconstituents of concern
 CPE Actions...Communication and Public Engagement Actions
 CSD.....Community Services District
 CSIPCastroville Seawater Intrusion Project
 DACs.....Disadvantaged Communities
 DDWDivision of Drinking Water
 DEM.....Digital Elevation Model
 DMS.....Data Management System
 D-TACDrought Technical Advisory Committee
 DTSCCalifornia Department of Toxic Substances Control
 DWRCalifornia Department of Water Resources
 EDFEnvironmental Defense Fund
 EIREnvironmental Impact Report
 EPAEnvironmental Protection Agency
 ET.....evapotranspiration
 eWRIMSElectronic Water Rights Information Management System
 GAMAGroundwater Ambient Monitoring and Assessment Program
 GDEgroundwater-dependent ecosystem
 GEMSMonterey County Groundwater Extraction Management System
 GISGeographic Information System
 GMPGroundwater Monitoring Program
 gpmgallons per minute
 GSA.....Groundwater Sustainability Agency/Agencies
 GSP or Plan....Groundwater Sustainability Plan
 HCMhydrogeologic conceptual model
 HCP.....Habitat Conservation Plan
 IIP.....Integrated Implementation Plan
 ILRPIrrigated Lands Regulatory Program
 IPRindirect potable reuse
 InSARInterferometric Synthetic Aperture Radar
 IRWMPIntegrated Regional Water Management Plan
 ISWinterconnected surface water
 JPA.....Joint Powers Authority
 M1WMonterey One Water
 MCLsMaximum Contaminant Levels
 MCWD.....Marina Coast Water District
 MCWRA.....Monterey County Water Resources Agency

Monterey County GSA...County of Monterey Groundwater Sustainability Agency
 MPWMD.....Monterey Peninsula Water Management District
 MTBEmethyl-tertiary-butyl ether
 NAVD88North American Vertical Datum of 1988
 NCCAG.....Natural Communities Commonly Associated with Groundwater
 NEPANational Environmental Policy Act
 NMFS.....National Marine Fisheries Service
 NOAANational Oceanic & Atmospheric Administration
 O&M.....operations and maintenance
 OSWCROnline System for Well Completion Report
 PMAsprojects and management actions
 RCDMCResource Conservation District of Monterey County
 Reclamation Plant...Salinas Valley Reclamation Plant
 River SeriesSalinas River Discharge Measurement Series
 RMARoutine Maintenance Agreement
 RMSRepresentative Monitoring Sites
 RWMG.....Greater Monterey County Regional Water Management Group
 SAGBI.....Soil Agricultural Groundwater Banking Index
 SDACsSeverely Disadvantaged Communities
 SGMA.....Sustainable Groundwater Management Act
 SMCSustainable Management Criteria
 SMCLsSecondary Maximum Contaminant Levels
 SMP.....Salinas River Stream Maintenance Program
 SRDF.....Salinas River Diversion Facility
 Subbasin.....180/400-Foot Aquifer Subbasin
 SVBGSA.....Salinas Valley Basin Groundwater Sustainability Agency
 SVIHM.....Salinas Valley Integrated Hydrologic Model
 SVOM.....Salinas Valley Operational Model
 SVRP.....Salinas Valley Reclamation Project
 SWIGSeawater Intrusion Working Group
 SWRCB.....State Water Resources Control Board
 URCs.....Underrepresented Communities
 TAC.....Technical Advisory Committee
 TDStotal dissolved solids
 USACEU.S. Army Corps of Engineers
 USFWSU.S. Fish and Wildlife Service
 USGSU.S. Geological Survey
 UWMPUrban Water Management Plan

1 INTRODUCTION TO THE 180/400-FOOT AQUIFER SUBBASIN GROUNDWATER SUSTAINABILITY PLAN AMENDMENT 2

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 requires four activities:

1. Forming one 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 – 180/400-Foot Aquifer Subbasin (180/400 Subbasin) as a high priority basin. The 180/400 Subbasin is one of nine subbasins in the Salinas Valley Groundwater Basin, and it is located at the northern end of the Salinas Valley and is bounded by the Monterey Bay to the northwest (Figure 1-1).

Groundwater conditions in the 180/400 Subbasin have deteriorated in recent decades, including seawater intrusion, declines in groundwater elevations in specific areas, and an overall decline in groundwater in storage. Seawater intrusion poses groundwater quality concerns, with the 500 milligrams/liter (mg/L) chloride isocontour in the 180-Foot and 400-Foot Aquifers already having reached Marina and Castroville, and progressing towards the City of Salinas. The purpose of this GSP Amendment is to outline how SVBGSA, in coordination with Marina Coast Water District Groundwater Sustainability Agency (MCWDGSA), and Monterey County Groundwater Sustainability Agency (MCGSA), will address the declining groundwater conditions and achieve groundwater sustainability in the Subbasin. Sustainability is the absence of undesirable results for any of the 6 sustainability indicators applicable in the Subbasin: groundwater level declines, groundwater storage reductions, seawater intrusion, degradation of groundwater quality, land subsidence, and surface water depletion from groundwater use. Sustainability must be achieved by 2040 and maintained for an additional 30 years.

In 2020, SVBGSA submitted the GSP for the 180/400 Subbasin (original GSP) that outlined how it would adaptively manage groundwater. In 2022, SVBGSA submitted GSPs for the 5 other Salinas Valley subbasins under its authority. Also in 2022, SVBGSA submitted GSP Amendment 1 to the 180/400 Subbasin GSP to align all SVBGSA GSPs in approach and timing, and resubmitted GSP Amendment 1 in 2025 with a 5-year periodic evaluation. This GSP Amendment 2 incorporates additional data about the groundwater basin, addresses recommended actions from DWR’s review of the original GSP, and revises the goals for seawater intrusion and

groundwater quality. This GSP Amendment 2 is submitted to DWR according to GSP Regulation § 355.10, and replaces the original GSP and Amendment 1. GSP Amendment 2 will be referred to as the GSP or GSP Amendment 2 in this document. It continues to meet all of the GSP regulatory requirements and is submitted with the 2027 Periodic Evaluation of the GSP Amendment 1, meeting GSP Regulations § 356.4.

This GSP Amendment 2 first presents 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, the GSP will be modified to reflect changes in the local understanding.

Following the foundational information, the GSP Amendment 2 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 achieve sustainability and provide a plan for implementing the GSP. The GSP is intended to include adaptive management that will refine the implementation and direction of this GSP over time.

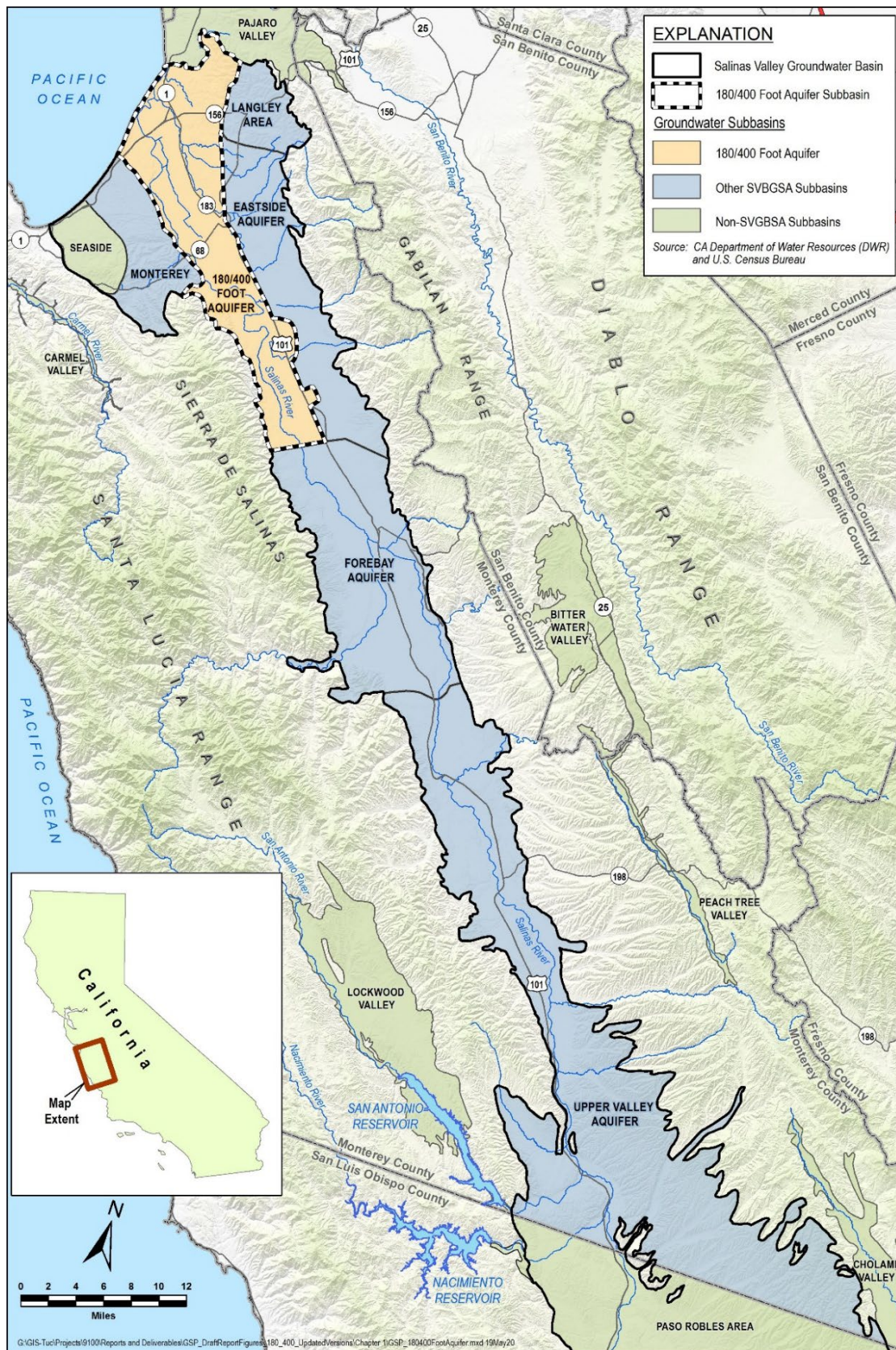


Figure 1-1. 180/400 Subbasin Location

1.2 Agency Information

All or portions of the 180/400 Subbasin fall within the jurisdiction of 3 GSAs: the SVBGSA, MCWDGSA, and MCGSA. This GSP was developed by the SVBGSA with input and assistance from the MCWDGSA and the MCGSA. Each is an exclusive GSA for its respective portion of the Subbasin. The Subbasin boundary is shown on Figure 1-1.

1.2.1 Agency Name, Mailing Address, and Plan Manager

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

Salinas Valley Basin Groundwater Sustainability Agency

Attn.: Piret Harmon, General Manager

1441 Schilling Place

Salinas, CA 93901

<https://svbgsa.org>

Marina Coast Water District Groundwater Sustainability Agency

Attn.: Remleh Scherzinger, General Manager

11 Reservation Road

Marina, CA 93933

<http://www.mcwd.org>

County of Monterey Groundwater Sustainability Agency

Attn: Kelly Donlon, Chief Assistant County Counsel

169 W Alisal St, 3rd Floor

Salinas, CA 93901

<https://www.countyofmonterey.gov/>

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>

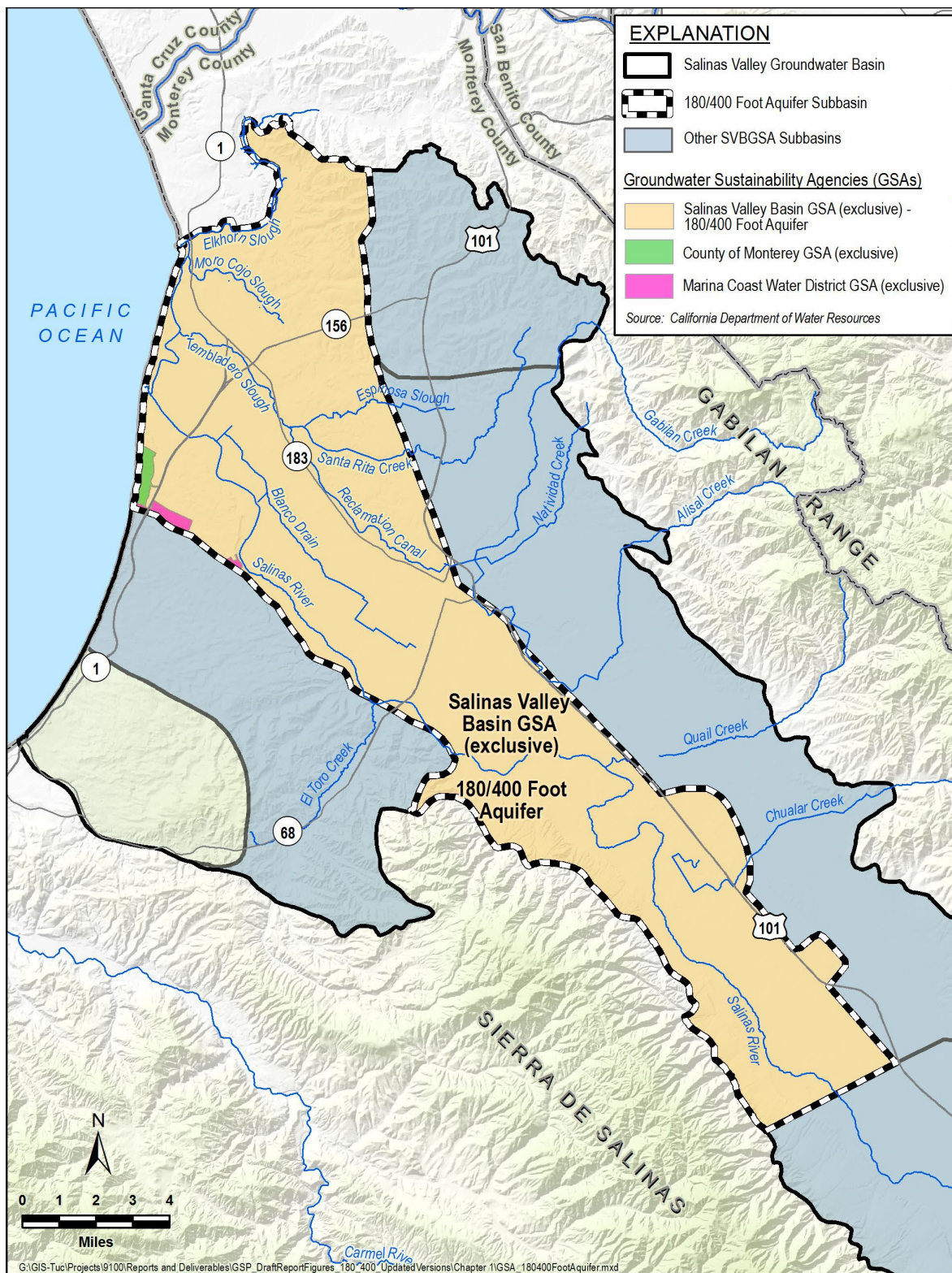


Figure 1-2. Map of Area Covered by Each GSA

1.2.2 SVBGSA

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 Subbasins.

SVBGSA is a Joint Powers Authority (JPA) that was formed for six 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 eight of the 11 Board members. A super majority vote is required for:

- Approval of a GSP
- Amendment of budget 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 the 180/400 Subbasin, Marina Coast Water District GSA (MCWDGSA), discussed in Section 1.2.3 below, and Monterey County GSA (MCGSA), discussed in Section 1.2.4. By agreement, SVBGSA developed a single GSP for the entire 180/400 Subbasin, with input from MCWDGSA and MCGSA. In other SVBGSA subbasins, an Arroyo Seco Coordination Committee engaged in the Forebay Subbasin, and a SMC Technical Advisory Committee (SMC TAC) established Figure 1-2.

Board and Committees

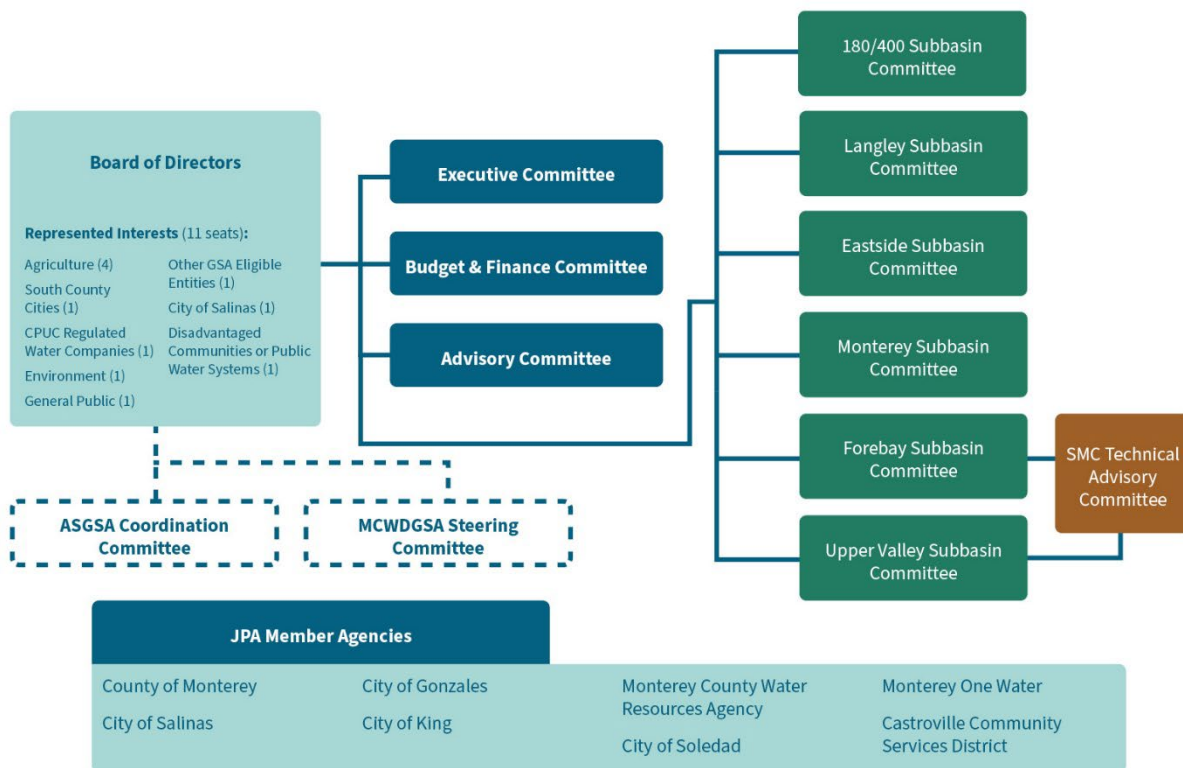


Figure 1-3. SVBGSA Board and Committees

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 is comprised of 6 Subbasin Committee seats, 4 Partner Agency seats, and up to 3 of the Board-Designated seats. Members collectively 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) nominate 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 one 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 which 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.

Subbasin Planning Committees were established in May 2020 by the Board 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 2, as well as GSP implementation, is guided and reviewed by the 180/400 Subbasin Committee, which is comprised 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 2040 and to maintain sustainability through 2070.

1.2.3 MCWDGSA

Marina Coast Water District (MCWD) is an independent public agency organized under the County Water District Law of 1913 (California Water Code Division 12). As a Division 12 County Water District, MCWD possesses broad statutory authority to develop, manage, protect, and distribute water resources within its jurisdictional boundaries. This authority extends beyond groundwater sustainability planning and includes comprehensive responsibility for municipal water supply, infrastructure development, capital financing, rate-setting, public health compliance, and long-term resource planning.

MCWDGSA is a single agency GSA formed by MCWD and covers the areas within the MCWD service area within the Marina-Ord Management Area of the Monterey Subbasin, except for those areas owned by a federal government entity and thus not subject to SGMA. A portion of the MCWD service area extends into the 180/400 Subbasin, as illustrated on Figure 1-2, and lies within the jurisdiction boundary of MCWDGSA. MCWD is led by a 5-member Board of Directors who each serve 4-year terms. Board members are elected at large. Decisions on all GSA-related matters require an affirmative vote of a majority of the 5 Board of Directors members. MCWDGSA activities are coordinated by MCWD's staff.

1.2.3.1 Formation and Authority of MCWDGSA

MCWDGSA was formed in accordance with California Water District Law, California Water Code § 34000, and is responsible for water supply in a portion of the Subbasin. MCWD is therefore a local agency under California Water Code § 10721 with the authority to establish itself as a GSA. Upon establishing itself as a GSA, MCWD retains all the rights and authorities provided to GSAs under California Water Code § 10725 *et seq.*

1.2.3.2 MCWDGSA and SVBGSA Coordination

SVBGSA and MCWDGSA have agreements to cooperatively prepare the Monterey Subbasin GSP as well as this 180/400 Subbasin GSP. These agreements designate SVBGSA as the responsible agency for the 180/400 Subbasin GSP and MCWDGSA as the responsible agency for reporting to DWR on the Monterey Subbasin GSP. In the Monterey Subbasin, they establish MCWDGSA as responsible for the Marina-Ord Management Area and SVBGSA as responsible for the Corral de Tierra Management Area. The agreements guide SVBGSA and MCWDGSA coordination on both subbasins. Coordinate occurs through both on a technical level and through a "Steering Committee" that publicly meets at least quarterly to discuss items of shared interest related to the 180/400 and Monterey Subbasins.

1.2.4 Monterey County GSA

The Monterey County GSA (MCGSA) is governed by the Board of Supervisors of the County of Monterey. The Board of Supervisors is composed of 5 members who are elected by their

respective geographical districts within the County. MCGSA activities are coordinated by the County Administrative Officer (CAO) or designee.

1.2.4.1 Formation and Authority of Monterey County GSA

In December 2019, the County of Monterey Board of Supervisors adopted a resolution approving the formation of a groundwater sustainability agency for the approximate 400-acre parcel within the 180/400 Subbasin commonly known as the “CEMEX site”, pursuant to California Water Code section 10724(a). After subsequent litigation, MCGSA’s authority as the exclusive GSA of the CEMEX site was affirmed by the Sixth Appellate District of the Court of Appeal in *City of Marina et al., v. County of Monterey et al.* (2023) 97 Cal.App.5th 17.

1.2.4.2 MCGSA and SVBGSA Coordination

SVBGSA and Monterey County GSA developed a Cooperation Agreement in 2020 to coordinate a single GSP and to ensure that SGMA compliance and GSP implementation in the 180/400 Subbasin is synchronized, and the legal authorities to implement the GSP for the entire Subbasin exist. In the Cooperation Agreement, MCGSA designates SVBGSA as the manager of the CEMEX Site for groundwater management purposes under SGMA. SVBGSA and MCGSA coordinate through a GSA Work Group that meets upon request of either GSA.

The agreements are included in Appendix 1B.

1.3 Other Agency Coordination

1.3.1 Coordination with Other Water Agencies

In addition to coordination between GSA’s, SVBGSA continues to coordinate with agencies involved in water management within the 180/400 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. MCWDGSA, Arroyo Seco GSA, MIW and MCWRA have representation on the SVBGSA Advisory Committee. SVBGSA has also coordinated with the agencies of the basins or subbasins adjacent to the 180/400 Subbasin and other Salinas Valley subbasins (Pajaro Valley Groundwater Basin, Seaside Basin, and Paso Robles Area Subbasin).

1.3.2 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 the Cities of Salinas, Marina, and Gonzales. 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, on-going coordination between the GSA and land use agencies during GSP implementation. [SVBGSA also solicited input from Monterey County, City of Salinas, City of Marina, and City of Gonzales prior to submitting GSP Amendment 2 to DWR, with the periodic evaluation, in January 2027.]

1.4 Overview of GSP Amendment 2

This GSP Amendment 2 is developed in concert with GSP Amendments for 5 other Salinas Valley Groundwater Basin subbasins under SVBGSA jurisdiction: the Eastside Aquifer Subbasin (Eastside Subbasin), the Forebay Aquifer Subbasin (Forebay Subbasin), the Upper Valley Aquifer Subbasin (Upper Valley Subbasin), the Langley Area Subbasin (Langley Subbasin), and the Monterey Subbasin, in coordination with other GSAs where applicable. While this GSP is focused on the 180/400 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 180/400 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 (PMAs). Throughout preparation of GSP Amendments 1 and 2, SVBGSA continued to provide opportunities for public engagement and stakeholder input at its Subbasin Committees, 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 PMAs for reaching sustainability in the Subbasin by 2040.

The SVBGSA developed this GSP Amendment 2 as part of an adaptive management process using improved data, models, and analysis of PMAs to achieve sustainability since preparation of the original GSP. This amended GSP replaces the original and previously amended GSP. 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 PMAs 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 SVBGSA 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

SVBGSA stakeholders are highly diverse. Groundwater supports economic activities from small domestic scale to large industrial scale. Groundwater 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 \$55 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 (GDE) 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 the next section.

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, 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 with them include, but are not limited to, the Cities of Gonzales, Greenfield, King, Salinas, and Soledad, Castroville Community Services District, San Jerardo Cooperative, San Lucas, San Vicente Mutual Water Company, 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, 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, Monterey One Water, Seaside Groundwater Basin Watermaster, Monterey Peninsula Water Management District (MPWMD)

CPUC-regulated water companies. Alisal Water Service (Alco), California Water Service Company (Cal Water), California American Water.

2.3 180/400 Subbasin GSP Preparation and GSP Amendments

Given the importance of the groundwater and the development of the 180/400 Subbasin GSP to the communities, residents, landowners, farmers, ranchers, businesses, and others, inclusive stakeholder input was a primary component of the 180/400 Subbasin GSP process. To encourage ongoing stakeholder engagement SVBGSA deployed the following strategies in the preparation of the 180/400 Subbasin GSP, GSP Amendment 1, and GSP Amendment 2:

- 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.
- In 2018, established the 180/400 Subbasin Planning Committee that completed a comprehensive planning process that engaged the Advisory Committee in discussion of key plan elements and the Board of Directors on review of the Plan.
- In 2021, established the 180/400 Subbasin Implementation Committee that continued to provide input on GSP implementation, including ongoing SGMA compliance and development of PMAs, including engagement on key items also discussion with the Advisory Committee and Board of Directors. In 2024, the Subbasin Committee Program further refined their processes and roles.
- In 2025, refined the configuration and role of the Advisory Committee to focus on multi-subbasin considerations across the Valley, including the IIS and recommendations for the portfolio of PMAs to be prioritized in this and other subbasin GSP amendments.
- In 2026, presented information to the Subbasin Committees as the GSP amendments and evaluations were developed. All GSP chapters were posted for public review and comments.
- Publicly noticed drafts of the 180/400 Subbasin GSP and allowed for required public comment periods as required by SGMA. Public comments received are included in Appendix 2A.
- Followed consistent stakeholder outreach for GSP amendments.

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

2.4 180/400 Subbasin Committee

Subbasin committees are comprised of local stakeholders and Board members and are appointed by the Board of Directors following a publicly-noticed application process by SVBGSA. After

the 180/400 Subbasin Planning Committee completed the GSP submitted in January 2020, SVBGSA convened the 180/400 Subbasin Implementation Committee in October 2021. 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 project and management actions, general GSP implementation, and review of plan updates and amendments, with assistance and information provided by SVBGSA staff and technical consultants.

These committees include constituencies that are considered important stakeholders to implementing comprehensive subbasin plans for the Salinas Valley. A list of the 180/400 Subbasin Committee members at the time of Amendment 2 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 180/400 Subbasin. Communication and public engagement actions (CPE actions) that took place during GSP development continue during implementation of all 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 that 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 Basin are informed of progress and ongoing evaluation of groundwater conditions, and provide opportunities to participate in GSP implementation and plan amendments. Appendix 2B includes SVBGSA's communications plan.

Notice and communication, as required by GSP Regulations § 354.10, was focused on providing the following activities during the development of the 180/400 Subbasin GSP:

- Clear decision-making process on GSP approvals and outcomes
- Robust public engagement opportunities

- Encouragement of active involvement in GSP development and ongoing plan implementation

2.5.1 Goals for Communication and Public Engagement

Ultimately, the success of the 180/400 Subbasin GSP will be determined by the collective action of every groundwater user. To meet ongoing water supply needs, both for drinking water and for agricultural and other economic livelihoods, the Subbasin must achieve and maintain sustainability into the future. SVBGSA's outreach strategies engage the public early and frequently, and keep information flow seamless among staff, consultants, committee members and the SVBGSA Board regarding the goals and objectives of the 180/400 Subbasin GSP and associated monitoring and implementation activities.

Critical to the success of the 180/400 Subbasin GSP implementation is public understanding of the PMAs planned for sustainability, as well as sustainability implementation actions and other groundwater management activities. These important actions are specifically described in Chapters 9 and 10 of the 180/400 Subbasin GSP.

The required annual report due by April 1 each year for each GSP is an important and ongoing GSP implementation activity. The annual report covers annual 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 and includes assessment of the 6 SMC for the respective subbasin. The annual report provides an important opportunity to reengage the 180/400 Subbasin Committee in its review and to discuss sustainability status and progress on PMA planning and implementation.

The periodic evaluations, prepared at least every 5 years, also provide an important opportunity for public engagement. These evaluations assess plan performance and inform adaptive management. They function as an implementation tool by reviewing conditions over the previous 5 years, analyzing progress toward sustainability goals, and recommending adjustments as needed. In addition, a periodic evaluation provides the justification for and explanation of any GSP amendments. Because they offer a more comprehensive analysis than annual reports, they also present a valuable opportunity for GSAs to communicate how GSP implementation is progressing.

CPE actions provide outreach during the Subbasin planning and implementation efforts and assists 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, increase GSP awareness and track efforts:

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 and implementation 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 PMAs 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 communications and/or their preferred method of communications.
 - 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 dialogues 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 representatives of them. 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 communications and engagement 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 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 updates.

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

2.5.6 Engagement Strategies

SVBGSA utilizes 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

- 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: Shared 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 implementation described in section 2.6.

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

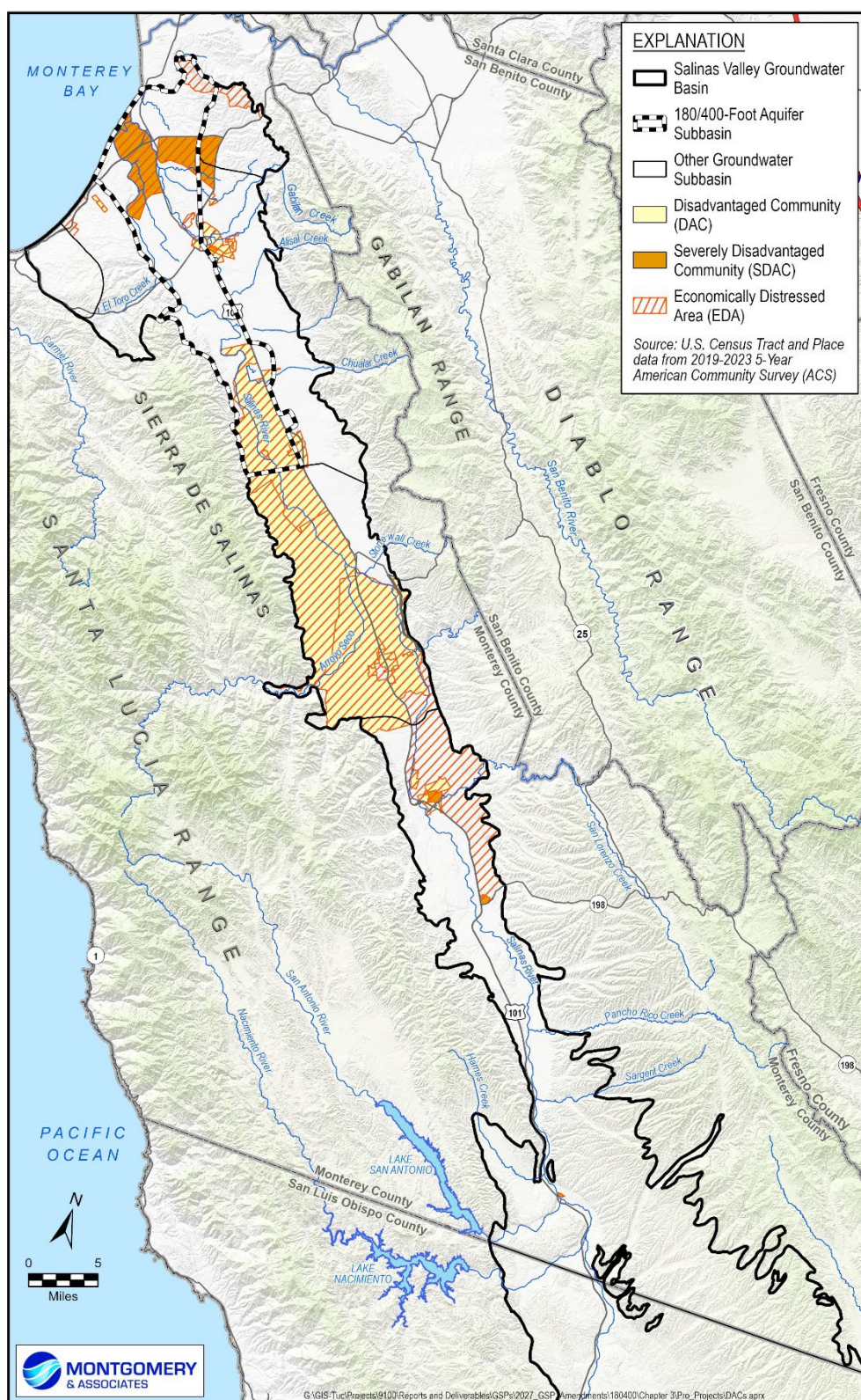
In this GSP, URCs and DACs are considered communities that currently have little or no representation in water management, or who historically have had disproportionately less representation in public policy decision making. URCs and DACs are inclusive of Severely Disadvantaged Communities (SDACs), Economically 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 Block Groups suggests that roughly 28.1% of the population of the 180/400 Subbasin live in a DAC, 2.5% live in an SDAC, and 34.9% live in an EDA. Considering Census Tracts, this analysis suggests that roughly 11.5% of the Subbasin's population live in a DAC, 1.5% live in an SDAC; and 12.8% live in an EDA.

Figure 2-1 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 engage constructively 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 1 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.



2.6.2 Activities 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 Amendment 2 covers the entire 180/400 Subbasin, as shown on Figure 3-1. This includes the areas within the Subbasin under the jurisdiction of SVBGSA, MCWDGSA, and MCGSA, as shown on Figure 1-2. The 180/400 Subbasin lies in northwestern Monterey County and includes the northern end of the Salinas River Valley. It covers an area of 89,700 acres, or 140 square miles (DWR, 2004a). The Subbasin is bounded by the Eastside and Langley Subbasins to the east (DWR subbasin numbers 3-004.02 and 3-004.09, respectively), the Forebay Subbasin (DWR subbasin number 3-004.05) to the south, the Monterey Subbasin (DWR subbasin number 3-004.10) to the southwest of the northern portion of the Subbasin, the Monterey Bay to the west, and Pajaro Valley to the north. The boundaries of the 180/400 Subbasin, together with those of the Monterey and Seaside Subbasins, are generally consistent with MCWRA's Pressure Subarea (MCWRA, 2006). Unless otherwise specified, references to the 180/400 Subbasin in this GSP denote the full Subbasin area.

The Salinas River drains the Subbasin, discharging into Monterey Bay. The Subbasin contains the municipalities of Salinas and Gonzales, part of Marina, and the census-designated places of Castroville, Moss Landing, Elkhorn, Boronda, Spreckels, and Chualar. United States Highway 101 runs generally north-south along the eastern border of the Subbasin. State Highways 1, 156, 183, and 68 also cross the Subbasin. 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 2 through to inform the development of the sustainability goal, SMC, and PMAs. This GSP Amendment 2 has been 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

As discussed in Chapter 1, there are 3 GSAs in the 180/400 Subbasin, but a single GSP for the Subbasin. SVBGSA is the GSP plan manager, in coordination with MCWDGSA and MCGSA and their respective areas of jurisdiction.

The 180/400 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 180/400 Subbasin.

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

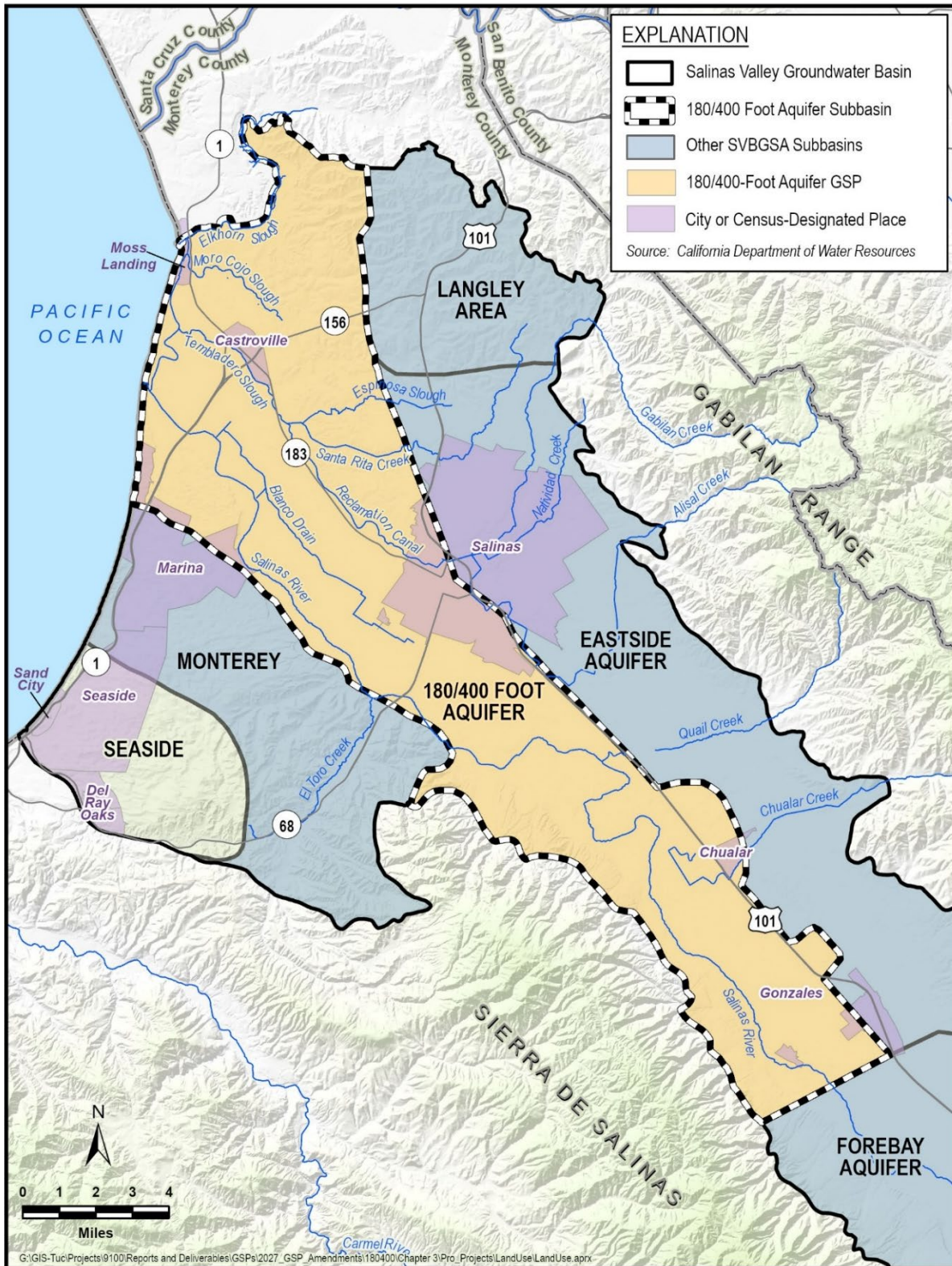


Figure 3-1. 180/400 Subbasin Area Covered by GSP

3.1.2 Jurisdictional Areas

3.1.2.1 Federal and State Jurisdictional Areas

Areas under federal jurisdiction are shown on Figure 3-2. 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). The United States Department of Fish and Wildlife manages the Salinas River National Wildlife Refuge. A portion of the Fort Ord former Army base lies in the Subbasin and encompasses the Marina Municipal Airport. Although the DWR land use dataset depicts this area as federal land, it has been transferred to civilian use and is no longer under federal jurisdiction. 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.

Areas under State jurisdiction are also shown on Figure 3-2. The California Department of Fish and Wildlife owns and operates the Elkhorn Slough Ecological Reserve, the Moro Cojo Slough State Marine Reserve (SMR), Elkhorn Slough State Marine Conservation Area (SMCA), Elkhorn SMR, and the Moss Landing Wildlife Area. The California Department of Parks and Recreation manages several areas in the Subbasin near Moss Landing including Moss Landing State Beach, Salinas River Dunes Natural Preserve, Salinas River State Beach, and the Salinas River Mouth Natural Preserve. These areas provide important habitat and coastal resources protection.

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 of city limits. There are no County conservation areas or parks within the Subbasin (BLM, 2020). Infrastructure and public services in several unincorporated communities in the 180/400 Subbasin are managed by independent Community Services Districts (CSD), including Castroville and Boronda, or County Service Areas (CSAs in the subbasin include Chualar, Las Palmas and Oak Hills).

3.1.2.3 Monterey County Water Resources Agency

MCWRA is a flood control and water agency established in 1990 by special act of the state legislature codified at Water Code Appendix Chapter 52, with broad water management authority in Monterey County. MCWRA's jurisdiction covering countywide and includes the entire 180/400 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 of the Board of Supervisors of MCWRA (MCWRA Act, Sec. 15).

3.1.2.4 City and Other Local Jurisdictions

The jurisdictional boundaries of cities are shown on Figure 3-2 (U.S. Census Bureau, 2018). Part of the cities of Salinas and Gonzales are located within the Subbasin and have water management authority.

In Gonzales, the City supplies drinking water and manages its wastewater. The Castroville CSD provides water and sewer collection services in the town of Castroville. The MCWD provides water and sewer collection services within its jurisdictional boundaries. A small portion of the MCWD’s service area extends from the Monterey Subbasin into the 180/400 Subbasin. Pajaro/Sunny Mesa Community Services District provides water services to part of the northern Subbasin.

3.1.2.5 CPUC Regulated Utilities

The City of Salinas water supplies are served by 2 CPUC-regulated private water utilities, Cal Water and Alco, through franchise agreements. Cal Water’s Salinas Hills system is partially located in the 180/400 Subbasin, along with a portion of the adjacent Monterey Subbasin. California American Water, also a CPUC-regulated utility, operates County Service Area water system for the unincorporated Chualar community, as well as the wastewater and recycling water system for the County Service Area for the unincorporated Las Palmas community, on behalf of the County of Monterey Department of Public Works, Facilities, and Parks.

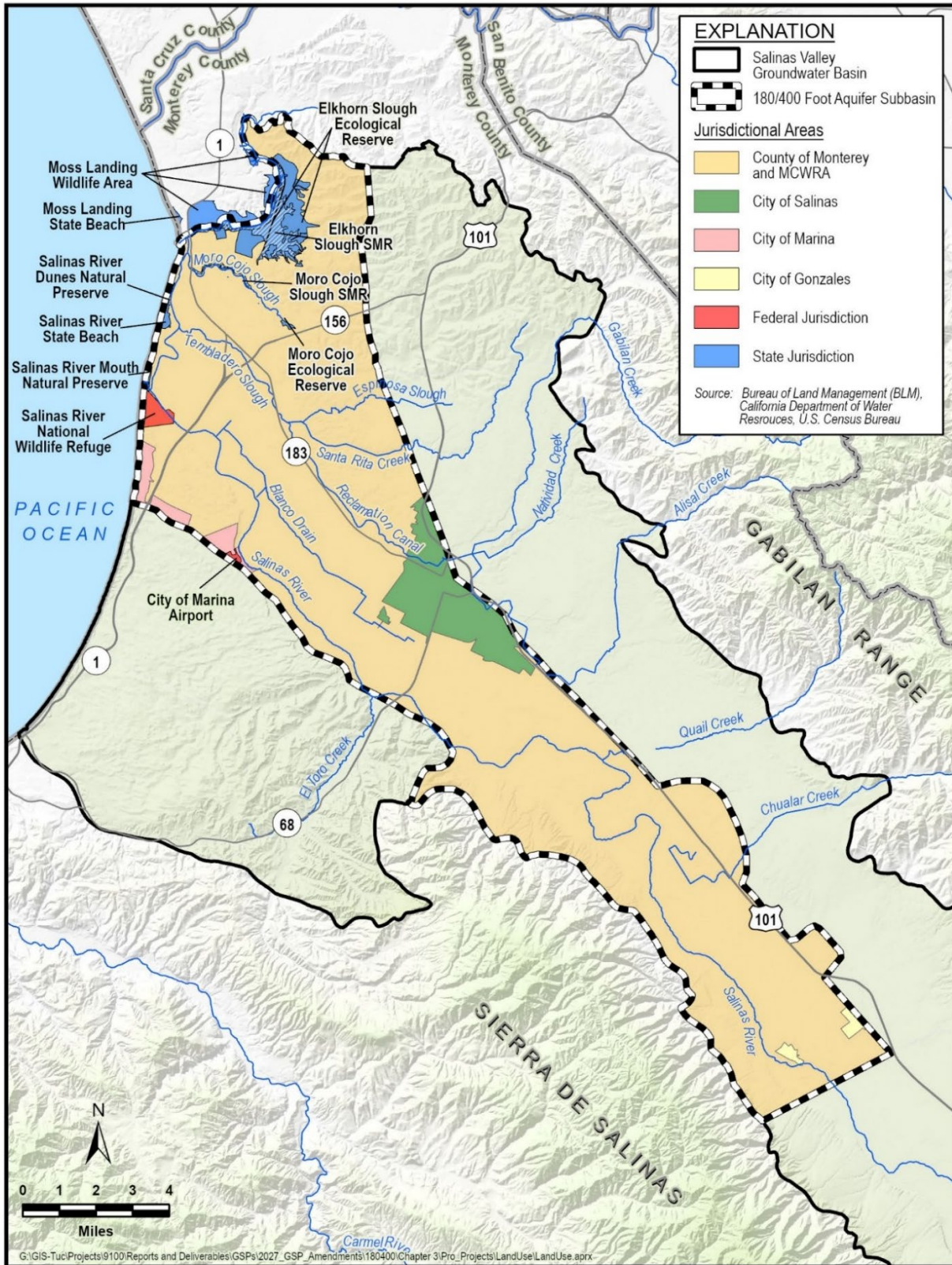


Figure 3-2. Federal, State, County, City, and Local Jurisdictional Areas

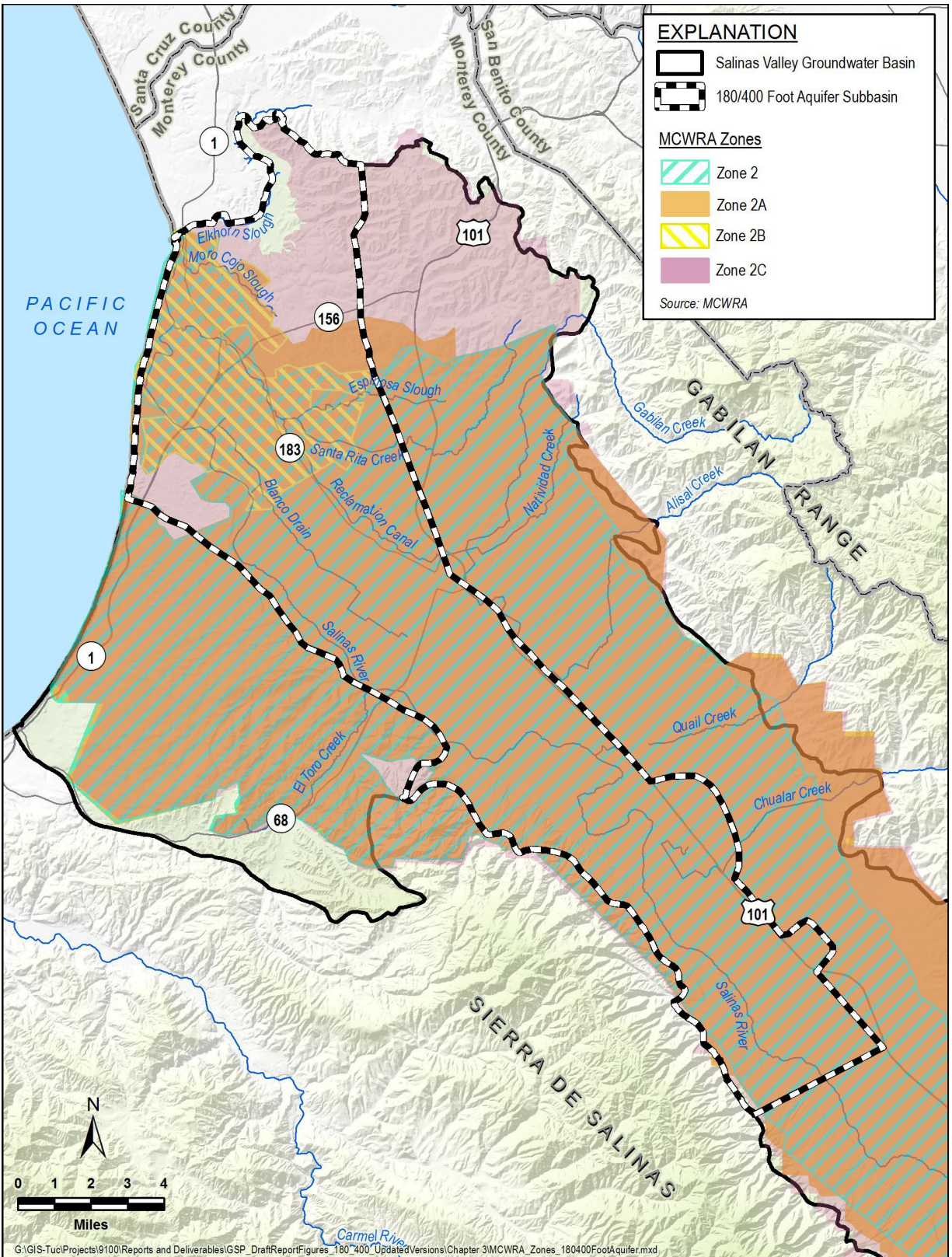


Figure 3-3. MCWRA Zones in the 180/400 Subbasin Land Use

3.1.3 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 180/400 Subbasin, as classified by the Assessor's 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 89,700 acres is the result of: 1) MCWD parcels not being included in the table; 2) some parcels having null land use values; and 3) small gaps between parcels that are not counted.

Table 3-1. Land Use Summary

Category	Area in Subbasin (acres)
Agriculture (Irrigated)	62,284
Agriculture (Dry)	2,616
Commercial	754
Industrial	2,056
Institutional	5,840
Miscellaneous	1,645
Multi-Family	626
Residential (Urban)	2,580
Rural	7,178
Other	535
Total	86,116

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 relying on than 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. Other crops and land uses included under irrigated agriculture are various row crops, field crops, and berries.

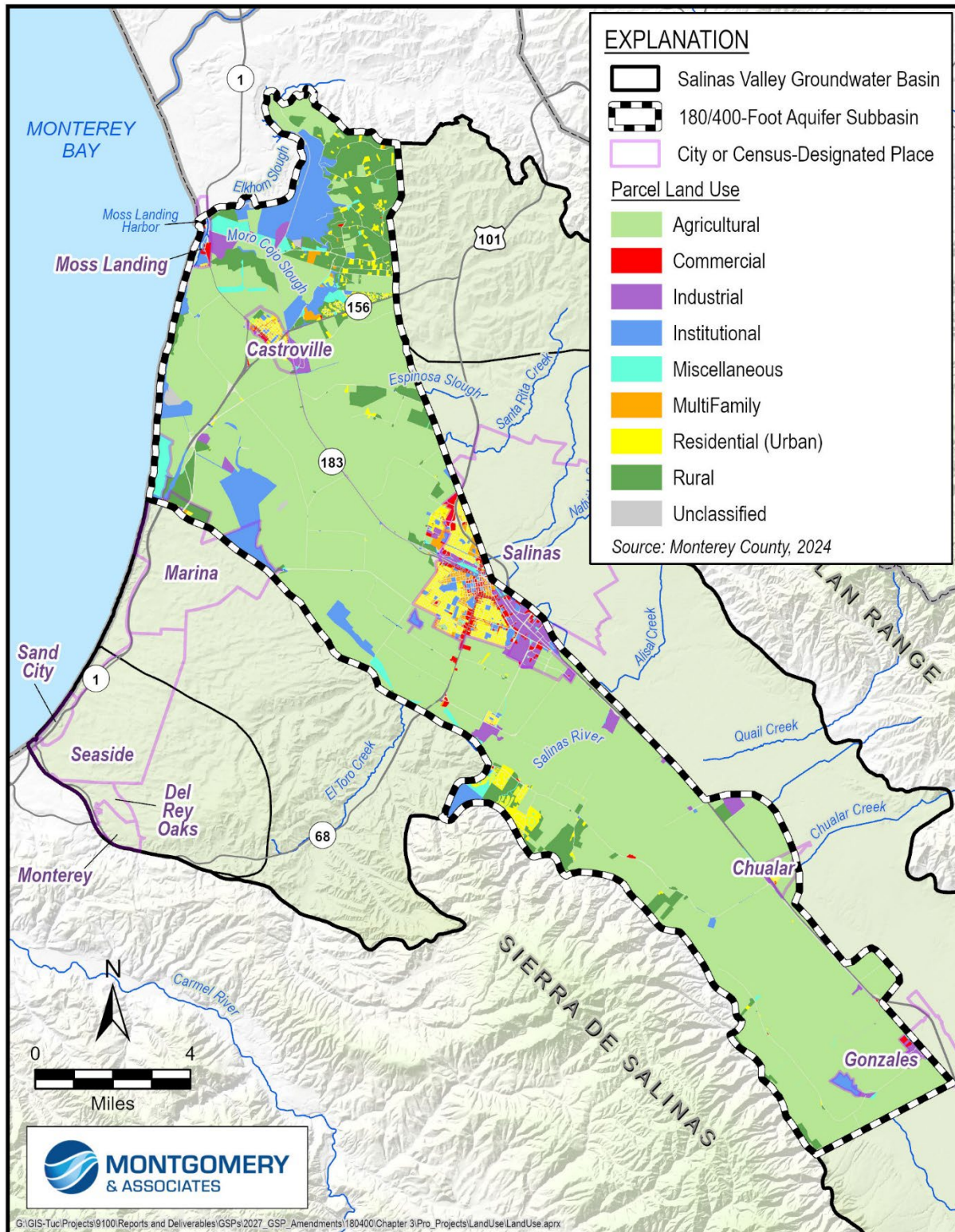


Figure 3-4. 2024 Land Use

3.1.4 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 Cities of Gonzales, Marina, and Salinas have land use authority over all or portions of the 180/400 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 180/400 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 (SWIM). 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 2. 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.

3.1.5 Effects of GSP Implementation on Water Supply Assumptions

Implementation of this GSP Amendment may affect water supply assumptions of relevant land use plans over the planning and implementation horizon. Implementation of GSP PMAs is necessary 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 or landowners.

3.2 Water Use

3.2.1 Sources

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 also reported to MCWRA as groundwater extractions. Starting in WY 2025 with the intention of preventing double counting of surface water and groundwater, MCWRA asked reporters if groundwater extractions were also reported as surface water diversions. CalWATRS data do not include the river diversions of the Salinas River Diversion Facility (SRDF), discussed below.

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 (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.

Through the Castroville Seawater Intrusion Project (CSIP), an average of 21,000 AF/yr of recycled water, surface water, and supplemental groundwater is delivered to about 12,000 acres in the coastal area of the 180/400 Subbasin. These conjunctive use projects are collectively referred to as the Monterey County Water Recycling Projects and described further in Section 3.3 below. Figure 3-5 shows the CSIP distribution area. CSIP delivers water to the agricultural land shown in orange. In other areas of the Subbasin, small amounts of recycled water is also used to irrigate horse pastures and lawns.

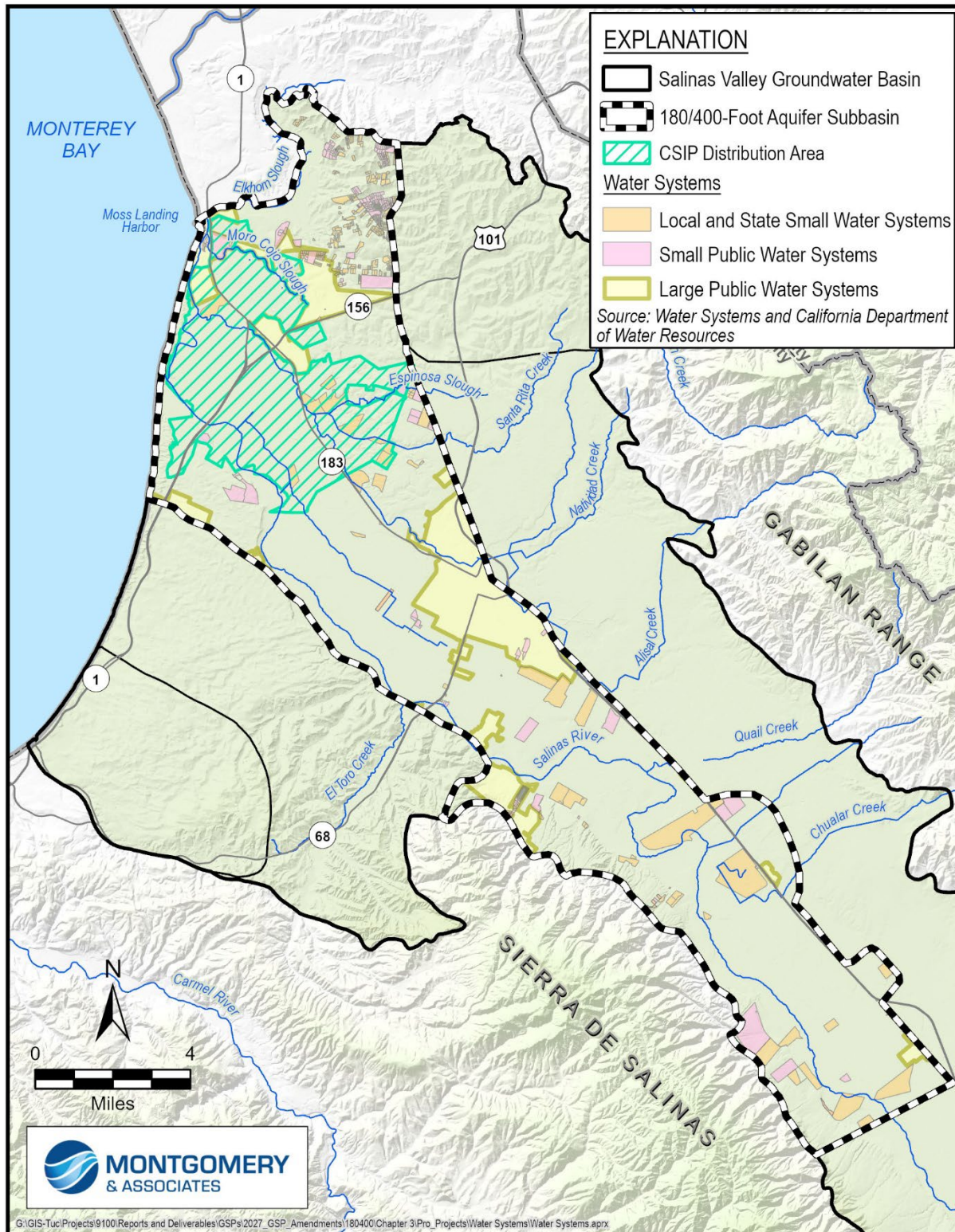


Figure 3-5. Communities Dependent on Groundwater

3.2.2 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.

- **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.
- **Managed wetlands.** DWR land use records indicate that there is 1 managed wetland in the Subbasin, an 11.2-acre wetland owned by the State of California and located northeast of the Monte De Lago neighborhood, between state highway 156 and Castroville Boulevard. The water use of this wetland is unknown.
- **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. There is also in-lieu recharge occurring as wastewater treated by the Salinas Valley Reclamation Project (SVRP) is distributed by the CSIP distribution system and used to offset agricultural groundwater pumping within the CSIP service area.
- **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.

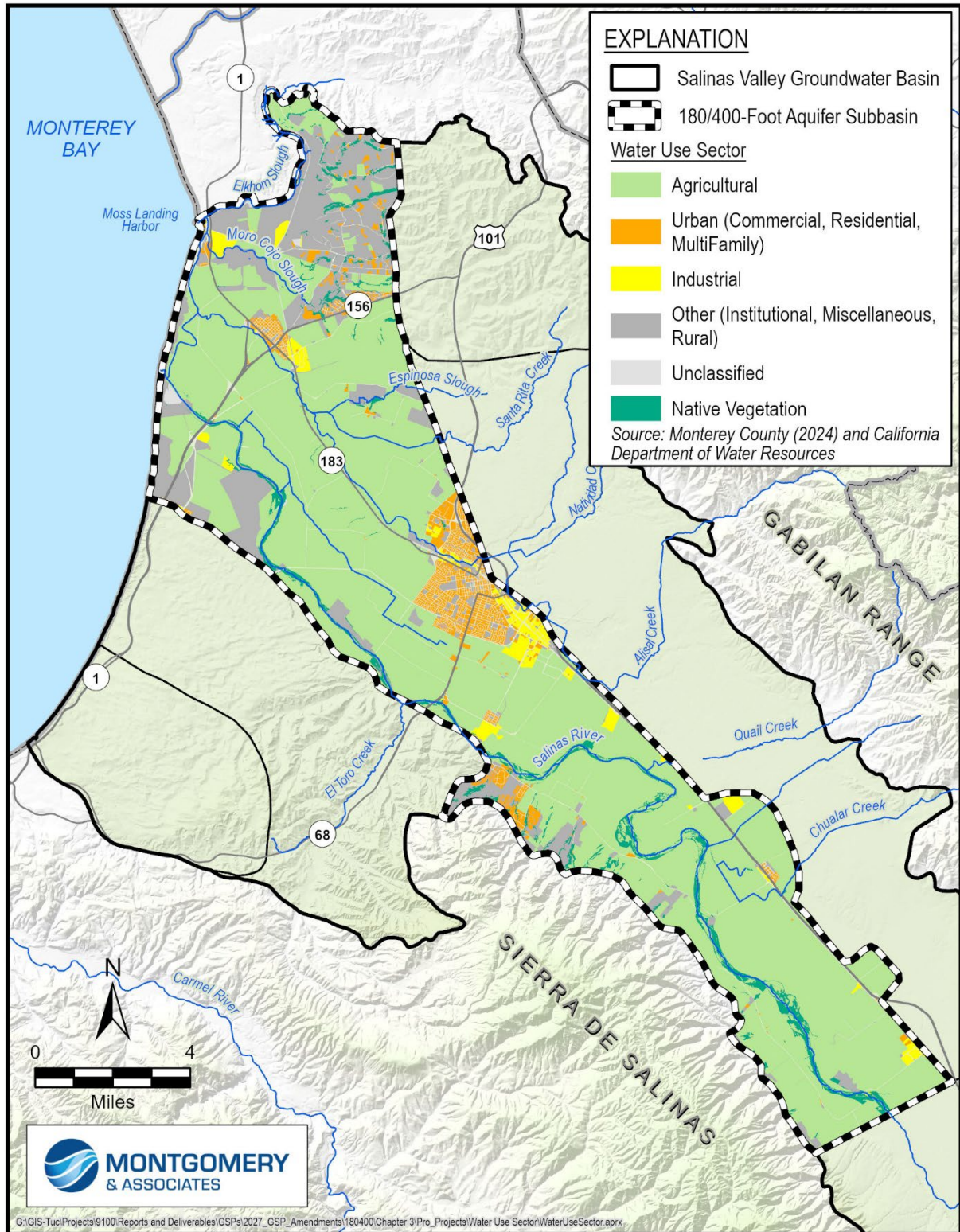


Figure 3-6. Map of Water Use Sectors

3.3 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 (formerly Monterey County Flood Control and Water Conservation District) 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 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.

In 1998, MCWRA and M1W cooperated to implement the Monterey County Water Recycling Projects. This includes the Salinas Valley Reclamation Project (SVRP), which provides tertiary treatment of municipal wastewater and delivers it to CSIP to augment groundwater supplies for agricultural irrigation on about 12,000 acres in the seawater intruded area near Castroville.

As part of the Salinas Valley Water Project (SVWP), MCWRA constructed and began to operate the Salinas River Diversion Facility (SRDF) in 2010. SRDF adds treated surface water to the recycled water and supplemental groundwater sources of CSIP water supplies. SVWP also resulted in reoperation of the reservoirs to release additional stored water during the summer when it is needed for irrigation and redirection at SRDF. The SVWP represents the primary conjunctive use program integrating reservoir operations with groundwater and recycled 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 cfs to roughly 550cfs, or about 4,100 to 33,000 AF per month, with even larger releases when there is a storm event—reflecting hydrologic conditions and the need to respond to system demand.

MCWRA adjusts releases dynamically to meet flow targets tied to 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 (HCP) to obtain federal Endangered Species Act (ESA) permits for its water management activities. Within the CSIP service area, this integrated supply approach allows for substantial reductions in groundwater pumping when surface water is available. During periods when the SRDF is operating, grower and CSIP supplemental groundwater extraction has been reduced by approximately 80 percent during peak irrigation demand periods. However, reliable irrigation supply still requires active conjunctive management of all 3 sources—surface water, recycled water, and groundwater—to balance seasonal demand and variable availability. Reservoir releases thus not only support groundwater recharge basin-wide but also directly enable substitution of surface and recycled water for groundwater pumping in critical coastal areas.

Despite these efforts, challenges remain. While the CSIP and broader SVWP have slowed the rate of seawater intrusion over the past 2 decades, they have not halted it. The subbasin continues to experience declining groundwater elevations below sea level and persistent overdraft, underscoring the importance of continued optimization of reservoir operations, diversions, recharge, and recycled water use. As outlined in this GSP, additional PMAs are needed to manage and control undesirable results from seawater intrusion.

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.

3.4 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 (a). 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 2 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. Table 3-2 includes the well count numbers from the OSWCR database for comparison. DWR's Well Completion Report Map Application 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. For OSWCR well counts, public supply wells are subtracted from the production category so as to not double count. Some domestic wells may be classified as *de minimis* extractors, defined as pumping less than 2 AF/yr for domestic purposes.

As of GSP Amendment 2, 700 wells in the 180/400 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 691 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	64	691
Production	591	780
Public Supply	45	43
Total	700	1,514

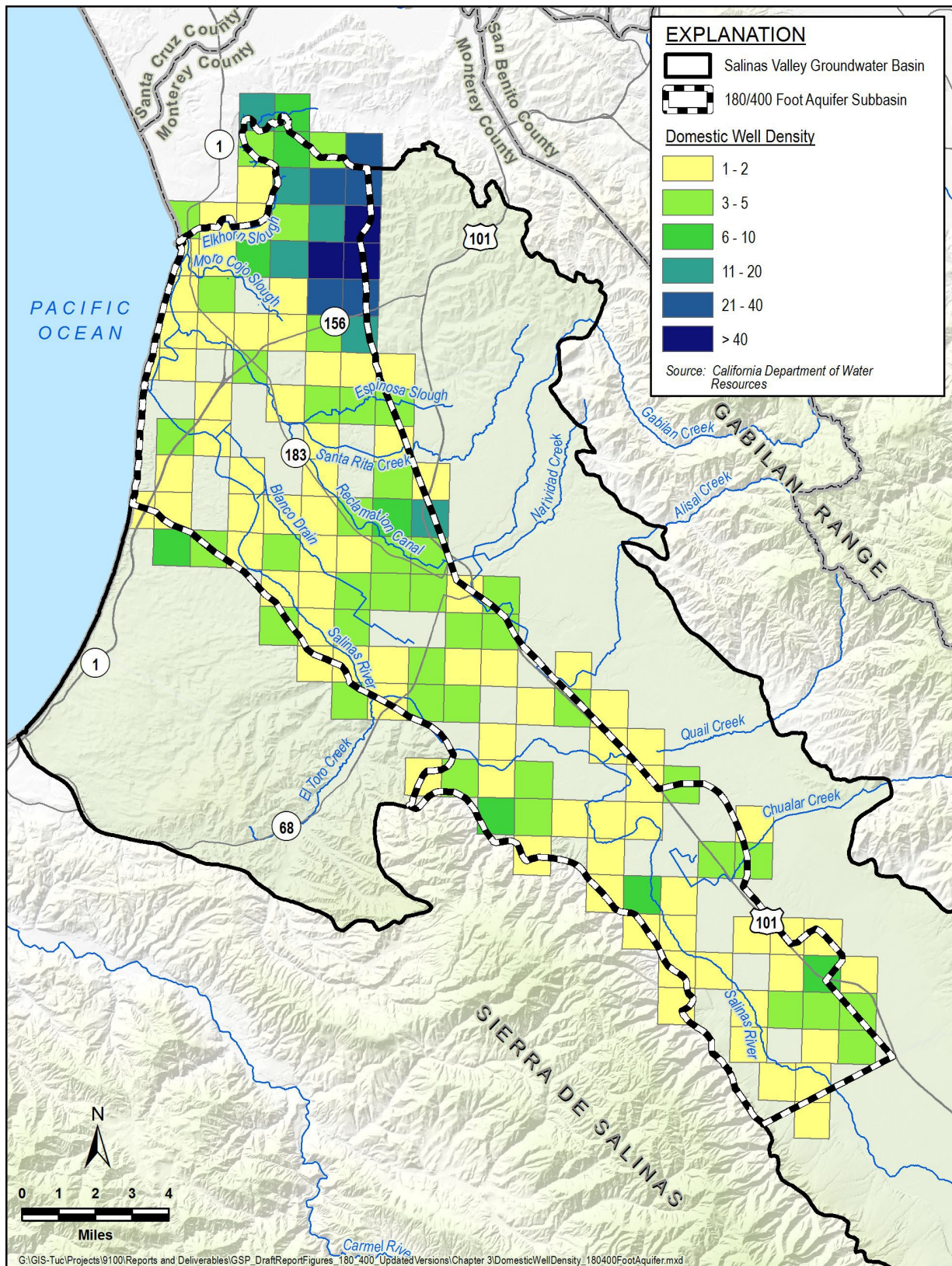


Figure 3-7. Density of Domestic Wells (Number of Wells per Square Mile)

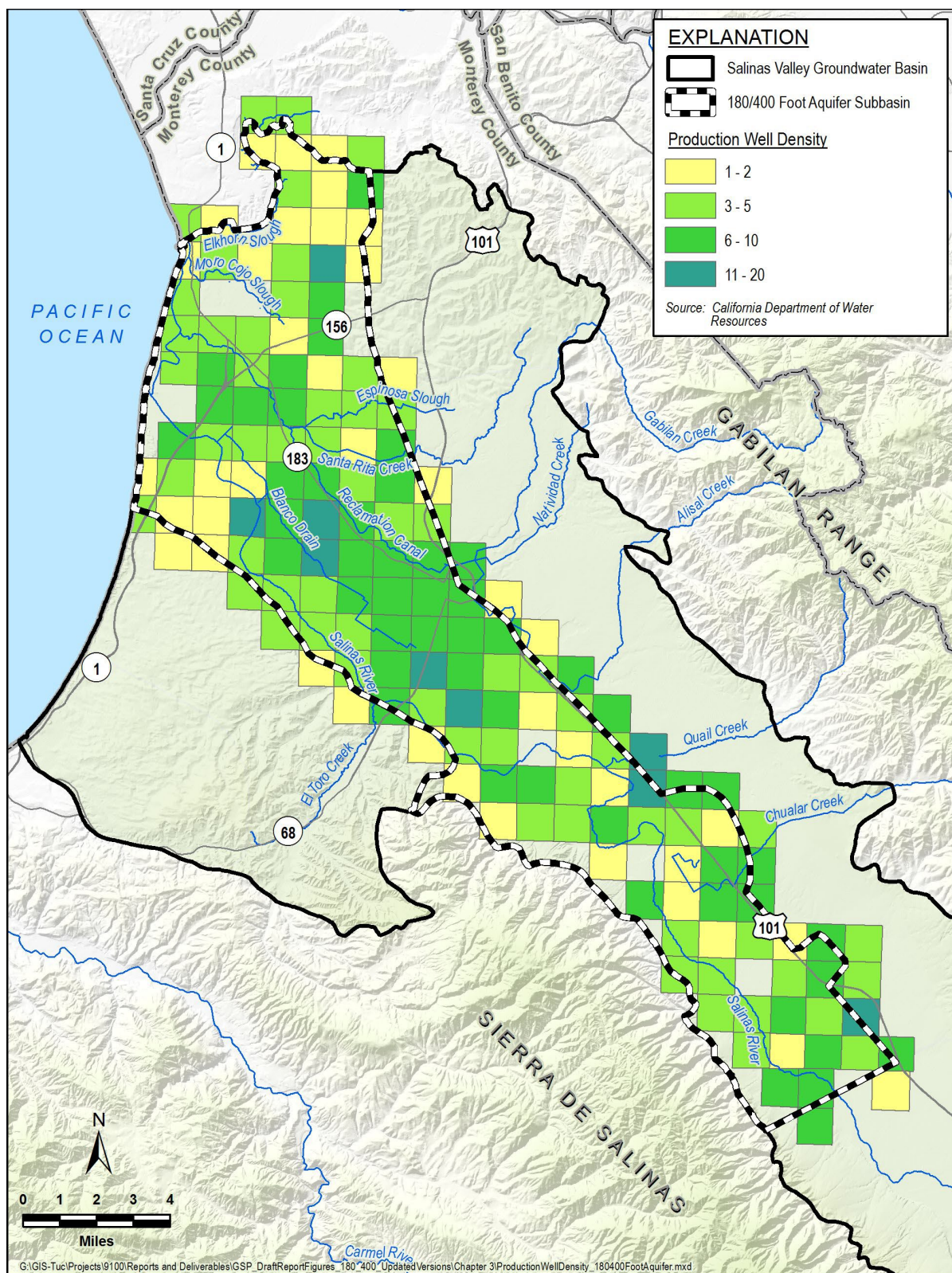


Figure 3-8. Density of Production Wells (Number of Wells per Square Mile)

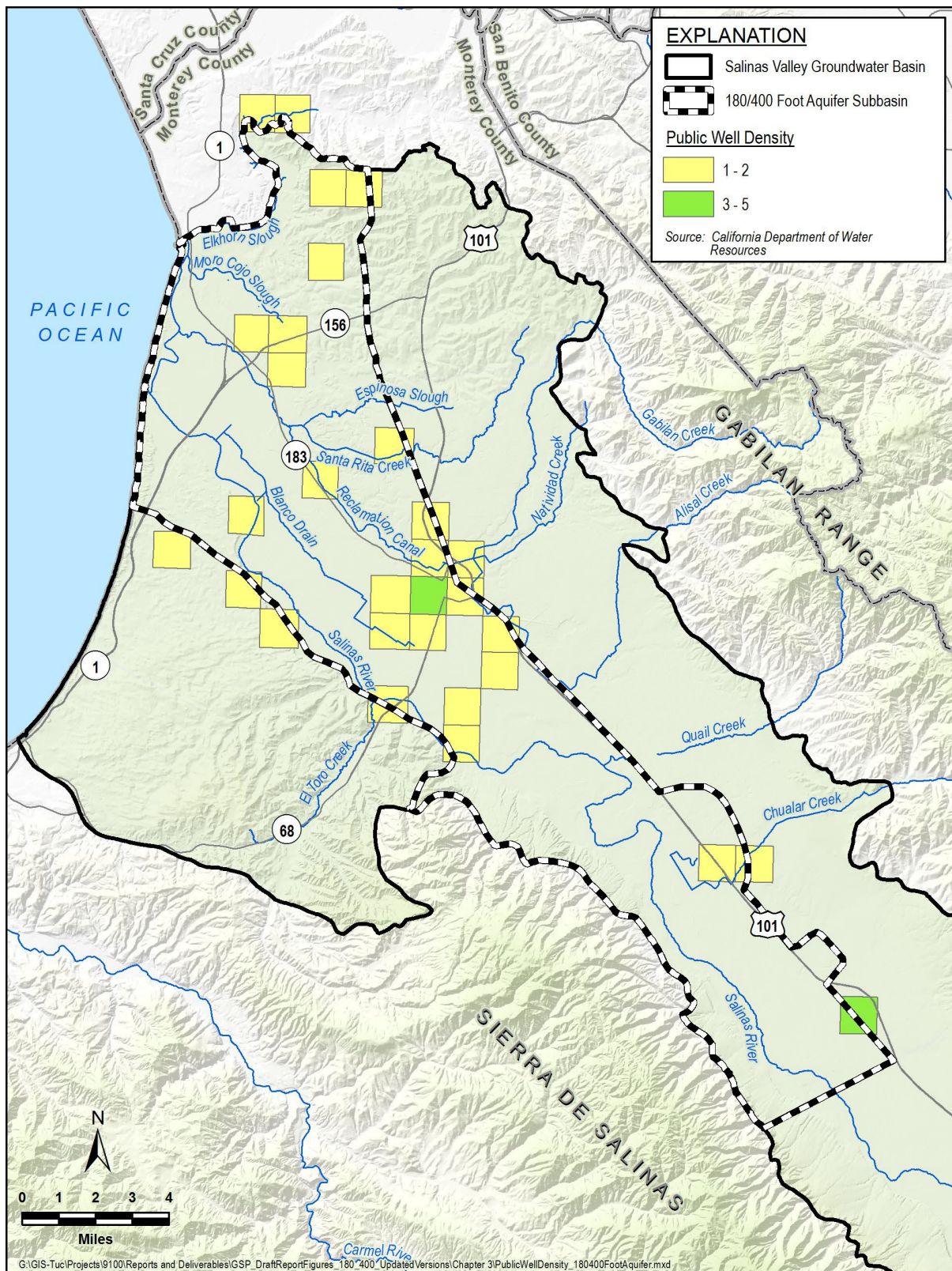


Figure 3-9. Density of Public Supply Wells (Number of Wells per Square Mile)

3.5 Existing Monitoring Programs

3.5.1 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 GMP also incorporates a Deep Aquifers Monitoring Plan to monitor conditions in the deeper aquifers of the Salinas Valley. The existing monitoring programs described below are being incorporated into and expanded under the GMP.

3.5.2 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 groundwater elevation monitoring programs document the avoidance of undesirable results in the principal aquifers in the Subbasin.

MCWRA historically monitored 21 wells within the 180/400 Subbasin as part of the CASGEM network. Of these, 12 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 Amendment 2, as described further in Chapter 7.

3.5.3 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.

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

3.5.4 Groundwater Quality Monitoring

3.5.4.1 MCWRA Seawater Intrusion Monitoring

MCWRA monitors seawater intrusion in the Salinas Valley with a network of dedicated monitoring and production wells in the 180/400, Eastside, Langley, and Monterey Subbasins, of which the majority are located in the 180/400 Subbasin. MCWRA collects samples in June and August that are analyzed for major cations and anions, and uses the data to produce chloride isocontours in the 180/400 Subbasin. This network is used for seawater intrusion monitoring under this GSP, as described in Chapter 7.

3.5.4.2 Other 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 Central Coast Regional Water Quality Control Board (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 will be 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 3.7.3.

3.5.5 Surface Water Monitoring

Streamflow gauges operated by the U.S. Geological Survey (USGS) within the 180/400 Subbasin include:

- Reclamation Ditch near Salinas (USGS Site #11152650)
- Salinas River near Chualar (USGS Site #11152300)
- Salinas River near Spreckels (USGS Site #11152500)

Water levels in the Salinas River Lagoon are measured by MCWRA at Monte Road and near the slide gate to the Old Salinas River. The locations of the surface-water monitoring facilities are depicted on Figure 3-10.

On 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.

The SWRCB CalWATRS is used to report 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 reporters if groundwater extractions were also reported as surface water diversions.

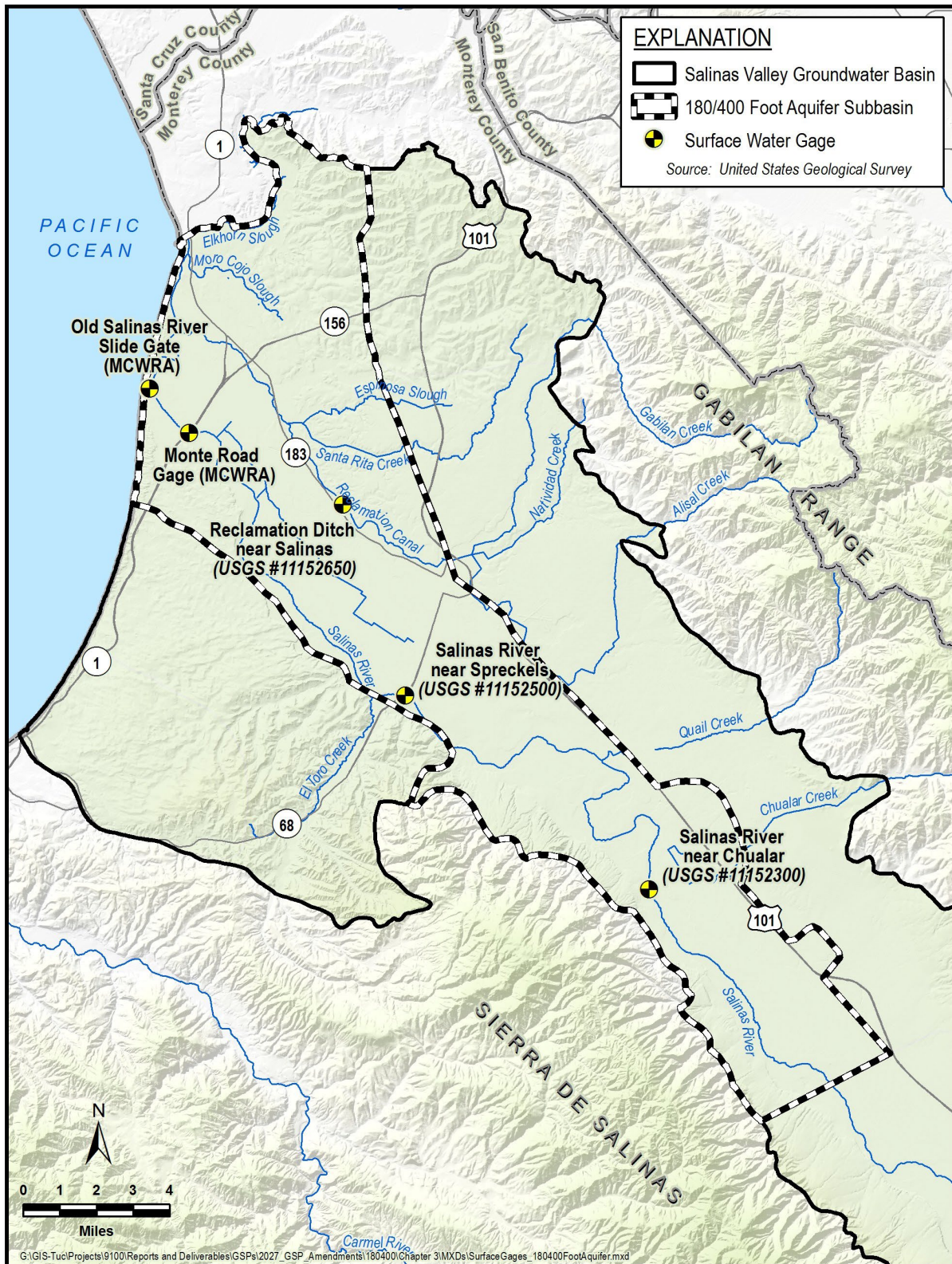


Figure 3-10. Surface Water Gauge Location

3.6 Existing Water Management Plans

3.6.1 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 2020 GSP succeeded the Groundwater Management Plan as the management plan for the Subbasin, and this GSP Amendment replaces the original GSP and GSP Amendment 1.

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 public education. 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.

3.6.2 Integrated Regional Water Management Plan

The Integrated Regional Water Management (IRWM) Plan for the Greater Monterey County Region was developed by the Greater Monterey County Regional Water Management Group (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 180/400 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 in the areas of:

- 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).

3.6.3 Urban Water Management Plans

This section describes the urban water management plans (UWMPs) developed by Cal Water for parts of the City of Salinas and Marina Coast Water District. The City of Gonzales is not required to have an urban water management plan. In addition, the Chualar area is served by an independent satellite system under California American Water which is excluded from their Monterey UWMP.

3.6.3.1 California Water Service (Salinas District) Urban Water Management Plan

Cal Water provides water service to portions of the City of Salinas and surrounding communities through its Salinas District in the 180/400, Eastside, and Langley Subbasins. 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 system losses and water supply reliability. The UWMP projects water demands through 2050 and evaluates water supply reliability under normal, single dry-year, and multiple dry-year conditions.

The UWMP describes the system's reliance on groundwater and Cal Water's support for the development and implementation of GSPs. Cal Water maintains an active well maintenance program to identify wells requiring replacement and intends to maintain sufficient wells and distribution facilities to accommodate future demand. To maintain system reliability and accommodate future growth, the UWMP describes supply-augmentation projects to reactivate 1 existing inactive well and bring three new wells online to extract an additional 7,090 AF/yr. by 2050. Cal Water also identifies groundwater sustainability considerations under SGMA as a driver for its ongoing conservation planning and resource management.

The UWMP recognizes that GSAs have authority under SGMA to implement projects and management actions. It states that the applicable GSPs contain various PMAs, and that if future actions such as groundwater pumping allocations or pumping fees are adopted, Cal Water will consider them in future supply planning.

Cal Water has and intends to take an active role in the local and state-wide management of groundwater resources over the next 5 to 25+ years by fully supporting and participating in the principal edicts of SGMA. Cal Water has had active participation with the SVBGSA, the SVBGSA Board, the SVBGSA technical advisory committees, and the subbasin committees.

The 2025 UWMP addresses groundwater quality as a factor in water supply reliability. Cal Water routinely monitors its wells and treated water for regulated constituents and tracks changes in constituent concentrations to proactively address potential water quality issues. Where source-water constituents are detected at concentrations requiring treatment, Cal Water may take affected wells offline and implement appropriate treatment. Cal Water also evaluates groundwater contamination when siting new wells and avoids areas of known contamination. Based on these monitoring and management practices, the UWMP concludes that water quality is not expected to affect the reliability of Cal Water's supplies through 2050.

Cal Water's UWMP notes that groundwater will continue to remain as its sole supply. The 2025 UWMP incorporates climate change into its reliability analyses and concludes that available supplies are expected to remain sufficient to meet projected demands, including during a 5-year drought and under projected climate change conditions.

3.6.3.2 Marina Coast Water District Urban Water Management Plan

The MCWD most recently updated its UWMP in 2015 (MCWD, 2016). The UWMP 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 losses.

The MCWD currently relies solely on groundwater, although the UWMP notes that, "The District is located along the Salinas River, and MCWD Board of Directors has considered purchasing surface water rights in the Salinas River Basin as a means of meeting long-term (beyond 2030) demands." The UWMP further notes that, "...the total Ord Community groundwater supply of 6,600 AF/yr falls short of the total 2030 Ord Community demand of 8,293 AF/yr by 1,693 AF/yr [and] ...the Central Marina service area is not projected to exceed its current SVGB groundwater allocation from the Fort Ord Reuse Authority (FORA) within the planning period."

The MCWD UWMP includes a number of demand management measures including:

- Water Waste Prevention Ordinances
- Metering
- Conservation Pricing
- Public Education and Outreach

- Programs to Assess and Manage Distribution System Real Loss
- Water Conservation Program Coordination and Staffing Support
- Water Survey Programs for Residential Customers
- Residential Plumbing Retrofits
- Residential Ultra-Low Flow Toilet Replacement Programs
- High-Efficiency Washing Machine Rebate Programs
- Commercial, Industrial, and Institutional Accounts
- Landscape Conservation Programs and Incentives

3.7 Existing Water Regulatory Programs

3.7.1 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 location 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 479 (2020)) 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 inhouse 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 area with overdraft conditions. GSPs have established Sustainable Management Criteria (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

3.7.2 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 180/400 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.

3.7.3 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 encompass 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.

3.7.4 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 (SWRCB, 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.

3.7.5 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 (CCR) for public water system wells, and all the data collected must be reported to the DDW. Title 22 also designates the Maximum Contaminant Levels (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.

3.7.6 County Ordinance Nos. 5302 and 5303 Regarding Deep Aquifer Wells

Due to identified concerns regarding the risk of seawater intrusion into the Deep Aquifers the County of Monterey Board of Supervisors adopted Ordinance No. 5302 in May 2018, pursuant to Government Code Section 65858. The ordinance was an interim urgency ordinance, which took effect immediately upon adoption. The ordinance prohibited the acceptance or processing of any applications for new wells beneath areas impacted by seawater intrusion and in the Deep Aquifers of the Salinas Valley, with stated exceptions including municipal wells and replacement wells. The ordinance was originally only effective for 45 days, but at the June 26, 2018, County of Monterey Board of Supervisors meeting, the Board of Supervisors extended the ordinance to May 21, 2020, by adoption of Ordinance No. 5303. The ordinance also required that all new wells in the Deep Aquifers meter groundwater extractions, monitor groundwater elevations and quality, and all data submitted to MCWRA and SVBGSA. Ordinances Nos. 5302 and 5303 have expired. Figure 3-11 shows the Area of Impact (Monterey County Board of Supervisors, 2018).

In December 2020, County Ordinance No. 5339 was adopted and placed a 90-day moratorium on new well construction permit applications. The moratorium was adopted so the County could study the impact of the California Supreme Court's decision on August 27, 2020, in the case *Protecting Our Water and Environmental Resources et al., v. County of Stanislaus et al.*, (10 Cal.5th 479 (2020); "Protecting Our Water").

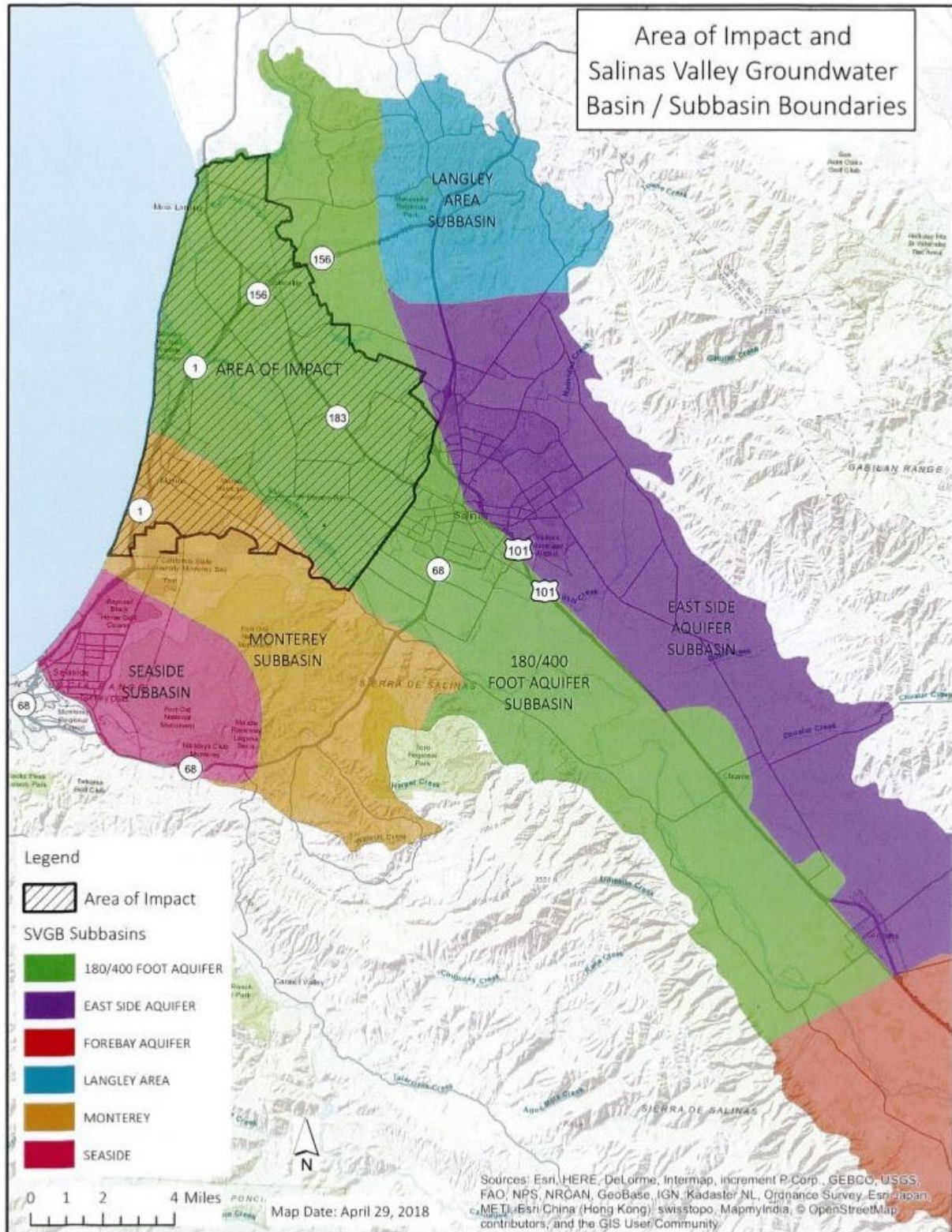


Figure 3-11. Map of Ordinance No. 5302 Area of Impact

3.7.7 Monterey County Water Resources Agency Ordinance No. 3709

MCWRA Ordinance No. 3709, adopted in 1993 by the MCWRA Board of Supervisors of the Water Resources Agency, prohibits groundwater extractions and the drilling of new extraction wells in certain portions of the 180-Foot Aquifer after January 1, 1995. The ordinance pertains to portions of the Pressure 180-Foot Aquifer in MCWRA's Pressure Area, which includes portions of the northern 180/400 Subbasin and portions of the Monterey and Eastside Subbasins, defined in the ordinance boundary delineation as Territory A and Territory B and as shown on Figure 3-12 (MCWRA, 1995).

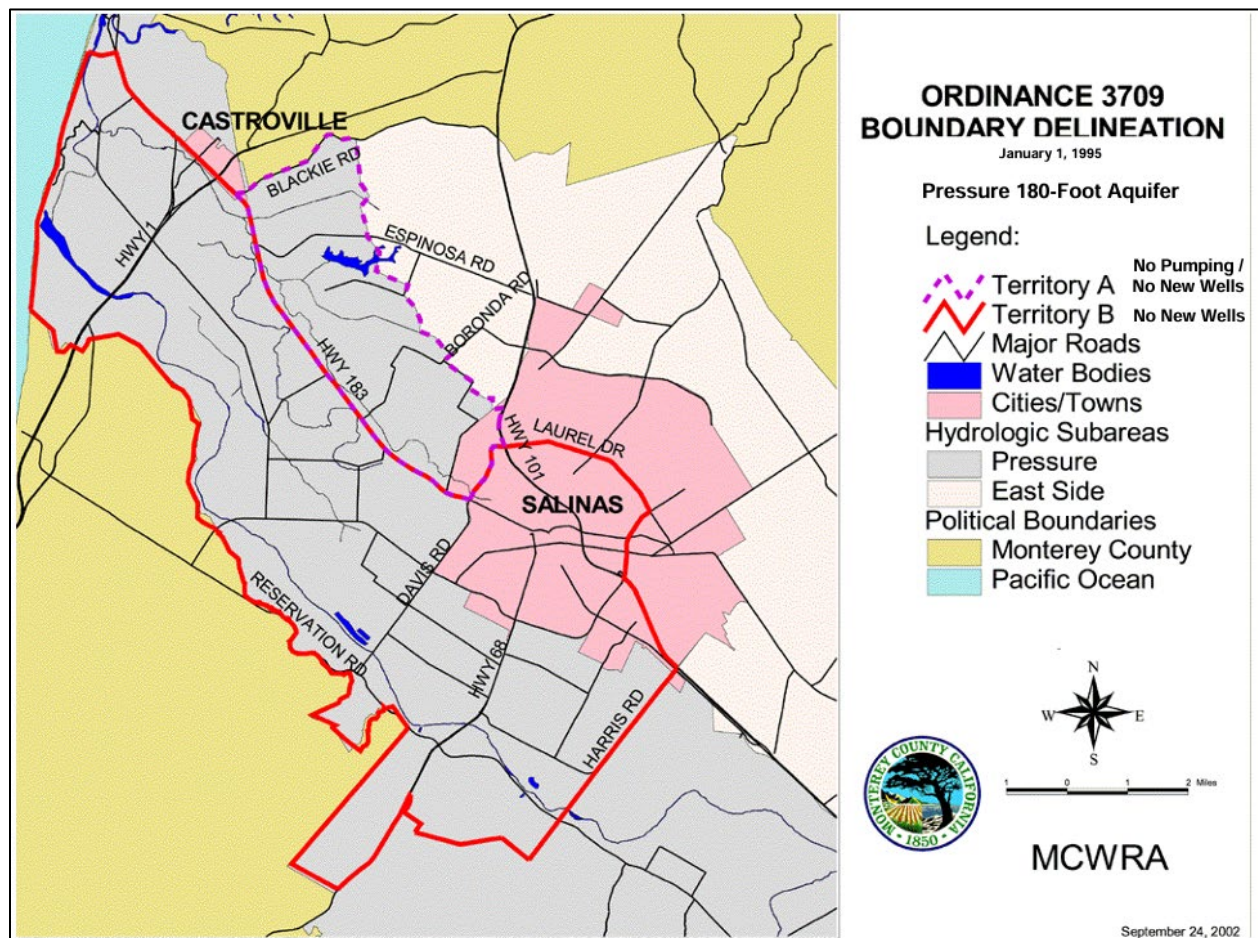


Figure 3-12. Territory A and Territory B of MCWRA Ordinance No. 3709

3.7.8 Monterey County Water Resources Agency Ordinance No. 3790

Adopted in 1994, MCWRA Ordinance No. 3790 establishes regulations for the classification, operation, maintenance, and destruction of groundwater wells in the Castroville Seawater Intrusion Project area, also known as Zone 2B.

3.7.9 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.

3.8 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 Amendment. They are taken into consideration during the preparation of the sustainability goals, when establishing SMC, and when developing PMAs. This GSP Amendment has been developed to reflect the principles outlined in those existing local plans and builds off 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 PMAs 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 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 Amendment 2 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 as part of the Periodic Evaluation (Montgomery & Associates, 2024a). The updated HCM strengthens the historical understanding of the Subbasin presented in the original GSP to guide SGMA implementation with greater accuracy. This HCM update focuses on key areas where new data indicated an updated understanding was needed. The primary updates to this HCM include:

- Refined the extents and depths of coastal aquitards including the Salinas Valley Aquitard (SVA), and incorporated data-supported gaps and thin-spots in the 180/400 Aquitard
- Updated the thickness of the 400-Foot Aquifer in the southern portion of the Subbasin
- Incorporated the results of the *Deep Aquifers Study* (Montgomery & Associates, 2024b) that defined the 400/Deep Aquitard that separates the 400-Foot Aquifer from the Deep Aquifers where the aquitard is present in the Subbasin
- Updated the depth of the bedrock surface and offshore geology
- Refined the boundary of the 180/400 Subbasin with the Corral de Tierra portion of the Monterey Subbasin

4.1 Subbasin Setting and Topography

The 180/400 Subbasin is at the northern, down-gradient end 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 the Salinas River draining towards the northwest into the Pacific Ocean at Monterey Bay (Figure 3-13).

The colored bands on Figure 3-13 show the topography of the Subbasin, derived from the USGS Digital Elevation Model (DEM). The Subbasin slopes at an average grade of approximately 5 feet/mile to the northwest toward the Pacific Ocean. Land surface elevations in the Subbasin range from approximately 500 feet above sea level along its border with the Sierra de Salinas to sea level at Monterey Bay.

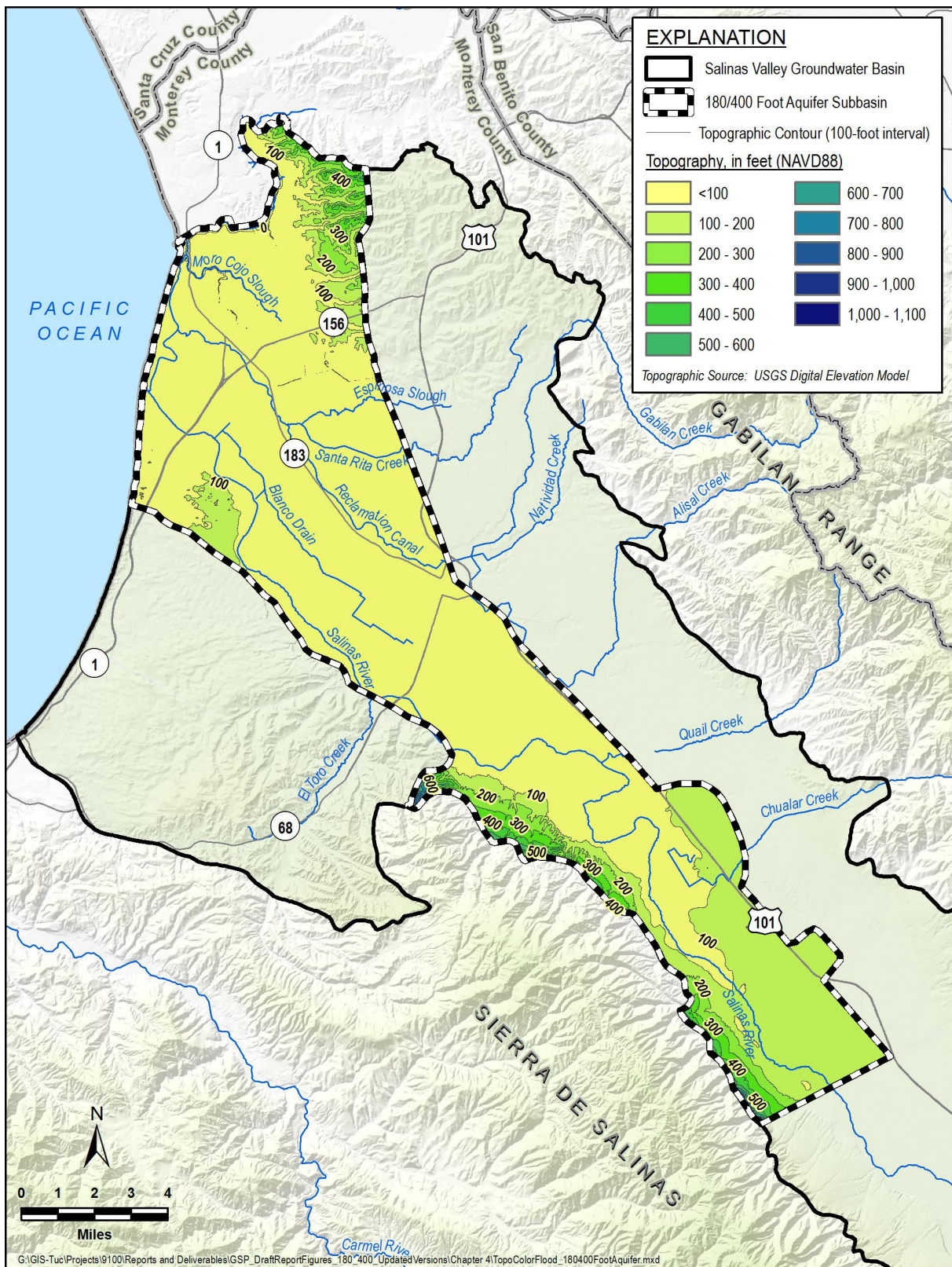


Figure 4-1. 180/400-Foot Aquifer Subbasin Topography

4.2 Subbasin Geology

The subbasin geology describes the physical framework in which groundwater occurs and moves. The geology of the Subbasin controls the locations and depths of aquifers and aquitards, as well as the subbasin boundaries. The geologic descriptions described 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 periods of marine and terrestrial sedimentation in a tectonically active area on the eastern edge of the Pacific Plate. Figure 3-14 presents a geologic map of the Subbasin and vicinity. This geologic map was adopted from the 2001 Digital Geologic Map of Monterey County as well as the California Geologic Survey's 2010 statewide geologic map (Rosenberg, 2001; Jennings, *et al.*, 2010). The locations of cross-sections used to define the principal aquifers in Section 4.4 are also shown on Figure 3-14. The legend on Figure 3-14 presents the age sequence of the geologic materials from the youngest unconsolidated Quaternary sediments to the oldest pre-Cambrian basement rock. It also contains the locations of cross-sections that are located in Section 4.4.

The geology of the 180/400 Subbasin is characterized by alluvium, terrace deposits, marine deposits, the Aromas Red Sands, the Paso Robles Formation, and the Purisima Formation (DWR, 2004a). The Santa Margarita Sandstone and Monterey Formation are minor components of the Subbasin geology, and are mentioned here primarily because they are important components of Salinas Basin stratigraphy. This Subbasin geology is a result of fluvial sedimentary deposits from the Salinas River, alluvial deposits from tributaries, and marine deposits from the Pacific Ocean. The majority of the sediments in this subbasin are a mix of sands, gravels, and clays.

FIGURE 4-2. EXPLANATION

QUATERNARY

Qal	Alluvial deposits, undifferentiated
Qb	Basin deposits
Qd	Dune deposits
Qfl	Artificial fill
Qfp	Flood-plain deposits, undifferentiated?
Qfpl	Alluvial fans, late Pleistocene
Qfpm	Alluvial fans, middle Pleistocene
Qhf	Alluvial fan deposits, Holocene
Qsc	Stream channel deposits
Qa	Aromas Sand, undifferentiated
Qbs	Beach sand
Qc	Colluvium
Qe	Eolian deposits
Qt	Fluvial terrace deposits, undifferentiated

TERTIARY

Tcg	Unnamed clastic sediments, sandstone and conglomerate
Tms	Unnamed clastic sediments

CRETACEOUS

Kms	Schist of Sierra de Salinas
Kqmg	Garnetiferous quartz monzonite of Pine Canyon
pKm	Marble
pKqf	Quartzofeldspathic rocks

GEOLOGIC FEATURES

——	fault, certain
.....	fault, concealed

QUATERNARY-TERTIARY

Qtmp	Fluvial terrace deposits, middle Pleistocene
Qtlp	Fluvial terrace deposits, late Pleistocene

4.2.1 Geologic Formations

Major geologic units present in the 180/400 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; Clark, *et al.*, 2000; Johnson, *et al.*, 1988; DWR, 2004a). The corresponding designations on Figure 3-14 are provided in parentheses.

Quaternary Deposits

- *Alluvium from streams and small drainages* (Qsc, Qal, Qb, 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. Clays mixed with silt, sand, and organic material have collected at the bottoms of past and present basins (Qb). 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.

- *Aromas Red Sands and similar (Qa, Qe, and Qc)* – The Aromas Red Sands Formation is comprised of lower fluvial sand units and upper aeolian sand units generally separated by interbedded clays and silty clays (DWR, 2004a). Some of these interbedded clays are highly cemented and may act as caprock when exposed at the tops of hills, or as perch zones within the formation (Harding, 2001). The Aromas Red Sands include partly consolidated, moderately to poorly sorted, silty clay, sand, and gravel (Qa). This unit is located at the northeastern end of the Subbasin along the boundary with the Langley Subbasin. Eolian deposits (Qe) are transported by wind and are exclusively sand and finer grains, as gravel is too heavy to be carried by wind. Sand matching that of the Aromas Red Sands is also found in windblown deposits (Qe). These deposits can also be found along the boundary with the Langley Area Subbasin and as well as along the boundary with the Monterey Subbasin. Colluvium collects gradually over time as a result of gravity (Qc). These small, isolated deposits are found at the northeastern end of the Subbasin, where the topography is steeper. These small Holocene deposits were transported by a combination of runoff and gravity, not streamflow. Some sources refer to the windblown deposits as the Upper Aromas Red Sands.
- *Alluvial fans (Qhf, Qfpl and Qfpm)* – Alluvial fans are sediments deposited in a distributary manner at the base of mountain fronts where streams emerge (Kennedy/Jenks, 2004). They consist of weakly to moderately consolidated, moderately to poorly sorted sand, silt, and gravel deposits, although recent data have shown them to have higher clay content than previously understood. This clay content is likely the result of chemical decomposition of the feldspars found in the granite. Gravel content increases toward the head of the alluvial fans, while finer sediments such as clay and silt increase towards the furthest extents of the fans, interfingering with the silts and clays often found in flood-plain and stream-channel deposits. Late and middle Pleistocene alluvial fans (Qfpl and Qfpm, respectively) can be weakly to moderately consolidated.
- *Terrace deposits (Qt, Qtmp, and Qtlp)* – Terrace occur as the erosional remnants of former stream channels and floodplains. In 180/400 Subbasin, they can be found around the eastern boundary with the Langley Area and Eastside Aquifer Subbasins (DWR, 2004a). They are partially consolidated and consist mostly of sand mixed with silt and gravel. Some are known to be from the middle Pleistocene (Qtmp) and late Pleistocene (Qtlp). Others are of indeterminate age (Qt).

These quaternary deposits are sometimes grouped together in other reports as Alluvium or Valley Fill Deposits.

Quaternary-Tertiary Deposits

Paso Robles Formation (QTcl and QTp, not shown on map) – The Paso Robles Formation underlies the entire Subbasin but is rarely exposed at the surface. This Pliocene to lower Pleistocene unit is composed of lenticular beds of sand, gravel, silt, and clay from terrestrial deposition (Thorup, 1976; Durbin, et al., 1978). The depositional environment is largely fluvial but also includes alluvial fan, lake and floodplain deposition (Durbin, 1974; Harding ESE, 2001; Thorup, 1976; Greene, 1970). The alternating beds of fine and coarse materials typically have thicknesses of 20 to 60 feet (Durbin, et al., 1978). Durham (1974) reports that the thickness of the Formation is variable due to erosion of the upper part of the unit; and that the Formation is approximately 1,500 feet thick near Spreckels and 1,000 feet thick near the City of Salinas. The Paso Robles Formation has 3 main bodies: an upper, middle, and lower body (Harding ESE, 2001; HydroMetric, 2009). The middle body of the Paso Robles Formation is clay-rich, and separates the more productive zones of the upper and lower bodies (Harding ESE, 2001; HydroMetric, 2009).

Tertiary Deposits

Purisima Formation (Tp, not shown on map) – The Purisima Formation underlies much of the Subbasin; however, it is also not exposed at the surface (DWR, 2004a). This Pliocene unit consists of interbedded siltstone, sandstone, conglomerate, clay and shale deposited in a shallow marine environment (Greene, 1977; Harding ESE, 2001). The Purisima Formation ranges from 500 to 1,000 feet in thickness (WRIME, 2003).

Santa Margarita Sandstone (Tsm, not shown on map) – The Santa Margarita Sandstone is not exposed at the surface in this Subbasin. This Miocene unit consists of white, arkosic sandstone made of very fine to coarse sand, and conformably overlies the Monterey Formation. It has very thick beds and some localized cross-bedding. In some areas, the Santa Margarita Sandstone directly underlies the Paso Robles Formation where the Purisima Formation is absent (Greene, 1977). The Santa Margarita Formation is most likely to be encountered at depth near the boundary with the Monterey Subbasin.

Monterey Formation (Tm, not shown on map) – The Monterey Formation is also not exposed at the surface in this Subbasin. This Miocene unit consists of shale and mudstone deposited in a shallow marine environment (Harding ESE, 2001; Greene, 1977). This unit typically underlies the Salinas Valley Groundwater Basin and acts as a boundary for vertical groundwater flow, which is why it is included in the definition of the “base” or “bottom” of several Subbasins. This unit is most likely to be encountered at depth near the boundary with the Monterey Subbasin.

Cretaceous Rocks

The Sierra de Salinas, which borders the Subbasin to the southwest, is composed of metamorphic (Kms, pKm, and pKqf) and igneous (Kqmg) rocks and is important as a geologic boundary in the Subbasin and greater Salinas Valley Groundwater Basin as well.

4.2.2 Restrictions to Flow

There are no known structural features that restrict groundwater flow within the 180/400 Subbasin, such as geologic folds or faults. However, a buried trace of the Reliz Fault generally aligns with the boundary between the Monterey Subbasin and the 180/400-Foot Aquifer Subbasin. The location of this fault is poorly constrained or defined. Beneath the bottom of the Subbasin, the Monterey Formation is displaced downward on the northeast side of the Reliz Fault by as much as 1,000 feet (Durbin, 2007). There is no sign of fault affecting “late Pleistocene or younger sediments” (HLA, 1994; Feeney and Rosenberg, 2003). This fault does not appear to impede groundwater flows based on observed groundwater elevation and seawater intrusion conditions across the boundary with the Monterey Subbasin close to the coast. The fault may behave differently farther south near the Salinas River and Toro Creek confluence where groundwater levels suggest some potential disconnection across the mapped location of the fault. Additional data and analyses are needed to verify the impact of the fault in multiple areas, whether it behaves as a facilitator or impediment to groundwater flows.

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 3-15 is a composite soil map of soils in the Subbasin from the USDA Natural Resources Conservation Service (NRCS) and the Gridded Soil Survey Geographic (SSURGO) Database that is produced by the National Cooperative Soil Survey (NCSS).

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

- **Mollisols** are the most widespread soil order in the 180/400-Foot Aquifer 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 enough available moisture to support perennial grasses is typical.

- **Entisols** are the predominant 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. These soils may be found near active tributaries in the Subbasin.
- **Vertisols** are present in some areas on the Subbasin lowlands. 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. During the wet season these soils trend to have water pooling on the surface due to the high clay content.
- **Alfisols** are present along the margins of the Subbasin. Alfisols are known to have natural fertility both from clay accumulation 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.

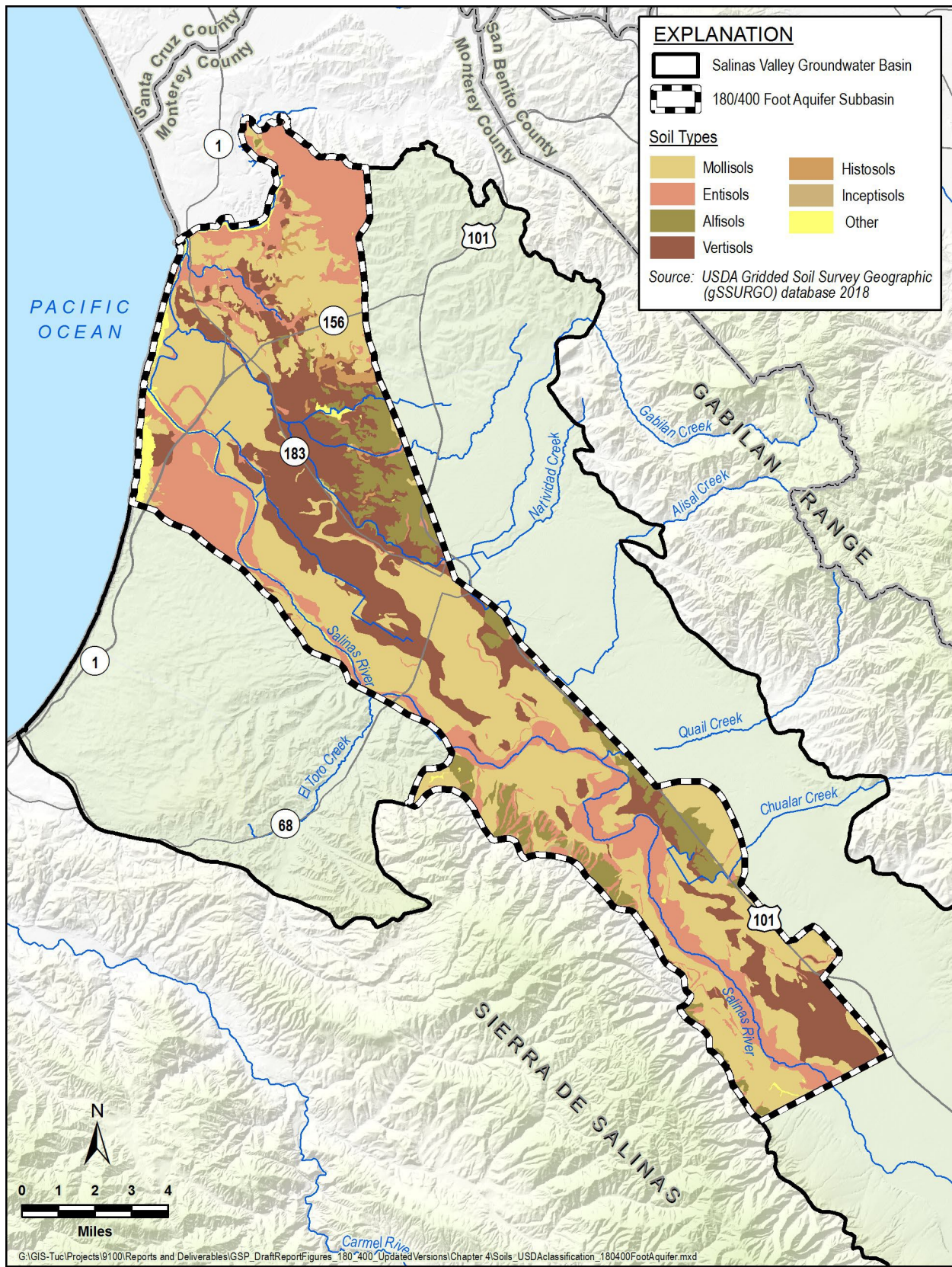


Figure 4-3. Composite Soils Map Subbasin Extent

The subbasin extents describe both the lateral and vertical extents of the Subbasin. The Subbasin extents are defined by the California Department of Water Resources (DWR) and are documented in Bulletin 118, (DWR, 2003; DWR, 2016a).

Figure 3-13 illustrates the extent of the Subbasin.

4.2.4 Lateral Subbasin Boundaries

The 180/400 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.

4.2.4.1 Boundaries with Adjacent Subbasins

The 180/400 Subbasin is bounded by the following subbasins:

- **The Forebay Subbasin.** The southern boundary with the adjacent Forebay Subbasin is near the town of Gonzales (DWR, 2004a). It is the approximate historically southeastern limit of confining conditions that were the defining characteristic of the 180/400-Foot Aquifer Subbasin. Many of the sediments that define the aquifer of the 180/400-Foot Aquifer Subbasin are generally found in the Forebay Subbasin with less confining conditions. The marine-derived Salinas Valley Aquitard is not found in the Forebay Subbasin, but analogous continentally-derived clays are present and may create locally confining conditions. There is no reported hydraulic barrier between the Forebay and the 180/400 Subbasins; however, the sediments are more stratified in the 180/400 Subbasin than in the Forebay Subbasin.
- **The Eastside Subbasin.** The eastern boundary with the adjacent Eastside Subbasin generally follows the trace of Highway 101 and coincides with the northeastern limit of shallow confining conditions in the 180/400 Subbasin resulting from the deposition of marine clays. An analysis of stratigraphic correlations concluded that the depositional facies near this boundary begin to change from alluvial fan deposits on the east to Salinas Basin fluvial and marine deposits on the west (Kennedy-Jenks, 2004). Previous studies of groundwater flow across this boundary indicate that there is restricted hydraulic connectivity between the subbasins. Newly acquired data in combination with existing studies indicate that this restricted hydraulic connectivity may be due to the abundance of fine-grained materials that define the farther extents of the alluvial fans.
- **The Langley Subbasin.** The northern boundary with the Langley Subbasin generally coincides with the 200-foot land surface elevation contour. Although the Langley Subbasin is not on the valley floor, there are no reported hydraulic barriers separating these subbasins, particularly as the Aromas Sand comprises portions of both the 180-Foot and 400-Foot Aquifers. Therefore the GSP needs to consider potential for groundwater flow between these adjacent subbasins.

- **The Monterey Subbasin.** The western boundary with the Monterey Subbasin is based on topographic rise that coincides with a buried trace of the Reliz fault. Newly acquired data indicate that this fault behaves differently near the coast than it does near the confluence of the Salinas River and Toro Creek. There is potential for groundwater flow between these 2 subbasins, and this fault may impact how groundwater flows between them. The bedrock surface in the Monterey Subbasin was revised significantly in the Corral de Tierra area based on new data. While this does not impact the bedrock surface in the 180/400 Subbasin, the groundwater flow relationship will be revised to reflect this new surface, which includes locations of no or limited groundwater flow along the Toro Creek corridor. The potential for groundwater flow from Corral de Tierra to the 180/400 Subbasin is therefore reduced.

4.2.4.2 Physical Basin Boundaries

The 180/400 Subbasin is bounded by the following physical feature:

- **The Monterey Bay shoreline.** The northern Subbasin boundary is defined by the Monterey Bay shoreline. The Subbasin aquifers extend across this boundary into the subsurface underlying Monterey Bay and there are no hydrogeologic barriers limiting groundwater flow across this coastal boundary. The recent HCM updates included the Bay geology by extending the contacts between formations to Monterey Canyon where they crop out and are in contact with ocean water. The geometry of the Bay was also updated to reflect the most recent bathymetry. These changes are mainly geometry and geology focused, and affirm that there are no hydrogeologic barriers to groundwater flow across the coastal boundary.
- **Elkhorn Slough.** The northern boundary of the Subbasin follows the current course of Elkhorn Slough; corresponding to a paleo-drainage of the Salinas River (DWR, 2003). Elkhorn Slough separates the 180/400 Subbasin from the Pajaro Valley Groundwater Basin. This paleo-drainage is a 400-Foot deep, buried, clay-filled boundary that limits groundwater flow between these basins (Durbin, et al., 1978).
- **The Sierra de Salinas.** The southwest extension of the King City fault corresponds to the contact between the Quaternary deposits and the low-permeability granitic and metamorphic basement rock of the Sierra de Salinas. This geologic contact creates a groundwater flow barrier and the southwestern hydrogeologic boundary of the Subbasin.

4.2.5 Vertical Subbasin Boundaries

The base, or bottom, of the Subbasin has been updated with newly available data, and expanded to include updates to offshore geology. The base of the groundwater basin is defined as a combination of 1) the contact between the permeable sediments and the crystalline rocks of the Gabilan and Sierra de Salinas Ranges, where these contacts occur and are observable, 2) the low-

permeability Monterey Formation where it occurs, and 3) the base of the usable, productive unconsolidated sediments as defined by Durbin *et al* (1978).

Within the bulk of the subbasin, the usable portion of the Subbasin does not always include the full thickness of Alluvium. Previous investigations have estimated that the entire sedimentary sequence in the Salinas Valley Groundwater Basin might range between 10,000 and 15,000 feet thick. However, the productive freshwater principal aquifers in this Subbasin are at shallower depths. With increasing depth, 2 factors limit the viability of the sediments as productive, principal aquifers:

1. Increased consolidation and cementation of the sediments decrease well yields.
2. Deeper strata contain poor-quality brackish water unsuitable for most uses.

Because these factors gradually change with depth, there is not a sharp well-defined bottom of the Basin throughout the 180/400 Subbasin, and this GSP retains the bottom of the aquifer that was defined by the USGS (Durbin, *et al.*, 1978) where other bedrock surfaces are not observable with current data.

Along the boundary with the Sierra de Salinas, there may be contact with the crystalline rocks where the Reliz Fault occurs. The base of the Basin near the boundary with the Monterey Subbasin is better defined by the low-permeability Monterey Formation, where it is the defined base of that subbasin. The Monterey Formation is also a part of the stratigraphy encountered in the basin, and continues under Monterey Bay until it crops out in Monterey Canyon. Along the boundary with the Eastside Subbasin, the usable base of the basin was extrapolated to the revised bedrock surface in the Eastside Subbasin, which is defined as the contact between the alluvial fans and the granitic rocks of the Gabilan Range. This bedrock contact was more observable with recent AEM surveys, and revised to better reflect the data.

Figure 3-16 is a map of elevation contours of the bottom of the Subbasin. Figure 3-17 shows a contour map of depth to the bottom of the Subbasin prepared using the extrapolated bottom elevation and ground surface elevation.

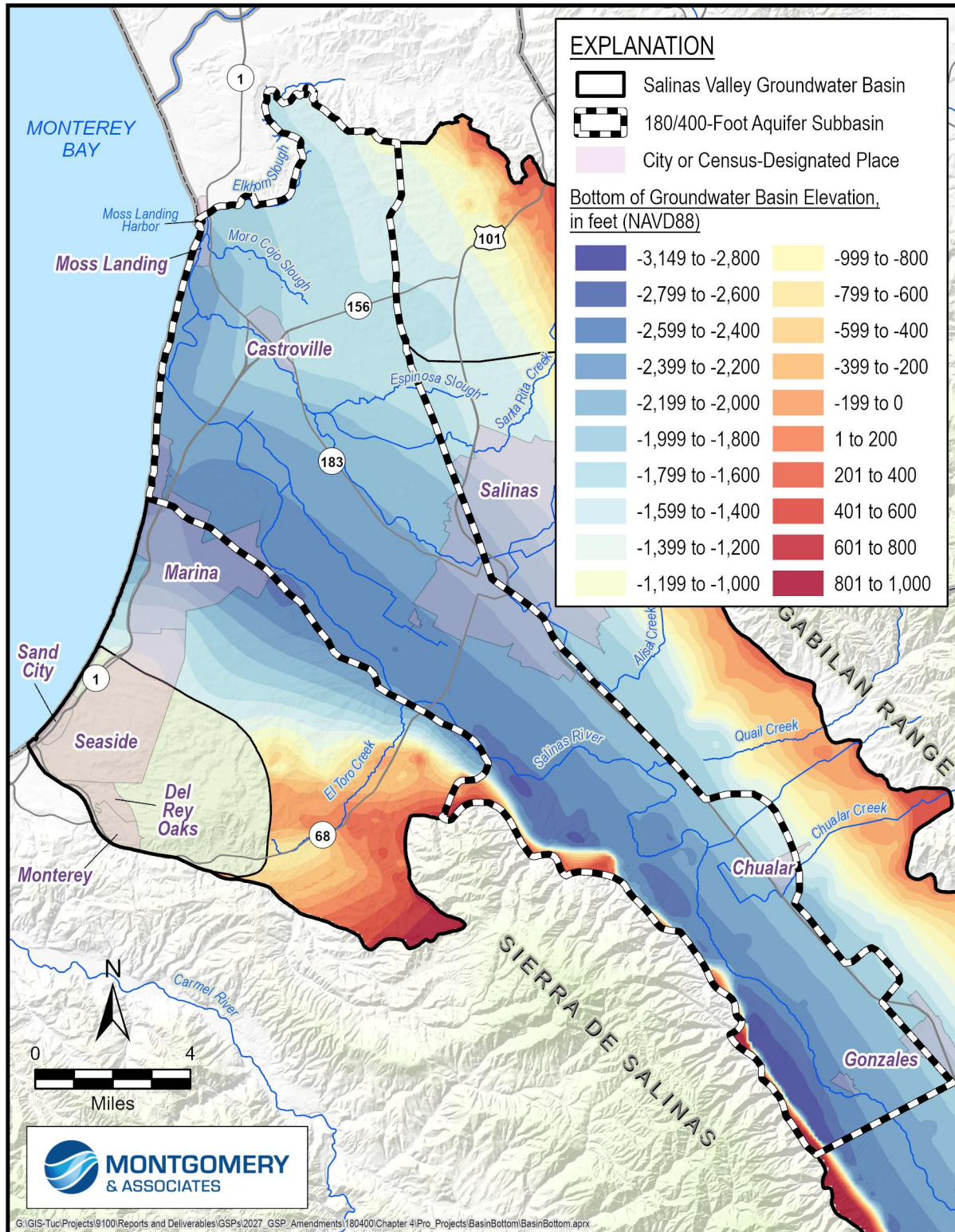


Figure 4-4. Elevation of the Bottom of the 180/400-Foot Aquifer Subbasin

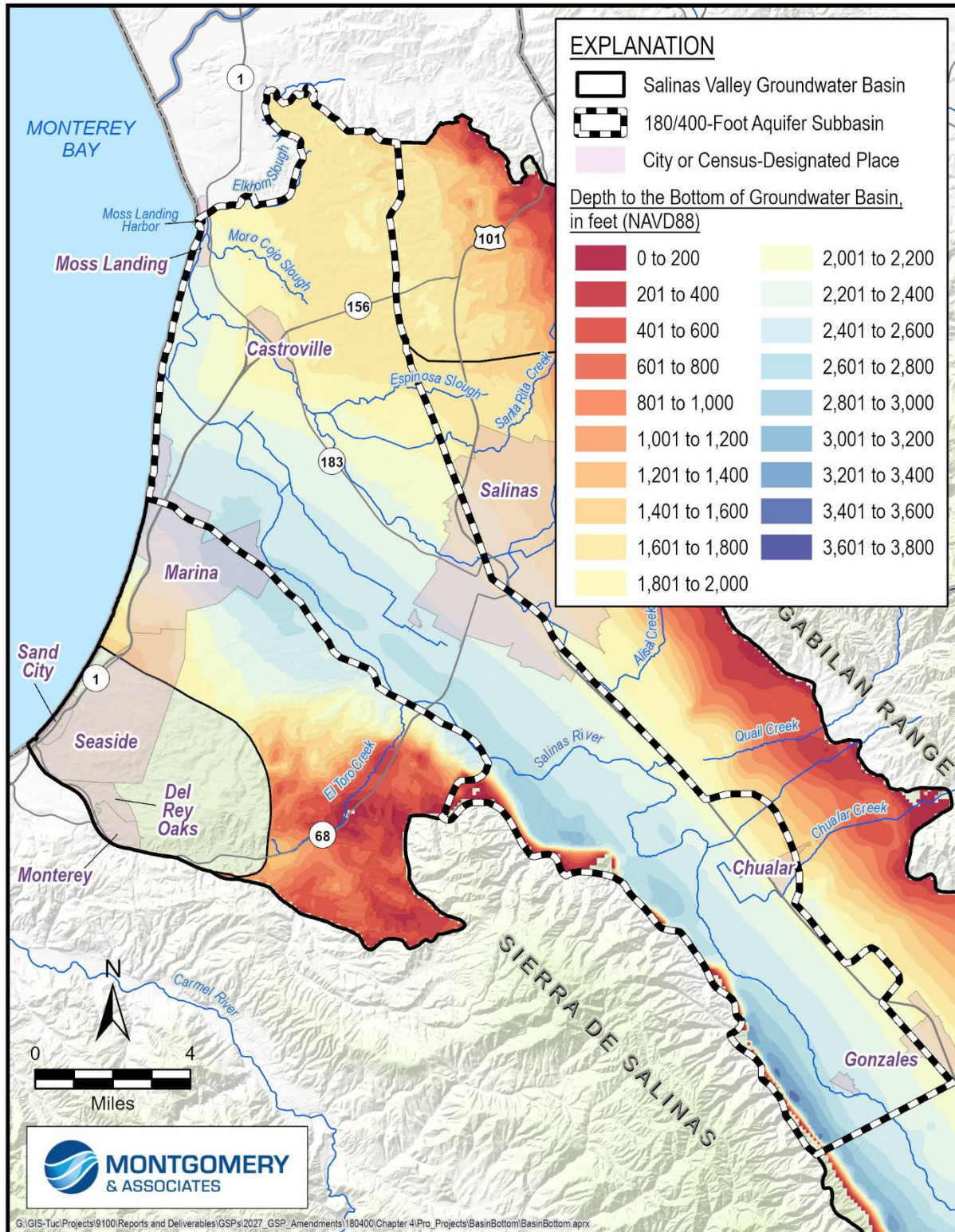


Figure 4-5. Depth to Bottom of the 180/400-Foot Aquifer Subbasin, in feet

4.3 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.

Groundwater in the 180/400 Subbasin is primarily produced from alluvial deposits belonging to 3 geologic units: the Holocene Alluvium, the Quaternary Older Alluvium, and the Pliocene Paso Robles Formation described above. Although these 3 geologic formations differ in age, they have similar distributions of sediment type and layering; and in practice it is difficult to distinguish between these formations during borehole drilling. For purposes of groundwater development in the Subbasin, these geologic units are collectively referred to as alluvium.

Although groundwater can be found throughout most of the Holocene Alluvium and the Quaternary Older Alluvium, not all groundwater is part of a principal aquifer. 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. All the groundwater encountered in the Subbasin is a part of the overall groundwater system, but the focus of this GSP is on the principal aquifers. Within the 180/400 Subbasin there are 3 principal aquifers: the 180-Foot Aquifer, the 400-Foot Aquifer, and the Deep Aquifers.

The most recent, detailed hydrostratigraphic analysis of the 180/400 Subbasin was conducted in 2024 and refines the understandings published in 2004 and 2015 (Kennedy/Jenks, 20024; Brown and Caldwell, 2015). These updates are reflected here.

4.3.1 Principal Aquifers and Aquitards

The shallowest water-bearing sediments are thin, laterally discontinuous, and do not constitute a significant source of water for the Subbasin. These shallow sediments are therefore not considered a principal aquifer. These sediments are generally within 30 feet of the ground surface, above the Salinas Valley Aquitard or shallow clays, and are part of the Holocene Alluvium unit. Although these sediments are a minor source of water due to their poor quality and low yield, some small domestic wells draw water from this zone (Kennedy-Jenks, 2004; DWR, 2003; Showalter, 1984). Groundwater in these sediments is hydraulically connected to the Salinas River but is assumed to be relatively poorly connected to the underlying productive principal aquifers due to the presence of the underlying Salinas Valley Aquitard, although some gaps and thin spots may exist.

Beneath the shallow sediments, the following series of aquitards and principal aquifers have long been recognized in a multitude of studies and reports. They are the distinguishing hydrostratigraphic features of this Subbasin.

- Salinas Valley Aquitard
- 180-Foot Aquifer
- 180/400-Foot Aquitard
- 400-Foot Aquifer
- 400-Foot/Deep Aquitard
- Deep Aquifers

Table 3-5 presents the Basin's geologic sequence and conceptual hydrostratigraphy, along with the sequence of principal aquifers and aquitards.

Table 3-1. Generalized Geologic-Hydrogeologic Relationships

Period/Epoch	Geological Unit	Principal Aquifers and Aquitards
Holocene	Recent Dune Sand (Qd) Older Dune Sand (Qod)	Dune Sand Aquifer
Pleistocene	Old Alluvium / Valley Fill Deposits (Qo/Qvf)	Fort Ord-Salinas Valley Aquitard
		180-Foot Aquifer
	Aromas Sand (Qar)	180/400-Foot Aquitard
		400-Foot Aquifer
	Paso Robles Formation (QTp)	400/Deep Aquitard
Pliocene	Purisima Formation (Tp)	Deep Aquifers
	Santa Margarita Sandstone (Tsm)	
Miocene	Monterey Formation (Tm)	N/A (Minimally Water-Bearing)

4.3.1.1 Salinas Valley Aquitard

The Salinas Valley Aquitard is the shallowest, relatively continuous hydrogeologic feature in the Subbasin. The aquitard is composed of blue or yellow sandy clay layers with minor interbedded sand layers (DWR, 2003). The Salinas Valley Aquitard is a marine clay that correlates to the

Pleistocene Older Alluvium stratigraphic unit and was deposited in a shallow sea during a period of relatively high sea level. The HCM updates include other shallow clays from continental sources deposited at the same time. They were identified from the AEM surveys and confirmed with WCR analysis. These clays and the Salinas Valley Aquitard act together as an impediment to downward groundwater flows to the principal aquifers.

Figure 3-18 shows the lateral and vertical extent of the Salinas Valley Aquitard and other identified shallow clays. Laterally, the Salinas Valley Aquitard extends from Monterey Bay in the north to Chualar in the south, and to an irregular contact in the east that is roughly represented by the DWR-designated boundary with the Eastside Subbasin (DWR, 2003). Most of the Salinas Valley Aquitard is generally encountered at depths of less than 30 feet. Close to Monterey Bay, the Salinas Valley Aquitard is over 100 feet thick but thins to 10 feet near the City of Salinas (DWR, 1975). The continental clays identified during the HCM updates have been included as yellow and red areas on Figure 3-18.

While this clay layer is relatively continuous in the northern portion of the Valley, it is not monolithic. The clay layer is missing in some areas and pinches out in certain areas. Known gaps are shown in gray on Figure 3-18. In these intermittent areas, the shallow sediments may be in hydrologic connection with the 180-Foot Aquifer, and may be a potential conduit for recharge. This is especially pertinent for places where the Salinas River flows over these gaps and may provide recharge to the alluvial sediments and principal aquifers below.

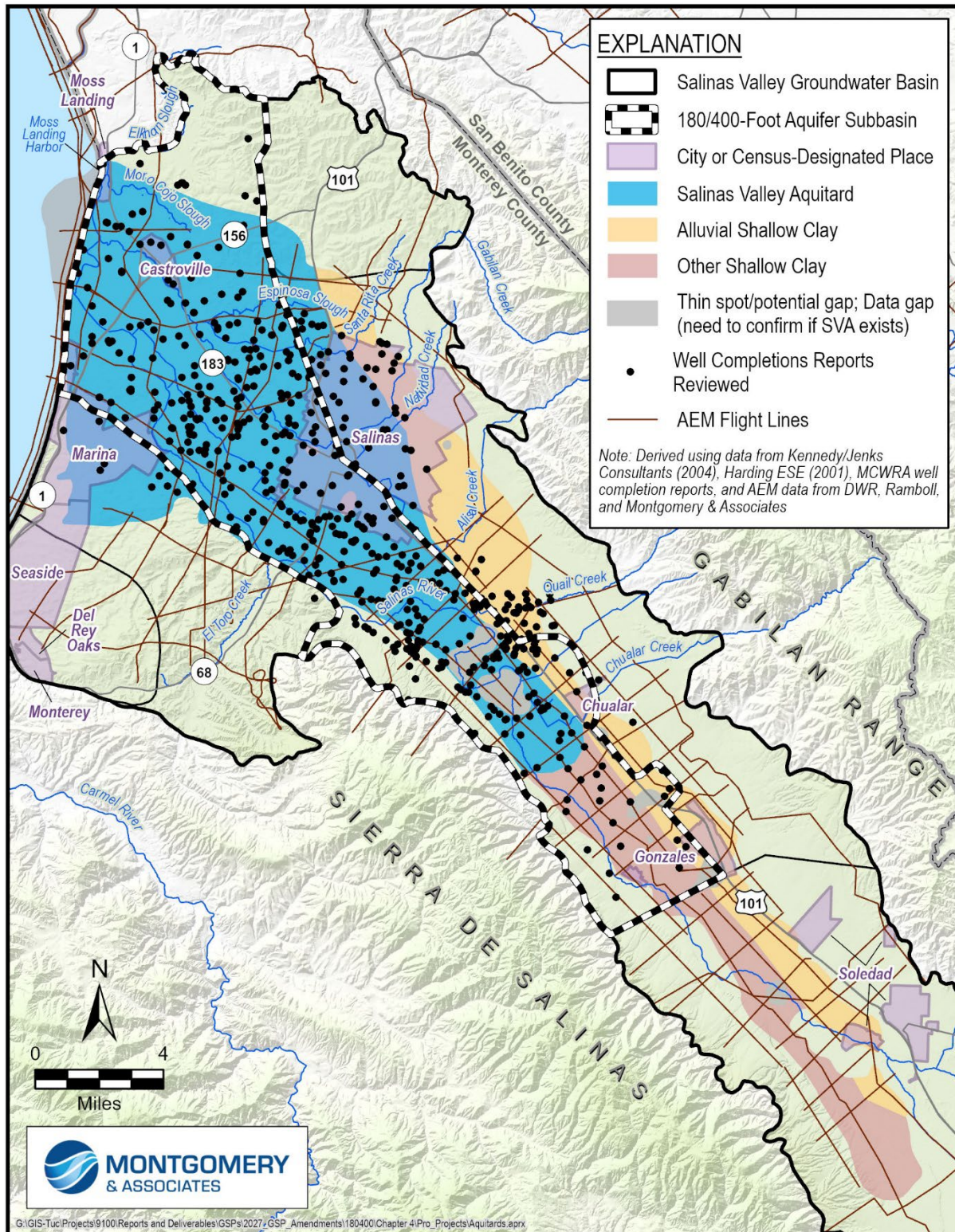


Figure 4-6. Extent of the Salinas Valley Aquitard and Equivalent Shallow Clays

4.3.1.2 180-Foot Aquifer

The Salinas Valley Aquitard and equivalent shallow clays overlie and confine the 180-Foot Aquifer. The 180-Foot Aquifer is the shallowest laterally extensive principal aquifer in the 180/400-Foot Aquifer Subbasin. This aquifer consists of interconnected sand and gravel beds that are from 50 to 150 feet thick. The sand and gravel layers are interlayered with clay lenses. This aquifer is correlated to the Older Alluvium or upper Aromas Sand formations (Harding ESE, 2001; Kennedy-Jenks, 2004). The 180-Foot Aquifer is exposed on the floor of Monterey Bay (Todd Engineers, 1989).

The primary uses of the 180-Foot Aquifer are for domestic, irrigation, and municipal water supply.

4.3.1.3 180/400-Foot Aquitard

The base of the 180-Foot Aquifer is the top of the 180/400-Foot Aquitard, which consists of interlayered clay and sand layers, including a marine blue clay layer similar to the Salinas Valley Aquitard (DWR, 2003). Similar to the Salinas Valley Aquitard, continentally derived clays were deposited around the same time as the marine clays. They were also identified in the AEM data and act in concert with the 180/400-Foot Aquitard to generally preclude downward migration of groundwater from the 180-Foot to the 400-Foot Aquifer. It is widespread in the Subbasin but varies in thickness and quality, and areas of hydrologic connection between the 400-Foot and 180-Foot Aquifers are known to exist (Kennedy-Jenks, 2004). These locations of intermittent clays are shown as hatched lines on Figure 3-19. In areas where the 180/400-Foot Aquitard is thin or discontinuous, groundwater in the 180-Foot Aquifer can migrate downward into the 400-Foot Aquifer in response to pumping (Kennedy-Jenks, 2004). This includes seawater intruded areas, and higher saline plumes ahead of the seawater intrusion front in the 400-Foot Aquifer have been recorded.

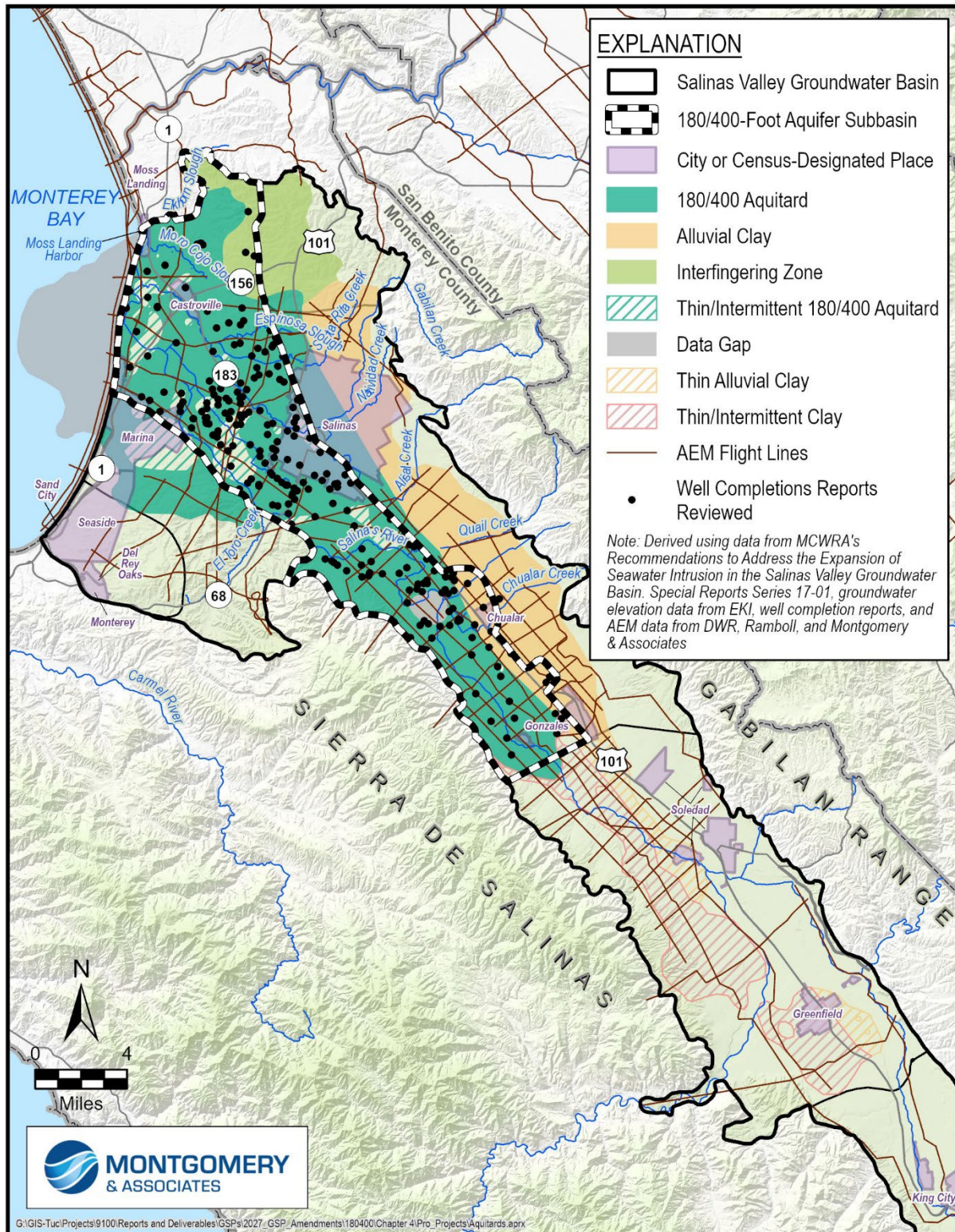


Figure 4-7. Extent of the 180/400 Aquitard and Equivalent Clays

4.3.1.4 400-Foot Aquifer

The 180/400-Foot Aquitard overlies and confines the 400-Foot Aquifer. The 400-Foot Aquifer consists of sand and gravel with varying degrees of interbedded clay layers. It is generally encountered between 270 and 650 feet below ground surface. The 400-Foot Aquifer can be encountered at depths of up to 1,000 feet farther south in the Subbasin along the margin of the Sierra de Salinas, mirroring the downthrown side of the Reliz Fault where the Basin bottom is deepest allowing for the accumulation of more sediments. This hydrogeologic unit correlates to the Aromas Red Sands and the upper part of the Paso Robles Formation. In some areas, the 400-Foot Aquifer is a single permeable bed approximately 200 feet thick; but in other areas the aquifer is split into multiple permeable zones by clay layers (DWR, 1973). The upper portion of the 400-Foot Aquifer merges and interfingers with the 180-Foot Aquifer in some areas where the 180/400-Foot Aquitard is missing (DWR, 1973).

The primary uses of the 400-Foot Aquifer are for domestic, irrigation, and municipal water supply.

4.3.1.5 400-Foot/Deep Aquitard

The base of the 400-Foot Aquifer is the top of the 400-Foot/Deep Aquitard. The 400-Foot/Deep Aquitard is primarily comprised of an increase in clay content in the sediments, rather than a distinct clay unit. This aquitard can be several hundred feet thick (Kennedy-Jenks, 2004; Brown and Caldwell, 2015), consisting of mostly clay with some sand and gravel lenses. This aquitard is the middle member of the Paso Robles Formation, which has been noted as being a higher clay content member in an otherwise large sandy alluvial unit (Harding ESE, 2001; HydroMetrics, 2009). The extent of this aquitard was determined during the Deep Aquifers Study and incorporated into this amended GSP. The extent of the Deep Aquifers in the 180/400 Subbasin is shown on Figure 3-20, which also shows the extent defined in the Deep Aquifers Study. This figure includes areas marked as the uncertain extent, where current data are not sufficient to conclusively determine if the Deep Aquifers are present.

This heterogeneous nature of the aquitard indicates there may be potential pathways for vertical migration of groundwater between the 400-Foot Aquifer and the Deep Aquifers.

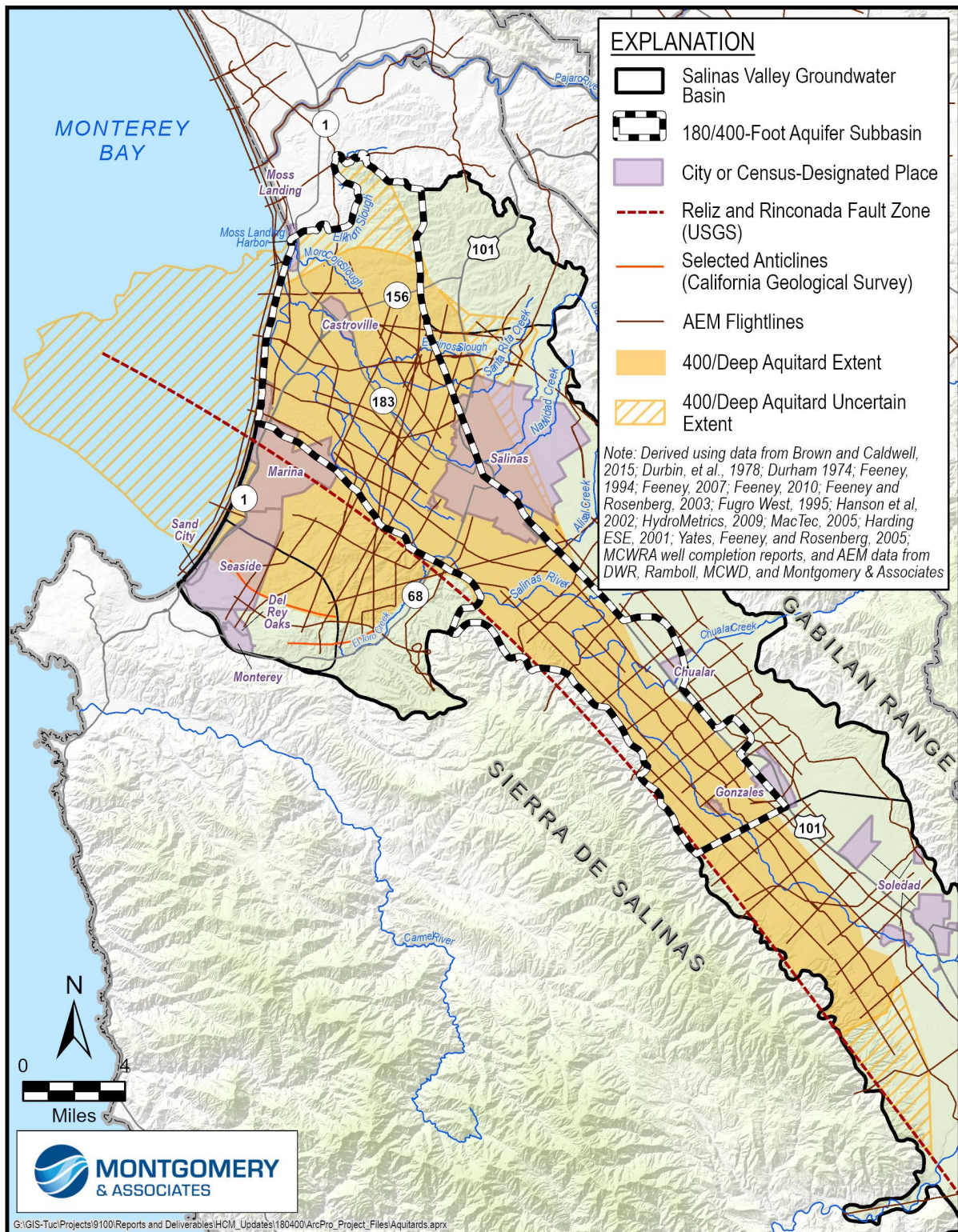


Figure 4-8. Extent of the 400/Deep Aquitard

4.3.1.6 Deep Aquifers

The 400-Foot/Deep Aquitard overlies and confines the Deep Aquifers. The Deep Aquifers, historically referred to as the 800-Foot, 900-Foot, 1,100-Foot and 1500-Foot Aquifers, are up to 900 feet thick and have alternating sandy-gravel layers and clay layers which do not differentiate into distinct aquifer and aquitard units (DWR, 2003). The Deep Aquifers correlate to the lower Paso Robles Formation, Purisima Formation, and Santa Margarita Sandstone where they exist. The Deep Aquifers overlie the low permeability Monterey Formation. Some well owners have indicated that there are different portions of the Deep Aquifers with different water qualities, potentially due to the geochemical differences between formations. The majority of Deep Aquifers wells are near the coast where seawater intrusion has rendered wells unusable in the shallower aquifer units. Many of these wells span multiple productive zones at depth, or more than 1 formation, mixing water qualities or types. The formations that comprise the Deep Aquifers are in contact with Monterey Bay, however there is no observed seawater intrusion to date.

The Deep Aquifers are used primarily for irrigation and municipal water supply, particularly where seawater has intruded overlying principal aquifers.

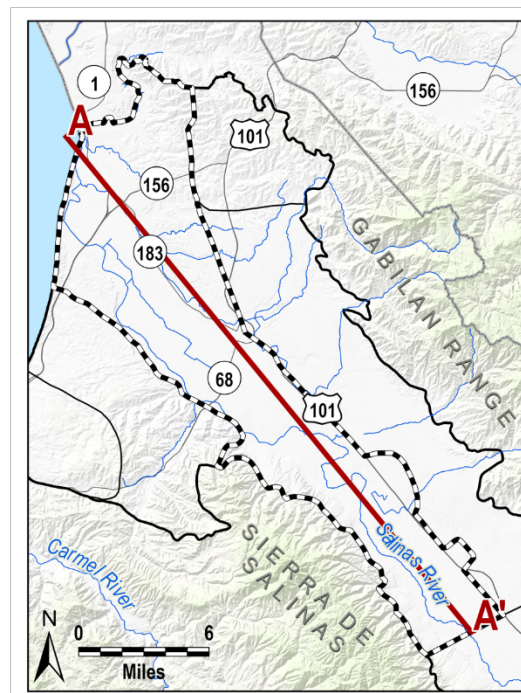
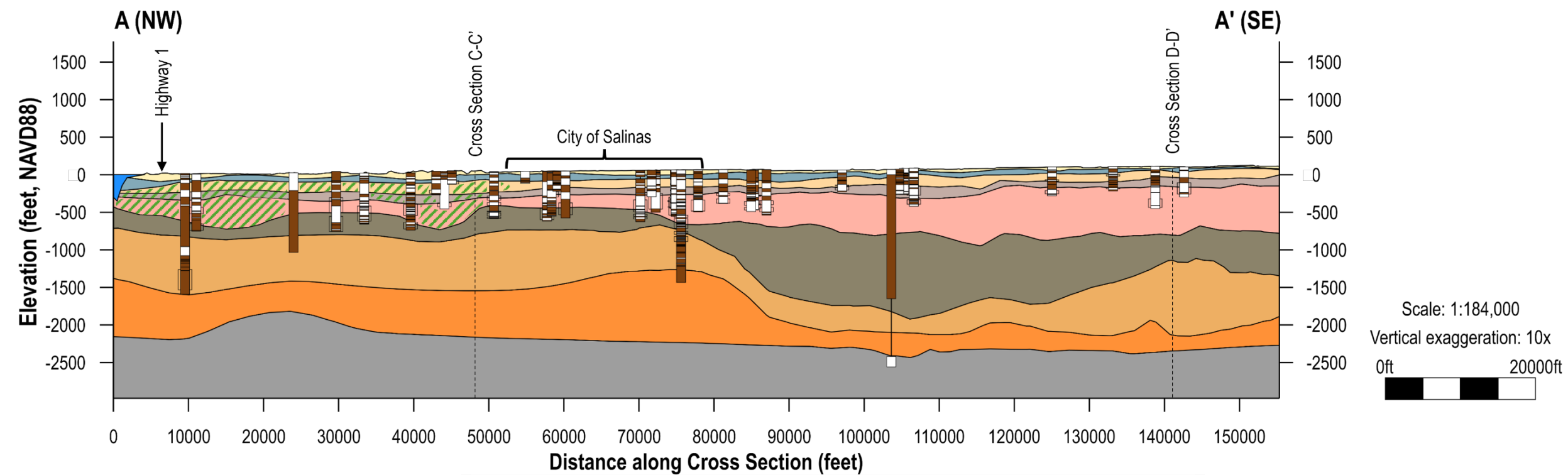
4.3.1.7 Hydrogeologic Cross Sections

Three hydrogeologic cross sections, parallel and perpendicular to the long axis of the Subbasin, are shown on Figure 4-9, Figure 4-10, and Figure 4-11. The locations of these cross sections are depicted on Figure 3-14. The finer sediments are shown in darker colors representing clay-rich zones, whereas the coarser sediments are shown in lighter colors, representing sand or gravel rich zones. AEM resistivity data indicating higher incidence of clay-rich sediments in the subsurface are denoted with black dashed lines. These generally correspond with the alluvial fans in the Eastside Subbasin, which are result of both clay deposition and granitic decomposition to clay. Seawater intrusion is denoted with green hatched lines to illustrate its general locations in the 180-Foot and 400-Foot Aquifers along these sections.

Section A-A' extends down the length of the 180/400-Foot Aquifer Subbasin. Sections B-B' and C-C' extend across the width of the Subbasin, but at different angles. These cross sections represent the groundwater flow models' generalized layering, which amalgamate fines and coarse sediments for groundwater flow modeling purposes. Model layers incorporate both alluvial and Salinas River depositions into 1 layer to represent average conditions from different depositional environments. Additionally, aquitards are shown as laterally continuous in these cross sections, spanning the width of the groundwater basin. This is an artifact of the model layer construction, which is based on grouping sediments into effective layers, and these aquitards should be understood to be not laterally continuous across the groundwater basin as discussed above.

These cross sections also illustrate the asymmetry of the Basin. The deepest part of the Basin is along the Sierra de Salinas, mirroring the Reliz Fault, shown on Section C-C. Section A-A' also shows a structural trough from the coast toward inland areas where the Basin is the deepest.

The updated cross-sections are based on the AEM data collected from the DWR Survey Area 1, 2020 (DWR, 2020a), DWR Survey Area 8, 2022 (DWR, 2022), and the Deep Aquifers Survey, 2023 (Montgomery & Associates, 2024b), as well as key geologic logs provided in DWR Water Well Drillers Reports. AEM data are useful for filling gaps between known data points such as wells. The AEM data were the principal source for this HCM update. The generalized relationships of finer or coarser sediments identified through resistivity data and between boreholes should be interpreted with caution and an understanding that the alluvium is mixed and distributary in character.



EXPLANATION

Geologic Layer

- Pacific Ocean
- Shallow Sediments
- Salinas Valley Aquitard or Shallow Clays
- 180-Foot Aquifer or Equivalents
- 180/400 Aquitard or Equivalent Clays
- 400-Foot Aquifer or Equivalents
- 400/Deep Aquitard (Middle Paso Robles Formation)
- Deep Aquifers (Lower Paso Robles Formation)
- Deep Aquifers (Purisima Formation, Santa Margarita Sandstone, or Equivalent)
- Bedrock
- Seawater intruded area (based on MCWRA's 500 mg/L chloride isocontours)

Borehole Lithology

- Not Clay
- Clay
- Hard Pan
- Bedrock

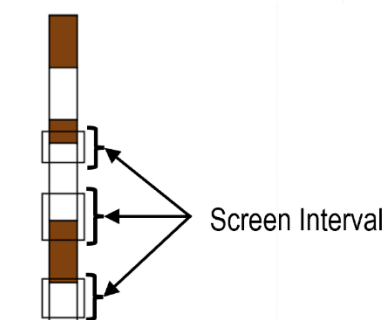


Figure 4-9. Hydrogeologic Cross-Section A-A'

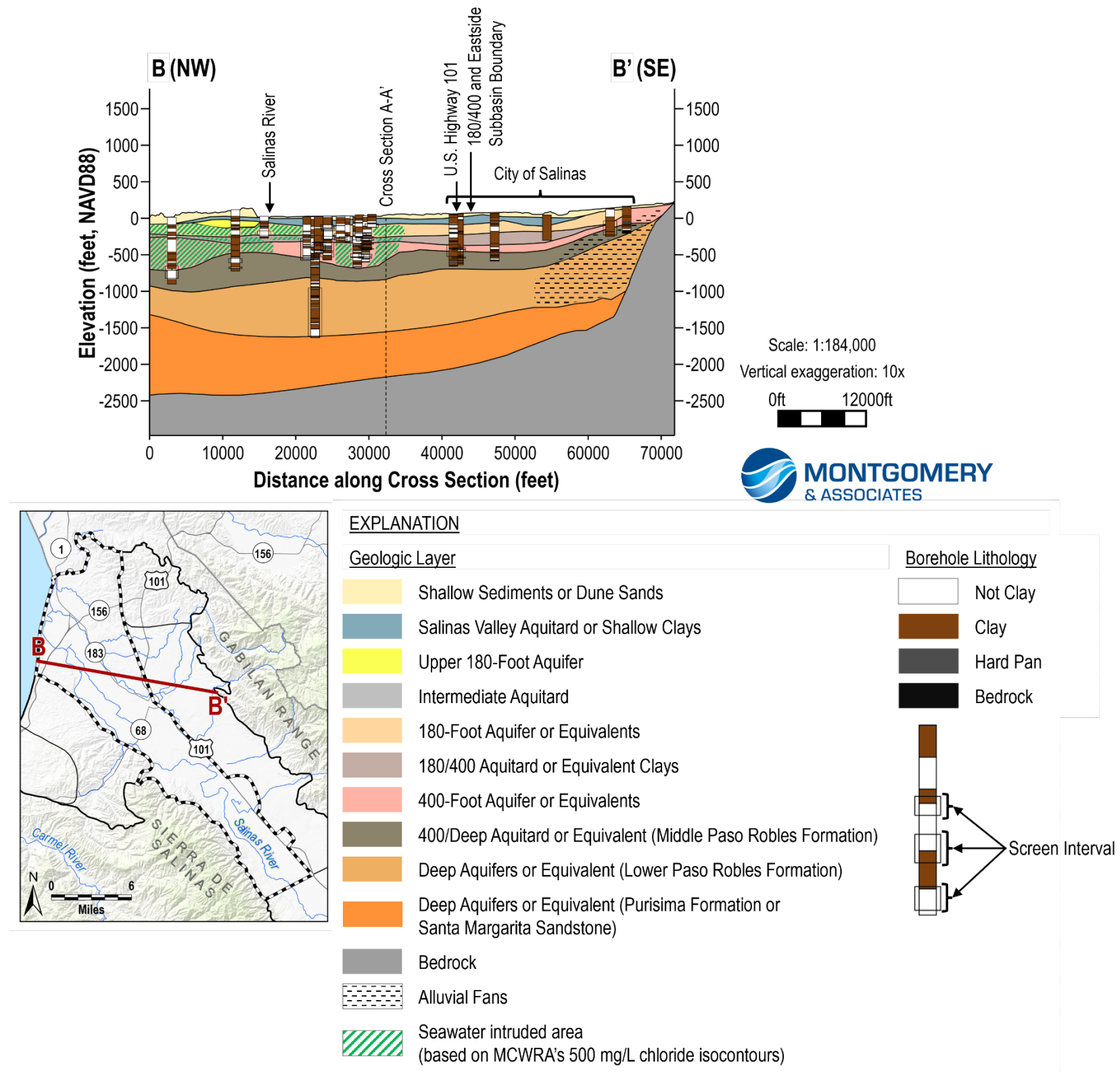


Figure 4-10. Hydrogeologic Cross-Section B-B'

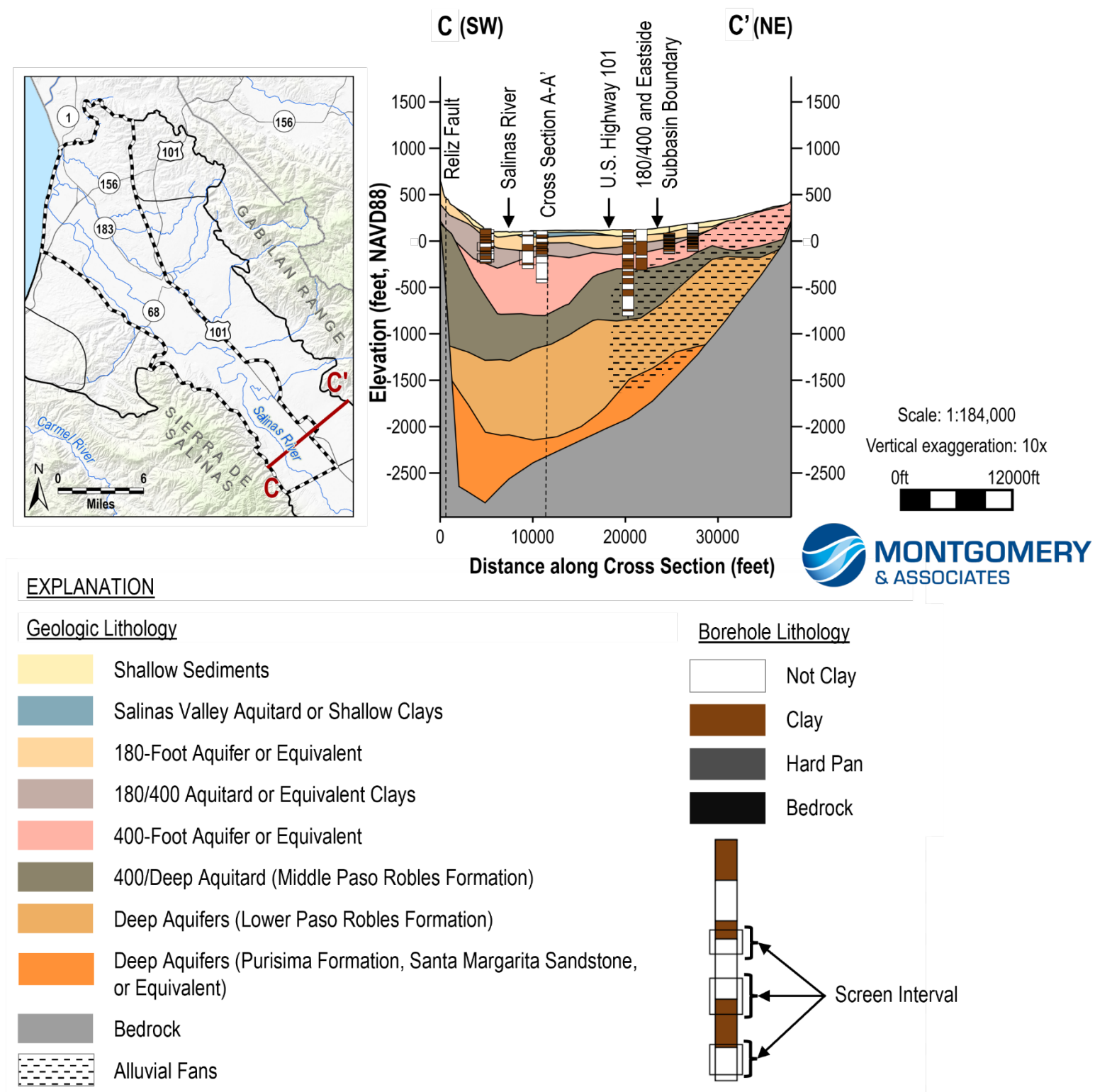


Figure 4-11. Hydrogeologic Cross-Section C-C'

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 achieving sustainability.

The values and distribution of aquifer properties in the 180/400-Foot Aquifer Subbasin have not been well characterized and documented. The relatively sparse amount of measured aquifer properties throughout the Subbasin is considered a data gap that can be addressed during implementation of the GSP. Aquifer property data were compiled from existing well reports and hydrogeologic investigation reports. In addition, aquifer tests were conducted in the Subbasin to help fill data gaps.

Although hydrogeologic properties have not been measured at many specific locations in the Subbasin, the 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.

4.3.1.8 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 aquifer saturated thickness 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, or drainable porosity, is the amount of water that drains from pores when an unconfined aquifer is dewatered. Often specific yield values range from 8% to 20%. Estimated specific yield values compiled by DWR for Subbasin range from 6% to 16% (DWR, 2004a). Fugro West *et al.*, (2005) defined the specific yield for the Paso Robles Formation as 5% to 17%, which is in the same expected range as Yates (1988), and may be a good reference for the Deep Aquifers in this 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. Very few measurements of storage properties are available for the Subbasin. Two of the measurements were obtained from pumping tests conducted for the Deep Aquifer Study. From these measurements, specific storage is estimated to be on the order of 10^{-6} 1/ft for the 180-Foot Aquifer (storativity of 0.0003), and 10^{-7} to 10^{-6} 1/ft in the deep portions of the aquifer just outside of the Deep Aquifers' extent, which represent sediments of the same depth, but are located in the Eastside alluvial fan deposits that extend into the 180/400 and Forebay Subbasins (storativity of 0.0002 to 0.0008). The storage property estimates indicate confined aquifer conditions.

Detailed aquifer property values specific to the Subbasin will continue to be filled during implementation.

4.3.1.9 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. The updated and calibrated SVIHM (Montgomery & Associates, 2025a) estimated hydraulic conductivities between 40 to about 260 ft/day with average of about 120 ft/day for the 180-Foot Aquifer, between 3 and 200 ft/day with average of about 60 ft/day for the 400-Foot Aquifer, and between less than 1 to 460 ft/day with an average of about 10 ft/day for the Deep Aquifers. Few estimates of either hydraulic conductivity or transmissivity exist for the Subbasin. The SVBGSA conducted 2 constant rate pumping tests near the Eastside Subbasin boundary as part of the Deep Aquifers Study. These tests provide an estimated hydraulic conductivity range on the order of 30 to 45 ft/day and are considered to be representative for the deep zone of the Eastside alluvial fan deposits adjacent to the Deep Aquifers in the 180/400 Subbasin. The SVBGSA also conducted 3 slug tests in new Deep Aquifers monitoring wells, resulting in the following estimates of hydraulic conductivity: about 62 ft/day for the 180-Foot Aquifer, about 75 ft/day for the 400-Foot Aquifer, and about 6 to 13 ft/day for the Deep Aquifers. Estimates from slug tests are often smaller than estimates from pumping tests.

In addition, depth-specific aquifer test data were obtained for the aquifers in the Subbasin. Many of these tests were conducted for aquifer intervals less than 3 feet thick and are not considered representative of average properties of the relatively thick aquifer units. Nonetheless, these results provide some insight on hydraulic properties in the Subbasin. Hydraulic conductivity estimates from these tests range from about 35 to 530 ft/day with average of about 240 ft/day for the 180-Foot Aquifer and from about 60 to 1,000 ft/day with average of about 400 ft/day for the Dune Sands, which is not part of a principal aquifer. These data do not include in the Subbasin.

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 production rate in gallons per minute (gpm) and the water level drawdown in the well during pumping, measured in feet. Specific capacity is moderately well correlated, and approximately proportional to, aquifer transmissivity. Durbin, et al. (1978) reported the following well yields and specific capacity estimates:

- Fluvial deposits that constitute the shallowest productive zones in most of the Subbasin, including the 180-Foot aquifer, have well yields of 500 to 4,000 gpm and an average specific capacity of approximately 70 gpm/ft. Hydraulic conductivity estimates from previous specific capacity testing range from about 30 to 260 ft/day with average of 150 ft/day for the 180-Foot Aquifer, from about 5 to 500 ft/day with average of 90 ft/day for the 400-Foot Aquifer, and from about 0.5 to 7 ft/day with average of 3 ft/day for the Deep Aquifers.
- In the 400-Foot aquifer, well yields range from 300 to 4,000 gpm and average 1,200 gpm, with specific capacity averaging about 30 gpm/ft.
- In the Deep Aquifers, known transmissivities range from about 50 to 6,000 feet squared per day (ft²/day). Estimated hydraulic conductivity values range from 2 to 36 ft/day, with geometric mean of about 10 ft/day. These estimates are generally consistent with estimates from the calibrated SVIHM. All available estimates are from wells located in the coastal areas, and they represent a variety of depth intervals with screen lengths ranging from 20 to more than 800 feet.

These values suggest that the principal aquifers have relatively high transmissivities and hydraulic conductivities, generally decreasing with aquifer depth. Wells completed in the shallower principal aquifers can produce substantial amounts of water with limited drawdown, while the Deep Aquifers shows significant drawdown with less extraction. This indicates the sensitivity of confined aquifers, and the need for careful management in the Deep Aquifers in particular.

4.3.2 Primary Aquifer Uses

The primary uses of groundwater from the 3 aquifers include domestic, irrigation, and municipal water supply uses (DWR, 2004a).

4.3.3 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 (man-made) recharge is provided in Chapter 6.

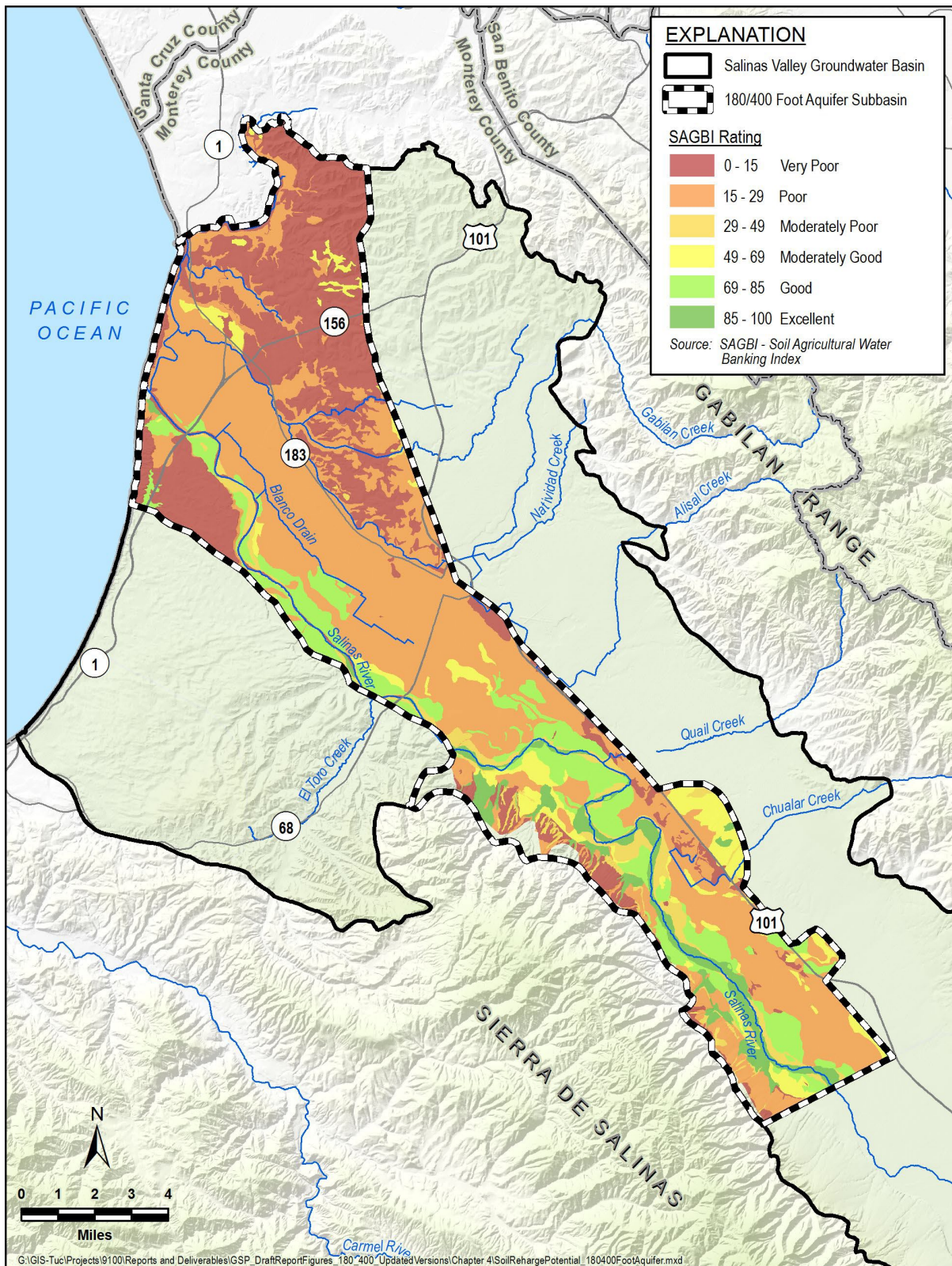
Natural groundwater recharge occurs through the following processes:

- Infiltration of surface water from the Salinas River and tributary channels originating in the Sierra de Salinas and Gabilan Range
- Deep percolation of excess applied irrigation water
- Deep percolation of infiltrating precipitation
- Subsurface inflow from the adjacent Subbasins

The first 3 mechanisms of recharge are dependent on the absence of the Salinas Valley Aquitard and other shallow clays to allow for hydrologic connection from the surface to the principal aquifers. Infiltration 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 3-24 presents the SAGBI index map for the 180/400 Subbasin. This map ranks soil suitability for 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, but this map provides helpful guidance on where natural recharge likely occurs.

Areas with the highest potential for recharge are along the Salinas River. Although Figure 3-24 shows these areas of good potential recharge in the 180/400 Subbasin, recharge to the principal aquifers of the Subbasin is very limited because of the low permeability Salinas Valley Aquitard and other shallow clays where they are observed. It is likely that only limited surficial recharge in the 180/400 Subbasin reaches the productive 180-Foot Aquifer or the 400-Foot Aquifer. This demonstrates the limited utility of potential recharge maps that are based on soil properties. This map should not be used as the sole data source for identifying recharge areas that will directly benefit the extensive principal aquifers in the 180/400 Subbasin. The Salinas Valley Aquitard and other shallow clays are shown on Figure 3-19, along with notable gaps. Maps on Figures 4-7 and 4-10 should be combined with additional analyses to better identify recharge areas. Subsurface recharge is primarily from inflow from the adjacent Forebay Subbasin to the south (DWR, 2004a).



4.3.4 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. Chapter 6 provides quantitative information about all natural and anthropogenic discharge.

Natural groundwater discharge areas within the Subbasin include wetlands and other surface water bodies that receive groundwater discharge to surface water bodies and evapotranspiration (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.

4.3.4.1 Potential Interconnected Surface Water

Figure 3-25 shows locations of potential interconnected surface water (ISW), in the 180/400-Foot Aquifer 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 3-25 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 ISW. 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 3-25. These ISW locations are based on simulated results from the updated SVIHM, which is calibrated to measured groundwater levels and streamflows. Although seepage along the ISW reaches is based on assumed channel and aquifer parameters as model inputs, the SVIHM is currently 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.

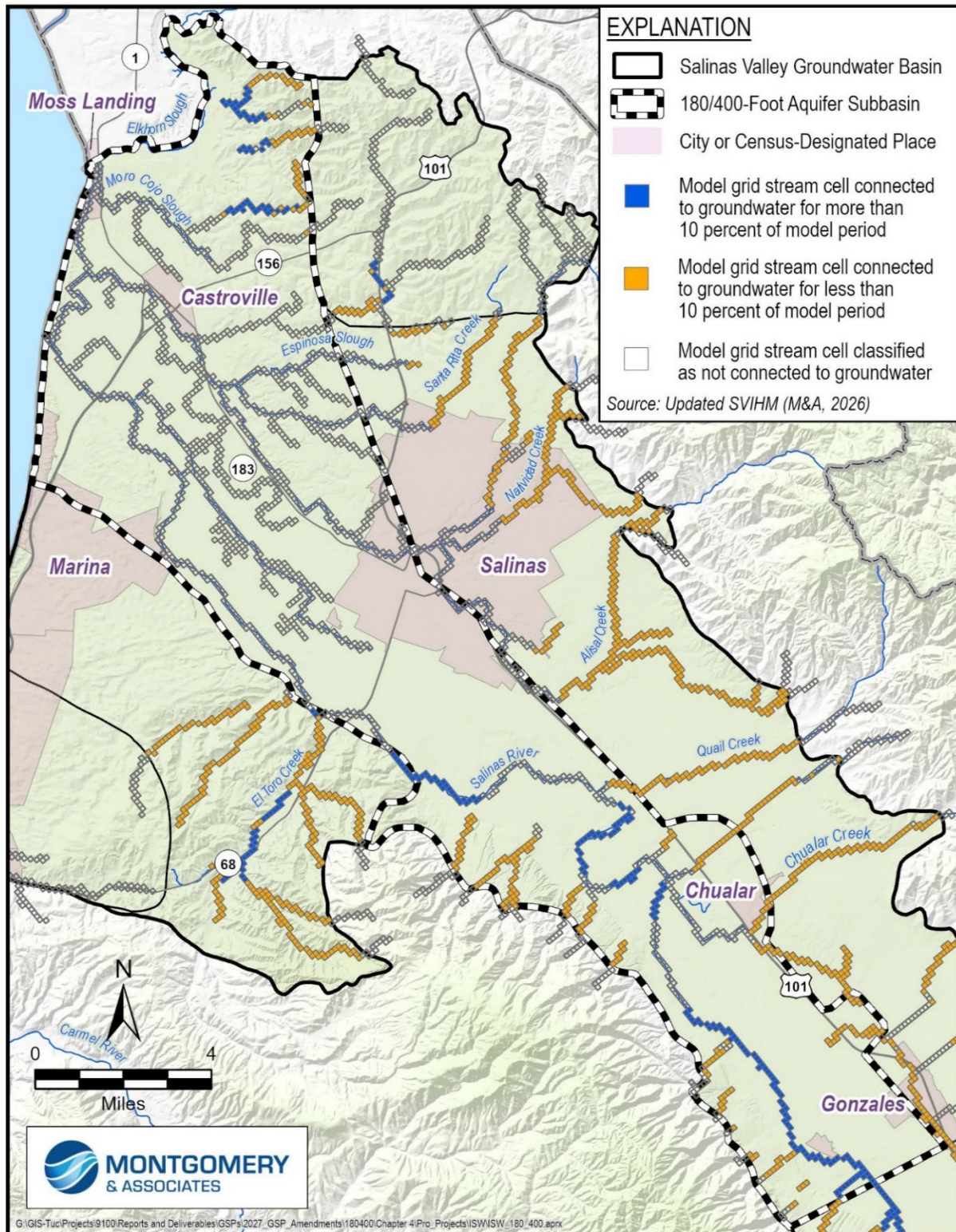


Figure 4-13. Locations of Interconnected Surface Water

4.3.4.2 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.

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 groundwater dependent ecosystems (GDEs) in the Subbasin was compiled using information from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and The Nature Conservancy (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 3-6. Species with an indirect potential dependence on groundwater were not included.

Seven threatened and endangered species listed either federally or in the state, including the South-central Coast Steelhead, and the California Red-legged Frog, were identified as likely to rely directly on groundwater. While the species might rely directly on groundwater, the identification of potential GDEs in the Salinas Valley does not distinguish between groundwater and surface water sources. Four species identified have an unknown dependence on GDEs or groundwater.

Table 3-2. Federal and State Listed Threatened and Endangered Species with Direct or Unknown Groundwater Dependence for 180/400 Subbasin

Groundwater Dependence*	Common Name	Habitat	Federal Status	State Status
Direct	California Black rail	Yearlong resident of saline, brackish, and fresh emergent wetlands		Threatened
Direct	California red-legged frog	Quiet pools of streams, marshes, and occasionally ponds	Threatened	
Direct	California Ridgeway's rail	Saltwater marshes, freshwater marshes, and mangrove swamps	Endangered	Endangered
Direct	Longfin smelt	Uses a variety of habitats from nearshore waters, to estuaries and lower portions of freshwater streams (Garwood 2017)		Threatened
Direct	Santa Cruz long-toed salamander	Seasonal and permanent aquatic features (ponds or wetlands) for breeding and adjacent upland scrub and woodland areas during the nonbreeding season	Endangered	Endangered
Direct	Steelhead: south-central Coast distinct population segment	Rivers and large streams from Watsonville to Arroyo Grande	Threatened	
Direct	Tidewater goby	Brackish water lagoons, estuaries, and marshes along the California coast	Endangered	
Direct	Tricolored blackbird	Freshwater marshes and agricultural fields, particularly in wheat, rye, and other grain fields, primarily in Central Valley		Threatened
Unknown	California tiger salamander	Tiger salamanders breed and lay eggs primarily in vernal pools and other temporary rainwater ponds	Threatened	Threatened
Unknown	Short-tailed albatross	Marine-dependent, feeding in continental shelf areas and breeding on remote islands	Endangered	
Unknown	Smith's blue butterfly	Only exists near the coasts of Monterey County and northern San Luis Obispo County. "Habitat" specifically means just 2 plants: coast buckwheat (<i>Eriogonum latifolium</i>) and seaciff buckwheat (<i>Eriogonum parvifolium</i>)	Endangered	
Unknown	Vernal pool fairy shrimp	Vernal pools in California	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.

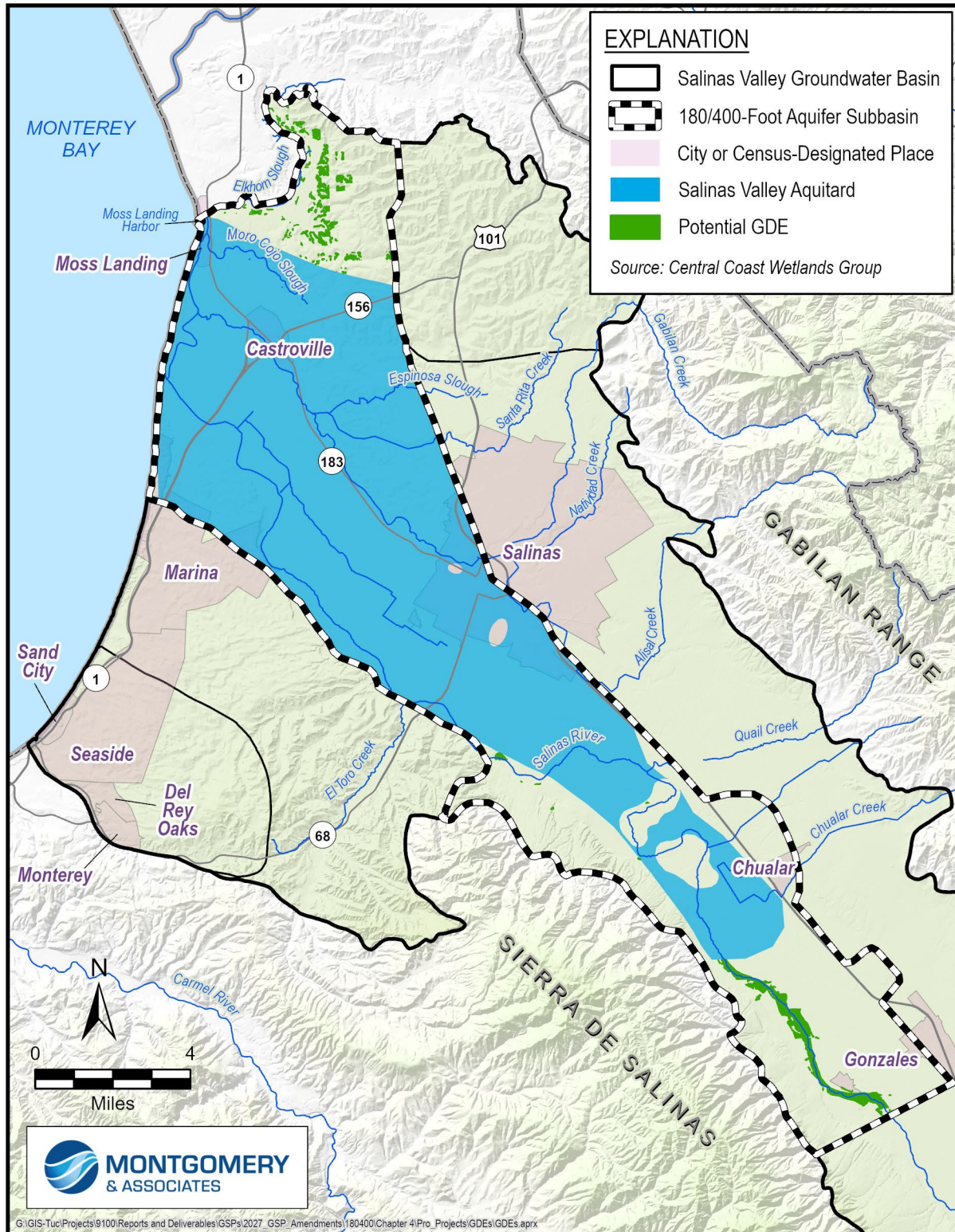
The process for identifying and mapping potential GDEs in the Salinas Valley was developed by Central Coast Wetlands Group (CCWG) with guidance from documents developed by The Nature Conservancy (TNC) (Rhode et al. 2018, Rhode et al. 2020), TNC staff and San Francisco Estuary Institute (SFEI) staff with 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 180/400 Subbasin. GDE identification provides the basis for monitoring and assessment.

The areas in the 180/400 Subbasin where GDEs may be found are mainly along the Salinas River, and in tributary canyons and washes where shallow alluvium is present. The presence of the Salinas Valley Aquitard and other shallow clays likely prevents connection of GDEs to the principal aquifer throughout much of the 180/400 Subbasin, except in areas where the Salinas Valley Aquitard and other shallow clays are discontinuous or not present. For a more refined analysis of the connection of surface water to the principal aquifer below, a more detailed analysis of the near surface stratigraphy was conducted in 2024, better defining the extent and continuity of the Salinas Valley Aquitard and other shallow clays as shown on Figure 4-6.

During the HCM update, the AEM data showed a greater prevalence of shallow clay across the Salinas Valley which can impact interconnection between surface water and groundwater. The marine-derived Salinas Valley Aquitard (SVA) is the most well-known shallow clay body and confines most of the 180-Foot Aquifer in the 180/400 Subbasin. However, continentally derived clays at similar elevations are found more widespread and extend into the adjacent subbasin. The updated mapped shallow clays are shown on Figure 4-7 which visually catalogues all updated mapped shallow clays. The locations where these clays underlie the Salinas River may inhibit connection between the Salinas River and principal aquifer, but are generally found to be intermittent and less uniform than the SVA, and therefore are not considered to fully prevent recharge and hydraulic connection. Further site-specific evaluations may be needed if potential GDEs show declines in health.

Figure 3-26 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 and where the Salinas Valley Aquitard is not present (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.



(CCWG, 2026)

Figure 4-14. Potential Groundwater Dependent Ecosystems within the 180/400 Subbasin

4.4 Surface Water Bodies

The primary surface water body in the Subbasin is the Salinas River. This river runs the entire length of the Subbasin and is fed by local tributaries (Figure 3-27). The following surface water bodies and river are located outside of the

Subbasin but are important controls on the rate and timing of Salinas River flows into the Subbasin:

- Two reservoirs constructed to control flooding and to increase recharge from Salinas River 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).
- Arroyo Seco, a tributary with a 275 square mile drainage area that has no dams in its drainage basin and is characterized by both very high flood flows and extended dry periods.

Agricultural diversions and the construction of dams on the Salinas River and its tributaries have altered the river's hydrology, and the river no longer exhibits the seasonal variation in flows that were observed before the mid-20th century. The restoration of natural flows to the Salinas River is not within the scope of this GSP.

Within the Subbasin, 2 constructed canals convey surface water across the valley floor, as shown on Figure 3-27. Reclamation Ditch #1665 (Rec Ditch) was originally constructed in 1917 and is operated in part by MCWRA for flood management. The ditch flows southeast to northwest and drains the stormwater detention from Smith Lake and Carr Lake before flowing northwest towards Castroville, discharging into Tembladero Slough, and then flowing into the Old Salinas River Channel and ultimately into Moss Landing Harbor. The Blanco Drain, also known as Storm Maintenance District No. 2, is a drainage system that covers approximately 6,400 acres of farmland, predominately receiving agricultural return flow from tile drains in the dry season and stormwater runoff in the wet season. The Blanco Drain discharges into the Salinas River.

The mouth of the Salinas River forms a lagoon; and its outflow to Monterey Bay is blocked by sand dunes except during winter high-water flows. MCWRA operates a slide-gate to transfer water through a culvert from the lagoon into Old Salinas River during the wet season for flood control (MCWRA, 2014). The Old Salinas River discharges through tide gates at Potrero Road into Moss Landing Harbor and ultimately the Monterey Bay.

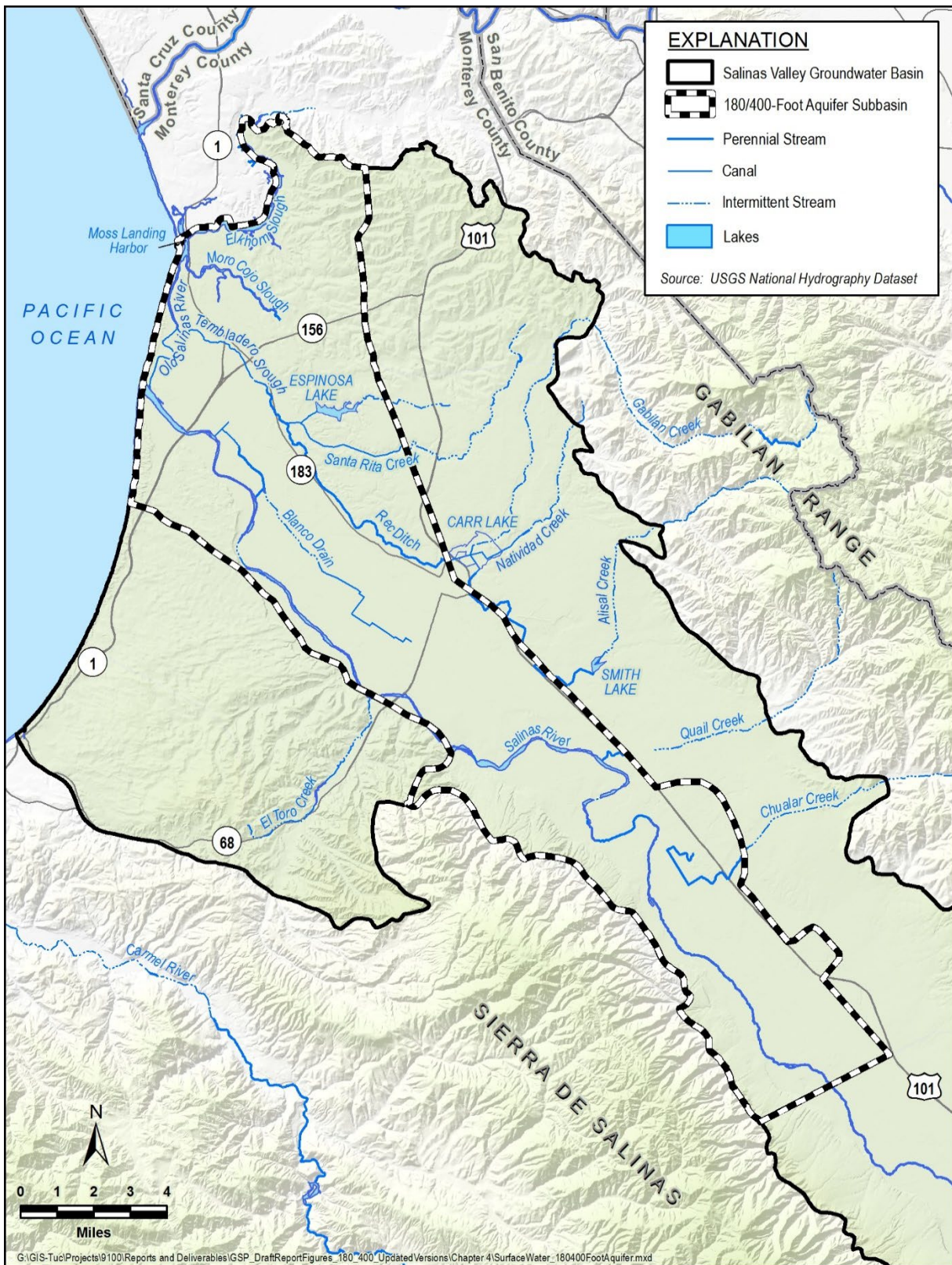


Figure 4-15. Surface Water Bodies in the 180/400-Foot Aquifer Subbasin

4.4.1 Watersheds

Figure 3-28 shows several watersheds that contribute small tributary streams to the Salinas River in the 180/400 Subbasin. From the boundary with the Forebay Subbasin to the Pacific Ocean from the Eastside Subbasin to the Sierra de Salinas and the Monterey Subbasin, the HUC12 watersheds within the 180/400 Subbasin are as follows:

- Limekiln Creek-Salinas River
- Johnson Creek
- Chualar Creek
- 180600051507-Salinas River
- El Toro Creek
- Quail Creek
- Alisal Creek-Salinas River
- Monterey Bay
- Natividad Creek-Gabilan Creek
- Alisal Slough-Tembladero Slough
- Elkhorn Slough

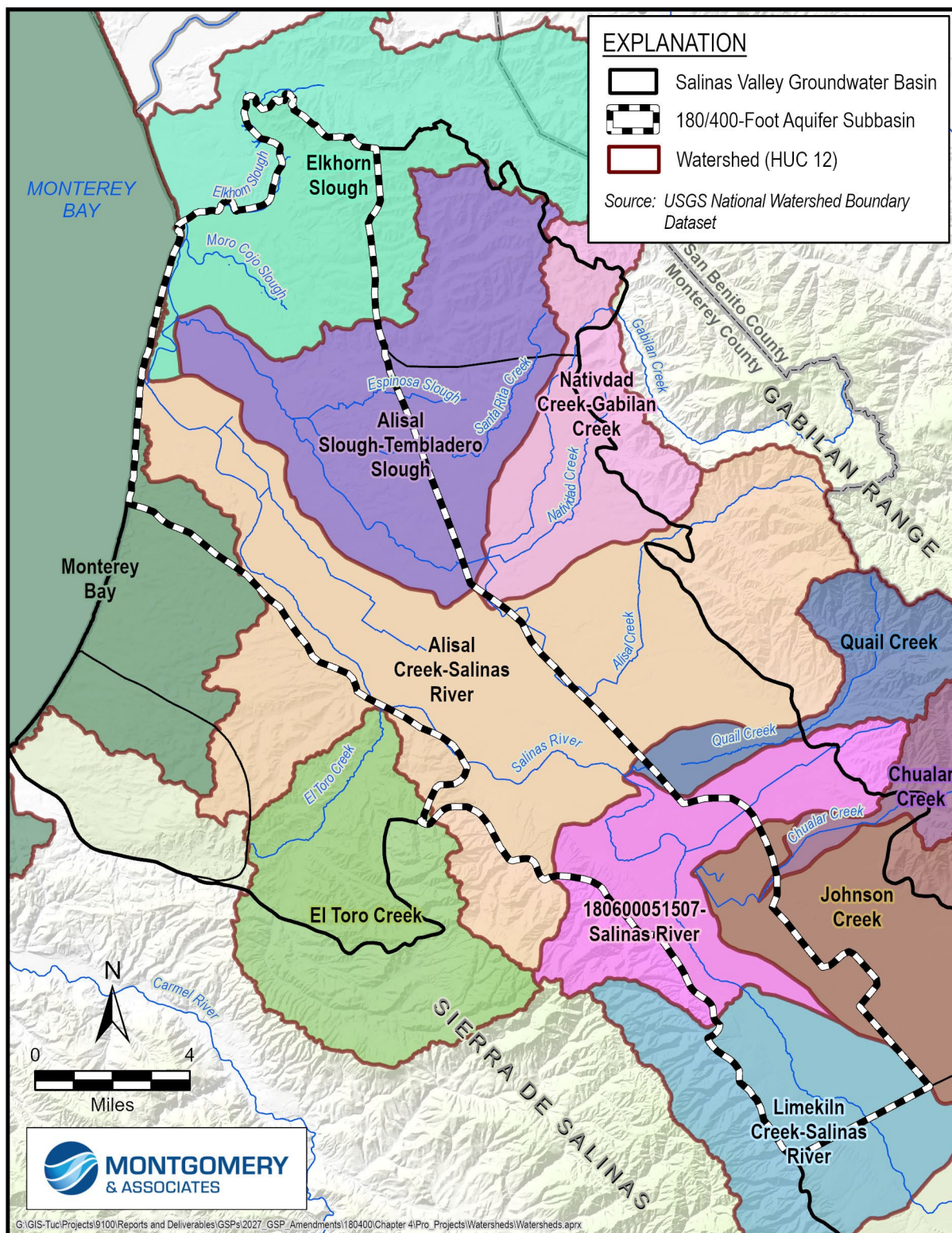


Figure 4-16. HUC12 Watersheds within the 180/400-Foot Aquifer Subbasin

4.10.2 Imported Water Supplies

There is no water imported into the 180/400 Subbasin from outside the Salinas River watershed.

4.11 Water Quality

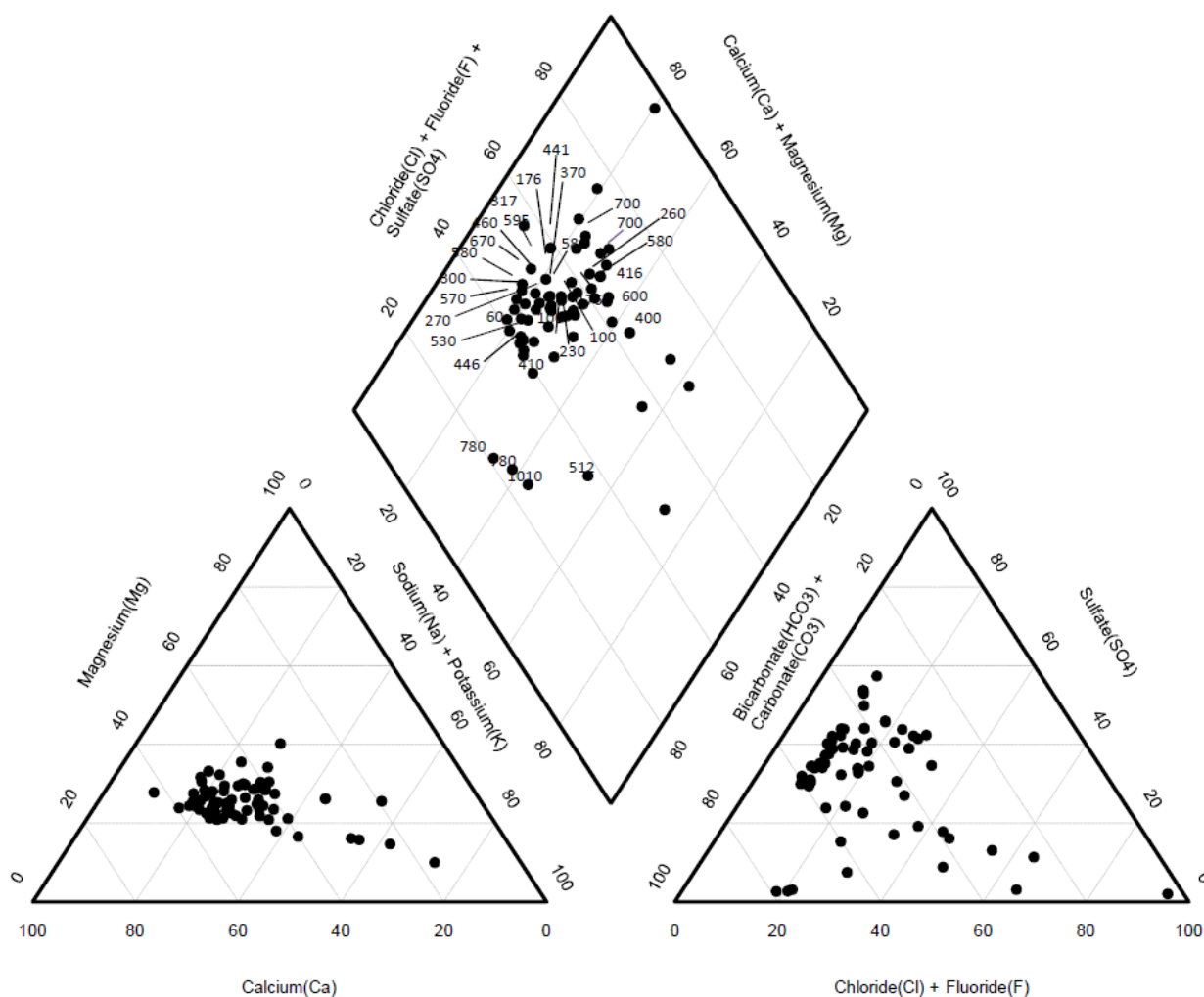
Natural groundwater quality can determine how much treatment may be needed prior to being used for municipal uses, or how the water may impact crop production. This chapter presents a general discussion of the natural groundwater quality in the Subbasin, focusing on general minerals. This discussion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

4.11.1 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 Central Coast Regional Water Quality Control Board (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 3-29 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 3-29 show that most groundwater samples are of a similar type and plot in a single cluster. The samples are generally of a magnesium bicarbonate type, which is a more alkaline type of water. However, there are outlier samples that are higher in sodium and potassium than the other samples, and are most noticeable in the dots that plot in the middle and right portions of the cation triangle. Piper diagrams do not provide spatial information about groundwater samples, and therefore it is difficult to assess the source of the sodium and/or potassium in the outlier samples.



Note: Well depths indicated when available.

(Source: CCGC, 2015)

Figure 4-17. Piper Diagram of 180/400-Foot Aquifer Subbasin Representing Major Anions and Cations in Water Samples

4.11.2 Seawater intrusion

Groundwater pumping has lowered groundwater elevations to a point that allows seawater to flow into the Subbasin from Monterey Bay. Increased salt concentrations from seawater intrusion, measured as TDS or chloride concentration, are considered a nuisance for domestic or municipal uses rather than a health or toxicity concern. Additionally, increased salt concentrations from seawater intrusion may impact the ability to use groundwater for irrigation. Seawater intrusion in the 180-Foot and 400-Foot Aquifers has driven the demand to drill deeper for fresh water, resulting in the installation of many Deep Aquifers wells in the seawater impacted areas.

Seawater intrusion occurs in both the 180/400 and Monterey Subbasins. Seawater intrusion was first identified in the 1940s. MCWRA has monitored and mapped it since that time.

Advancement of the seawater intrusion front has slowed in the 180-Foot Aquifer since the SVWP. From 1944 to 2011, on average the 500 milligrams per liter (mg/L) chloride isocontour advanced at a rate of 360 acres/year in the 180-Foot Aquifer, and that rate slowed to 30 acres/year from 2011 to 2026. In the 400-Foot Aquifer the initial advancement was slower with an average advancement of 200 acres/year from 1959 when it was first mapped to 2011. From 2011 to 2026 the average rate of advancement was 390 acres/year; however, much of that was due to vertical migration down from the 180-Foot Aquifer and the annual rate has slowed to 250 acres/year since 2015 when SGMA was enacted.

The effect of seawater intrusion on the beneficial uses of groundwater occurs at concentrations much lower than that of seawater. The TDS of seawater is approximately 35,000 mg/L. The State of California has adopted a recommended Secondary Maximum Contaminant Level (SMCL) for TDS of 500 mg/L, and a short term maximum SMCL of 1,500 mg/L. As discussed further in Chapter 8, the SMC in this GSP is based on the 500 mg/L chloride isocontour, which generally delineates the usable from unusable groundwater. However, this isocontour is interpolated between groundwater monitoring locations and therefore represents an approximation of actual groundwater quality conditions. As a result, chloride concentrations at some locations seawater of the mapped isocontour may be less than 500 mg/L. In addition, chloride thresholds for specific beneficial uses and crop types vary. For example, the CCRWQCB's Basin Plan (CCRWQCB, 2019) identifies a chloride concentration of 106 mg/L as the level above which crop productivity may be reduced.

The current seawater intrusion conditions are described more fully in Chapter 5.

4.12 Uncertainty of the HCM

As of GSP Amendment 2, key data gaps of the 180/400 Subbasin HCM were filled, areas of additional analysis that may help further refine the understanding of the aquifer system include:

- Measurements of aquifer properties such as hydraulic conductivity and specific yield in the Subbasin, particularly to highlight the differences and connectivity between the principal aquifers.
- Effect of dewatering of the 400/Deep Aquitard and vertical leakage to the Deep Aquifers, and subsequently the risks for subsidence and vertical transmission of seawater Extent of hydraulic connectivity between the ocean, the offshore portions of the aquifer system, and the onshore aquifers.

Although further study of these issues could help refine our understanding of how the principal aquifers function, the current level of understanding is sufficient for management purposes. 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.