Salinas Valley Groundwater Basin
Eastside Aquifer Subbasin
Groundwater Sustainability Plan

Salinas Valley Basin
Groundwater Sustainability Agency

(Approved by Salinas Valley Basin Groundwater Sustainability Agency Board of Directors on January 13, 2022)

Photo courtesy of Norm Groot

Prepared by:

MONTGOMERY
& ASSOCIATES
Water Resource Consultants

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SVBGSA Member Agencies

County of Monterey
Monterey County Water Resources Agency
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City of Soledad
City of Gonzales
King City
Castroville Community Services District
Monterey One Water

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Steve Adams, South County Cities Member
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Anthony Rocha, City of Salinas Member
Ron Stefani, Disadvantaged Community or Public Water System Member

Eastside Aquifer Subbasin Planning Committee

Horacio Amezquita
Brian Barrientos
Marc Bloom
Christopher Bunn
Adnen Chaabane
Caroline Chapin
Ross Clark
Tom Franscioni
Brenda Granillo
Robin Lee
Colby Pereira, Chair

SVBGSA Staff

Donna Meyers, *General Manager*
Emily Gardner, *Deputy General Manager*
Gary Petersen, *Senior Advisor*
Les Girard, *General Counsel*
Merida Alvarez, *Administrative Assistant*
Ann Camel, *Administrative Support*
Harrison Tregenza, *Clerk of the Board*

Technical Consultants

Montgomery & Associates (M&A)

- Derrik Williams, P.G., C.Hg., Principal Hydrogeologist
- Abby Ostovar, Ph.D., Water Policy Specialist
- Tiffani Canez, Hydrogeologist
- Joseph Oliver, Senior Hydrogeologist
- Staffan Schorr, Principal Hydrogeologist
- Greg Nelson, P.G., Senior Hydrogeologist
- Victoria Hermosilla, Hydrogeologist
- Michael Levengood, GIS and Data Coordinator
- Trevor Pontifex, Hydrogeologist
- Jon Reeves, Hydrogeologist

Wallace Group

- Kari Wagner, P.E., Principal/Director of Water Resources
- Greg Hulburd, P.E., Senior Civil Engineer

Wood Group

- Matt Baillie, P.G., C.Hg., Senior Hydrogeologist

Paris Kincaid Wasiewski

- Valerie Kincaid, Principal

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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 Company
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
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
CDFW............California Department of Fish and Wildlife
CEQA.............California Environmental Quality Act
cfs...................cubic feet per second
COC ....constituents of concern
CPE Actions...Communication and Public Engagement Actions
CPUC ....California Public Utilities Commission
CSD................Community Services District
CSIP ....Castroville Seawater Intrusion Project
DACs..............Disadvantage Communities
DDW ....Division of Drinking Water
DEM...............Digital Elevation Model
DMS ....Data Management System
D-TAC ....Drought Technical Advisory Committee
DTSC ....California Department of Toxic Substances Control
DWR ....California Department of Water Resources
EDF ....Environmental Defense Fund
EIR ....Environmental Impact Report
EPA ....Environmental Protection Agency
ET...................evapotranspiration
eWRIMS ....Electronic Water Rights Information Management System
GAMA ....Groundwater Ambient Monitoring and Assessment Program
GDE ....groundwater-dependent ecosystem
GEMS ....Monterey County Groundwater Extraction Management System
GIS ....Geographic Information System

GMP...............Groundwater Management Plan
gpm ....gallons per minute
GSA................Groundwater Sustainability Agency/Agencies
GSP or Plan....Groundwater Sustainability Plan
HCM ....hydrogeologic conceptual model
HCP................Habitat Conservation Plan
ILRP...............Irrigated Lands Regulatory Program
InSAR ....Interferometric Synthetic Aperture Radar
IRWMP..........Integrated Regional Water Management Plan
ISW ....interconnected surface water
JPA.................Joint Powers Authority
LID.................low impact development
MAR ....managed aquifer recharge
MBARD.........Monterey Bay Air Resources District
MBNMS.........Monterey Bay National Marine Sanctuary
MCLs ....Maximum Contaminant Levels
MCWRA........Monterey County Water Resources Agency
MTBE ....methyl-tertiary-butyl ether
NAVD88........North American Vertical Datum of 1988
NCCAG..........Natural Communities Commonly Associated with Groundwater
NEPA ....National Environmental Policy Act
NMFS.............National Marine Fisheries Service
NOAA............National Oceanic & Atmospheric Administration
NPDES...........National Pollutant Discharge Elimination System
O&M..............operations and maintenance
OSWCR ....Online System for Well Completion Report
RCDMC.........Resource Conservation District of Monterey
RMA ....Routine Maintenance Agreement
RMS...............Representative Monitoring Sites
ROW ....Right of Way
RWMG...........Greater Monterey County Regional Water Management Group
SAGBI............Soil Agricultural Groundwater Banking Index
SDACs ....Severely Disadvantaged Communities
SGMA............Sustainable Groundwater Management Act
SMC...............Sustainable Management Criteria
SMCLs...........Secondary Maximum Contaminant Levels
SMP................Salinas River Stream Maintenance Program
SRDF..............Salinas River Diversion Facility
Subbasin.........Eastside Aquifer Subbasin
SVBGSA........Salinas Valley Basin Groundwater Sustainability Agency

SVIHM...........Salinas Valley Integrated Hydrologic Model
SVOM............Salinas Valley Operational Model
SWIG ....Seawater Intrusion Working Group
SWRCB..........State Water Resources Control Board
URCs..............Underrepresented Communities
TAC................Technical Advisory Committee
TDS................total dissolved solids
USACE ..........U.S.Army Corps of Engineers
USFWS ..........U.S. Fish and Wildlife Service
USGS .............U.S. Geological Survey
UWMP ....Urban Water Management Plan

EXECUTIVE SUMMARY

1 INTRODUCTION (GSP CHAPTER 1)

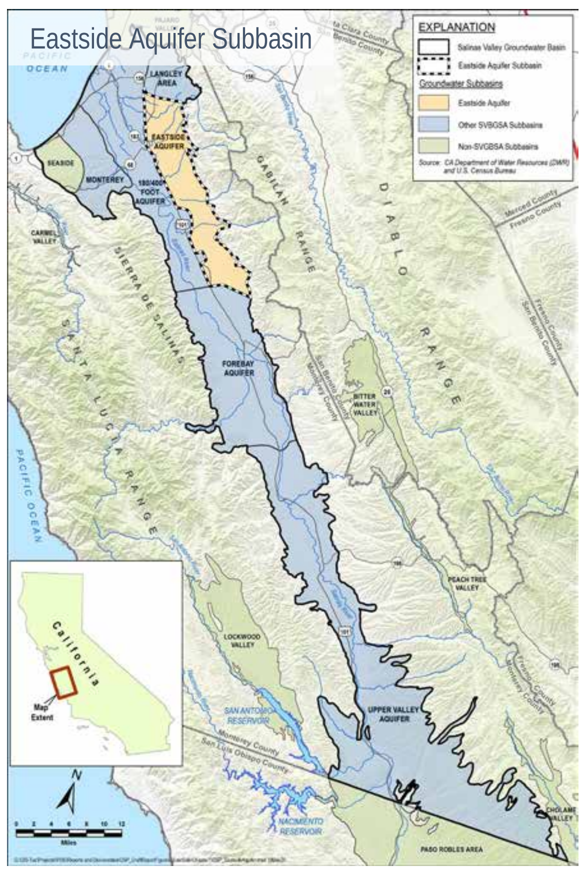
The 2014 California Sustainable Groundwater Management Act (SGMA) requires that medium- and high-priority groundwater basins and subbasins develop Groundwater Sustainability Plans (GSPs) that outline how groundwater sustainably will be achieved in 20 years, and then maintained for an additional 30 years. This GSP fulfills that requirement for the Salinas Valley—Eastside Aquifer Subbasin (Subbasin), which is designated by the DWR as a medium priority groundwater subbasin.

In 2017, local GSA-eligible entities formed the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) to develop and implement the GSPs for the Salinas Valley. The SVBGSA is a Joint Powers Authority (JPA) with membership comprising the County of Monterey, Monterey County Water Resources Agency (MCWRA), City of Salinas, City of Soledad, City of Gonzales, City of King, Castroville Community Services District, and Monterey One Water. The SVBGSA is governed by an eleven-member Board of Directors, representing public and private groundwater interests throughout the Salinas Valley Groundwater Basin. In addition, an Advisory Committee ensures participation by, and input to, the Board by constituencies whose interests are not directly represented on the Board.

The Salinas Valley Groundwater Basin consists of 9 subbasins, of which 6 are entirely or partially under the SVBGSA's jurisdiction. One of the 9 subbasins, the Seaside Subbasin, is adjudicated and not managed by the SVBGSA. Another 2 subbasins, the Paso Robles and Atascadero Subbasins, lie completely in San Luis Obispo County and are managed by other groundwater sustainability agencies.

The SVBGSA developed this GSP for the Eastside Subbasin (DWR subbasin number 3-004.02) in concert with the GSPs for its 5 other Salinas Valley Subbasins: the 180/400-Foot Aquifer Subbasin (DWR subbasin number 3-004.01), the Forebay Aquifer Subbasin (DWR subbasin number 3-004.04), the Upper Valley Aquifer Subbasin (DWR subbasin number 3-004.05), the Langley Area Subbasin (DWR subbasin number 3-004.09) and the Monterey Subbasin (DWR subbasin number 3-004.10). Having a single GSA prepare all or part of the six plans promotes coordination and cooperation across subbasin boundaries.

This GSP covers the entire 57,500 acres of the Eastside Subbasin, as shown on the figure below. The GSP describes current groundwater conditions, develops a hydrogeologic conceptual model, establishes the water budget, outlines locally defined sustainable management criteria, and provides projects and management actions that can be used to reach sustainability by 2042.



2 COMMUNICATIONS AND PUBLIC ENGAGEMENT (GSP CHAPTER 2)

The SVBGSA designed all phases of SGMA implementation to be open collaborative processes with active stakeholder engagement that allows stakeholders and public participants opportunities to provide input and to influence the planning and development process and subsequently GSP implementation. The communications and public engagement process included the following:

- **GSA formation and coordination.** SVBGSA formation and coordination took place from 2015 through 2017 and included completing a Salinas Valley Groundwater Stakeholder Issues Assessment which resulted in recommendations for a transparent, inclusive process for the local implementation of SGMA and formation of the SVBGSA.
- **GSP preparation.** Given the importance of the Subbasin and the development of the GSP to the communities, residents, landowners, farmers, ranchers, businesses, and others, it is essential that inclusive stakeholder input is a primary component of the GSP process. A rigorous review process for each chapter in this GSP and for the final plan ensured that stakeholders had multiple opportunities to review and comment on the draft GSP.
- **Subbasin Planning Committee.** The Eastside Subbasin Planning Committee provides overall direction for GSP development. It comprises local stakeholders and a Board of Directors member, all of whom were appointed by the Board following a publicly noticed application process by the GSA. This Committee represents constituencies that are considered important stakeholders in the Eastside Subbasin, and who may not be represented on the Board of Directors. During the planning process, the SVBGSA held more than 34 Eastside planning meetings including 11 workshops.
- **Communication and public engagement actions (CPE Actions).** CPE Actions provide the SVBGSA Board and staff a guide to ensure consistent messaging about SVBGSA 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, are informed of milestones, and offered opportunities to participate in GSP implementation and plan updates.
- **Underrepresented communities (URCs) and disadvantaged communities (DACs).** During development of the 2022 GSPs SVBGSA assessed 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 will communicate impacts of groundwater management on local water conditions to engage URCs and DACs into GSA plan reviews and develop pathways for future involvement.

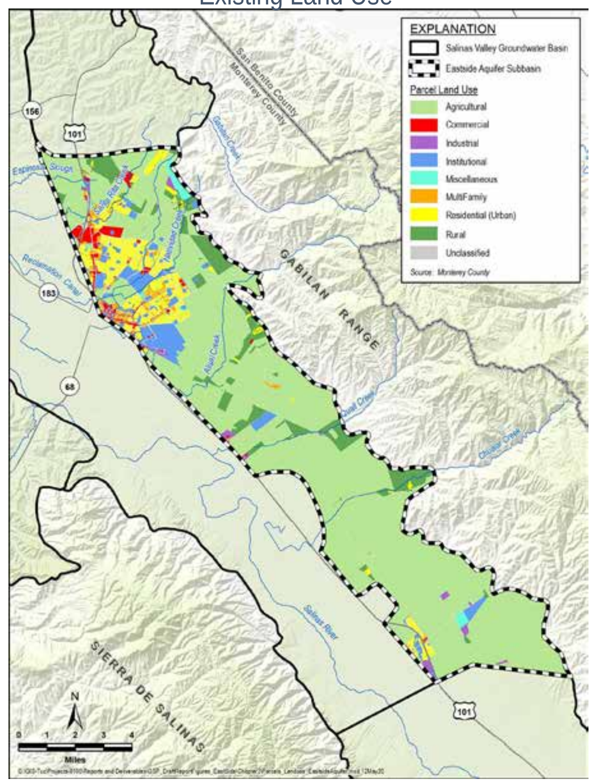
SVBGSA supports public participation by the development of an interactive website that allows access to all planning and meeting materials, data sets, and meeting notifications. The website can be accessed at: https://svbgsa.org.

3 DESCRIPTION OF PLAN AREA (GSP CHAPTER 3)

The Eastside Subbasin is located in northeastern Monterey County. The Subbasin contains portions of the City of Salinas, City of Gonzales, and a small portion of Chualar. The figure at right shows that the majority of land in the Subbasin is used for agriculture. Accordingly, the primary water use sector is agriculture. Groundwater is the main water source in the Subbasin; however, surface water diversions also provide a small amount of water.

The Eastside Subbasin is entirely within the jurisdiction of the SVBGSA. This GSP takes into consideration and incorporates existing water resource management, monitoring, and regulatory programs. The sustainability goal, sustainable management criteria, and projects and management actions in this GSP reflect and build on existing local plans and programs. Any potential limits to operational flexibility have already been incorporated into this GSP. Implementation of this GSP is not anticipated to affect water supply assumptions of relevant land use plans over the planning and implementation horizon. The GSA does not have authority over land use planning. However, the GSA will coordinate with the County on General Plans and land use planning/zoning as needed when implementing the GSP.

Existing Land Use



4 HYDROGEOLOGIC CONCEPTUAL MODEL (GSP CHAPTER 4)

The geology of the Eastside Subbasin is dominated by alluvial fans deposited by surface-water drainages originating in the Gabilan Range. The eastern boundary of the Subbasin is the contact between the unconsolidated sediments and the Gabilan Range that consists mostly of granitic rocks. The northern boundary with the Langley Subbasin generally coincides with the presence of the Aromas Red Sands. There are no reported hydraulic barriers separating these subbasins and therefore there is potential for groundwater flow between them. Similarly, there is likely groundwater flow between the Eastside and 180/400-Foot Aquifer Subbasins, although flow may be restricted due to the change from alluvial fan sediments in the Eastside Subbasin to marine and riverine sediments in the 180/400-Foot Aquifer Subbasin, which generally define this boundary. At the Subbasin's southern boundary there may be reasonable hydraulic connectivity with the Forebay Subbasin where water along the border moves both down from the mountains and toward the ocean.

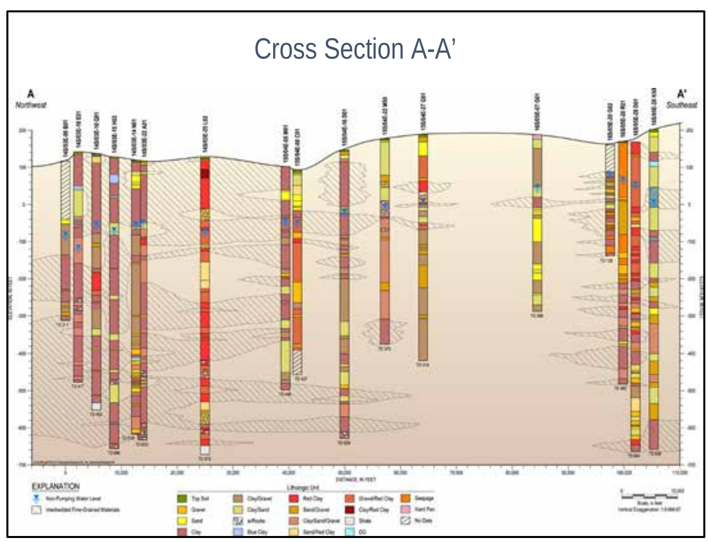
The Eastside Subbasin's sole principal aquifer is made up of two generalized water-bearing zones have been recognized within the alluvial fan aquifer system: the Eastside Shallow Zone and the Eastside Deep Zone. These designations of Shallow and Deep have not been identified as distinct aquifers by most investigators. They are only generalized zones of water-bearing sediments with time-correlated depositions and that are somewhat hydraulically connected to the 180-Foot and 400-Foot Aquifers in the 180/400-Foot Aquifer Subbasin. The seawater intrusion that is occurring in the 180/400-Foot Aquifer Subbasin has not been observed in the Eastside Subbasin, despite the eastward groundwater gradient, suggesting that the hydraulic connection between the subbasins is limited at best. In the 180/400-Foot Aquifer Subbasin, the 400-Foot Aquifer is separated from the Deep Aquifers by the 400-Foot/Deep Aquitard. The historical extents of the alluvial fans that define the Eastside region near the City of Salinas are contemporaneous with the 400-Foot Aquifer. Thus, by inference, the edge of the Deep Aquifers could also potentially extend into the Eastside Subbasin, but further investigation is required to determine this. The figure below shows a geologic cross section of the Subbasin.

This GSP adopts the base of the Subbasin defined by the USGS (Durbin, et al., 1978). The base of the Subbasin is defined by the sharp interface between alluvium and the underlying granitic rocks that exists near the Gabilan Range; however, the Subbasin does not have a well-defined base across the entire Subbasin. The usable portion of the Subbasin does not always include the full thickness of alluvium and with depth the viability of the sediments as productive freshwater principal aquifer becomes increasingly limited.

Detailed aquifer property values (storativity, conductivity, and transmissivity) for the principal aquifer were not available at the time of GSP development. The SVBGSA will fill this data gap during GSP implementation. Specific capacity data is used as a proxy for transmissivity data and indicate that the principal aquifer is relatively transmissive with moderate well yields.

Natural groundwater recharge occurs through infiltration of surface water from streams, deep percolation of excess applied irrigation water, deep percolation of infiltrating precipitation, and subsurface inflow from adjacent subbasins. The areas with the highest potential for surficial recharge are found along tributary streams. Many of the other soils in the Subbasin are classified as moderate for recharge potential, meaning that some water applied to surface could make it to the Eastside Shallow Zone or perched zones. Actual recharge to deeper productive zones of the Subbasin could be limited because the discontinuous alluvial sediments and the interfingering clay lenses may prevent deep recharge. Subsurface recharge is primarily from inflow from the adjacent Forebay and 180/400-Foot Aquifer Subbasins to the south and west, respectively (DWR, 2004).

Groundwater can leave the aquifer in locations where surface water and groundwater are interconnected. There are no potential locations of interconnected surface water in the Subbasin to date but interconnection could happen in the future. In areas of interconnection, groundwater dependent ecosystems (GDEs) may depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface, and may discharge groundwater through evapotranspiration (ET).



5 GROUNDWATER CONDITIONS (GSP CHAPTER 5)

Historical groundwater conditions in the Subbasin occurred before January 1, 2015 and current conditions occurred after January 1, 2015. Where possible, 2019 was chosen as the representative current year for groundwater conditions.

- **Groundwater elevations.** Historically, groundwater hydrographs show a decline in groundwater elevations throughout most of the Eastside Subbasin, in both the Shallow and Deep Zones of the Aquifer. Groundwater elevations have been chronically lowered due to pumping and are lowest during higher irrigation seasons. Groundwater elevations near the boundary with the Forebay Aquifer Subbasin have generally been more stable than the rest of the Subbasin. The figure at right shows example hydrographs for the Subbasin.

- **Change in groundwater storage.** The historical average annual loss of storage based on groundwater elevation change between 1944 and 2019 is approximately 3,400 acre-feet per year (AF/yr.) in the Eastside Subbasin, defined as the average change in groundwater that can be safely used for domestic, industrial, or agricultural purposes. However, other analyses have estimated greater declines in storage. Based on prior reports, groundwater elevations, and modeling, this GSP considers the average historical overdraft to be approximately 10,000 AF/yr.

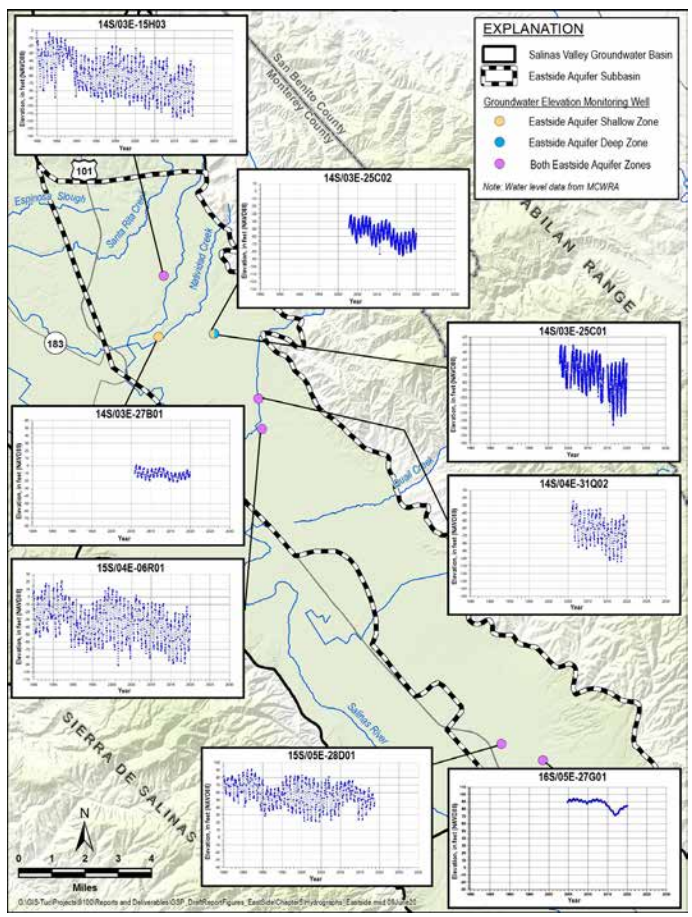
- **Seawater intrusion.** There is no seawater intrusion in the Eastside Subbasin. However, the neighboring 180/400-Foot Aquifer Subbasin has been subject to seawater intrusion for more than 70 years.

- **Groundwater quality.** Elevated nitrate concentrations in groundwater were locally present in the 1960s and significantly increased in 1970s and 1980s. In 2018, nitrate levels exceeded the drinking water MCL in 58% of on-farm domestic wells and 61% of irrigation supply wells in the Subbasin (CCRWQCB, 2018). Other constituents found at levels of concern for either potable or irrigation uses include 1,2,3-trichloropropane, iron, specific conductance, and total dissolved solids.

- **Subsidence.** No measurable subsidence has been recorded anywhere in the Subbasin between June 2015 and June 2019.

- **Interconnected surface water.** Provisional model results show that there is no interconnected surface water in the Subbasin.

Map of Example Hydrographs



6 WATER BUDGETS (GSP CHAPTER 6)

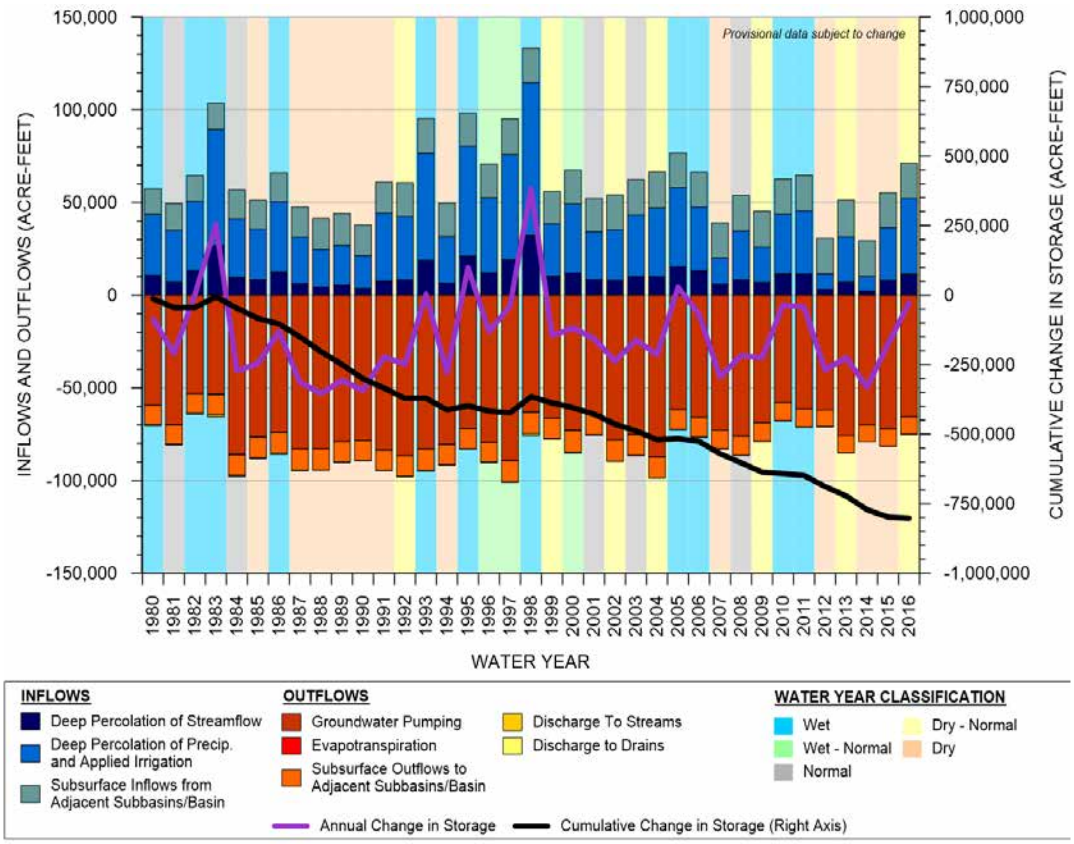
Water budgets provide an accounting and assessment of the total annual volume of surface water and groundwater entering and leaving the Subbasin. This GSP presents water budgets for 3 time periods – historical (1980 to 2016), current (2016), and projected with estimated 2030 and 2070 climate change factors. Water Year 2016 was the last year included in the models that could be used to develop water budgets for the GSP. Water Year 2016 meets the definition of current year found in the SGMA regulations (23 California Code of Regulations §354.18 (c)(1)); however, Water Year 2016 was preceded by multiple dry or dry-normal years and may not necessarily represent average current conditions. This chapter presents the surface water budget and groundwater budget for each time period. The groundwater budget contains aggregate numbers for the Subbasin and is not differentiated spatially.

The water budgets are developed using the historical Salinas Valley Integrated Hydrologic Model (SVIHM) and the predictive Salinas Valley Operational Model (SVOM), both developed by the USGS. The models are representations of natural conditions and are limited by assumptions and uncertainty associated with the data upon which they are based. The water budgets produced by the models are adjusted with reported extraction data to ensure the water budgets are based on the best available science and data.

Historical and Current Water Budgets and Historical Sustainable Yield. The groundwater budget accounts for the inflows and outflows to and from the Subbasin's groundwater system. This includes subsurface inflows and outflows of groundwater at the Subbasin boundaries, recharge, pumping, ET, and net streambed exchange.

The historical groundwater budget figure on the next page shows the annual groundwater inflows and outflows, annual change in groundwater storage, and cumulative change in storage. Changes in groundwater storage are generally driven by groundwater pumping, increasing during wet periods and declining during dry periods. However, historical decline in groundwater levels varies across the Subbasin. On average, historical outflows from the groundwater system have been greater than inflows, resulting in a decrease in groundwater storage. Based on estimates from Brown and Caldwell's State of the Salinas River Groundwater Basin report (2015), analysis and comparison of groundwater level changes over time, and model results, it is estimated that the Subbasin has historically been in overdraft on the order of 10,000 AF/yr. When this change in storage is subtracted from a range of the historical pumping, the estimated historical sustainable yield ranges from 69,300 to 86,700 AF/yr. The sustainable yield of the Subbasin is an estimate of the quantity of groundwater that can be pumped on a long-term average annual basis without causing any of the 6 undesirable results defined in ES-8. The current sustainable yield represents a snapshot in time and is not used for groundwater management planning. These results are provisional and are subject to change in future GSP updates after the SVIHM and SVOM are released by the USGS. Projected Water Budgets and Projected Sustainable Yield. Projected water budgets for 2030 and 2070 are extracted from the SVOM, which simulates future hydrologic conditions with assumed climate change based on the climate change factors recommended by DWR. Results are then adjusted based on extraction to produce the water budget based on best available data. The projected water budget includes a surface water budget and groundwater budget, each quantifying all inflows and outflows. The average change in storage for the sustainable yield calculations is set to a loss of 10,000 AF/yr. as is done in the historical water budget. Subtracting the average change in storage of 10,000 AF/yr. from the projected pumping, results in a projected sustainable yield of 80,400 AF/yr. and 84,500 AF/yr. for 2030 and 2070, respectively.

SVIHM Simulated Historical and Current Groundwater Budget



The projected sustainable yield is the long-term estimate of the quantity of groundwater that can be pumped once all 6 undesirable results have been addressed; however, it does not include projects, management actions, or pumping reductions needed to avoid undesirable results and reach sustainability according to the 6 sustainability indicators. Although the sustainable yield values provide guidance for achieving sustainability, simply increasing groundwater recharge or reducing pumping to within the sustainable yield is not proof of sustainability. Sustainability must be demonstrated through avoiding all 6 undesirable results. The projected water budgets are based on a provisional version of the SVOM and are subject to change. Model information and assumptions are based on provisional documentation on the model.

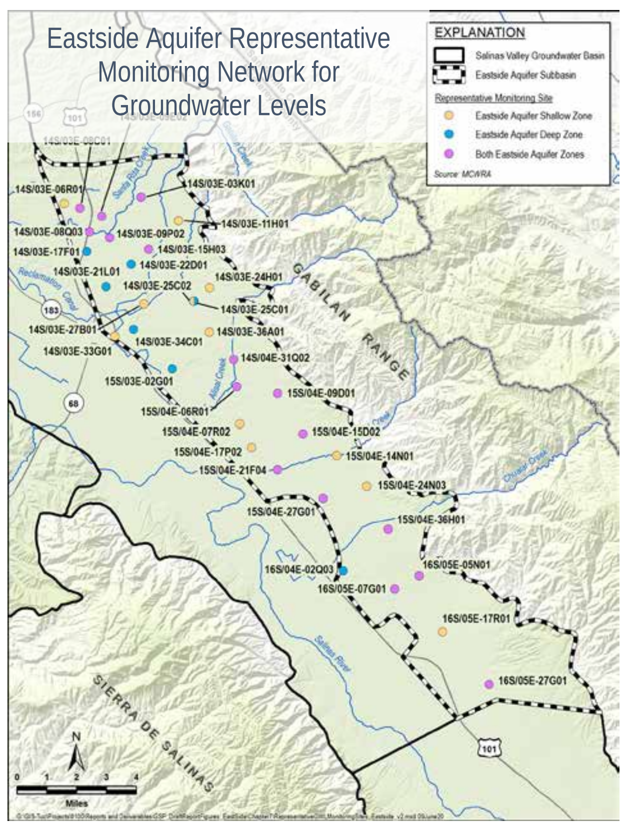
The sustainable yield value will be updated in future GSP updates as more data are collected and additional analyses are conducted. The table below summarizes the historical and projected sustainable yields for the Subbasin.

	Historical Sustainable Yield Range	2070 Projected Sustainable Yield
Groundwater Pumping	79,300 to 96,700	94,500
Change in Storage	-10,000	-10,000
Sustainable Yield	69,300 to 86,700	84,500

7 MONITORING NETWORKS (GSP CHAPTER 7)

Monitoring networks are developed for data collection of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the Subbasin and to evaluate changing conditions that occur as the Plan is implemented. The SVBGSA developed monitoring networks for each of the 6 sustainability indicators, based on existing monitoring sites to the extent possible. Where needed monitoring networks will be expanded and data gaps filled to improve the SVBGSA's ability to demonstrate sustainability and refine the hydrogeologic conceptual model.

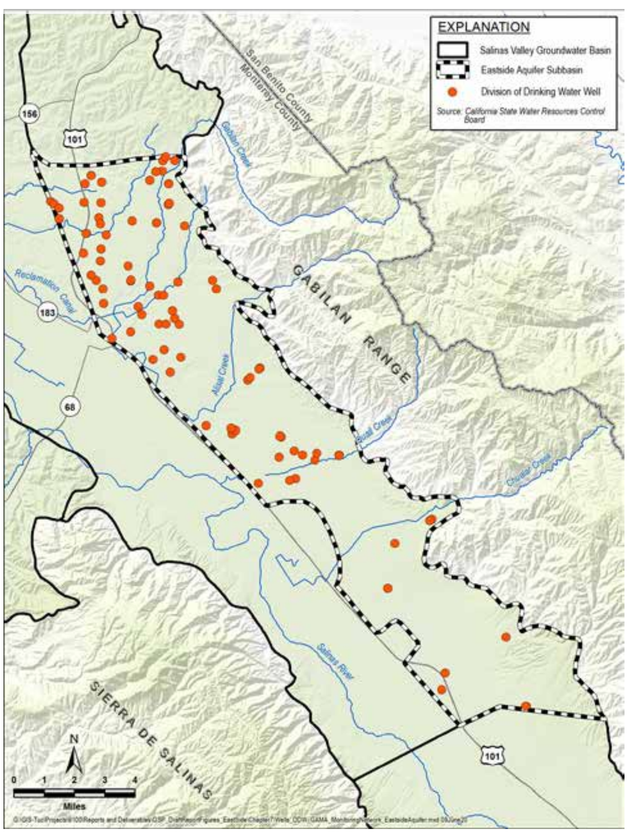
- **Groundwater levels** are measured in 35 designated monitoring wells that form a network sufficient to demonstrate groundwater occurrence, flow directions, and hydraulic gradients. The figure to the right shows the existing monitoring network, all monitoring is conducted by MCWRA.
- **Groundwater storage** is measured by groundwater elevations; thus the groundwater storage and groundwater level monitoring networks are identical.
- **Seawater intrusion** is evaluated based on a 500 mg/L chloride concentration isocontour derived from measurements at a specific network of monitoring wells in the Eastside Subbasin and the adjacent 180/400-Foot Subbasin. Monitoring and development of the chloride isocontour maps are done by MCWRA.
- **Groundwater quality** is evaluated by monitoring groundwater quality at a network of existing water supply wells. Drinking water constituents of concern will be assessed at public water system supply wells through the Division of Drinking Water program and at on-farm domestic wells through the Irrigated Lands Regulatory Program (IRLP), shown on the figures at right and on the following page, respectively. Agricultural constituents of concern will be assessed at irrigation supply wells that are also monitored through the ILRP.
- **Land subsidence** is assessed based on the land subsidence data DWR has collected with InSAR satellite data.
- **Interconnected surface water** will be assessed through monitoring shallow groundwater elevations near locations of interconnection. Given the lack of monitoring data, the SVBGSA plans to install a shallow well to establish the level of interconnection of the Gabilan Creek with the underlying shallow sediments just over the boundary with the Langley Subbasin. Interconnection might exist in the future near this area within the Eastside Subbasin.



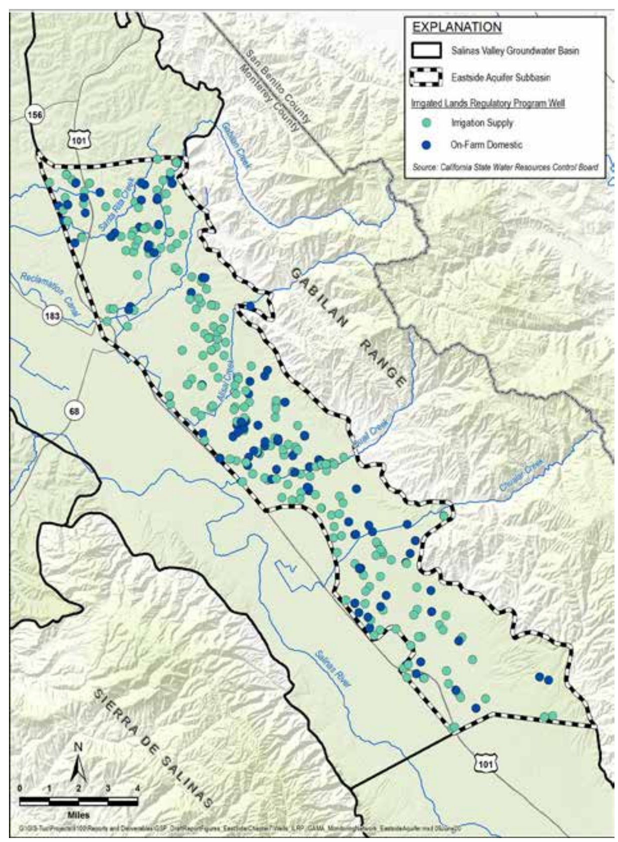
- **Other monitoring networks** are not necessary to monitor the 6 sustainability indicators in the Subbasin; however, DWR requires annual reporting of pumping and surface water use in the Subbasin.
    - **Groundwater extraction** monitoring includes municipal and agricultural pumping reported to the MCWRA.
    - **Salinas River Watershed Diversion** data from the Electronic Water Rights Information Management System (eWRIMS) is used to monitor the surface water diversions in the Subbasin.

The SVBGSA has developed a Data Management System (DMS) to store, review, and upload data collected as part of GSP development and implementation. The DMS includes a publicly accessible web-map hosted on the SVBGSA website; accessed at https://svbgsa.org/gsp-web-map-and-data/.

DDW Public Water System Supply Wells
in the Groundwater Quality Monitoring Network



ILRP On-Farm Domestic and Irrigation Supply Wells in the
Groundwater Quality Monitoring Network



8 SUSTAINABLE MANAGEMENT CRITERIA (GSP CHAPTER 8)

The sustainability goal of the Eastside Subbasin is to manage groundwater resources for long-term community, financial, and environmental benefits to the Subbasin's residents and businesses. The goal of this GSP is to ensure long-term viable water supplies while maintaining the unique cultural, community, and business aspects of the Subbasin. It is the express goal of this GSP to balance the needs of all water users in the Subbasin.

Sustainable Management Criteria (SMC) define the conditions that constitute sustainable groundwater management. The following table provides a summary of the SMC for each of the 6 sustainability indicators. Measurable objectives reflect the subbasin's goals for desired groundwater conditions for each sustainability indicator. These provide operational flexibility above the minimum thresholds. The minimum thresholds are quantitative indicators of the Subbasin's locally defined significant and unreasonable conditions. The undesirable result is a combination of minimum threshold exceedances that show a significant and unreasonable condition across the Subbasin. This GSP is designed avoid undesirable results, and achieve the sustainability goals within 20 years, along with interim milestones every 5 years that show progress. The management actions and projects provide sufficient options for reaching the measurable objectives within 20 years and maintaining those conditions for 30 years for all 6 sustainability indicators.

Sustainable Management Criteria Summary

Sustainability Indicator	Measurable Objective	Minimum Threshold	Undesirable Result
Chronic lowering of groundwater levels	Minimum thresholds are set to 2015 groundwater elevations.	Measurable objectives are set to 1999 groundwater elevations.	More than 15% of groundwater elevation minimum thresholds are exceeded. Allows for 4 exceedances per year in the Eastside Aquifer Subbasin.
Reduction in groundwater storage	Minimum thresholds are established by proxy using groundwater elevations. The reduction in groundwater storage minimum thresholds are identical to the chronic lowering of groundwater levels minimum thresholds.	Measurable objectives are established by proxy using groundwater elevations. The reduction in groundwater storage measurable objectives are identical to the chronic lowering of groundwater levels measurable objectives.	More than 15% of groundwater elevation minimum thresholds are exceeded. The undesirable result for reduction in groundwater storage is established by proxy using groundwater elevations.
Seawater intrusion	Minimum threshold is the 500 mg/L chloride isocontour at the Subbasin boundary.	Measurable objective is identical to the minimum threshold, resulting in no seawater intrusion in the Eastside Subbasin.	Any exceedance of the minimum threshold, resulting in mapped seawater intrusion within the Subbasin boundary.
Degraded groundwater quality	Minimum thresholds are zero additional exceedances of the regulatory drinking water standards (potable supply wells) or the Basin Plan objectives (irrigation supply wells) beyond those observed in 2019 for groundwater quality COC. Exceedances are only measured in public water system supply wells and ILRP on-farm domestic and irrigation supply wells. (Measurable objectives are identical to the minimum thresholds.)		Future or new minimum thresholds exceedances are caused by a direct result of GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction.
Land subsidence	Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors. (Measurable objective is identical to the minimum threshold, resulting in zero net long-term subsidence.)		There is an exceedance of the minimum threshold for subsidence due to lowered groundwater elevations.
Depletion of interconnected surface water	Minimum thresholds are established by proxy using shallow groundwater elevations observed in 2015 near locations of ISW.	Measurable objectives are established by proxy using shallow groundwater elevations observed in 1999 near locations of ISW.	There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor ISW.

9 PROJECTS AND MANAGEMENT ACTIONS (GSP CHAPTER 9)

This GSP identifies projects and management actions that provide stakeholders with options to reach sustainability. The set of projects and actions achieve the following objectives:

- Attaining groundwater sustainability by 2042 by meeting Subbasin-specific SMC
- Providing equity between who benefits from projects and who pays for projects
- Providing incentives to constrain groundwater pumping within the sustainable yield

The projects and management actions included in this GSP outline a framework for reaching sustainability; however, many details must be negotiated before any of the projects and management actions can be implemented. The set of projects and management actions provides sufficient options for reaching and maintaining sustainability throughout the planning horizon, but they do not all necessarily need to be implemented.

This GSP is developed as part of an integrated effort by the SVBGSA to achieve groundwater sustainability in all 6 subbasins of the Salinas Valley under its authority. Therefore, the projects and actions included in this GSP are part of a larger set of integrated projects and actions for the entire Valley.

This GSP focuses on the projects that directly help the Eastside Subbasin reach its sustainability goals, but also includes multi-subbasin projects outside the Subbasin that will likely benefit the Subbasin and reduce the need for additional projects and management actions. In addition, the chapter includes implementation actions that contribute to groundwater management and GSP implementation but do not directly help the Subbasin reach or maintain sustainability. The projects, management actions, and implementation actions for this GSP are listed in the following table

Projects and Management Actions

Project/ Management Action #	Name	Description	Project Benefits
A – INCREASED RECHARGE			
A1	Managed Aquifer Recharge with Overland Flow	Construct basins for managed aquifer recharge of overland flow before it reaches streams	Groundwater recharge, less stormwater and erosion, more regular surface temperature
A2	Floodplain Enhancement and Recharge	Restore creeks and floodplains to slow the flow of water	More infiltration, less erosion, less flooding
B – SURFACE WATER DIVERSIONS			
B1	11043 Diversion at Chualar	Build a new facility near Chualar that would be allowed to divert water from the Salinas River when streamflow is high	Less groundwater pumping, moderately less seawater intrusion in other subbasins
B2	11043 Diversion at Soledad	Build a new facility near Soledad that would be allowed to divert water from the Salinas River when streamflow is high	Less groundwater pumping, slightly less seawater intrusion in other subbasins
B3	Surface Water Diversion from Gabilan Creek	Build a new facility on Gabilan Creek that would be allowed to divert water when streamflow is high.	Collects streamflow that would otherwise be lost to the ocean

Project/ Management Action #	Name	Description	Project Benefits
C – ALTERNATIVE WATER SUPPLIES			
C1	Eastside Irrigation Water Supply Project (or Somavia Road Project)	Import groundwater from the 180/400-Foot Aquifer Subbasin	Less groundwater pumping in the Eastside Aquifer Subbasin
C2	Salinas Scalping Plant	Build a water treatment facility to recycle wastewater for agricultural use	Less groundwater pumping
D – REGIONAL ALTERNATIVE WATER SUPPLIES			
D1	Regional Municipal Supply Project	Build a regional desalination plant that would treat brackish water extracted from seawater intrusion barrier and supply drinking water to municipalities in the Eastside Aquifer Subbasin and other subbasins	Less groundwater pumping, reduced risk of seawater intrusion
D2	CSIP Optimization and Expansion	Expand CSIP into the northwest corner of the Eastside Aquifer Subbasin	Less groundwater pumping
E – DEMAND MANAGEMENT			
E1	Conservation and Agricultural BMPs	Promote agricultural best management practices and support use of ET data as an irrigation management tool for growers	Better tools assist growers to use water more efficiently; decreased groundwater extraction
E2	Fallowing, Fallow Bank, and Agricultural Land Retirement	Includes voluntary fallowing, a fallow bank whereby anybody fallowing land could draw against the bank to offset lost profit from fallowing, and retirement of agricultural land	Decreased groundwater extraction for irrigated agriculture
E3	Pumping Allocations and Controls	Proactively determines how extraction should be fairly divided and controlled if needed	Decreases extraction if needed
F – SALINAS RIVER PROJECTS AND MANAGEMENT ACTIONS *(projects will likely have indirect benefits for the Eastside Subbasin that may reduce the need for other projects and management actions)*			
F1	Multi-benefit Stream Channel improvements	Prune native vegetation and remove non-native vegetation, manage sediment, and enhance floodplains for recharge. Includes 3 components: Stream Maintenance Program Invasive Species Eradication Floodplain Enhancement and Recharge	Groundwater recharge, flood risk reduction, returns streams to a natural state of dynamic equilibrium
F2	MCWRA Drought Reoperation	Support the existing Drought Technical Advisory Committee (D-TAC) when it develops plans for how to manage reservoir releases during drought	Multi-subbasin benefits: more regular seasonal reservoir releases; drought resilience
F3	Reservoir Reoperation	Collaborate with MCWRA to evaluate potential reoperation scenarios, which could be paired with projects such as the Interlake Tunnel, seasonal reservoir releases with aquifer storage and recovery, or other potential projects.	Additional regular annual reservoir releases; drought resilience
G - IMPLEMENTATION ACTIONS			
G1	Well Registration	Register all production wells, including domestic wells	Better informed decisions, more management options
G2	Groundwater Extraction Management System (GEMS) Expansion and Enhancement	Update current GEMS program by collecting groundwater extraction data from wells in areas not currently covered by GEMS and improving data collection	Better informed decisions

Project/ Management Action #	Name	Description	Project Benefits
G3	Dry Well Notification System	Develop a system for well owners to notify the GSA if their wells go dry. Refer those owners to resources to assess and improve their water supplies. Form a working group if concerning patterns emerge.	Support affected well owners with analysis of groundwater elevation decline
G4	Water Quality Coordination Group	Form a working group for agencies and organizations to collaborate on addressing water quality concerns	Improve water quality
G5	Support Protection of Areas of High Recharge	Work with land use agencies to protect land with high recharge potential	Help prevent decline of infiltration capacity
G6	Deep Aquifers Study	Complete study of the Deep Aquifers to enable better management of groundwater and seawater intrusion	Increase understanding of Deep Aquifers
G7	Land Use Jurisdiction Coordination Program	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.	Better aligned land use and water use planning

Mitigation of Overdraft. The Eastside Subbasin has historically been in overdraft and it is projected to still be in overdraft throughout the GSP planning horizon unless projects and management actions bring extraction in line with the sustainable yield. The overdraft can be mitigated by reducing pumping or recharging the subbasin, either through direct or in-lieu means.

The potential projects and management actions in this chapter are sufficient to mitigate existing overdraft. These include potential demand management through pumping allocations to be used if other projects and management actions do not reach sustainability goals and mitigate overdraft.

10 IMPLEMENTATION (GSP CHAPTER 10)

This GSP lays out a roadmap for addressing all of the activities needed for GSP implementation between 2022 and 2042, focusing mainly on the activities between 2022 and 2027. Implementing this GSP requires the following formative activities:

Data, monitoring, and reporting. SGMA requires submittal of annual monitoring data and development of an annual report to track groundwater conditions with respect to the SMC. Monitoring will mostly rely on existing monitoring programs, and expansion of those programs. The groundwater level and groundwater extraction monitoring networks will be improved to provide sufficient temporal coverage. Only ISW needs the establishment of a new monitoring network, which will help monitor ISW in the adjacent Langley Area Subbasin. Data from the monitoring programs will be maintained in the DMS and evaluated annually. SVBGSA also plans to fill the aquifer properties and lithologic and hydrostratigraphic data gaps in the HCM to gain a better understanding of the principal aquifer.

Continuing communication and stakeholder engagement. The SVBGSA website will be maintained as a communication tool for posting data, reports, and meeting information. Additionally, the SVBGSA will routinely report information to the public about GSP implementation, progress towards sustainability, and the need to use groundwater efficiently.

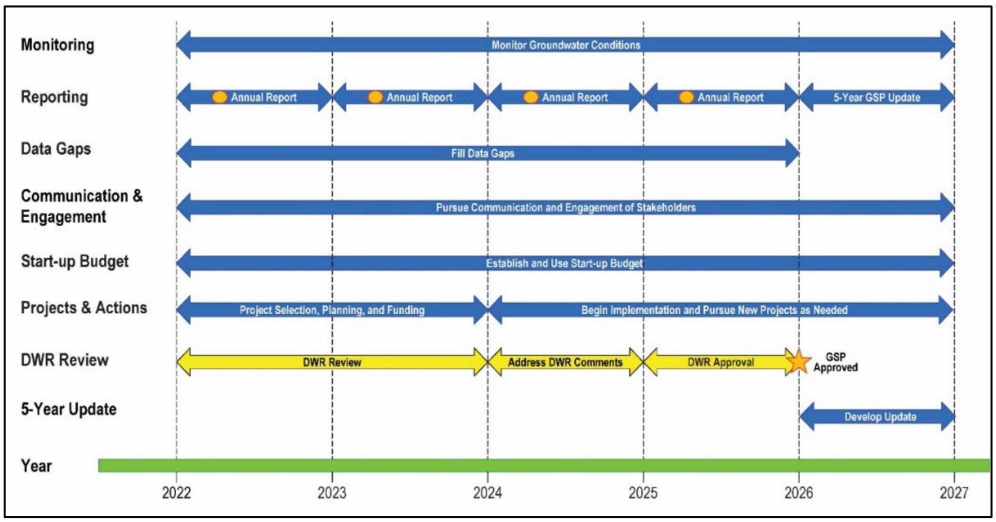
Refining and implementing projects and management actions. The projects and management actions in this GSP have been identified as beneficial and sufficient for reaching and maintaining sustainability in the Eastside Subbasin. During GSP implementation, they will be refined and prioritized, and impacts of projects and management actions on adjacent subbasins will be analyzed as part of the project selection process. The SVBGSA Board of Directors will approve projects and management actions that are selected for funding.

Adapting management with the 5-year update. SGMA requires assessment reports every 5 years to assess progress towards sustainability, a description of significant new information or data, and whether the GSP needs to be adapted. The 5-year update will include updating the SVIHM and SVOM with newly collected data and updating model scenarios to reflect both the additional data and refinements in project design or assumptions.

Developing a funding strategy. SVBGSA established a valley-wide Operational Fee to fund the typical annual operational costs of its regulatory program authorized by SGMA, including regulatory activities of management groundwater to sustainability (such as GSP development), day-to-day administrative operations costs, and prudent reserves. The cost is relatively low because SVBGSA can spread its administrative costs over the 6 subbasins it manages. In addition, this GSP provides an estimate of the start-up budget needed to implement this GSP within the Eastside Subbasin. The SVBGSA estimates that these planned activities will cost $888,000 over the first 5 years of implementation in the Eastside Subbasin. The start-up budget does not include funding for implementing specific projects and management actions. For projects funded by SVBGSA or funding SVBGSA raises to contribute to the implementation of projects, this GSP includes a list of potential funding mechanisms, and SVBGSA will evaluate the most appropriate mechanism for each project.

Schedule. Implementation of the Eastside Aquifer Subbasin GSP must be integrated with that of the 5 other GSPs in the Salinas Valley to ensure all subbasins can reach and maintain sustainability. The general implementation schedule for the first 5 years of GSP implementation, provided in the figure below, includes 6 main tasks and DWR's review and approval process. For projects and management actions, implementation will begin with implementation actions and prioritization of projects and management actions to reach sustainability. Throughout GSP implementation, projects and management actions will be continually updated as new data and analyses are available. The GSP is intended to include adaptive management that will refine the implementation and direction of this GSP over time.

General Schedule of 5-Year Start-Up Plan



1 INTRODUCTION TO THE EASTSIDE AQUIFER SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

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 4 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 – Eastside Aquifer Subbasin (Subbasin, or Eastside Subbasin) as a high priority basin. The Eastside Subbasin is 1 of 9 subbasins in the Salinas Valley, and it is located along the northeast edge of the Salinas Valley (Figure 1-1). This document satisfies the GSP requirement for the Eastside Subbasin and meets all of the regulatory standards.

With limited recharge and continued groundwater extraction, groundwater conditions in the Eastside Subbasin have declined in recent decades. Extensive groundwater pumping has caused a long-lasting groundwater table depression in the northwestern part of the subbasin. Overall groundwater elevations and storage have also declined. Nitrates pose groundwater quality concerns, with the average concentration of 69 mg/L in 1997, substantially above the drinking water standard of 45 mg/L (DWR, 2004). The purpose of this GSP is to outline how the Salinas Valley Basin GSA (SVBGSA) 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: chronic lowering of groundwater levels, groundwater storage reductions, seawater intrusion, groundwater quality degradation, land subsidence, and interconnected surface water (ISW) depletion. Sustainability must by achieved in 20 years and maintained for an additional 30 years.

This GSP first presents the stakeholders, plan area, geologic and hydrogeologic data, groundwater conditions, and water budget 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 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. The final chapters detail projects and actions that should be implemented to achieve sustainability and provide an implementation plan for achieving sustainability. The GSP is intended to include adaptive management that will refine the implementation and direction of this GSP over time.

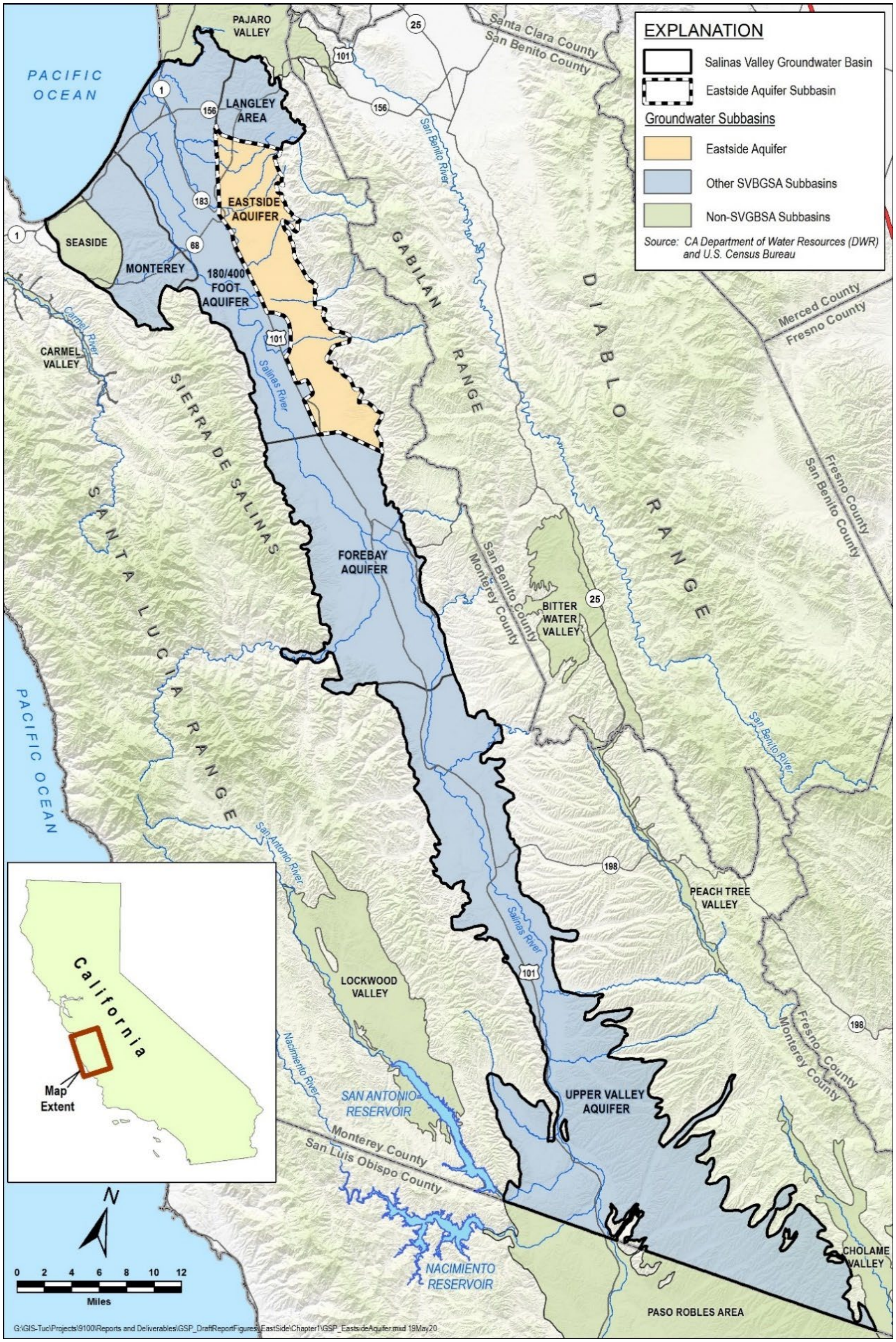


Figure 1-1. Eastside Aquifer Subbasin Location

1.2 Agency Information

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

1.2.1 Agency Name, Mailing Address, and Plan Manager

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

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

The Plan Manager and her contact information are:

Ms. Donna Meyers, General Manager
Salinas Valley Basin Groundwater Sustainability Agency
1441 Schilling Place
Salinas, CA 93901 | (831) 682-2592
meyersd@svbgsa.org
https://svbgsa.org

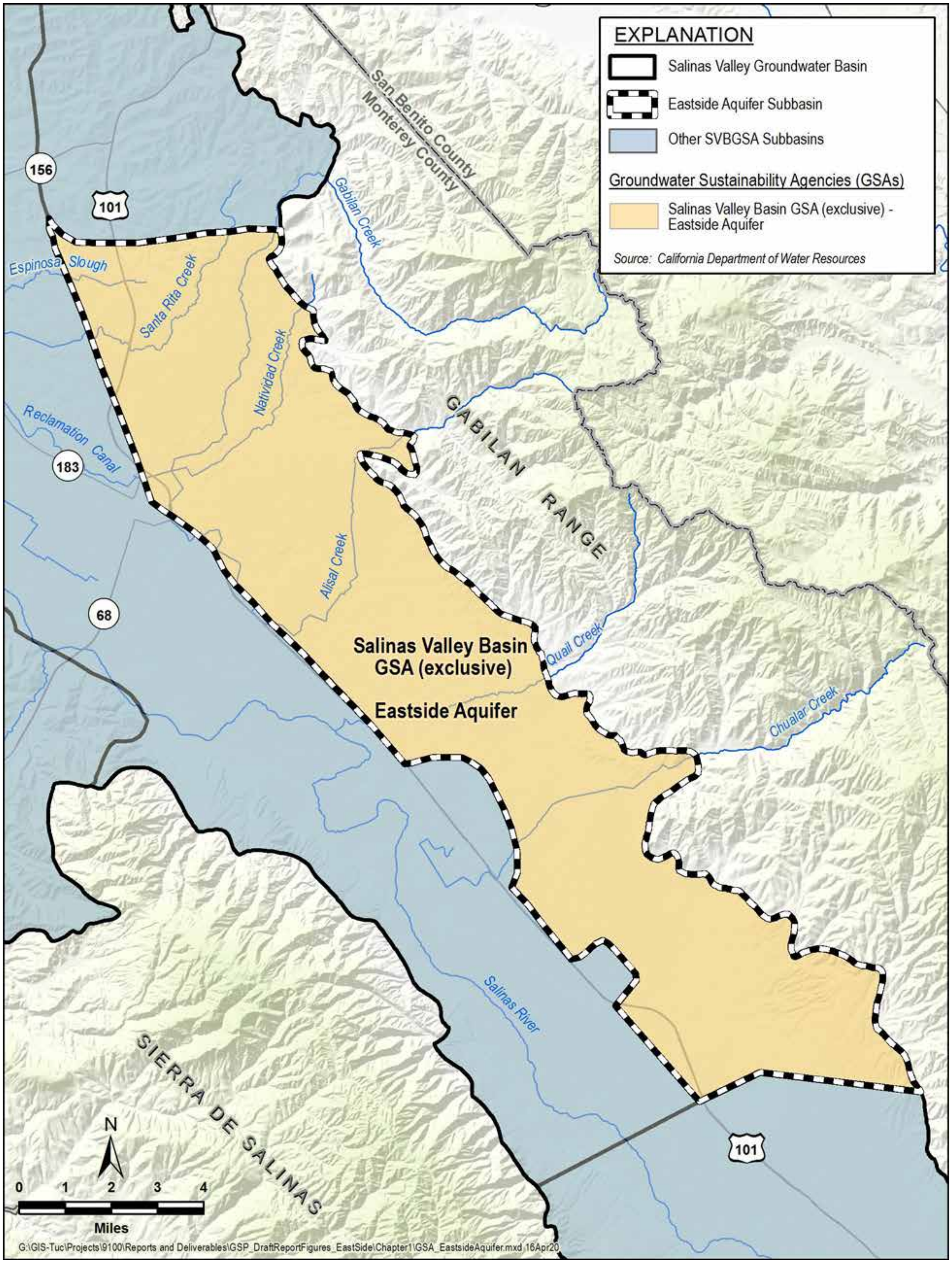


Figure 1-2. Map of Area Covered by the SVBGSA in the Eastside Aquifer Subbasin

1.2.2 SVBGSA Organization and Management Structure

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

The SVBGSA is a Joint Powers Authority (JPA), and its membership includes the County of Monterey, Monterey County Water Resources Agency (MCWRA), City of Salinas, City of Soledad, City of Gonzales, City of King (King City), the Castroville Community Services District (CSD), and Monterey One Water (formerly the Monterey Regional Water Pollution Control Agency). The SVBGSA is governed and administered by an 11-member Board of Directors (Board), representing public and private groundwater interests throughout the Valley. When a quorum is present, a majority vote is required to conduct business. Some business items require a super majority vote or a super majority plus vote. A super majority requires an affirmative vote by 8 of the 11 Board members. A super majority vote is required for:

- 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, SVBGSA includes a Budget and Finance Committee consisting of 5 Directors, an Executive Committee consisting of 5 Directors, and an Advisory Committee consisting of Directors and non-directors. The Advisory Committee is designed to ensure participation by constituencies whose interests are not directly represented on the Board. The SVBGSA's activities are coordinated by a general manager. The SVBGSA established individual subbasin planning committees to advise the Board on each of the subbasins under its jurisdiction for which it is developing a 2022 GSP. This GSP has been guided and reviewed by the Eastside Aquifer Subbasin Planning Committee, which comprises local representatives from the Subbasin. Once all GSPs are adopted, the subbasin planning committees will transition to implementation committees to advise on the implementation of the GSPs.

1.2.3 Authority of Agency

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.

SVBGSA is a JPA that was formed for 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:

- The County of Monterey has land use authority over the unincorporated areas of the County, including areas overlying the Eastside Subbasin.
- The MCWRA is a California Special Act District with broad water management authority in Monterey County.
- The City of Salinas is incorporated under the laws of the State of California. The City provides water supply and land use planning services to its residents.
- The City of Soledad is incorporated under the laws of the State of California. The City provides water supply and land use planning services to its residents.
- The City of Gonzales is incorporated under the laws of the State of California. The City provides water supply and land use planning services to its residents.
- King City is incorporated under the laws of the State of California. The City provides water supply and land use planning services to its residents.
- The Castroville CSD is a local public agency of the State of California, organized and operating under the CSD Law, Government Code § 6100 *et seq*. Castroville CSD provides water services to its residents.
- Monterey One Water is itself a joint powers authority whose members include many members of the SVBGSA.

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.

1.2.3.1 Coordination Agreement

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

1.3 Overview of this GSP

The SVBGSA developed this GSP for the entire Eastside Subbasin. This GSP is developed in concert with GSPs for 5 other Salinas Valley Groundwater Subbasins under SVBGSA jurisdiction: the 180/400-Foot Aquifer Subbasin, the Forebay Aquifer Subbasin, the Upper Valley Aquifer Subbasin, the Langley Area Subbasin, and the Monterey Subbasin. While this GSP is focused on the Eastside Subbasin, the GSP will be implemented in accordance with SVBGSA's role in maintaining and achieving sustainability for all subbasins within the Salinas Valley Groundwater Basin. The Eastside Subbasin is referred to as the Subbasin or Eastside Subbasin throughout this GSP, and the collection of Salinas Valley Groundwater Subbasins that fall partially or entirely under SVBGSA jurisdiction are collectively referred to as the Basin or the Valley.

The SVBGSA used a collaborative process to develop this GSP. Chapter 2 details the stakeholders that participated, and process followed, to develop this GSP. Stakeholders worked together to gather existing information, define sustainable management criteria (SMC) for the Subbasin, and develop a list of projects and management actions.

This 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. This GSP defines local SMC, details required monitoring networks, and outlines projects and management actions for reaching sustainability in the Subbasin by 2042.

The SVBGSA developed this GSP as part of an adaptive management process. This GSP will be updated and adapted as new information and more refined models become available. This includes updating SMC and projects and management actions to reflect updates and future conditions. Adaptive management will be reflected in the required 5-year assessment 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 Groundwater Basin. GSA formation and coordination took place from 2015 through 2017 and included completing a Salinas Valley Groundwater Stakeholder Issues Assessment which resulted in recommendations for a transparent, inclusive process for the local implementation of SGMA and the formation of the SVBGSA. Through the development and implementation of the GSPs SVBGSA is committed to following the requirements for stakeholder engagement as defined by SGMA:

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

2.2 Defining and Describing Stakeholders for Public Engagement

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

Agriculture. Includes row crops, field crops, vineyards, orchards, cannabis, and rangeland. The Salinas Valley agricultural region supports a $4.25 billion dollar production value and produces a large percentage of the nation’s produce and healthy foods including 61% of the leaf lettuce, 57% of celery, 56% of head lettuce, 40% of broccoli, and 38% of spinach. Agriculture is the largest user of groundwater in the Basin accounting for approximately 250,000 irrigated acres and 94% of pumping in the Basin.

Domestic Water Users. Includes urban water use assigned to 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 quarries and oil production. There is little industrial use within the Basin.

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 include the following. These users are also represented on the SVBGSA Board and Advisory Committees as described in the next section.

- **Environmental organizations**. Environmental organizations that are stakeholders include 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 and the Carmel River Steelhead
- **Underrepresented communities (URCs) and Disadvantaged Communities (DACs)**. URCs and DACs include the City of Greenfield, the City of Salinas, Castroville CSD, San Jerardo Cooperative, San Ardo Water District, San Vicente Mutual Water Company, Environmental Justice Coalition for Water
- **City and county government**. Cities of Gonzales, Soledad, Greenfield, King City, Marina, and Salinas, Monterey County, Monterey County Environmental Health Department
- **Land use nonprofits**. 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**. Monterey County Water Resources Agency, Marina Coast Water District, Arroyo Seco Groundwater Sustainability Agency, Castroville Community Services District, Monterey One Water, Monterey Peninsula Water Management District (MPWMD)
- **California Public Utilities Commission (CPUC) regulated water companies**. Alco Water Corporation, California Water Service Company, California American Water.

2.3 SVBGSA Governance Structure

SVBGSA is governed by a local and diverse 11-member Board and relies on robust science and public involvement for decision-making. The Board meets monthly and all meetings are open to the public. The Board is the final decision-making body for adoption of GSPs completed by the GSA.

The SVBGSA Advisory Committee advises the SVBGSA Board. The Advisory Committee is comprised of 25 members. The Advisory Committee strives to include a range of interests in groundwater in the Salinas Valley and outlined in SGMA. Advisory Committee members live in the Salinas Valley or represent organizations with a presence or agencies with jurisdiction in the Basin including:

- All groundwater users
- Municipal well operators, Public-Utilities Commission-Regulated water companies, and private and public water systems
- County and city governments
- Planning departments/land use
- Local landowners
- URCs
- Business and agriculture
- Rural residential well owners
- Environmental uses

The Advisory Committee, at this time, does not include representation from:

- Tribes
- Federal government

The Advisory Committee will review its charter following GSP completion for additional members if identified as necessary by the Board. The Advisory Committee provides input and recommendations to the Board and uses consensus to make recommendations to the Board. The Advisory Committee was established by Board action and operates according to a Committee Charter which serve as the bylaws of the Advisory Committee. The Advisory Committee reviews and provides recommendations to the Board on groundwater-related issues that may include:

- Development, adoption, or amendment of the GSP

- Sustainability goals
- Monitoring programs
- Annual work plans and reports
- Modeling scenarios
- Inter-basin coordination activities
- Projects and management actions to achieve sustainability
- Community outreach
- Local regulations to implement SGMA
- Fee proposals
- General advisory

Subbasin planning committees were established in May 2020 by the Board to inform and guide planning for the 5 GSPs due in January 2022. Membership is 7-12 people per subbasin planning committee and all meetings are subject to the Brown Act.

Together the Board, Advisory Committee, and subbasin planning committees are working to complete the 6 GSPs required within the SVBGSA jurisdiction. Subsequent to that SVBGSA, will complete a Salinas Valley Basin-wide Integrated Implementation Plan that will detail project portfolios and groundwater sustainability programs to meet SGMA compliance for subbasins by 2040 and maintain sustainability through 2050. Once all the GSPs are filed, the subbasin planning committees will transition to implementation committees.

The following graphic captures the phases of GSA development and GSP planning and implementation intended by the SVBGSA through 2050.

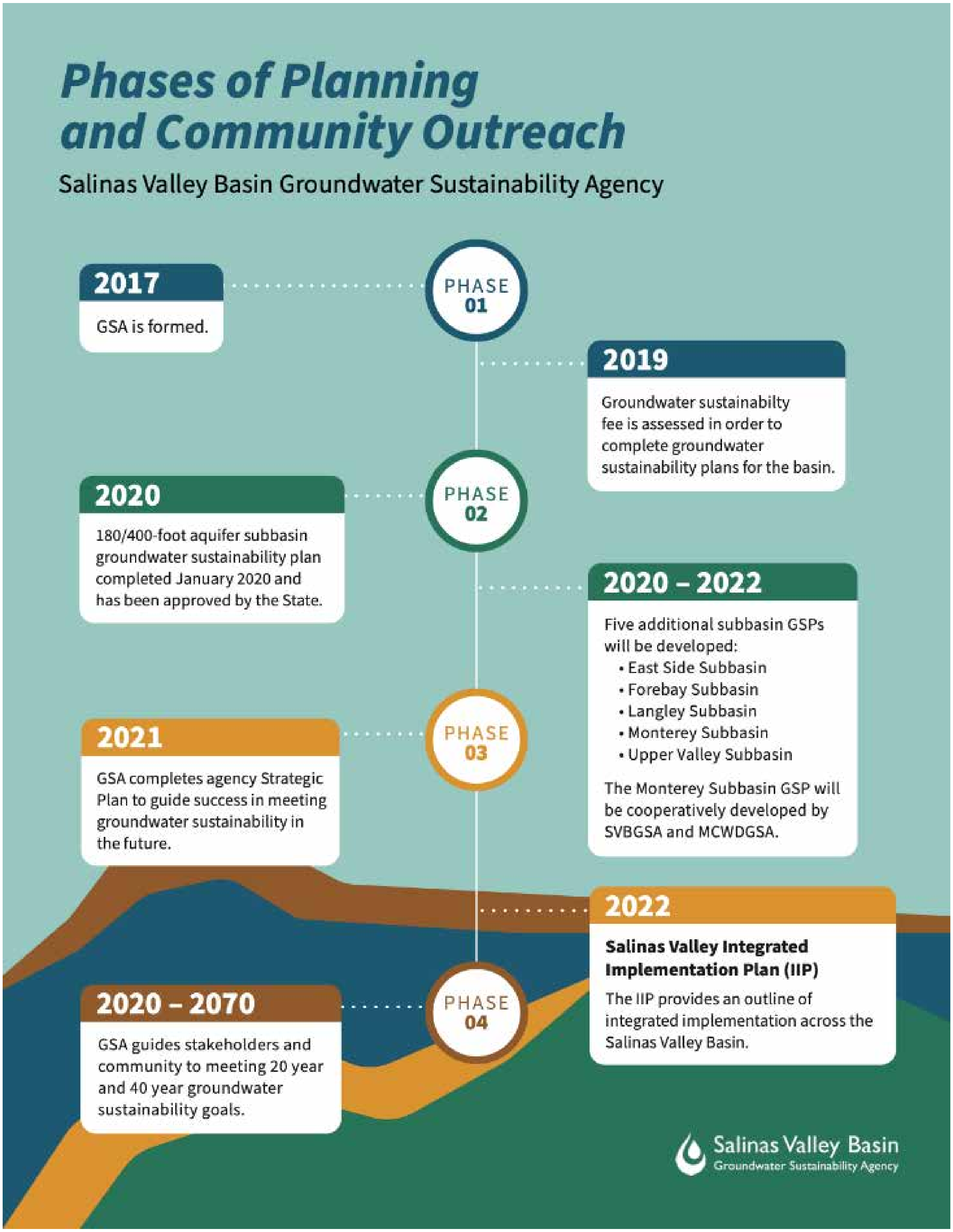


Figure 2-1. Phases of Planning and Community Outreach

2.4 Eastside Subbasin GSP Preparation

Given the importance of the Basin and the development of the Eastside GSP to the communities, residents, landowners, farmers, ranchers, businesses, and others, inclusive stakeholder input was a primary component of the Eastside GSP process. In order to encourage ongoing stakeholder engagement SVBGSA deployed the following strategies in the preparation of the Eastside Subbasin GSP:

- An inclusive outreach and education process conducted that best supports the success of a well-prepared GSP that meets SGMA requirements.
- Kept the public informed by distributing accurate, objective, and timely information.
- Invited input and feedback from the public at every step in the decision-making process.
- Established a Subbasin Planning Committee for the Subbasin and completed a comprehensive planning process with this Committee including engagement on key items with the Board and Advisory Committee
- Publicly noticed drafts of the Eastside Subbasin GSP and allowed for required public comment periods as required by SGMA. Public comments received and responses are included in Appendix 2A.

Additionally, a rigorous review process for each chapter in the Eastside GSP and for the final plan was completed. This process ensured that stakeholders had multiple opportunities to review and comment on the development of the chapters. A graphical presentation of the planning process is presented below.

Figure 2-2. GSP Development Process

2.5 Eastside Subbasin Planning Committee

Subbasin planning committees are comprised of local stakeholders and Board members and were appointed by the Board following a publicly noticed application process by the GSA. Subbasin planning committees were convened in June and July 2020. Subbasin planning committees do the comprehensive work of plan development, review, and recommendations, with assistance provided by SVBGSA staff and technical consultants.

These committees represent constituencies that are considered important stakeholders to developing comprehensive subbasin plans for the Salinas Valley or are not represented on the Board. A list of the Eastside Subbasin Planning Committee is included in the Acknowledgements section of this GSP.

Subbasin planning committee meetings are Brown Act meetings and noticed publicly on the SVBGSA website. Public comment is taken on all posted agenda items. Subbasin planning committees have been engaged in an iterative planning process that combines education of pertinent technical topics through presentations and data packets and receiving GSPs chapters for review and comment. A live GSP comment form is available on the SVBGSA website for ongoing comment submission on all GSP chapters. All GSP chapters were posted for public review and comment.

GSP chapters that have been taken to the Subbasin Planning Committee were also taken to the Advisory Committee for further review and comments. Community engagement and public transparency on SVBGSA decisions is paramount to building a sustainable and productive solution to groundwater sustainability in the Basin. At the conclusion of the planning process in August 2021 for the Eastside GSP the SVBGSA held more than 34 planning meetings and technical workshops on each aspect of the Eastside Subbasin GSP.

In addition to regularly scheduled committee meetings, a series of workshops were held for the Eastside Subbasin Planning Committee as detailed below. These workshops were informational for committee members, stakeholders, and the general public and cover pertinent topics to be included in the GSPs. Workshops were timed to specific chapter development for the GSP. Subject matter experts were brought in as necessary to provide the best available information to Subbasin Planning Committee members.

Table 2-1. Subject Matter Workshops Held During GSP Preparation

Topic	Date
Brown Act and Conflict of Interest	July 22, 2020
SMC	July 28, 2020
Water Law	August 10, 2020
Salinas Valley Watershed Overview	August 26, 2020
Web Map Workshop	September 30, 2020
Town Hall – Domestic Wells & Drinking Water	October 28, 2020

Topic	Date
Pumping Allocations	November 18, 2020
Funding Mechanisms	January 27, 2021
Water Budgets	February 24, 2021
Communications and Implementation	March 31, 2021
Technical Modeling Workshop – SVIHM & SVOM	June 30, 2021

2.6 Communication and Public Engagement Actions

SVBGSA is focused on communication and public engagement targeted at the public, including beneficial users, regarding the development of the SVBGSA's GSP for the Eastside Subbasin**.** Communication and public engagement actions (CPE Actions) that have taken place during GSP development will continue during implementation of all SVBGSA GSPs. Communication and public engagement actions provide the SVBGSA Board and staff a guide to ensure consistent messaging about SVBGSA 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 milestones and offered opportunities to participate in GSP implementation and plan updates. Appendix 2B includes the SVBGSA's marketing and communications plan.

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

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

2.6.1 Goals for Communication and Public Engagement

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

Critical to the success of the Eastside GSP implementation will be public understanding of the projects and management actions planned for sustainability, as well as sustainability implementation actions and other groundwater management activities. These important actions are identified below and specifically described in Chapter 9 of the Eastside GSP.

Increased Recharge

- Managed Aquifer Recharge (MAR) with Overland Flow
- Floodplain Enhancement and Stormwater Recharge

Surface Water Diversions

- 11043 Diversion at Chualar
- 11043 Diversion at Soledad
- Surface Water Diversion from Gabilan Creek

Alternative Water Supplies

- Eastside Irrigation Water Supply Project (Somavia Road)
- Salinas Scalping Plant

Regional Alternative Water Supplies

- Regional Municipal Supply Project
- Castroville Seawater Intrusion Program (CSIP) Optimization and Expansion

Demand Management

- Conservation and Agricultural BMPs
- Fallowing, Fallow Bank, and Agricultural Land Retirement
- Pumping Allocations and Control

Salinas River Projects, and Management Actions

- Multi-benefit Stream Channel Improvements
- MCWRA Drought Reoperation
- Reservoir Reoperation

Implementation Actions

- Well Registration

- Groundwater Extraction Management System (GEMS) Expansion and Enhancement
- Dry Well Notification System
- Water Quality Coordination Group
- Support Protection of Areas of High Recharge
- Deep Aquifers Study
- Land Use Jurisdiction Coordination Program

Additional important actions of GSP implementation will be the production of the required Annual Report by April 1 each year for the Eastside Subbasin. 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. The Annual Report also includes assessment of the 6 SMC for the subbasin. The Annual Report provides an important opportunity to reengage the Eastside Subbasin Committee in its review and to discuss sustainability status and goals.

CPE Actions provide outreach during the Subbasin planning efforts and assists SVBGSA in being receptive to stakeholder needs through communication tools. The CPE Actions also forecast how SVBGSA will communicate during GSP implementation.

The goals of the CPE Actions are:

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 communications channels that will foster an open dialogue and increase stakeholder engagement during the planning process.
3. To invite input from the public at every step in the decision-making process and provide transparency in outcomes and recommendations.
4. To ensure that the Board, staff, consultants, and committee members have up-to-date information and understand their roles and responsibilities.
5. To engage the public on GSP Implementation progress especially for project and management actions and Annual Reports.

2.6.2 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 public meetings held on a monthly basis.
  - Facilitate productive dialogues among participants throughout the GSP planning 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 milestones through the distribution of outreach materials and posting of materials on the SVBGSA website for the GSP.
  - Secure quality media coverage that is accurate, complete, and fair.
  - Utilize social media to engage with and educate the general public.
- 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.

2.6.3 Target Audiences and Stakeholders

SVBGSA stakeholders consist of other agencies and interested parties including all beneficial users of groundwater or representatives of someone who is. 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 Basin whose SGMA knowledge varies from high to little or none. Given this variance, SVBGSA efforts are broad and all-inclusive. Target audiences include:

- SVBGSA Board, Advisory Committee, and Subbasin Planning Committees
- SVBGSA Groundwater Sustainability Fee Payers
- Partner agencies including Monterey County Environmental Health Department, County of Monterey, MCWRA, and the Greater Monterey County 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 Basin
- Beneficial uses and users of groundwater including, agriculture, domestic wells and local small or state small water systems, and environmental uses such as wetlands
- Diverse social, cultural, and economic segments of the population within the Basin including URCs
- The general public

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

2.6.4 Stakeholder Database

A stakeholder database of persons and organizations of interest will be created and maintained. The database will include stakeholders that represent the region's broad interests, perspectives, and geography. It will be developed by leveraging existing stakeholder lists and databases and by conducting research of potential stakeholders that may be interested in one 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.

2.6.5 Key Messages and Talking Points

SVBGSA developed key messages focused on getting to know your GSA, an overview of groundwater sustainability planning for our community, and how we intend to continue outreach through implementation. These messages were 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 will be more comprehensive with an engaged group of stakeholders providing useful information, SVBGSA will create as many opportunities as possible to educate stakeholders and obtain their feedback on the GSP implementation and plan updates.

These messages are being used as the basis for specific talking points/Q&A to support effective engagement with audiences. The SVBGSA Key Messages are also used to support communication with audiences (Appendix 2C).

2.6.6 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 currently and anticipated activities for GSP implementation:

- Develop and maintain a list of interested parties
- Offer public informational sessions and subject-matter workshops and provide online access via Facebook Live or via Zoom
- Basin tours (currently on hold due to COVID restrictions)
- SVBGSA Web Map
- Annual Report presentations
- FAQS – Offer FAQs on several topics including SGMA, SVBGSA, GSP, projects, Monitoring Program, Annual Report, Programs and Groundwater Sustainability Fee
- Science of Groundwater – new examples (studies, etc.)

- Board, Advisory Committee, and other Committee Meetings
    - Regular public notices and updates; Brown Act compliance
    - Develop talking points for various topics and evolve as necessary
- Subbasin Implementation Committees
        - Each subbasin's planning committee for GSP development will transition to a subbasin implementation committee to be convened for GSP updates and annual report reviews.
- Integrated Implementation Committee
    - The Integrated Implementation Committee will be convened to discuss Basin wide aspects to the 6 GSPs in the Basin including public outreach.
- Online communications
    - SVBGSA website: maintain with current information
    - SVBGSA Facebook page: maintain and grow social media presence
    - Direct email via Mailchimp newsletter
- Mailings to most-impacted water users and residents – topics to include: Annual Report dashboard, What does your GSA do with the Sustainability Fee?, newsletter that accompanies each tax bill.
- Media coverage. Appendix 2D includes SVBGSA's media policy.
    - Op-eds in the local newspapers
    - Press releases
    - Radio interviews
- Promote/Celebrate National Groundwater Week (held in December)
- Co-promotional opportunities and existing channels with agencies, committees, and organizations including email newsletters, social media, board meetings and mailings to customers.
- Talks and presentations to various stakeholder groups, associations, community organizations, and educational institutions.
- Educational materials

2.6.7 CPE Actions Timeline and Tactics

CPE Actions and GSP milestone requirements by phase include:

- Prior to initiating plan development: Share how interested parties may contact the GSA and participate in development and implementation of the plan submitted to DWR. (23 California Code of Regulations § 353.6)
- Prior to GSP development: Establish and maintain an interested persons list. (California Water Code § 10723.4)
- Prior to and with GSP submission:
  - Record statements of issues and interests of beneficial users of basin groundwater including types of parties representing the interests and consultation process
  - Lists of public meetings
  - Inventory of comments and summary of responses
  - Communication section in GSP (23 California Code of Regulations § 354.10) that includes: agency decision-making process, identification of public engagement opportunities and response process, description of process for inclusion, and method for public information related to progress in implementing the plan (status, projects, actions)

- Supporting tactics to be used to communicate messages and supporting resources available through GSP development and GSP implementation:
  - SVBGSA website, updated regularly to reflect meetings and workshop offerings
  - Direct email via Mailchimp sent approximately monthly to announce board meetings, special workshop offerings and other opportunities for engagement
  - Outreach to local media to secure coverage of announcements and events, radio interviews, op-ed placement
  - Workshops, information sessions and other community meetings
  - Social media, specifically Facebook, updated regularly to share information and support other outreach efforts

2.6.8 CPE Actions – Annual Evaluation and Assessment

CPE Actions and GSP milestone requirements by phase include:

- What worked well?
- What didn't go as planned?
- Are stakeholders educated about the GSP development process and their own role?
- Is the timeline for implementation of the GSP clear?
- Has the GSA received positive press coverage?

- Do diverse stakeholders feel included?
- Has there been behavior changes related to the program goals? Or improved trust/relationships among participants?
- Community meeting recaps and next steps
- Lessons learned
- Budget analysis

2.7 Underrepresented Communities and Disadvantaged Communities Strategic Engagement and Communications

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

2.7.1 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 cities of Salinas and Gonzales and the community of Chualar have URCs and DACs within their boundaries.

The basin wide SVBGSA program area also has well documented DAC designation including 7 Census Designated Places, 60 Block Groups and 20 Tracts. Additionally, work conducted by the Greater Monterey County Integrated Regional Water Management Program (IRWMP) identified 25 small DACs, SDACs, and suspected DACs in unincorporated areas of the IRWMP region (RWMG, 2018). Figure 2-3 shows where DACs, SDACs, and EDAs are located within the Salinas Valley Groundwater Basin, and Appendix 2E further describes DACs.

SVBGSA seeks to engage more constructively with URCs and DACs moving forward in subbasin planning processes and ultimately GSP implementation. In August 2019, 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. Based on this work, an initial set of short and middle term actions to complete from January 2021-August 2021 was identified and work has begun on these items during the GSP development period and will be operational for implementation in Fall 2021. The Board affirmed these short and middle term actions on February 11, 2021 and are intended for focus during implementation of the GSP. Middle and long-term actions with URCs were identified for 2022. The *Spectrum of Community to Ownership* will be utilized as a guide in further shaping SVBGSA work with URCs and DACs communities in the Basin in consultation with community leaders.

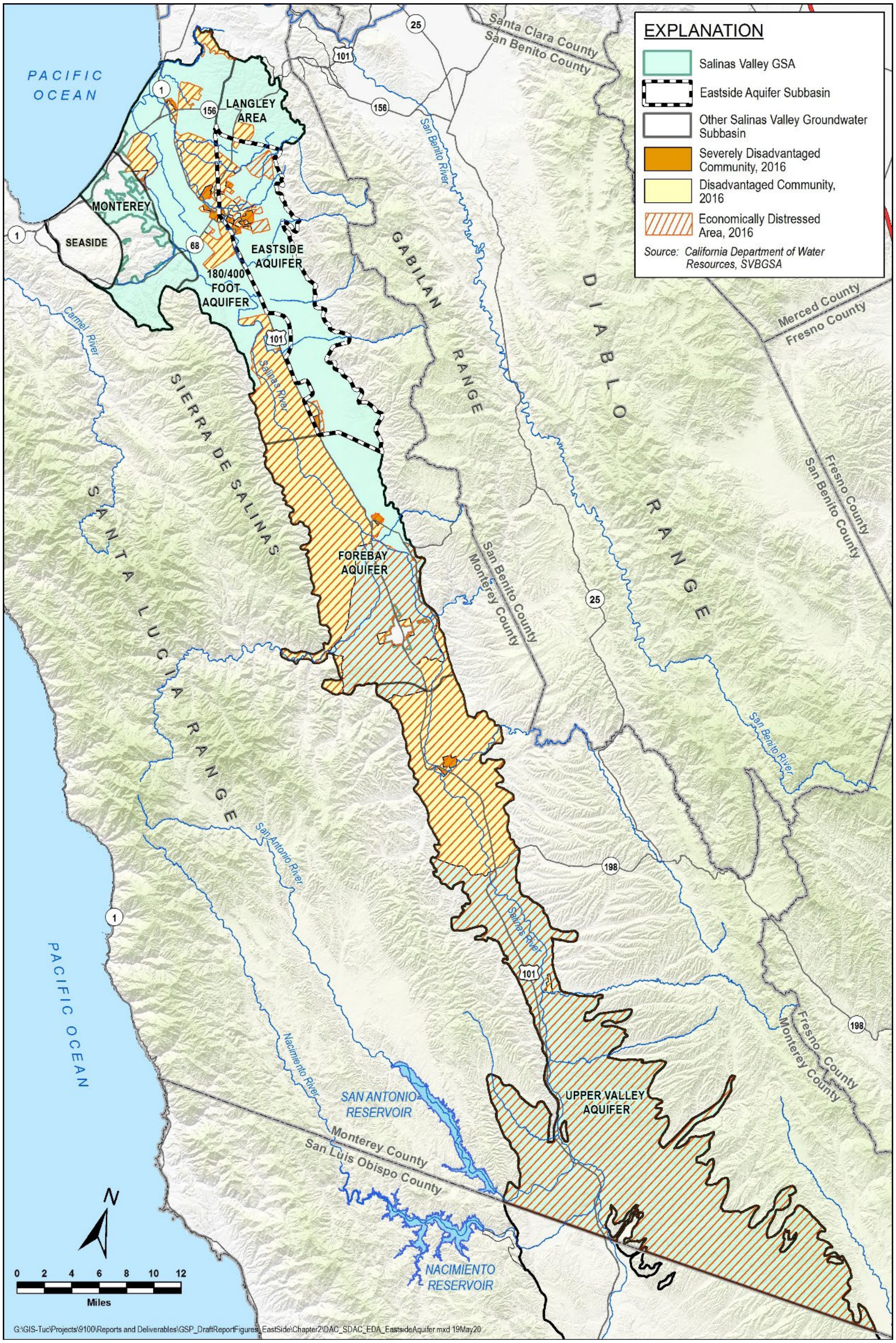


Figure 2-3. Disadvantaged Communities in the Salinas Valley Groundwater Basin

2.7.2 Additional activities scoped for engagement of Underrepresented Communities and Disadvantaged Communities

Additional activities scoped for engagement of URCs and DACs include:

- Conduct workshops with partners on importance of water and groundwater sustainability
- Identify URC and DAC concerns and needs for engagement
- Plan listening sessions around GSA milestones
- Coordinate with partner organizations to develop a “resource hub” where people can go for support
- Identify community allies in groundwater engagement work and bring down barriers for participation
- Consider particular URC and DAC impacts during routine GSA proceedings
- Convene a working group on domestic water, including URCs and DACs

3 DESCRIPTION OF PLAN AREA

This GSP covers the entire Eastside Subbasin, as shown on Figure 3-1. The Eastside Subbasin lies in northeastern Monterey County. The Subbasin covers an area of approximately 57,500 acres, or 90 square miles (DWR, 2004). The Eastside Subbasin lies along the east side of the Salinas Valley Groundwater Basin. It is bounded by the Gabilan Range to the east, the Forebay Subbasin (DWR subbasin number 3-004.05) to the south, the 180/400-Foot Aquifer Subbasin (DWR subbasin number 3-004.01) to the west, and the Langley Area Subbasin (DWR subbasin number 3-004.09) to the north. The Eastside Subbasin is generally coincident with MCWRA's Eastside Subarea, although minor differences exist between the extent of the 2 areas.

The Eastside Subbasin has several tributaries that drain from the western slopes of the Gabilan Range and flow westward across the Subbasin. Most tributaries drain into the Salinas River, which is located in the adjacent 180/400-Foot Aquifer Subbasin. The Eastside Subbasin contains portions of the municipalities of Salinas and Gonzales. A small portion of Chualar, a census designated place, is also located in the Subbasin. United States Highway 101 runs generally north-south along the western border of the Subbasin. Rivers and streams, urban areas, and major roads are shown on Figure 3-1.

This description of the plan 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 through the development of the sustainability goal, SMC, and projects and management actions. This GSP has been developed to reflect the principles outlined in existing local plans, programs, and policies, and will build off them during GSP implementation.

3.1 Summary of Adjudicated and Jurisdictional Areas

3.1.1 Adjudicated Areas, Other GSAs, and Alternatives

The Eastside 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 Eastside Subbasin.

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

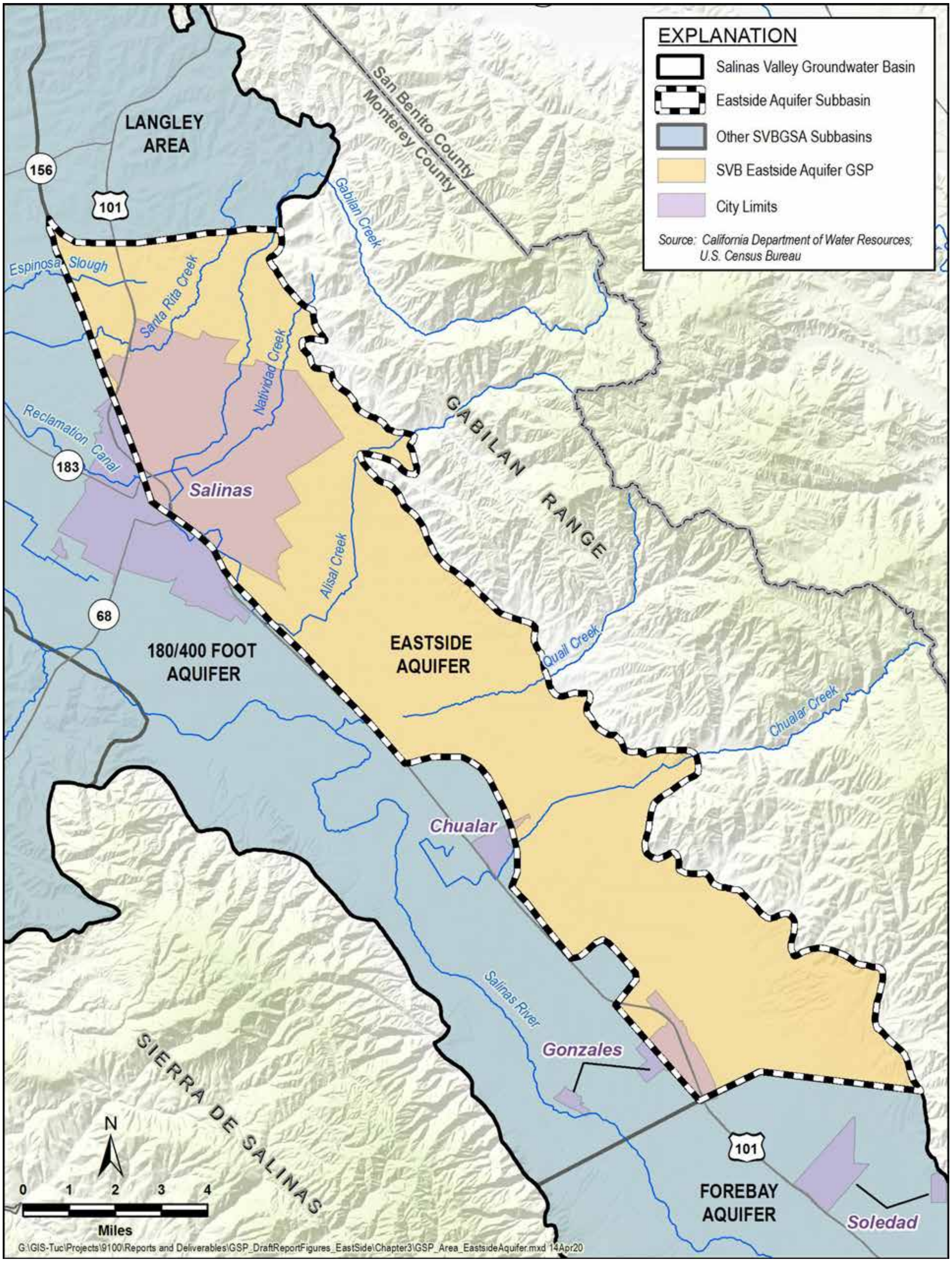


Figure 3-1. Eastside Aquifer Subbasin Area Covered by GSP

3.1.2 Jurisdictional Areas

3.1.2.1 Federal and State Jurisdictional Areas

Maps of federal and state jurisdictional areas are based on data from the U.S. Bureau of Land Management National Surface Management Agency National Geospatial Data Asset (BLM, 2020). There are no areas of federal or state jurisdiction over water management authority in the Subbasin. The Subbasin also does not contain any tribal lands (RWMG, 2018).

3.1.2.2 County Jurisdiction

The County of Monterey has jurisdiction over the unincorporated area of the Subbasin. There are no County conservation areas or parks within the Subbasin (BLM, 2020).

MCWRA has broad water management authority in Monterey County, with its jurisdiction covering the entire Eastside Subbasin, as shown on Figure 3-2. MCWRA manages, protects, stores, and conserves water resources in the Monterey County for beneficial and environmental use. Originally formed under a different name for flood control and management, it also has jurisdiction over water conservation, purveying water, and preventing extractions that are harmful to the groundwater basin. Key assessment zones for various projects and programs administered by MCWRA are shown in Figure 3-3. MCWRA is governed by a 9-member Board who are appointed by the 5-member MCWRA Board of Supervisors. The Board of Supervisors of the County is ex officio the Board of Supervisors of MCWRA (Monterey County Water Resources Agency Act, Sec. 15).

3.1.2.3 City and Local Jurisdiction

The jurisdictional boundaries of cities and local jurisdictions 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. The City of Salinas is served by 2 private water supplies: California Water Company and Alisal Water Corporation (Alco). In Gonzales, the City supplies drinking water.

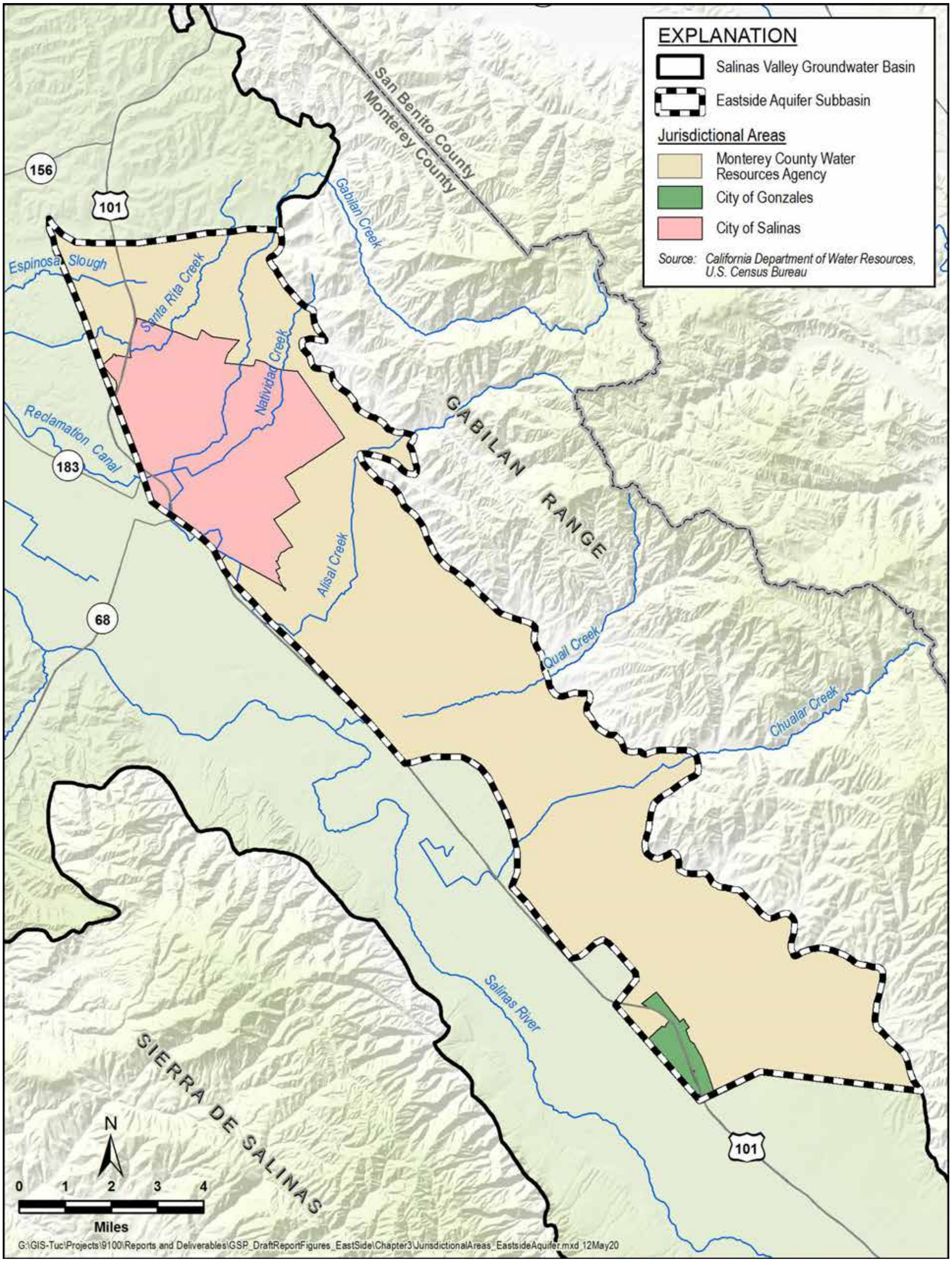


Figure 3-2. Local, City, and Water District Jurisdictional Areas

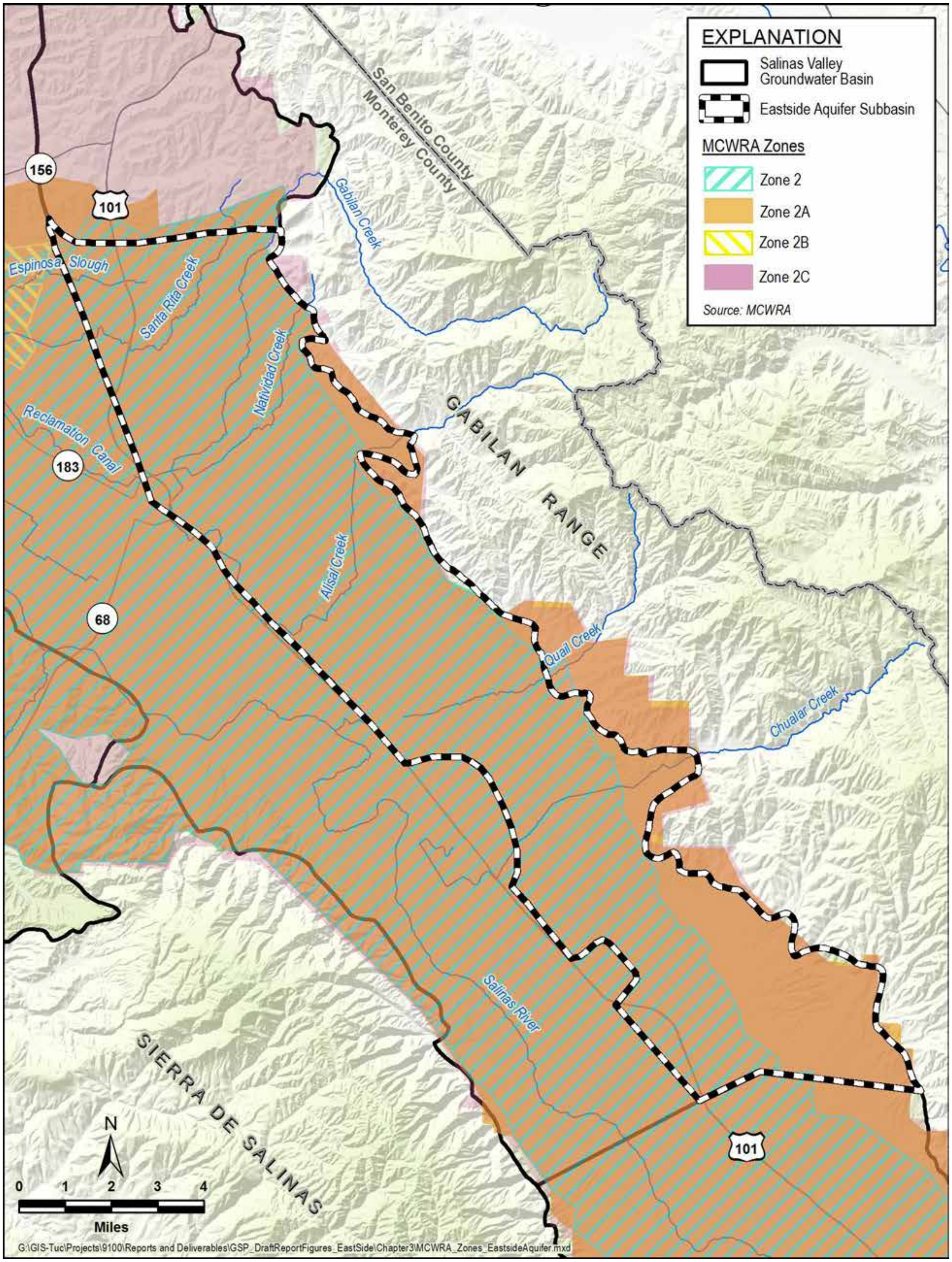


Figure 3-3. MCWRA Zones in the Eastside Aquifer Subbasin

3.2 Land Use

The Monterey County Assessor's office maintains a Geographic Information System (GIS) database of land use at the parcel level. Current (2019) land use in the Eastside Subbasin 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 57,500 acres is the result of 1) some parcels having null land use values and 2) small gaps between parcels that are not counted.

Table 3-1. Land Use Summary

Category	Area in Subbasin (acres)
Agriculture (Irrigated)	34,471
Agriculture (Dry)	7,446
Commercial	972
Industrial	525
Institutional	2,848
Miscellaneous	581
Multi-Family	825
Residential (Urban)	3,113
Rural	4,215
Not Classified	29
Total	55,025

Source: Monterey County Assessor's Office parcel data

The majority of land in the Subbasin is used for agriculture; the top 3 crops by value in Monterey County in 2017 were lettuce, strawberries, and broccoli (Monterey County Agriculture Commissioner, 2018). Vineyards are also a major crop in Monterey County. Other crops included under irrigated agriculture are various row crops, field crops, alfalfa, pasture, orchards (fruits and nuts), and irrigated agricultural preserves.

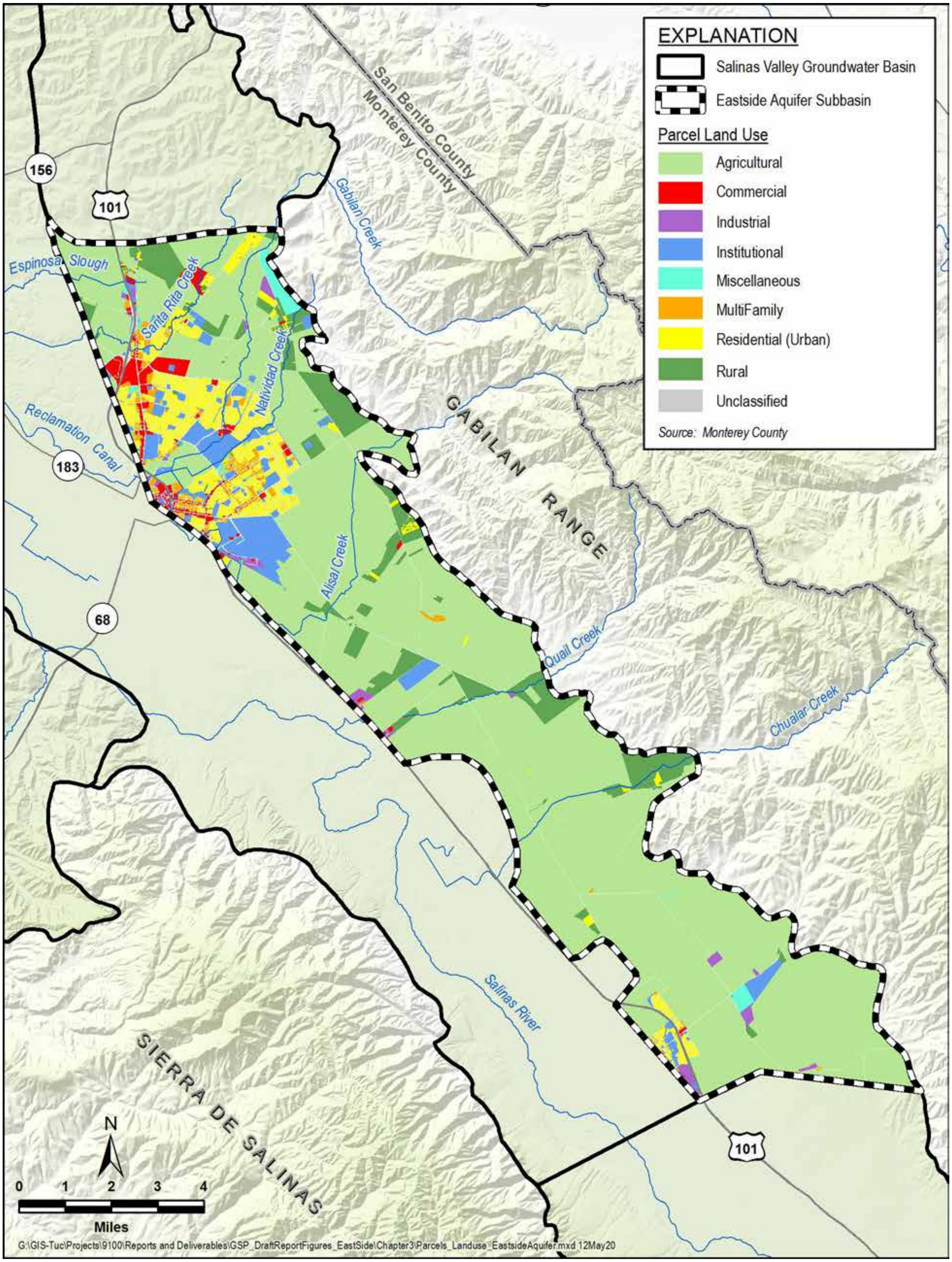


Figure 3-4. Existing Land Use

3.2.1 Water Source Types

No recycled water is used within the Subbasin. Surface water diversions within the Salinas River watershed are reported to the State Water Resources Control Board (SWRCB) under Electronic Water Rights Information Management System (eWRIMS). The locations of the reported surface water diversions are shown on Figure 3-5. This figure does not show land that is dependent on the reported diversions, but rather infers areas through locations of diversion permits. Elsewhere in the Salinas Valley Groundwater Basin some surface water diversions are also reported as groundwater extractions, but there is no double counting of that kind in the Eastside Subbasin.

Groundwater is the primary water source for all water use sectors in the Subbasin. Communities that depend on groundwater are shown on Figure 3-6. The large public water systems shown on this figure are derived from data provided by Tracking California (Tracking California, 2020). These boundaries were confirmed by the large water systems in the Eastside Subbasin. Water system boundaries include water system deliveries to both urban and agricultural areas. Monterey County provided the boundaries for the small public water systems and the local small or state small water systems shown on Figure 3-6. 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 3A.

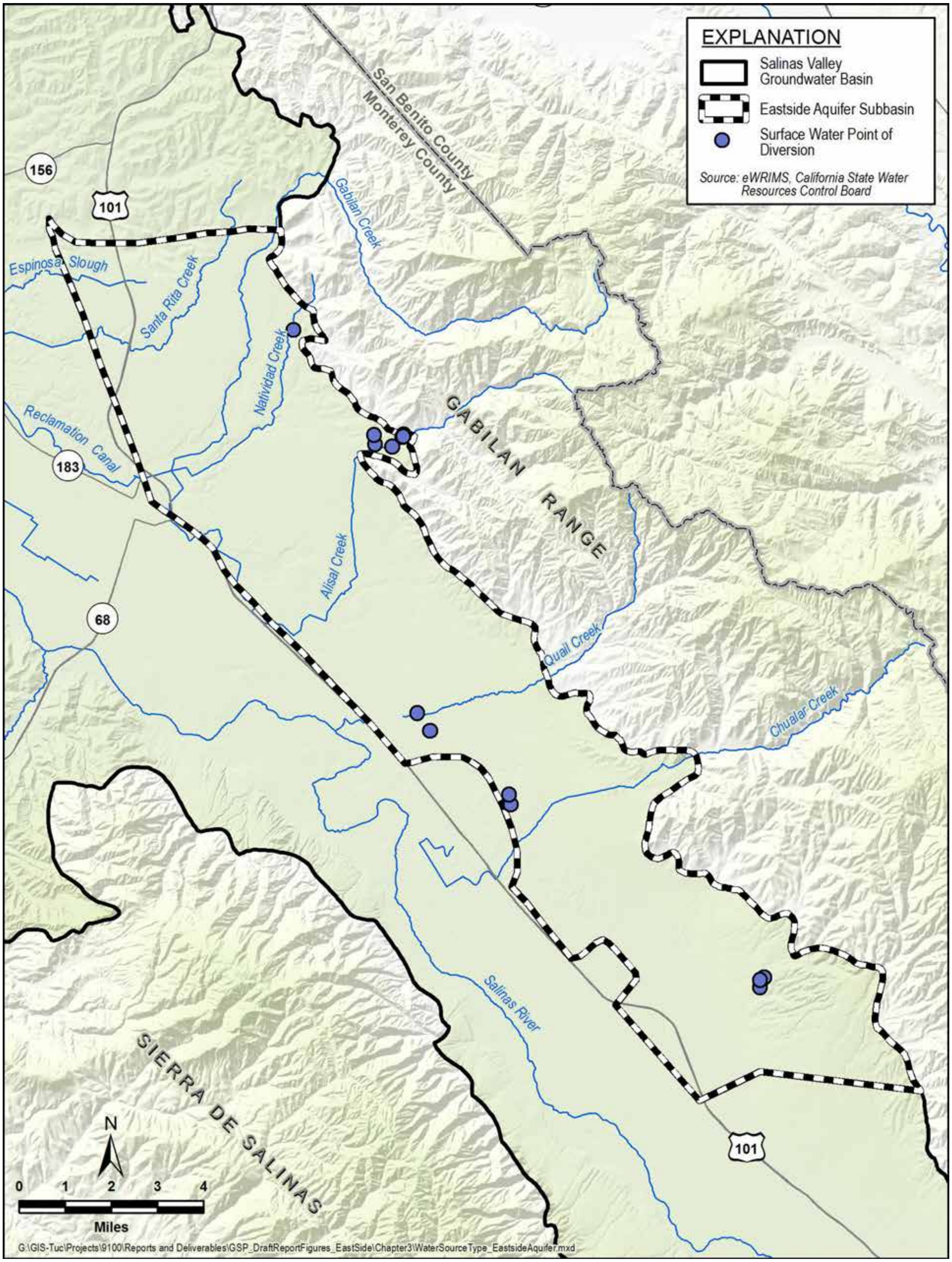


Figure 3-5. Salinas River Watershed Surface Water Points of Diversion in the Eastside Aquifer Subbasin

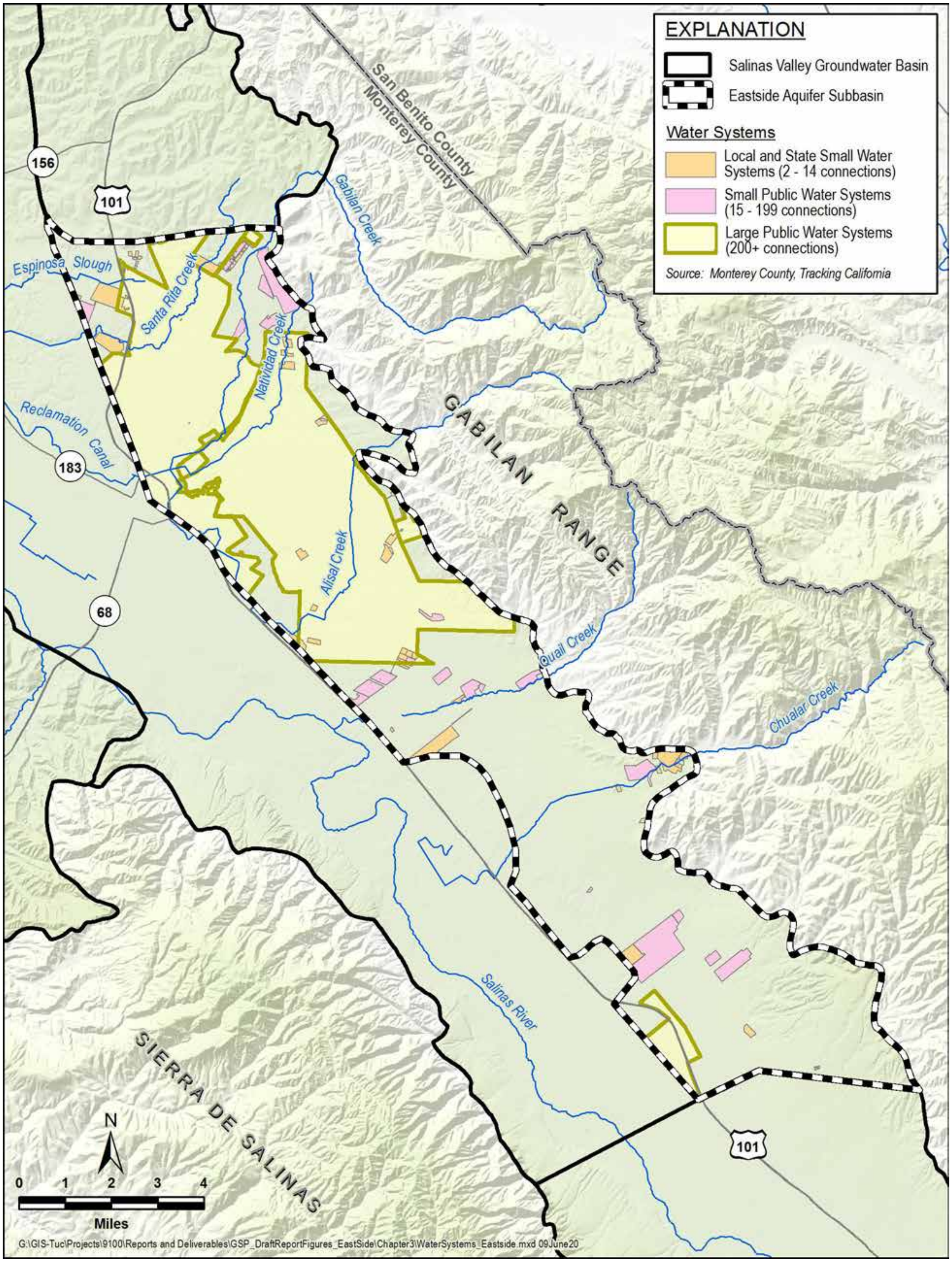


Figure 3-6. Communities Dependent on Groundwater

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 3-7. Groundwater demand categories include:

- **Urban**. Urban water use is assigned to non-agricultural water uses in the cities and census-designated places. Domestic use outside of census-designated places is not considered urban use.
- **Industrial**. There is limited industrial use in the Subbasin.
- **Agricultural**. This is the largest water use sector in the Subbasin.
- **Managed recharge**. There is no managed recharge in the Subbasin.
- **Native vegetation.** Groundwater use by native vegetation is minimal. Although not a native species, water use by *Arundo donax* is estimated at between 32,000 and 64,000 acre-feet per year (AF/yr.) in the entire Salinas Valley Groundwater Basin (Giessow, *et al.* 2011); an unknown quantity occurs within the Eastside Subbasin.
- **Other.** This includes rural residential water use and any water use not captured in the other water use sectors.

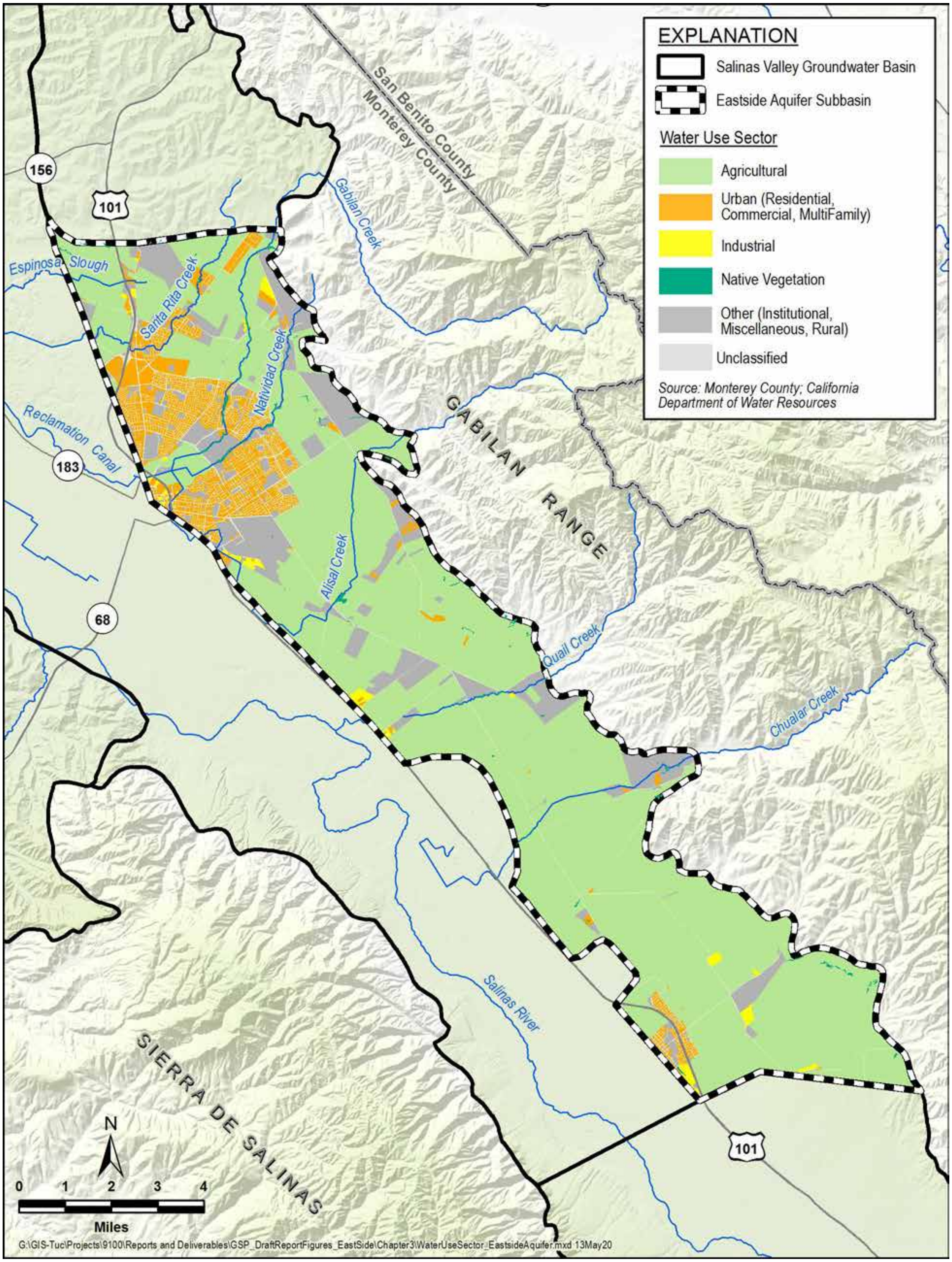


Figure 3-7. Map of Water Use Sectors

3.3 Existing Well Types, Numbers, and Density

Well density data were derived from DWR's Online System for Well Completion Report (OSWCR) Map Application (DWR, 2020a). Other data sources are available from MCWRA or other sources, and they may result in different well densities that are not reflected in DWR's OSWCR database. However, the DWR data were used for simplicity and consistency with other DWR data used in this GSP.

DWR's OSWCR 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. Fewer than 4% of wells in the Subbasin are classified as public supply wells, even though groundwater is the primary water source for urban and rural communities in the Subbasin. Domestic wells account for most of the remaining wells and have an average depth of approximately 361 feet. Some of the domestic wells identified by DWR may be classified as *de minimis* extractors, defined as pumping less than 2 AF/yr. for domestic purposes. Well counts in the Subbasin are summarized in Table 3-2, with public supply wells subtracted from the production category so as to not double count. DWR provides well counts by Public Land Survey System sections; well counts for sections that are only partially in the Subbasin use the proportion of the section in the subbasin to proportion the well count. These well counts may not be reflective of active wells in the Subbasin, as some wells may have been abandoned or are inactive. Figure 3-8, Figure 3-9, and Figure 3-10 show the density of domestic, production, and public supply wells, respectively, in the Subbasin, with the production wells being inclusive of the public supply wells.

Table 3-2. Well Count Summary

Category	Number of Wells
Domestic	214
Production	468
Public Supply	24
Total	706

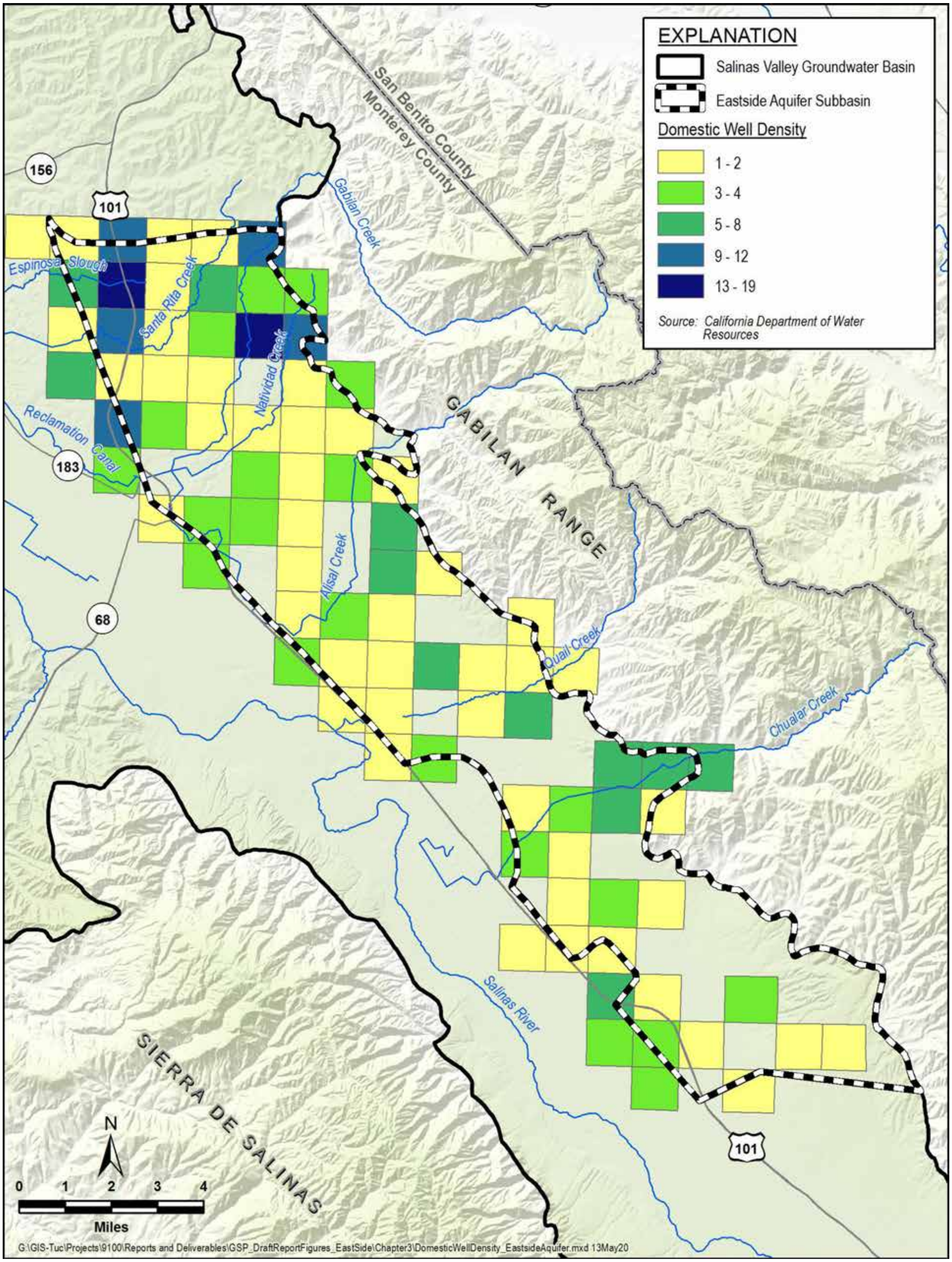


Figure 3-8. Density of Domestic Wells (Number of Wells per Square Mile)

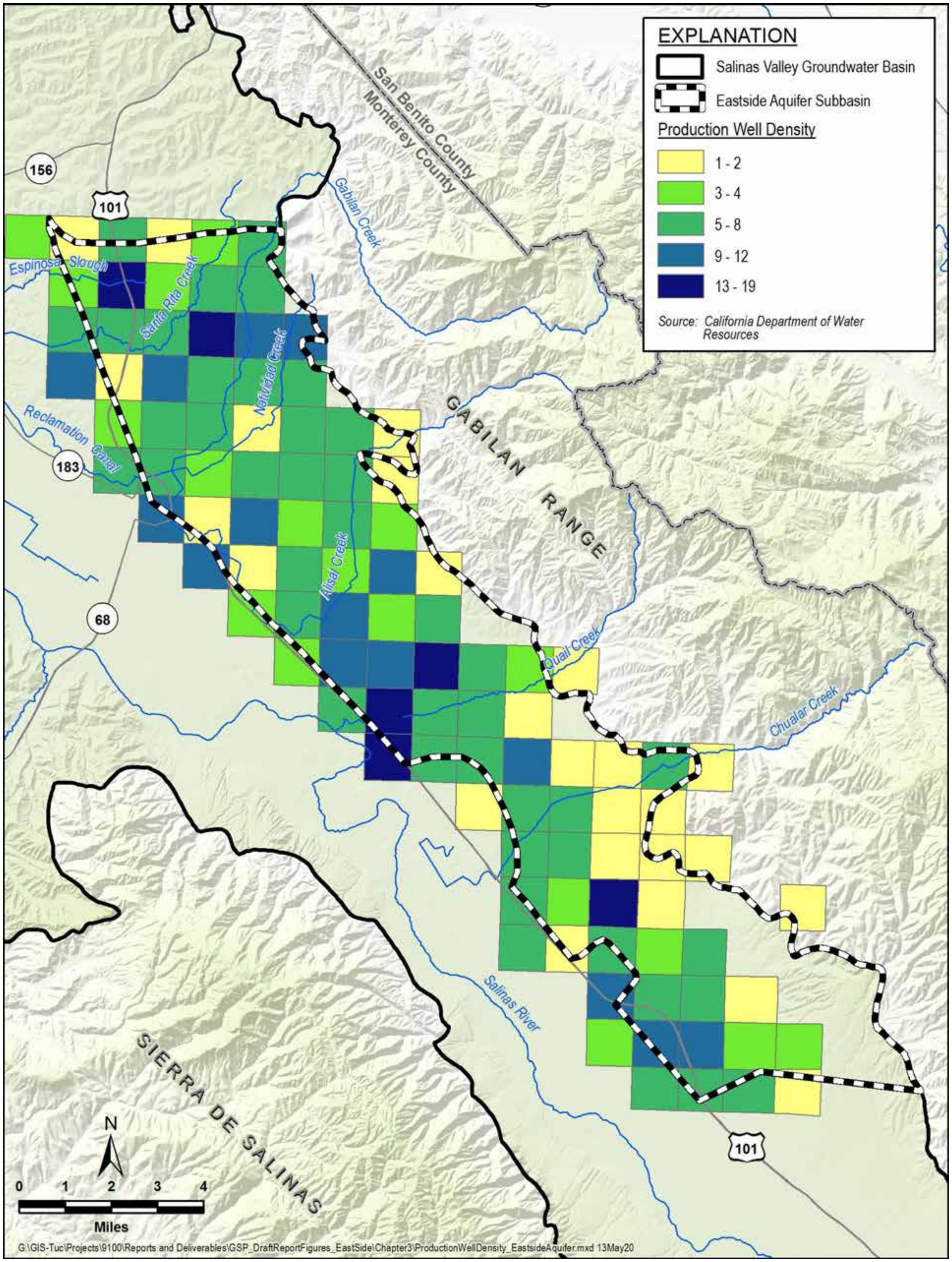


Figure 3-9. Density of Production Wells (Number of Wells per Square Mile)

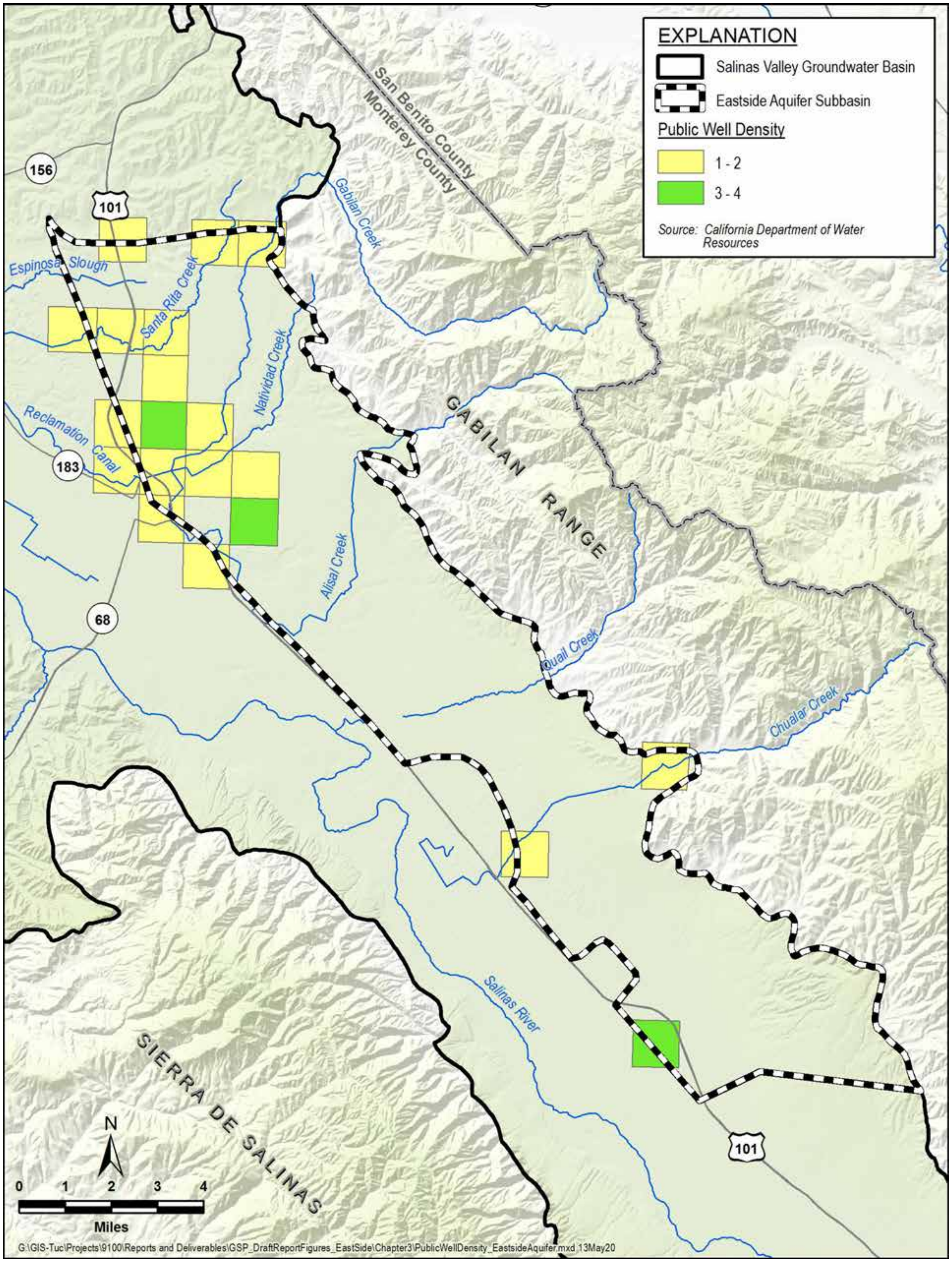


Figure 3-10. Density of Public Wells (Number of Wells per Square Mile)

3.4 Existing Monitoring Programs

3.4.1 Groundwater Elevation Monitoring

MCWRA operates existing groundwater elevation monitoring programs in the Salinas Valley Groundwater Basin, which are incorporated into the monitoring plan of this GSP as appropriate. MCWRA has annual fall, August, and monthly groundwater elevation monitoring programs, and is the responsible agency for the California Statewide Groundwater Elevation Monitoring (CASGEM) program in most areas of Monterey County. The existing groundwater elevation monitoring programs will be updated and improved to document the avoidance of undesirable results in the principal aquifer in the Subbasin.

MCWRA historically has monitored 7 wells within the Eastside Subbasin as part of the CASGEM network. Two of the Eastside CASGEM monitoring wells are owned by MCWRA and the others are privately owned by owners who have volunteered the well for inclusion in the CASGEM program. MCWRA collects monthly groundwater elevation data from the CASGEM wells, except for a few that are monitored biannually, and reports the groundwater elevation data to DWR twice per year. The CASGEM wells have been migrated to the SGMA monitoring network and will be supplemented with 28 other wells that are already part of the MCWRA groundwater elevation monitoring networks. Groundwater elevation data from all wells in the monitoring network are publicly available. This network will be used for water elevation monitoring under this GSP, as described further in Chapter 7. It will be updated and improved as needed to monitor groundwater elevations for this Subbasin.

3.4.2 Groundwater Extraction Monitoring

MCWRA collects groundwater extraction information from all wells within Zones 2, 2A and 2B that have internal discharge pipes of 3 inches or greater in diameter. These zones include all of the Eastside Subbasin as shown on Figure 3-3. These data have been collected since 1993.

This network will be used for groundwater extraction monitoring under this GSP, as described in Chapter 7. SVBGSA will work with MCWRA to update and enhance the program to enable it to sufficiently monitor groundwater extractions for this Subbasin.

3.4.3 Groundwater Quality Monitoring

3.4.3.1 MCWRA Seawater Intrusion Monitoring

Seawater intrusion has not been observed in the Eastside Subbasin; however, seawater has already intruded the adjacent 180/400-Foot Aquifer Subbasin and could reasonably threaten the Subbasin in the future. MCWRA monitors seawater intrusion with a network of 152 monitoring wells, most wells located within the 180/400-Foot Aquifer Subbasin and 2 in the Eastside

Subbasin. The seawater intrusion monitoring network comprises a combination of production wells and dedicated monitoring wells. This network will be used for seawater intrusion monitoring under this GSP, as described in Chapter 7.

3.4.3.2 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 Regulatory Program (ILRP), 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 ILRP, 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 ILRP irrigation supply wells and on-farm domestic wells monitored under the CCRWQCB's Agricultural Order, as described in Section 3.6.2.

3.4.4 Surface Water Monitoring

One streamflow gauge operated by the U.S. Geological Survey (USGS) within the Eastside Subbasin: the Gabilan Creek gauge near Salinas (USGS Site #11152600). The location of this stream gauge surface-water monitoring facility is depicted on Figure 3-12.

The SWRCB eWRIMS is used to collect surface water rights data in the Salinas River watershed for the points of diversion in the Subbasin that are shown on Figure 3-5. This includes monthly surface water diversions from the Salinas River and its tributaries.

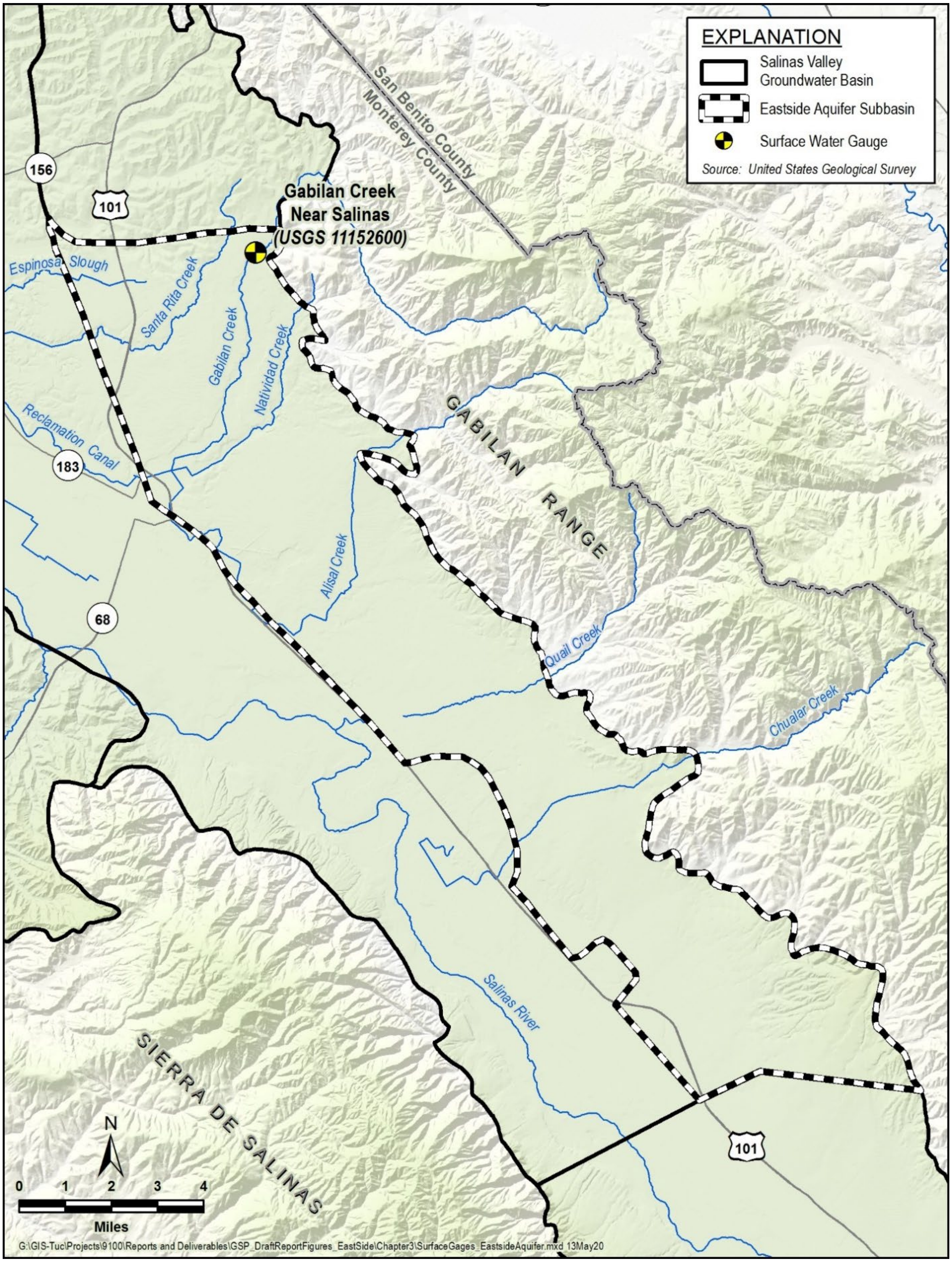


Figure 3-11. Surface Water Gauge Location

3.5 Existing Water Management Plans

3.5.1 Monterey County Groundwater Management Plan

MCWRA developed a Groundwater Management Plan (GMP) that is compliant with AB3030 and SB1938 legislation (MCWRA, 2006). This GMP exclusively covered the Salinas Valley Groundwater Basin in Monterey County. This GSP replaces the GMP.

The GMP 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 GMP identified 14 elements that should be implemented by MCWRA:

Plan Element 1: Monitoring of Groundwater Elevations, Quality, Production, and Subsidence

Plan Element 2: Monitoring of Surface Water Storage, Flow, and Quality

Plan Element 3: Determination of Basin Yield and Avoidance of Overdraft

Plan Element 4: Development of Regular and Dry Year Water Supply

Plan Element 5: Continuation of Conjunctive Use Operations

Plan Element 6: Short-Term and Long-Term Water Quality Management

Plan Element 7: Continued Integration of Recycled Water

Plan Element 8: Identification and Mitigation of Groundwater Contamination

Plan Element 9: Identification and Management of Recharge Areas and Wellhead Protection Areas

Plan Element 10: Identification of Well Construction, Abandonment, and Destruction Policies

Plan Element 11: Continuation of Local, State, and Federal Agency Relationships

Plan Element 12: Continuation of Public Education and Water Conservation Programs

Plan Element 13: Groundwater Management Reports

Plan Element 14: Provisions to Update the GMP

3.5.2 Integrated Regional Water Management Plan

The Integrated Regional Water Management (IRWM) Plan for the Greater Monterey County Region was developed by the 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 Eastside 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).

3.5.3 Urban Water Management Plans

This section describes the urban water management plans (UWMPs) developed by California Water Service for part of the City of Salinas. ALCO Water Service also provides water to the City of Salinas and sent its Validated Water Loss Audit Report to DWR in 2017. Upon review, DWR found that the report addresses all the code requirements, and therefore ALCO Water Service did not need to submit a UWMP. The City of Gonzales is not required to have a UWMP.

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

California Water Service serves a portion of the City of Salinas. Its 2015 UWMP (California Water Service, 2016) describes the service area; reports historic 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.

The UWMP describes the system's reliance on groundwater and California Water Service's support for efforts to avoid overdraft, including working cooperatively with MCWRA and participating in the development of this GSP. Specific activities that California Water Service intends to conduct include:

- Outreach to public agencies to ensure that the Company's presence, rights and interests, as well as historical and current resource management concerns are honored/incorporated within the GSA and GSP formulation process(es).
- Outreach to applicable local and regulatory agencies to ensure the Company's full participation, while also meeting the requirements and expectations set forth by SGMA.
- The enhanced use of digital/electronic groundwater monitoring equipment and other new technology aimed at measuring withdrawal rates, pumping water elevations, and key water quality parameters within the context of day-to-day operations.
- Full participation in the development of GSPs and formulation of groundwater models constructed in basins where the Company has an operating presence.
- Full participation in individual and/or joint projects aimed at mitigating seawater intrusion and other undesirable results.
- Inclusion of sound groundwater management principles and data in all applicable technical reports, studies, facility master plans, and urban water management, particularly as these undertakings relate or pertain to water resource adequacy and reliability.
- Inclusion of sound groundwater management principles and data in all general rate case filings and grant applications to ensure that resource management objectives remain visible and central to California Water Service's long-term planning/budgeting efforts.

The UWMP also addresses California Water Service's position on alternative supplies currently being developed for the Salinas Valley Groundwater Basin. California Water Service is evaluating the possibility of using up to 10,000 AF/yr. of water from the proposed Deep Water Desal LLC desalination plant at Moss Landing.

The UWMP addresses the need for California Water Service to implement a well replacement program to mitigate water quality impacts from nitrates, uranium, Methyl Tertiary Butyl Ether (MTBE), and sand contamination.

California Water Service's UWMP notes that groundwater will continue to remain as its sole supply due to uncertainties regarding the cost and implementation other options, such as surface water diversion or desalination. However, the UWMP recognizes that it would be beneficial for California Water Service to diversify its supply portfolio. California Water Service evaluated the impact of climate change on its water supply. The study found that climate change could result in a supply reduction of 6% to 7% by the end of the century.

3.6 Existing Water Regulatory Programs

3.6.1 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 Eastside 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.*

3.6.2 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's groundwater quality network.

3.6.3 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.

3.6.4 Title 22 Drinking Water Program

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

The DDW enforces the monitoring requirements established in Title 22 of the California Code of Regulations for public water system wells, and all the data collected must be reported to the DDW. Title 22 also designates the 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.

3.6.5 County Ordinance 5302 and 5303 Regarding Deep Aquifer Wells

Due to identified concerns regarding the risk of seawater intrusion into the Deep Aquifers the Monterey County 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 Deep Aquifer Wells beneath areas impacted by seawater intrusion, with stated exceptions including municipal wells and replacement wells. The ordinance was originally only effective for 45 days, but at the June 26, 2018 Monterey County 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 5302 and 5303 have expired.

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 27 August 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”). The decision may require environmental review, pursuant to the California Environmental Quality Act (CEQA), when the County considers applications to construct, repair, or destroy water wells if the decision to issue the permit involves the exercise of discretion by the decision-making authority. The County is currently waiting to finalize proposed modifications to its well construction ordinance and the moratorium on well construction permit applications has expired. Applications are currently being considered on a case-by-case basis.

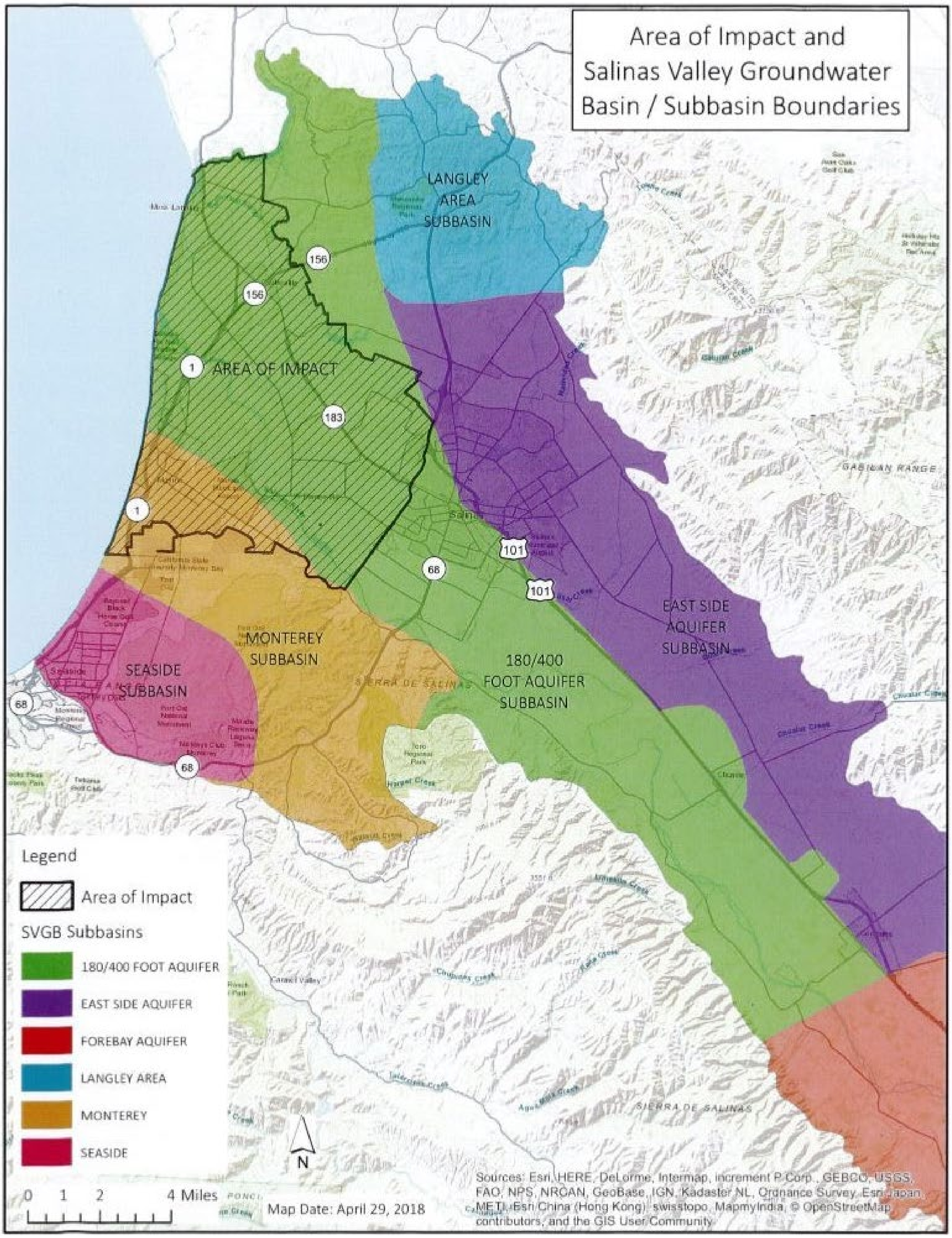


Figure 3-12. Map of Ordinance No. 5302 Area of Impact (Monterey County Board of Supervisors, 2018)

3.6.6 Water Resources Agency Ordinance 3709

Ordinance 3709, passed in 1993 by the 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 Territory A and Territory B, and the latter extends slightly into the Eastside Subbasin.

3.7 County Public Policy of Safe and Clean Water

To recognize the Human Right to Water, in December 2018 the County of Monterey established a public policy that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes and that the human right to water extends to all residents of Monterey County, including disadvantaged individuals and groups and communities in rural and urban areas. The County intended for the policy to inform the County when implementing policies and regulations affecting water supply and usage and to help the County to focus on the issue of drinking water pollution in certain Monterey County domestic wells and water systems as well as potential future threats due to drought and a lack of available drinking water, while not 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. They are taken into consideration during the preparation of the sustainability goal, when establishing SMC, and when developing projects and management actions. This GSP 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 projects and management actions included in this GSP. Examples of limits on operational flexibility include:

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

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

3.9 Conjunctive Use Programs

There are currently no conjunctive use programs in the Eastside Subbasin.

3.10 Land Use Plans

3.10.1 Land Use Plans in the Subbasin

Land use is an important factor in water management. Monterey County and the cities of Salinas and Gonzales have land use authority over portions of the Eastside Subbasin. Each of these entities has developed a general plan that guides land use in the Subbasin. General descriptions of these land use plans and how implementation may affect groundwater management in the Eastside Subbasin are included in Appendix 3B.

3.10.2 Land Use Plans Outside of Basin

Monterey County's General Plan is applicable throughout the unincorporated area of the County, including the adjoining Langley Subbasin, 180/400-Foot Aquifer Subbasin, and Forebay Subbasin. The cities of Greenfield and Soledad have general plans with land use elements in the neighboring Forebay Subbasin, and the City of Marina in the 180/400-Foot Aquifer Subbasin. Each of these entities has developed a general plan that guides land use in their respective subbasins. Because Soledad is a member of the SVBGSA, management actions taken by the SVBGSA or the SVBGSA has a cooperation agreement with their water district will be in alignment with the concerns and plans of that city and the County. The SVBGSA and ASGSA have developed an Implementation Agreement that establishes that the ASGSA will implement the GSP in the Arroyo Seco Cone Management Area. The ASGSA was formed through agreement with the City of Greenfield. Therefore, it is unlikely that these land use plans will affect the ability of the SVBGSA to achieve sustainable groundwater management.

3.10.3 Well Permitting

The Public Service element of the Monterey County General Plan addresses permitting of individual wells in rural or suburban areas. Table 3-3 summarizes the Monterey County General Plan's water supply guidelines for the creation of new residential or commercial lots (Monterey County 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 (Monterey County Housing and Community Development, 2010, Table PS-2).

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* (No. C083239), a case that has the potential to 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, Monterey 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* (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. Chapter 15.08 of the Monterey County Code sets forth the application and decision-making process for the County in considering applications for well construction permits. The Chapter sets forth certain technical requirements that appear to be purely ministerial in their application; however, the Chapter also 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. The Monterey County Code has not yet been amended, so permits are currently issued according to Chapter 15.08 and the 2010 General Plan, as applicable. The Monterey County Health Department, Environmental Health Bureau issues well permits and receives input from the County of Monterey Housing and Community Development to determine what, if any, level of CEQA review is necessary.

Table 3-3. Monterey County 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. Monterey County 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

3.10.4 Effects of Land Use Plan Implementation on Water Demand

The GSA does not have authority over land use planning. However, the GSA will coordinate with the County on general plans and land use planning/zoning as needed when implementing the GSP.

A lawsuit filed against the County of Monterey's 2010 General Plan led to a settlement agreement that could affect water supplies. The settlement agreement requires the County of Monterey to develop a study of the Salinas Valley Groundwater Basin within Zone 2C which largely overlaps the Basin 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

Should the study conclude that:

- Total water demand for all uses is likely to be exceeded by 2030, or
- Groundwater elevations are likely to decline by 2030, or
- The seawater intrusion boundary is likely to advance inland by 2030

Then the study shall make recommendations on how to address those conditions.

The outcomes from this study may affect the GSP implementation. However, the GSP will consider multiple approaches to reach sustainable yield through the measures laid out in Chapter 9. The study and GSP implementation are 2 parallel efforts, and the results of the County's study will be reviewed when finalized and considered during GSP implementation.

SGMA may preempt implementation of the County's study if it were to conflict with the purposes of SGMA and the efforts of the SVBGSA to attain sustainability in the Basin.

Monterey County has chosen to retain the USGS to develop the Salinas Valley Integrated Hydrologic Model (SVIHM), which will be used during implementation of this GSP. The USGS is currently planning to publicly release it in 2022.

3.10.5 Effects of GSP Implementation on Water Supply Assumptions

Implementation of this GSP is not anticipated to affect water supply assumptions of relevant land use plans over the planning and implementation horizon. This GSP lists potential projects and management actions to bring extraction within the sustainable yield, including the potential for pumping controls 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. However, there is no direct impact from the GSP implementation on land use management.

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 which govern the flow of water across the Subbasin boundaries, and outlines the general groundwater setting that may be encountered in the subsurface environment. Current and historical groundwater conditions are discussed in greater detail in the subsequent chapter. This current HCM in this GSP will be part of an iterative process where current conditions and data gaps are described, investigated, and then updated accordingly.

4.1 Subbasin Setting and Topography

The Eastside 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 several streams draining the Gabilan Range and flowing into the Salinas River, which then drains towards the northwest into the Pacific Ocean at Monterey Bay (Figure 4-1).

The colored bands on Figure 4-1 show the topography of the Subbasin, derived from the USGS Digital Elevation Model (DEM). The Subbasin slopes at an average grade of approximately 100 feet/mile, generally from the northeast to the southwest towards the Salinas River. Land surface elevations in the Subbasin range from approximately 900 feet above sea level along its border with the Gabilan Range to approximately 20 feet above sea level where it meets the 180/400-Foot Aquifer Subbasin along State Highway 101 near the City of Salinas.

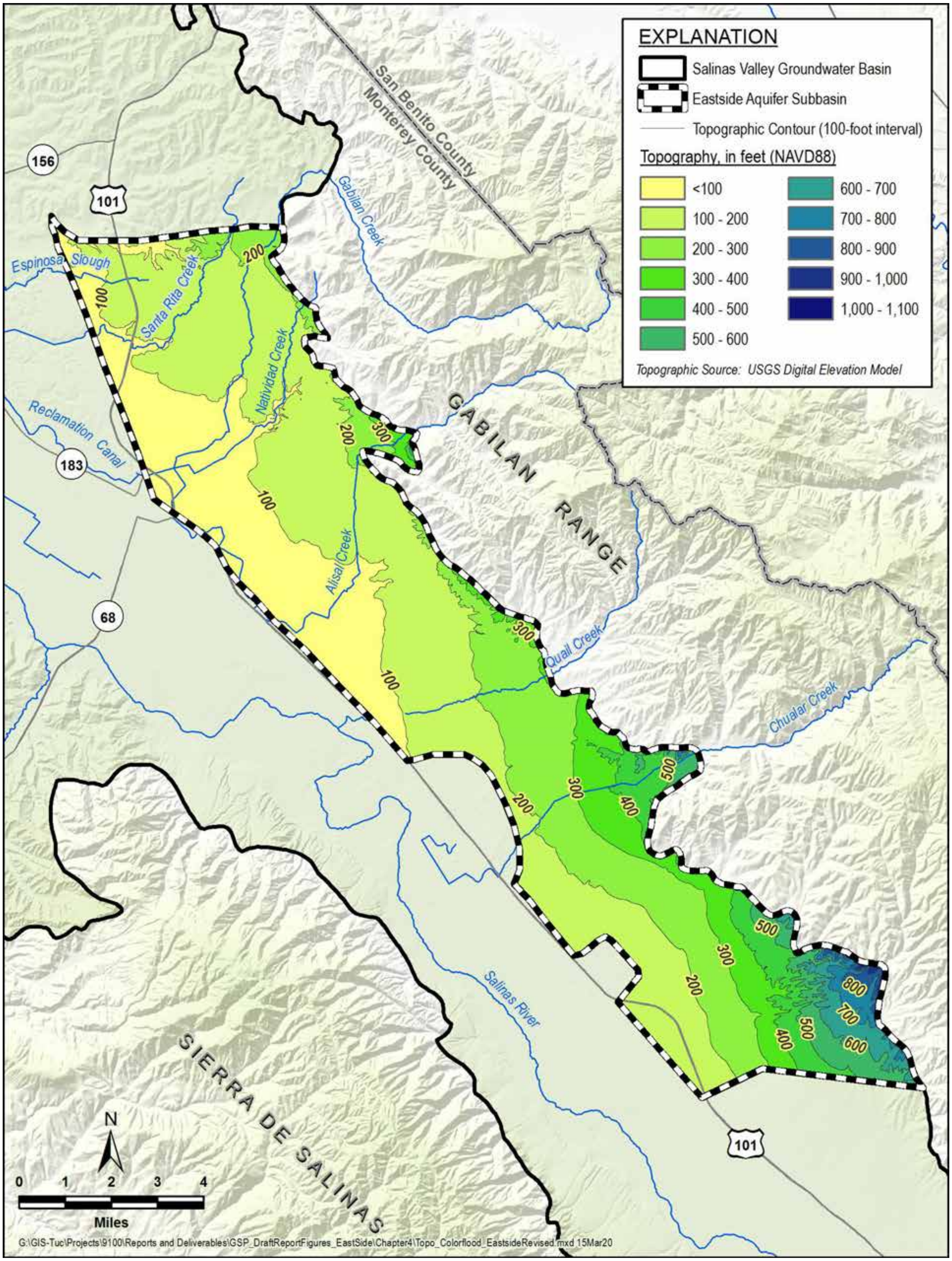


Figure 4-1. Eastside Aquifer Subbasin Topography

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 4-2 presents a geologic map of the Subbasin and vicinity. This geologic map was adopted from the California Geologic Survey's 2010 statewide geologic map (Jennings, *et al*., 2010; Rosenberg, 2001). The locations of cross-sections used to define the principal aquifer in Section 4.4 are also shown on Figure 4-2. The legend on Figure 4-2 presents the age sequence of the geologic materials from the youngest unconsolidated Quaternary sediments to the oldest pre-Cambrian basement rock.

The geology of the Eastside Subbasin is dominated by alluvial fan deposits. Surface-water drainages originating in the Gabilan Range deposited a series of interconnected alluvial fans that extend from the Gabilan Range in the northeast to the fluvial deposits that define the 180/400-Foot Aquifer Subbasin in the southwest.

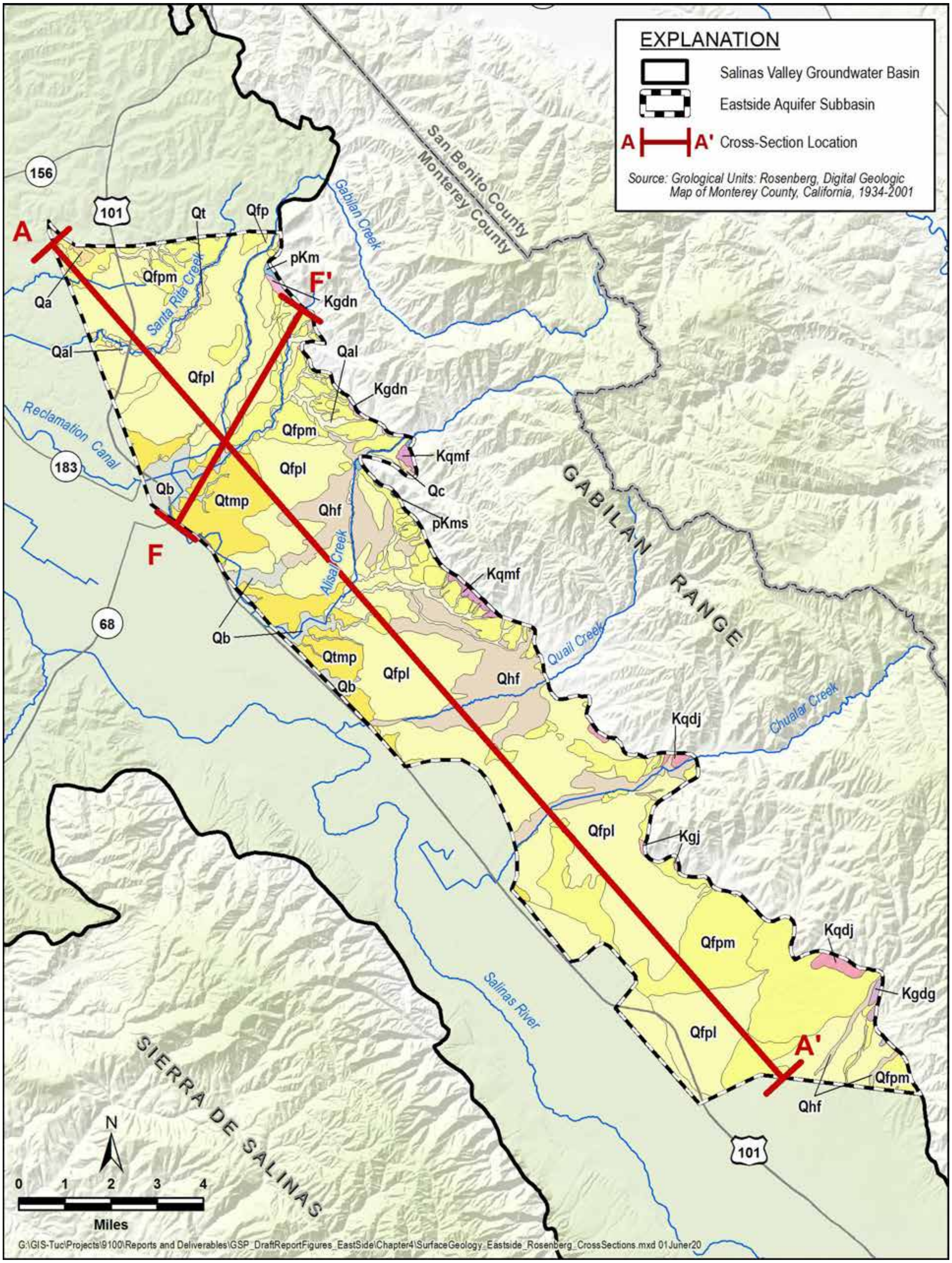


Figure 4-2. Subbasin Geology
(from Jennings, *et al*., 2010; Rosenberg, 2001)

FIGURE 4-2. EXPLANATION

QUATERNARY

Qa	Aromas Sand, undifferentiated
Qal	Alluvial deposits, undifferentiated
Qb	Basin deposits
Qc	Colluvium
Qe	Eolian deposits
Qfp	Flood-plain deposits, undifferentiated?
Qfpl	Alluvial fans, late Pleistocene
Qfpm	Alluvial fans, middle Pleistocene
Qhf	Alluvial fan deposits, Holocene
Qls	Landslide deposits
Qt	Fluvial terrace deposits, undifferentiated
Qtmp	Fluvial terrace deposits, middle Pleistocene

PRE-CRETACEOUS

pKms	Mica schist (Gabilan Range)
pKm	Marble

CRETACEOUS

Kgdg	Granodiorite of Gloria Road
Kgdn	Granodiorite of Natividad
Kgj	Granite of Jacks Hill
Kqdj	Quartz diorite-granodiorite of Johnson Canyon
Kqmf	Quartz monzonite of Fremont Peak

4.2.1 Geologic Formations

Major geologic units present in the Eastside 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, 2004). The corresponding designations on Figure 4-2 are provided in parentheses.

Quaternary Deposits

- *Alluvium in streambeds and small drainages (*Qal, Qb, and Qfp*)* – Streambeds and other drainages are filled with loose, moderately sorted silt and sand with lenses of clay and some areas of gravel (Qal). Clays mixed with silt, sand, and organic material have collected at the bottoms of past and present basins (Qb). A floodplain deposit in the northeast corner of the Subbasin contains loose sand and silt where Gabilan Creek has overflowed its banks (Qfp).
- *Hillslope deposits* (Qc and Qls) – These small Holocene deposits were transported by a combination of runoff and gravity, not streamflow. Colluvium collects gradually over time (Qc). Landslides happen suddenly (Qls). There is 1 colluvium deposit high in the foothills near Alisal Creek and there is 1 landslide deposit on the south bank of Natividad Creek.
- *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 are the dominant feature of Eastside Subbasin's surface geology, often stretching across the whole width of the Subbasin. They consist of moderately to poorly sorted sand, silt, and gravel. Holocene alluvial fans (Qhf) are unconsolidated. Late and middle Pleistocene alluvial fans (Qfpl and Qfpm, respectively) can be weakly to moderately consolidated.
- *Aromas Red Sands and similar (*Qa and Qe*)* – The Aromas Red Sands Formation marks the northern border of the Subbasin. It is comprised of lower fluvial sand units and upper aeolian sand units locally separated by interbedded clays and silty clays (DWR, 2004). They include partly consolidated, moderately to poorly sorted, silty clay, sand, and gravel (Qa). Sand matching that of the Aromas Red Sands is also found in windblown deposits (Qe). Some sources refer to the windblown deposits as the Upper Aromas Red Sands.
- *Terrace deposits (*Qt and Qtmp*)* – Terrace deposits are the remains of ancient floodplains. In Eastside Subbasin, they can be found near the lower stretches of most creeks. They are partially consolidated and consist mostly of sand mixed with silt and gravel. Some are known to be from the middle Pleistocene (Qtmp). Others are of indeterminate age (Qt).

Older Igneous and Metamorphic Rocks

The eastern border of the Subbasin is defined by the contact between the Quaternary sedimentary units described above and the Cretaceous igneous and pre-Cretaceous metamorphic rocks of the Gabilan Range. Hard rocks like these also form the basement below the aquifer.

4.2.2 Restrictions to Flow

There are no known structural features that restrict groundwater flow within the Eastside Subbasin, such as geologic folds or faults. However, groundwater flow from the Eastside Subbasin to various other subbasins may be restricted due to lack of continuous sediments. This lack of continuity is associated with different geologic depositional environments. For example, the transition from relatively layered fluvial and marine deposits in the 180/400-Foot Aquifer Subbasin to the alluvial fan deposits in the Eastside Subbasin may impact groundwater flow between the 2 subbasins. More locally, there is a groundwater depression northeast of Salinas, as shown in Chapter 5, Figure 5-1 through Figure 5-4. Usually, groundwater flow follows the topography of the valley northwest toward Monterey Bay, but groundwater near the depression instead flows toward that low point in the water table.

4.2.3 Soils

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

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

The Subbasin is dominated by 4 soil orders: mollisols, entisols, 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 Eastside 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.

- **Alfisols** are present along portions of the Subbasin. Alfisols are known to have natural fertility both from clay acumination in the subsurface horizons and from leaf litter when under forested conditions. This order of soils is commonly associated with high base minerals such as calcium, magnesium, sodium, and potassium.
- **Vertisols** are 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.
- **Entisols** are relatively rare in the Subbasin. 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.

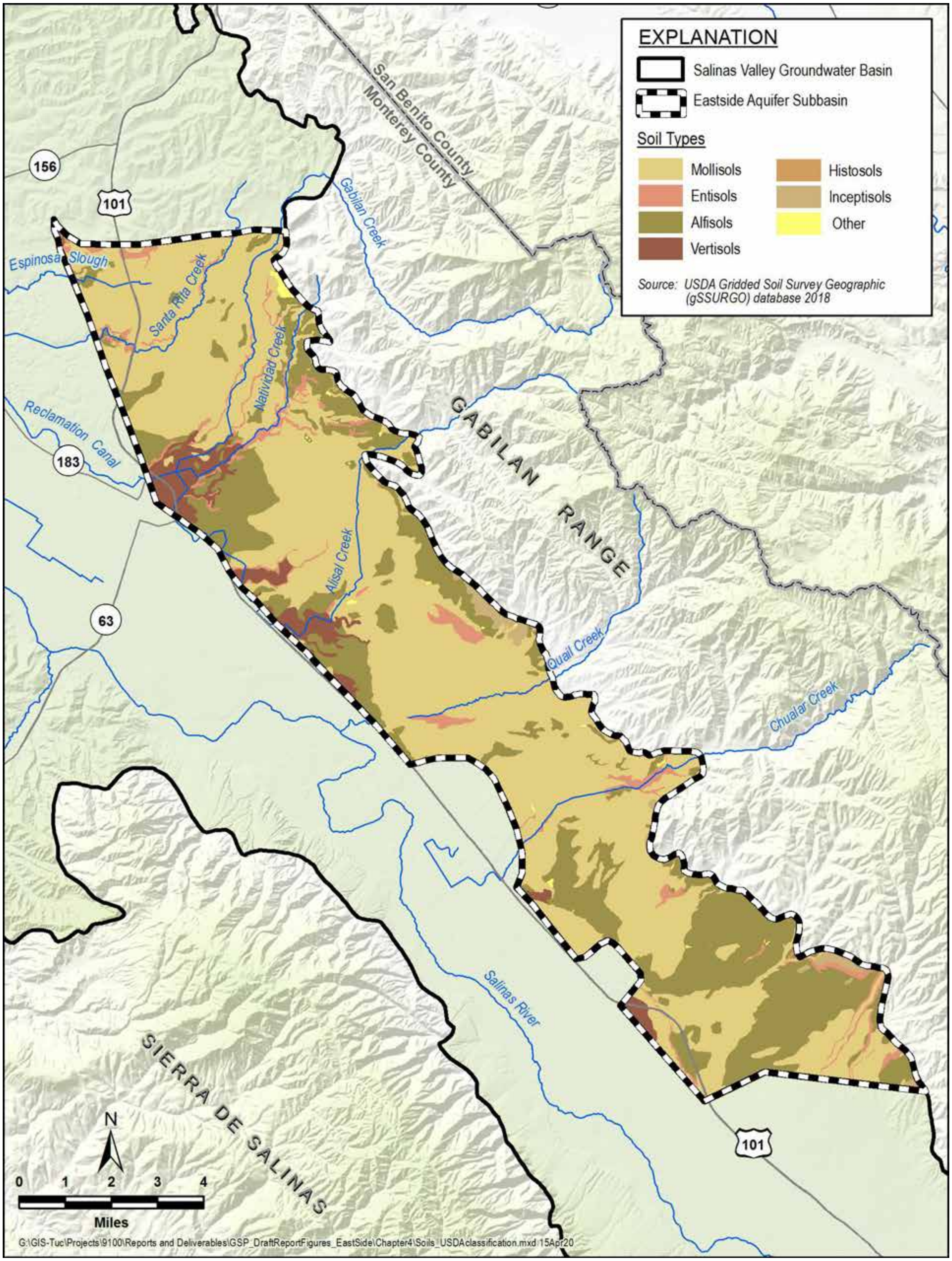


Figure 4-3. Composite Soils Map

4.3 Subbasin Extent

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

4.3.1 Lateral Subbasin Boundaries

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

4.3.1.1 Boundaries with Adjacent Subbasins

The Eastside 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, 2004). It is extended from the approximate southern limit of the regional clay layers that are the defining characteristic of the southern extent of the 180/400-Foot Aquifer Subbasin. There may be reasonable hydraulic connectivity with the Forebay Subbasin, although the principal aquifers change from relatively unconfined to confined near this boundary.
- **The 180/400-Foot Aquifer Subbasin.** The western boundary with the adjacent 180/400-Foot Aquifer Subbasin generally follows the trace of Highway 101 and coincides with the northeastern limit of confining conditions in the 180/400-Foot Aquifer Subbasin. An analysis of stratigraphic correlations concluded that there is a change in the depositional facies near this boundary, with tributary alluvial fan deposits on the east side of the boundary and Salinas River fluvial deposits on the west side of the boundary (Kennedy/Jenks, 2004). Previous studies of groundwater flow across this boundary indicate that there is restricted hydraulic connectivity between the subbasins.
- **The Langley Subbasin.** The northern boundary with the Langley Subbasin generally coincides with the presence of Pleistocene Aromas Red Sands indicative of the Langley Subbasin (DWR, 2004). Although the Langley Subbasin is not on the valley floor, there are no reported hydraulic barriers separating these subbasins and therefore the GSP needs to consider potential for groundwater flow between these adjacent subbasins.

4.3.1.2 Physical Basin Boundaries

The Eastside Subbasin is bounded by the following physical feature:

- **The Gabilan Range.** The eastern boundary of the Subbasin is the contact between the unconsolidated alluvial fan deposits and the Gabilan Range, which consists mostly of granitic rocks. Groundwater flow across this boundary has not been studied extensively, and many reports indicate groundwater recharge for this subbasin is primarily through the stream channels originating in the Gabilan Range. There are no published mapped faults or significant fracture sets that could contribute to mountain block recharge for the Subbasin.

4.3.2 Vertical Subbasin Boundaries

The base, or bottom, of the Subbasin does not contain a sharp interface between permeable sediments and lower-permeability basement rock across the entire Subbasin. While a sharp interface between alluvium and the underlying granitic rocks exists near the Gabilan Range, 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 aquifer in this Subbasin is at shallower depths.

With increasing depth, 3 factors limit the viability of the sediments as a productive, principal aquifer:

1. Increased consolidation and cementation of the sediments decrease well yields.
2. Deeper strata contain poor-quality brackish water unsuitable for most uses.
3. Discontinuous alluvial fan deposits interfingered with clay lenses impede vertical and horizontal groundwater flow.

Because these factors gradually change with depth, there is not a sharp well-defined bottom of the aquifers throughout the Salinas Valley Groundwater Basin. This GSP adopts the bottom of the aquifer that was defined by the USGS (Durbin, *et al.*, 1978) and extrapolates that surface to the Subbasin's boundary. Figure 4-4 is a map of elevation contours of the bottom of the Subbasin. Figure 4-5 shows a contour map of depth to the bottom of the Subbasin prepared using the extrapolated bottom elevation and ground surface elevation.

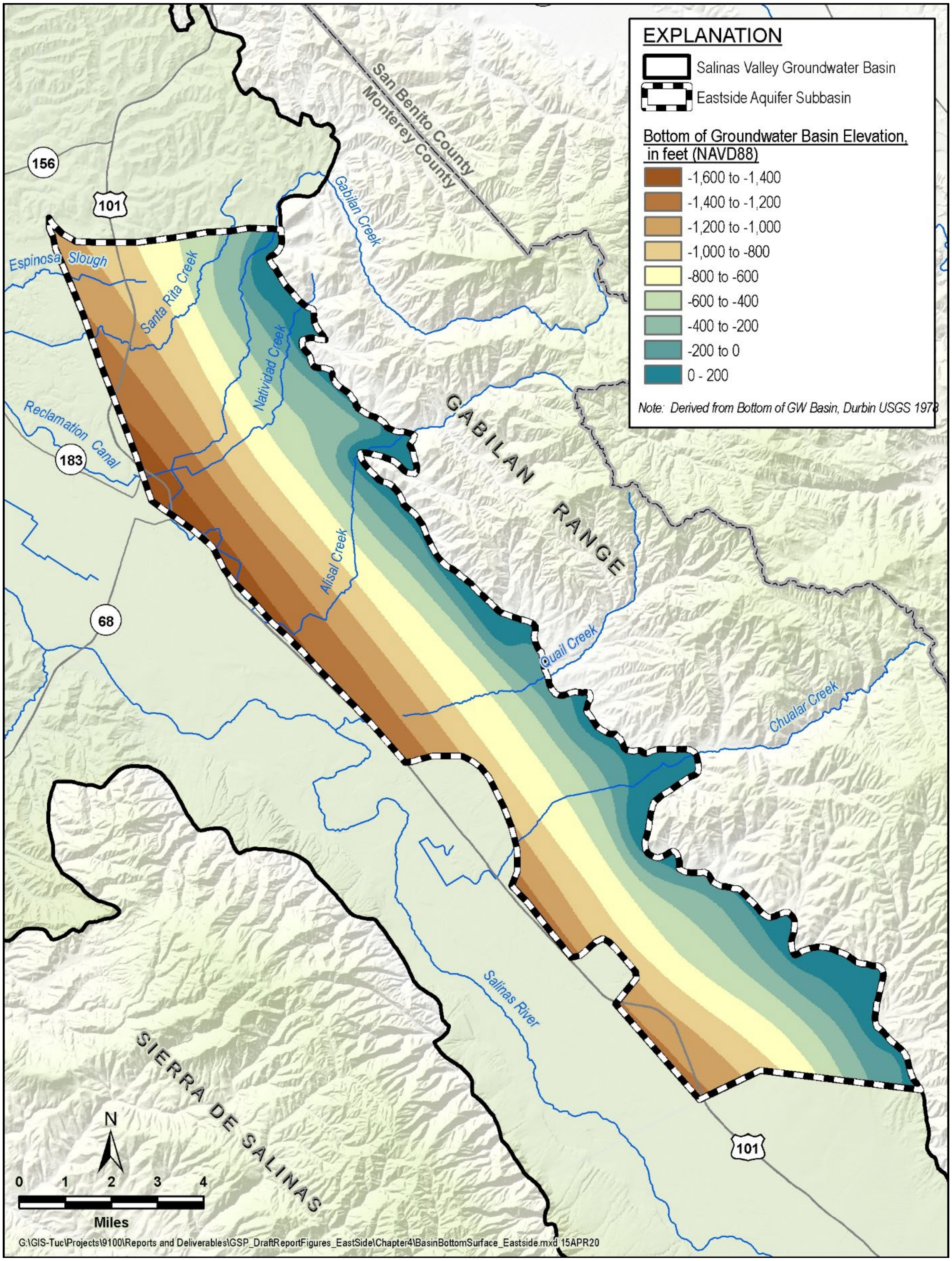


Figure 4-4. Elevation of the Bottom of the Eastside Aquifer Subbasin

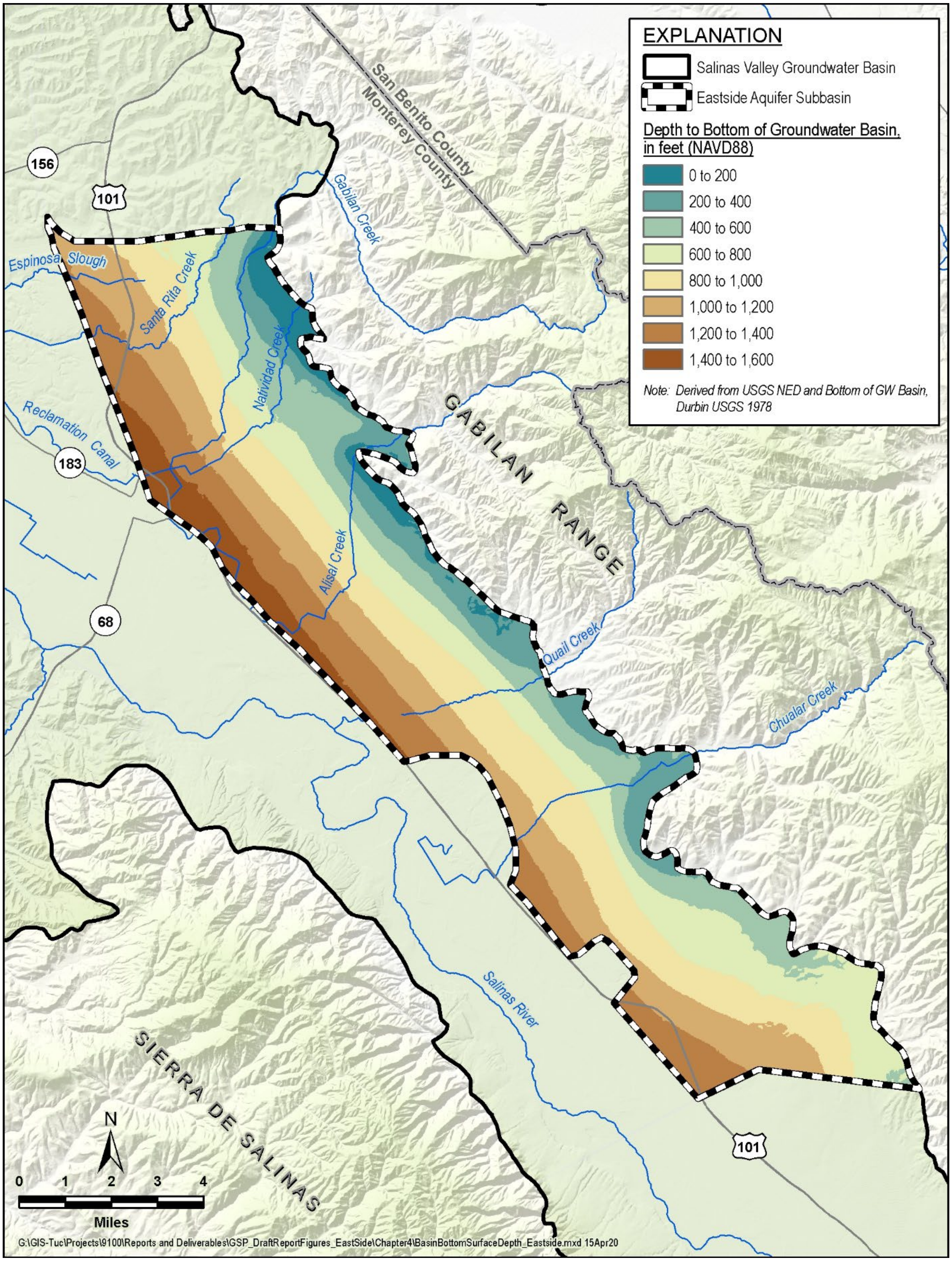


Figure 4-5. Depth to Bottom of the Eastside Aquifer Subbasin in Feet

4.4 Subbasin Hydrogeology

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

Groundwater in the Eastside Subbasin is primarily produced from alluvial fan deposits belonging to 2 geologic units: the Holocene Alluvium and the Quaternary Older Alluvium. Although these 2 geologic formations differ slightly in age, they have similar distributions of sediment type and layering, and are very difficult to distinguish during drilling. For purposes of groundwater development in the Subbasin, these geologic units are collectively referred to as Alluvium. In this subbasin, given the lack of an extensive, consistent aquitard, the alluvial material is considered to be 1 principal aquifer with a shallow and deep zone.

4.4.1 Principal Aquifers and Aquitards

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" (23 California Code of Regulations § 351 (aa)). All the groundwater encountered in the Subbasin is a part of the overall groundwater system, but the focus of this GSP is on the 1 principal aquifer.

There has been limited hydrogeologic analysis of the Eastside Subbasin aquifer. The most recent, detailed hydrostratigraphic analysis of the Eastside Subbasin was published in 2004 with an update in 2015 (Kennedy/Jenks, 2004; Brown and Caldwell, 2015). Two cross-sections along and across the Subbasin are shown on Figure 4-6 and Figure 4-7. The location of these cross-sections is depicted on Figure 4-2. Cross-section A-A' extends down the length of the Eastside Subbasin, and cross-section F-F' extends across the width of the Subbasin. Cross-section F-F' is a modified version of a cross-section from the Kennedy/Jenks 2004 report. Cross-section A-A' follows the general style of the Kennedy/Jenks cross-sections and attempts to group the coarse and fine sediments encountered within the Eastside Subbasin. The finer sediments are grouped in the regions with hatch lines; the coarser sediments have no hatching. The generalized relationships of finer or coarser sediments between boreholes should be interpreted with caution and an understanding the distal and proximal sedimentation of alluvial fans as it relates to the overall climatic setting over geologic time.

The cross-sections are based on geologic logs provided in DWR Water Well Drillers Reports. Geologic log descriptions were grouped into hydrologic units as follows:

- Fine-grained sediments such as clay, silt, sandy clay, and gravelly clay are shown as aquitards.
- Coarse-grained sediments such as sand, gravel, and sand-gravel mixtures are shown as aquifers.
- Sediments logged as gravel/clay, sand/clay, and sand/gravel/clay are interpreted to consist of interbedded coarse-grained and fine-grained deposits and are included with aquifer materials.

In some cases, the logs may be old, the depth resolution poor, or the lithologic distinction suspect, and therefore the lithology shown on the well logs should not be viewed as precise.

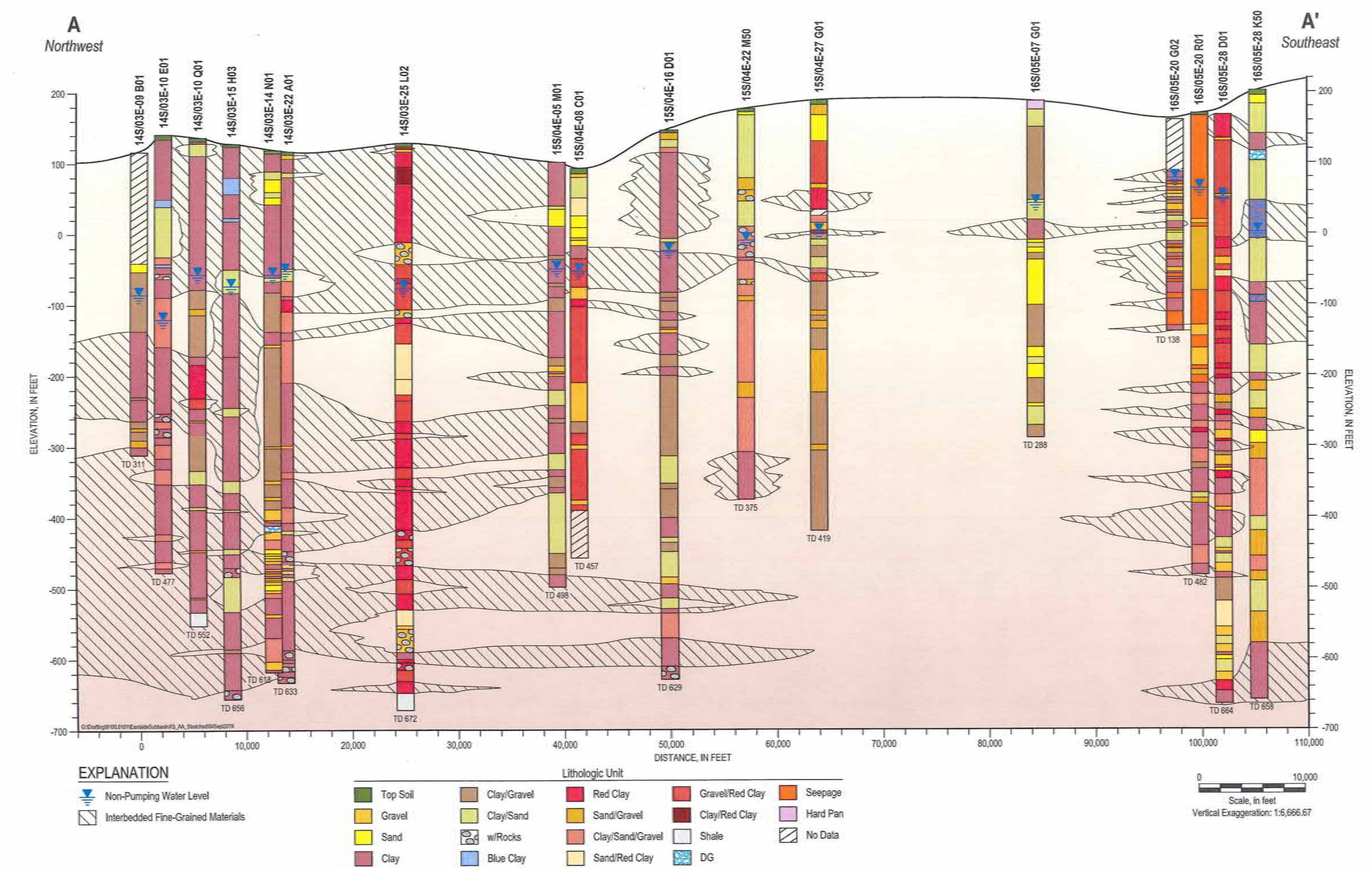


Figure 4-6. Cross-Section A-A'

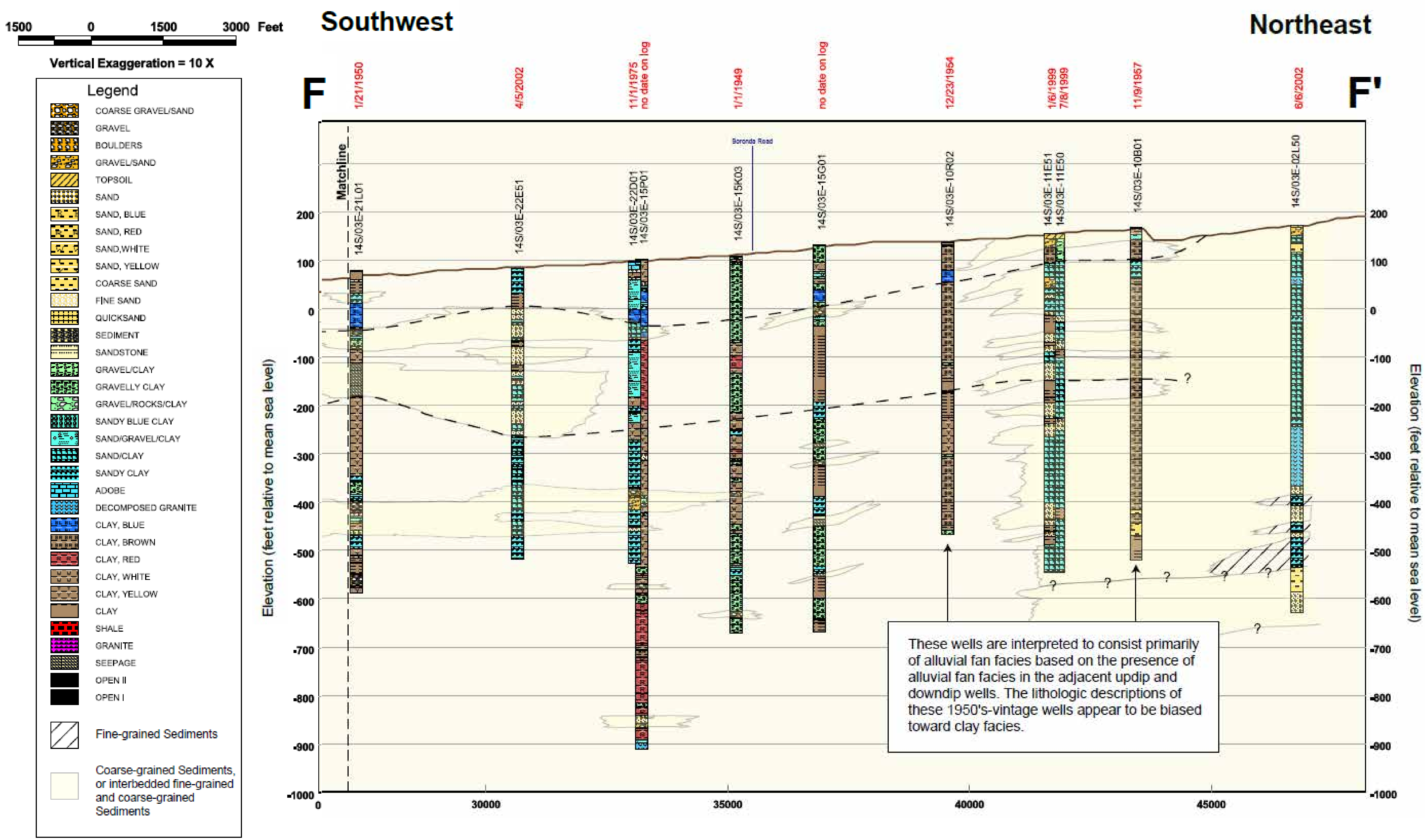


Figure 4-7. Cross-Section F-F'
(modified from Kennedy/Jenks, 2004)

The 2 cross-sections show the discontinuous and interbedded nature of the thin lenses of alluvial sediments that is characteristic of alluvial fan deposits. The cross-sections show generalized areas, both vertically and horizontally, where coarse material is prevalent; however, individual lenses of coarse material are not traceable over long distances and do not correlate well between boreholes (Kennedy/Jenks, 2004). In addition to the fact that aquifer material cannot be correlated between boreholes, no evidence exists for a discrete confining layer in the Subbasin (Brown and Caldwell, 2015). The lack of extensive and traceable aquifers or aquitards have resulted in most investigators and this GSP assigning all the alluvial material in the Eastside Subbasin to a single aquifer.

Within the Eastside Subbasin, 2 generalized water-bearing zones have been recognized within the alluvial fan aquifer system: the Eastside Shallow Zone and the Eastside Deep Zone. While these designations of Deep and Shallow have been useful for geologic investigations into the morphology of the Subbasin, they are not identified as distinct aquifers by most investigators. They are only generalized zones of water-bearing sediments with time-correlated depositions to the 180- and 400-Foot Aquifers in the 180/400-Foot Aquifer Subbasin. The single aquifer in the Eastside Subbasin appears to be somewhat hydraulically connected to the 180- and 400-Foot Aquifers in the 180/400-Foot Aquifer Subbasin, despite noted facies changes discussed in Section 4.3.1.1. This connectivity is purportedly evidenced by the eastwardly decreasing groundwater elevations near Salinas (Brown and Caldwell, 2015). However, seawater intrusion that is occurring in the 180/400-Foot Aquifer Subbasin has not been observed in the Eastside Subbasin, despite the eastward groundwater gradient. This suggests that the hydraulic connection between the 180/400-Foot Aquifer Subbasin and the Eastside Subbasin is limited.

In the 180/400-Foot Aquifer Subbasin, the 400-Foot Aquifer, which is usually encountered between 270 and 470 feet below ground surface, is separated from the Deep Aquifers by a blue marine clay layer called the 400-Foot/Deep Aquitard. This aquitard can be several hundred feet thick, and overlies and confines the Deep Aquifers, which are also referred to as the 900-Foot and 1500-Foot Aquifers (Kennedy/Jenks, 2004). The historical extents of the alluvial fans that define the Eastside region near the City of Salinas are contemporaneous with the 400-Foot Aquifer; thus, by inference, the edge of the Deep Aquifers could also potentially extend into the Eastside Subbasin. However, further investigation is required to determine this because the aquitards required to differentiate between the Deep Aquifers and other aquifers may not be present in the Subbasin.

4.4.2 Aquifer Properties

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

The values and distribution of aquifer properties in the Eastside 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.

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 that is used to develop this GSP.

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

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

4.4.2.1 Aquifer Storage Properties

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

- **Specific yield** is the amount of water that drains from pores when an unconfined aquifer is dewatered. Often, specific yield values range from 8% to 20%. Estimated specific yield values complied by DWR for the adjacent 180/400-Foot Aquifer Subbasin range from 6% to 16% (DWR, 2004). There are no estimated specific yield values published for the Eastside Aquifer.
- **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. Specific storage values are dimensionless, and often on the order of $5x10^{-4}$ to $1x10^{-5}$. There are no estimated specific storage values published for the Eastside Aquifer as this aquifer is intermittently unconfined.

Detailed aquifer property values specific to the Subbasin were not available at the time of this GSP development. This is a data gap that will be filled during implementation.

4.4.2.2 Groundwater Transmission Properties

Hydraulic conductivity measures the ability of an aquifer to transmit water. Hydraulic conductivity is expressed in units of length per unit time, such as feet per day. Materials with higher hydraulic conductivities, such as sands and gravels, transmit groundwater more readily than units with lower hydraulic conductivities, such as clay. Transmissivity is equal to the hydraulic conductivity multiplied by the aquifer thickness. Few estimates of either hydraulic conductivity or transmissivity exist for 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 pumping rate in gallons per minute (gpm), and the drawdown in the well during pumping measured in feet. Specific capacity is moderately well correlated, and approximately proportional to, aquifer transmissivity. Durbin, *et al*. (1978) reported that, the granitic fragments that comprise the alluvial fans along the Gabilan Range weather rapidly, and the pores of the unconsolidated sediments are plugged with clay minerals. This results in a reported specific capacity of 20 gpm/ft in the alluvial fan emanating from Gabilan Creek (Durbin, *et al*, 1978).

4.4.3 Primary Aquifer Uses

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

4.4.4 Natural Recharge Areas

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

Natural groundwater recharge occurs through the following processes:

- Recharge of surface water from the streams originating in the Gabilan Range
- Deep percolation of infiltrating precipitation
- Subsurface inflow from the adjacent subbasins

Recharge of surface water and deep percolation of precipitation are both surficial sources of natural groundwater recharge. An area's capacity for surficial groundwater recharge is dependent on a combination of factors, including steepness of grade, soil surface conditions such as paving or compaction, and ability of soil to transmit water past the root zone. To assist agricultural communities in California with assessing groundwater recharge potential, a consortium of researchers at University of California Davis developed a Soil Agricultural Groundwater Banking Index (SAGBI) and generated maps of recharge potential in agricultural areas of California (O'Geen, *et al.*, 2015). Figure 4-8 presents the SAGBI index map for the Eastside 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 tributary streams. Many of the other soils are classified as moderate, which means some water applied at the surface might make it to the Eastside Shallow Zone, or perched zones. Although Figure 4-8 shows some areas of good potential recharge in the Eastside Subbasin, actual recharge to the productive zones of the Subbasin could be limited because the discontinuous sediments of the alluvial fans may not provide a continuous path for recharge, and the interfingering clay lenses may retard or prevent deep recharge. This demonstrates the limited utility of potential recharge maps that are solely based on surficial soil properties. This map should not be used exclusively to identify recharge areas that will directly benefit the aquifers in the Eastside Subbasin. Rather, it should be used in conjunction with additional research and investigation tools.

Subsurface recharge is primarily from inflow from the adjacent Forebay and 180/400-Foot Aquifer Subbasins to the south and west, respectively (DWR, 2004). This inflow is estimated to be 17,000 acre-feet (AF) on an annual basis. Total natural recharge is estimated to be 41,000 AF (DWR, 2004).

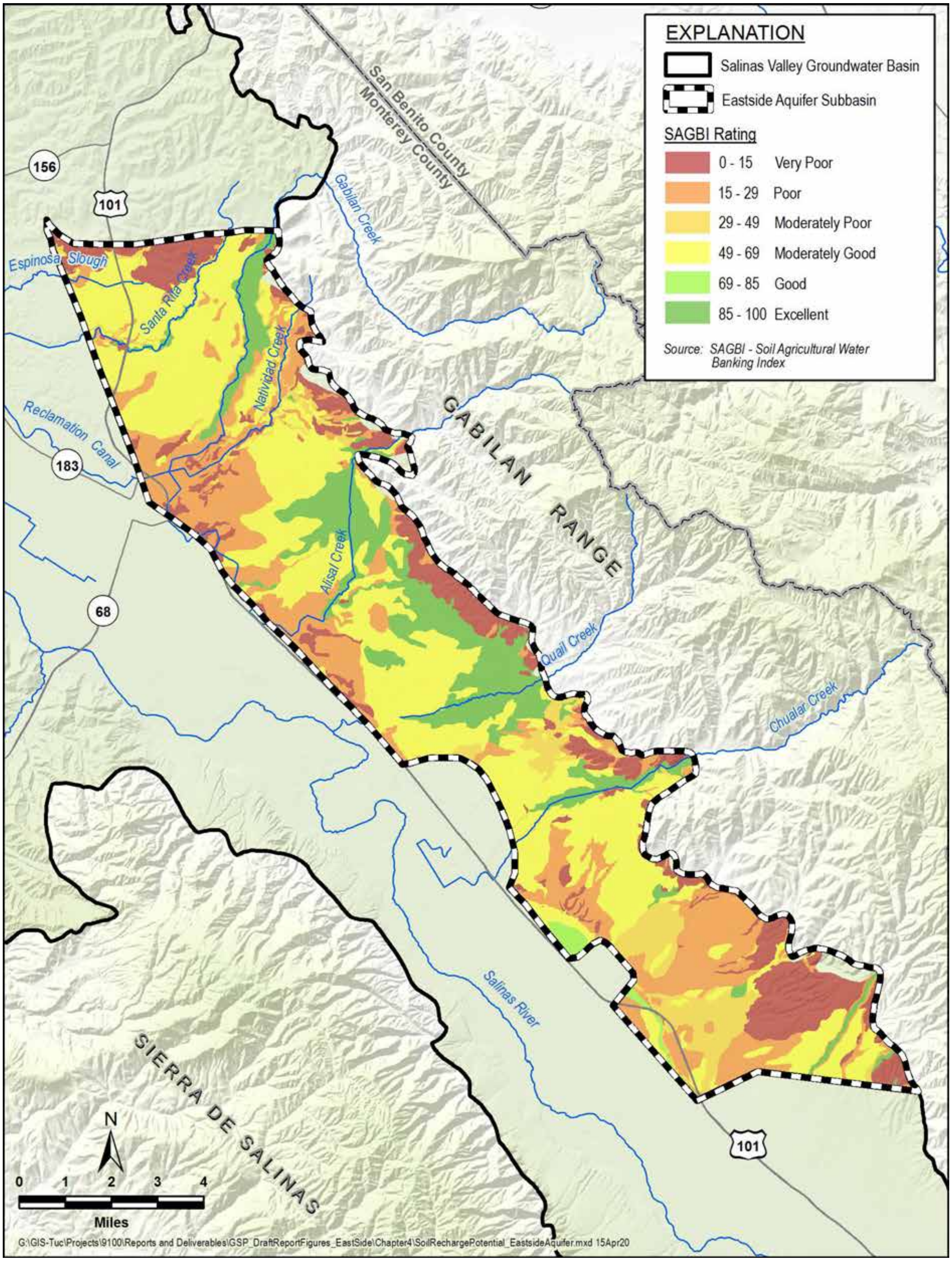


Figure 4-8. SAGBI Soils Map for the Eastside Aquifer Subbasin

4.4.5 Natural Discharge Areas

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

Natural groundwater discharge areas within the Subbasin include wetlands and other surface water bodies that receive groundwater discharge 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 has not been mapped to date.

4.4.5.1 Potential Interconnected Surface Water

Figure 4-9shows that the SVIHM did not identify any locations of ISW in the Eastside Subbasin. This evaluation was completed over a monthly basis over the entire model period from 1967 to 2017. The blue cells indicate areas where surface water is connected to groundwater for more than 50% of the number of months in the model period and are designated as areas of ISW. The clear cells represent areas that have interconnection less than 50% of the model period and require further evaluation to determine whether the SMC, discussed in Chapter 8, apply. In Figure 4-9 the gray cells show locations of canals, drains, or connectors and were excluded from the analysis. The ISW locations are based on simulated results from the preliminary 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 preliminary SVIHM is the best available tool to estimate ISW locations. The model construction and uncertainty are described in Chapter 6 of this GSP. This map does not show the extent of interconnection which is estimated in Chapter 5. Interconnection between surface water and groundwater can vary both in time and space. A seasonal analysis is included in Appendix 4A. Figure 4-9 is based on provisional version of the SVIHM[1] and is subject to change.

[1] These data (model and/or model results) are preliminary or provisional and are subject to revision. This model and model results are being provided to meet the need for timely best science. The model has not received final approval by the U.S. Geological Survey (USGS). No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the model and related material nor shall the fact of release constitute any such warranty. The model is provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the model.

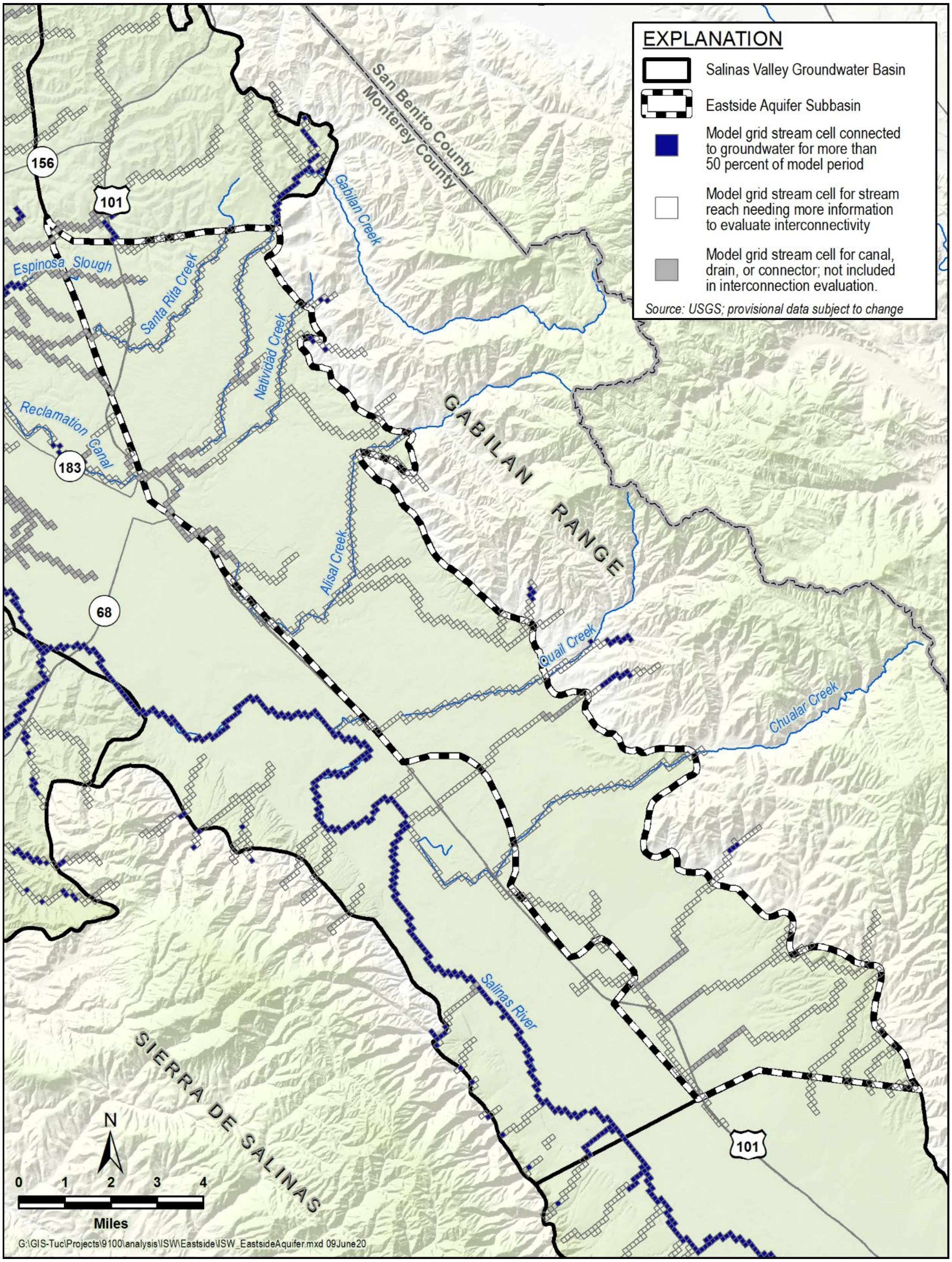


Figure 4-9. Locations of Interconnected Surface Water

4.4.5.2 Groundwater Dependent Ecosystems

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

GDEs may provide critical habitat for threatened or endangered species. Areas designated as critical habitat for threatened or endangered species contain the physical or biological features that are essential to the conservation of these species, and may need special management or protection (USFWS, 2017). A list of threatened and endangered species that might rely on GDEs in the Subbasin was compiled using information from the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and The Nature Conservancy (TNC). Several steps were taken to determine which threatened and endangered species were likely found in the Subbasin and of those, which were likely to 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 depend on groundwater, as indicated in Table 4-1.

Ten threatened and endangered species, including the Southern California Steelhead, and the California Red-legged Frog, were identified as likely to rely directly on groundwater in Monterey County, several of which may be found in the Subbasin. Ten species were identified as likely to rely indirectly on groundwater, and the remaining species are unknown with respect to whether they directly rely on GDEs or groundwater. All species listed have the potential for groundwater dependence. There are 8 species that appear in both the federal and state list for threatened or endangered species.

Table 4-1. Federal and State Listed Threatened and Endangered Species, and Respective Groundwater Dependence for Monterey County

Groundwater Dependence	Common Name	Federal Status	State Status
Direct	California black rail	-	Threatened
	California red-legged frog	Threatened	-
	California Ridgway's rail	Endangered	Endangered
	longfin smelt	-	Threatened
	Santa Cruz long-toed salamander	Endangered	Endangered
	steelhead - central California coast DPS	Threatened	-
	steelhead - south-central California coast DPS	Threatened	-
	Tidewater Goby	Endangered	-
	tricolored blackbird	-	Threatened
Direct and Indirect	arroyo toad	Endangered	-
Indirect	bald eagle	-	Endangered
	bank swallow	-	Threatened
	Belding's savannah sparrow	-	Endangered
	California condor	Endangered	Endangered
	California least tern	Endangered	Endangered
	least Bell's vireo	Endangered	Endangered
	southwestern willow flycatcher	Endangered	Endangered
	Swainson's hawk	-	Threatened
	willow flycatcher	-	Endangered
Unknown	Bay checkerspot butterfly	Threatened	-
	California tiger salamander	Threatened	Threatened
	foothill yellow-legged frog	-	Endangered
	San Joaquin kit fox	Endangered	Threatened
	short-tailed albatross	Endangered	-
	Smith's blue butterfly	Endangered	-
	vernal pool fairy shrimp	Threatened	-

The areas in the Eastside Subbasin where GDEs may be found in small patches along some of its creeks, and in some of the valleys in the foothills of the Gabilan Range where shallow alluvium is present. These areas of shallow alluvium may be saturated, but more investigation is needed to determine whether a continuous saturated zone connects to the principal aquifer. This area will require more analysis into the near surface stratigraphy to determine the connection of the principal aquifer to surface water.

Figure 4-10 shows the distribution of potential GDEs within the Subbasin based on the Natural Communities Commonly Associated with Groundwater (NCCAG) Dataset (DWR, 2020b). 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. This map does not account for the depth to groundwater or level of interconnection between surface water and groundwater. Actual rooting depth data are limited and will depend on the plant species and site-specific conditions, and availability to other water sources.

The NCCAG dataset and the additional shallow groundwater analysis are not a determination of GDEs by DWR or SVBGSA, but rather represent the best available data to provide a starting point for this GSP, as well as to direct monitoring, fill data gaps, guide implementation, and support other field activities initiated or partnered by the SVBGSA. Field data are needed to ascertain the degree to which identified ecosystems are groundwater dependent, rather than sustained by soil moisture.

Additional resources that contributed to an initial mapping of GDE locations are the CDFW Vegetation Classification and Mapping program (VegCAMP), the USFWS National Wetlands Inventory, and the USFWS online mapping tool for listed species critical habitat, as described in the methodology for the NCCAG development which is publicly accessible on the NC dataset website: https://gis.water.ca.gov/app/NCDatasetViewer/.

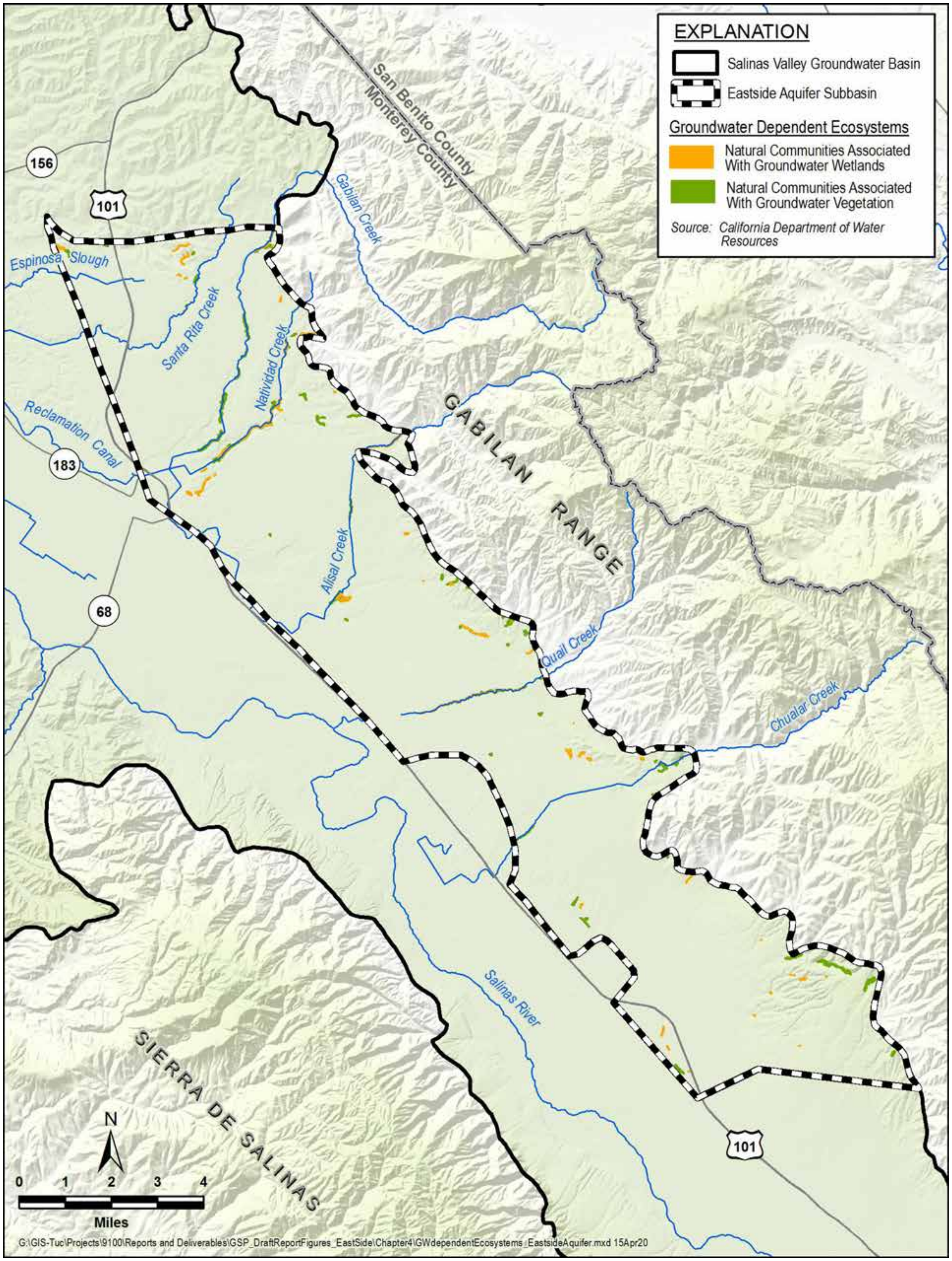


Figure 4-10. Groundwater Dependent Ecosystems

4.5 Surface Water Bodies

The primary surface water bodies in the Subbasin are tributaries to the Salinas River (Figure 4-11). Significant, named tributaries in the Eastside Subbasin include the following intermittent streams that drain the Gabilan Range and contribute to the Salinas River:

- Chualar Creek
- Quail Creek
- Alisal Creek
- Natividad Creek
- Gabilan Creek
- Santa Rita Creek.

Two reservoirs are located outside of the Eastside Subbasin but are important controls on the rate and timing of Salinas River flows in adjacent Subbasins.

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

Carr Lake and Smith Lake are ephemeral lakes that only contain appreciable surface water during wet seasons. Stormwater that accumulates in these lakebeds is drained by the Reclamation Canal (Figure 4-11).

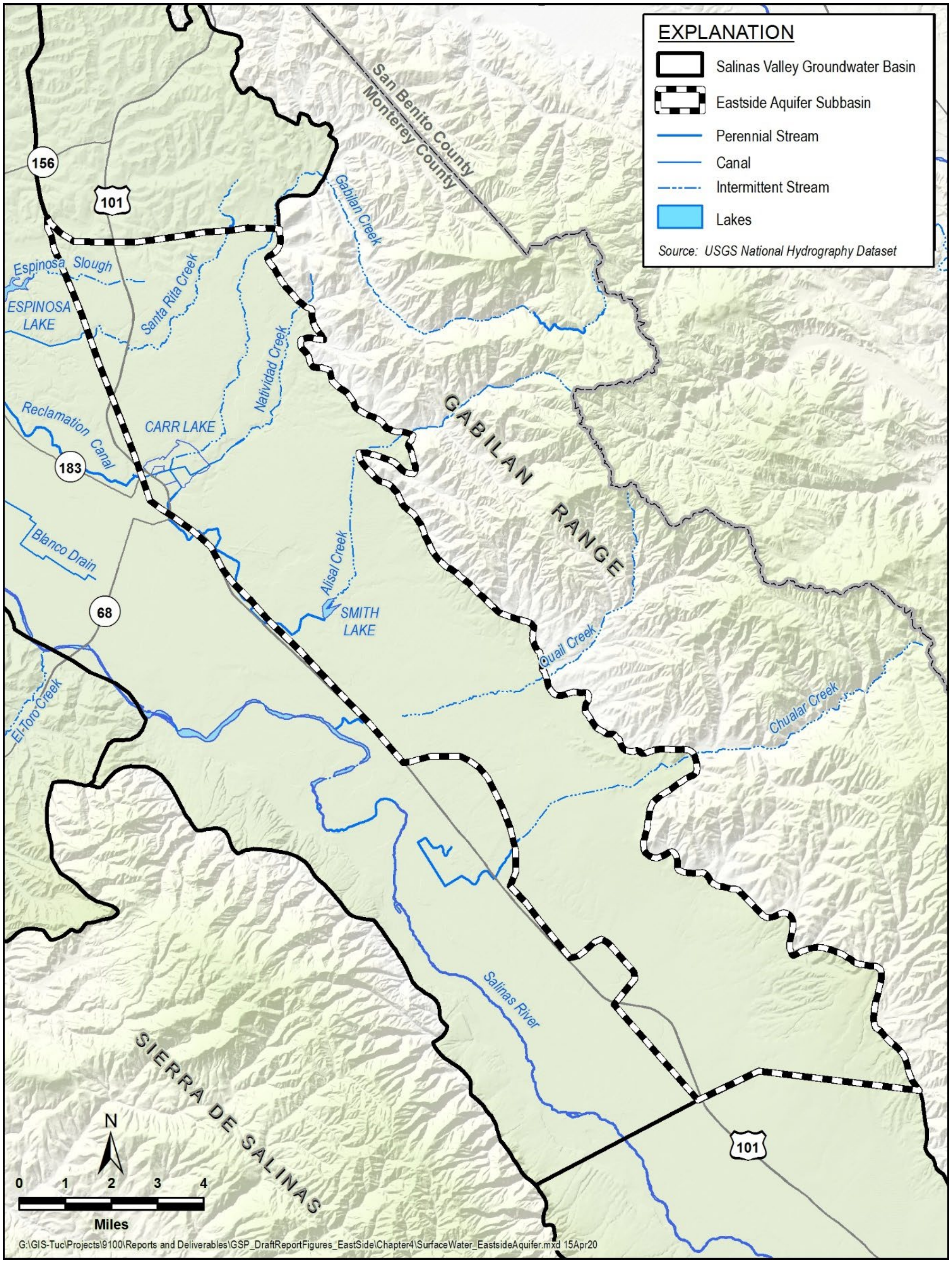


Figure 4-11. Surface Water Bodies in the Eastside Aquifer Subbasin

4.5.1 Watersheds

Figure 4-12 shows several watersheds that contribute small tributary streams to the Salinas River in the Eastside Subbasin. From the boundary with the Forebay Subbasin to the Langley Subbasin, the HUC12 watersheds within the Eastside Subbasin are as follows:

- McCoy Creek-Salinas River
- Limekiln Creek-Salinas River
- Johnson Creek
- Chualar Creek
- 180600051507-Salinas River
- Quail Creek
- Alisal Creek-Salinas River
- Natividad Creek-Gabilan Creek
- Alisal Slough-Tembladero Slough

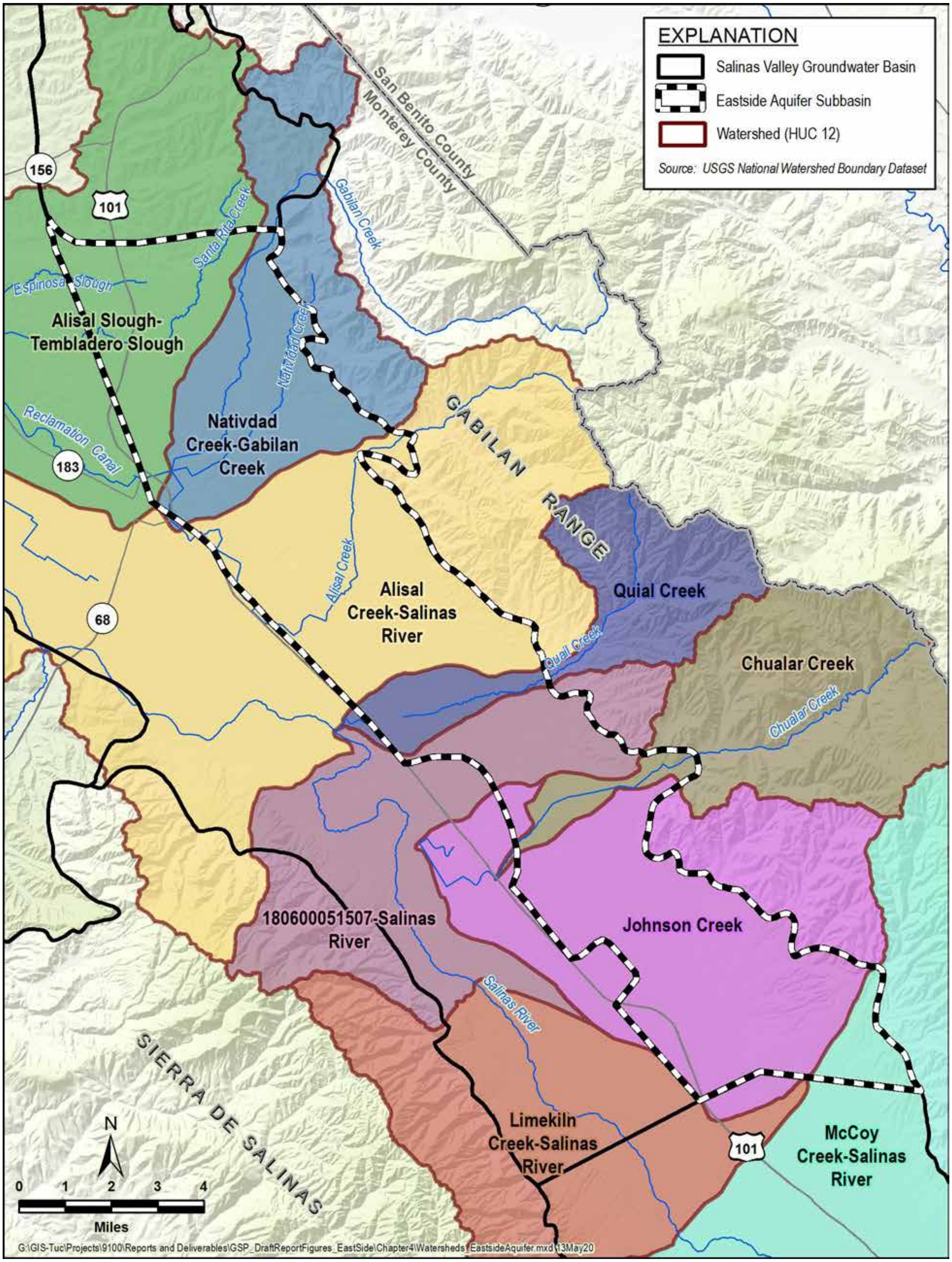


Figure 4-12. HUC12 Watersheds within the Eastside Aquifer Subbasin

4.5.2 Imported Water Supplies

There is no water imported into the Eastside Subbasin.

4.6 Water Quality

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

4.6.1 General Mineral Chemistry

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

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

Figure 4-13 presents a Piper diagram from the CCGC report that plots major ion data from within and near the Subbasin. The diagram provides a means of representing the proportions of major anions and cations in water samples. The lower left triangle of the piper diagram plots the relative abundance of cations in groundwater samples. The lower right triangle of the piper diagram plots the relative abundance of anions in groundwater samples. The diamond in the middle of the diagram combines the cation and anion abundances into a single plot. Groundwater samples with similar general mineral chemistries will group together on these diagrams. The data plotted on Figure 4-13 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 illustrate the source of the sodium and/or potassium in the outlier samples.

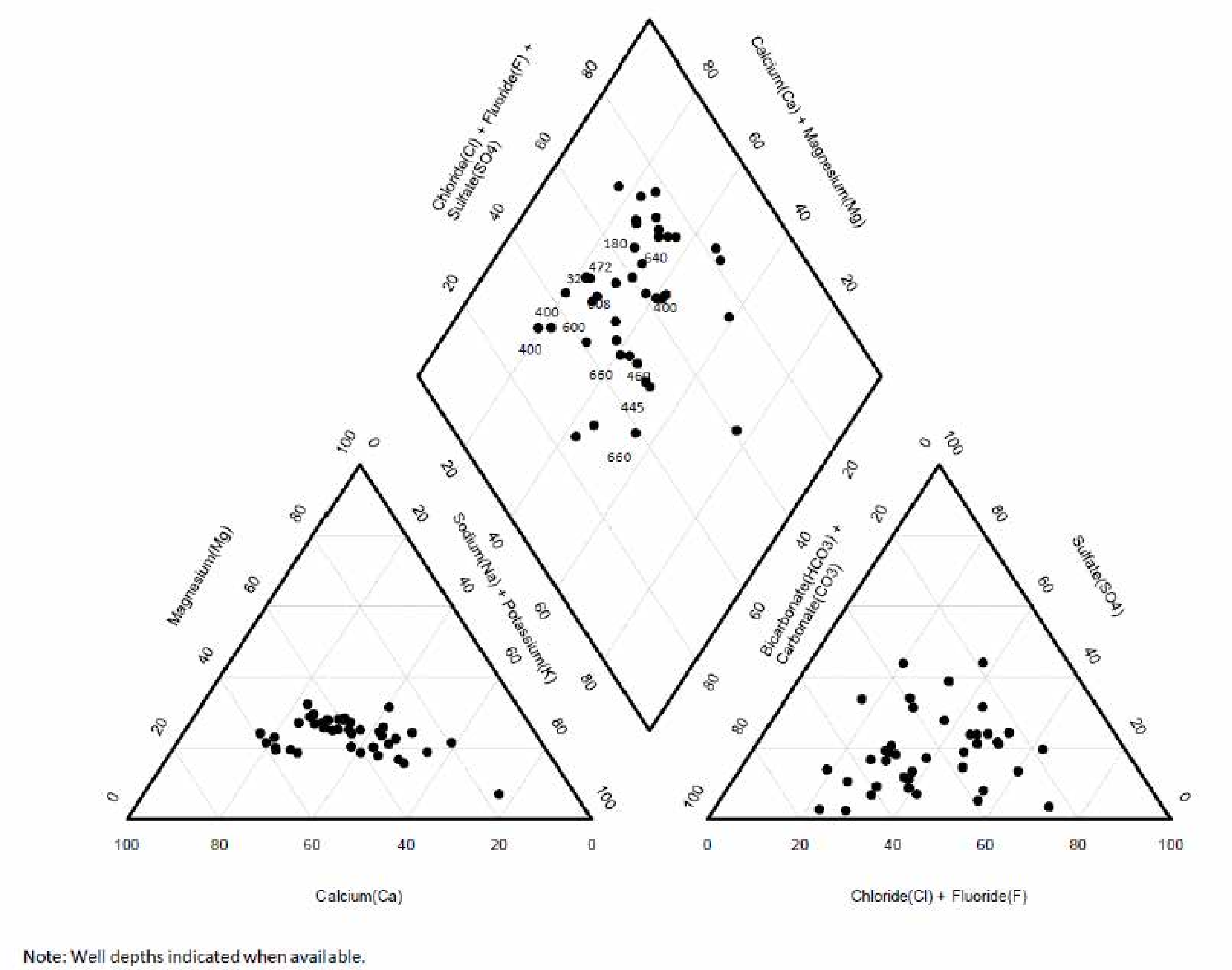


Figure 4-13. Piper Diagram of Eastside Aquifer Subbasin Representing Major Anions and Cations in Water Samples (Source: CCGC, 2015)

4.6.2 Seawater Intrusion

There is no recorded seawater intrusion in the Eastside Subbasin. Even though it is adjacent to the 180/400-Foot Aquifer Subbasin where seawater intrusion is occurring, seawater intrusion has not reached the Subbasin, which is approximately 7 miles from the coastline. However, there is a potential for seawater intrusion into the Subbasin. The most recent seawater intrusion contours in the 180-Foot Aquifer place the 500 mg/L chloride isocontour within 1 mile of the Eastside Subbasin. The most recent seawater intrusion contours in the 400-Foot Aquifer place the 500 mg/L chloride isocontour leading edge within 5 miles, and the isolated patches of elevated chloride within 2 miles of the Eastside Subbasin. Furthermore, the groundwater elevations in the northwestern portion of the Eastside Subbasin (near the City of Salinas) are below sea level, creating a groundwater gradient away from the coast and towards the Eastside Subbasin. Seawater intrusion into this subbasin is unlikely due to the fine alluvial sediments that generally demarcate the subbasin boundaries described in Section 4.3.2 above.

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

4.7 Data Gaps and Uncertainty of the HCM

The HCM in the Eastside Subbasin includes a few notable data gaps, including:

- Very few measurements of aquifer properties such as hydraulic conductivity and specific yield exist in the Subbasin.
- The hydrostratigraphy, vertical and horizontal extents, and potential recharge areas of the water producing zones and the Deep Aquifers are poorly known.

These data gaps have led to some minor uncertainties in how the principal aquifer functions, and the SVBGSA will minimize these uncertainties by filling data gaps. 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. Chapter 10 includes activities to address the identified data gaps and improve the HCM.

5 GROUNDWATER CONDITIONS

This chapter describes the historical and current groundwater conditions in the Eastside Aquifer Subbasin in accordance with the GSP Regulations § 354.16. In this GSP, current conditions are any conditions occurring after January 1, 2015. 2019 was chosen as the representative current year where possible. By implication, historical conditions are any conditions occurring prior to January 1, 2015. The chapter focuses on information required by the GSP Regulations, and information that is important for developing an effective plan to achieve sustainability. This chapter provides a description of current and historical groundwater conditions at a scale and level of detail appropriate for meeting the GSP sustainability requirements under SGMA.

This chapter is organized to align the groundwater conditions descriptions with the 6 sustainability indicators relevant to this Subbasin, including:

1. Chronic lowering of groundwater levels
2. Changes in groundwater storage
3. Seawater intrusion
4. Groundwater quality
5. Subsidence
6. Depletion of ISW

5.1 Groundwater Elevations

5.1.1 Data Sources

The assessment of groundwater elevation conditions is largely based on data collected by MCWRA from 1944 through the present. MCWRA's monitoring programs are described in Chapter 3.

5.1.2 Groundwater Elevation Contours and Horizontal Groundwater Gradients

Groundwater elevation data are analyzed and presented with 3 sets of graphics:

- Maps of groundwater elevation contours show the geographic distribution of groundwater elevations at a specific time. These contours represent the elevation of the groundwater in feet, using the NAVD88 vertical datum. The contour interval is 10 feet, meaning each blue line represents an area where groundwater elevations are either 10 feet higher or 10 feet lower than the next blue line (Figure 5-1 to Figure 5-8).
- Hydrographs of individual wells show the variations in groundwater elevations at individual wells over an extended period (Figure 5-9).

- Vertical hydraulic gradients in a single location assess the potential for vertical groundwater flow and its direction, as discussed in Section 5.1.4.

MCWRA annually produces groundwater elevation contour maps for the Salinas Valley Groundwater Basin using data from their annual August trough and fall measurement programs. August groundwater elevations are contoured to assess the driving force of seawater intrusion because this is usually when the aquifer is the most stressed. The August measurements represent seasonal low conditions in the Subbasin in this GSP. MCWRA also contours fall groundwater elevations because these measurements are taken from mid-November to December after the end of the irrigation season and before seasonal recharge from winter precipitation increases groundwater levels. MCWRA does not produce groundwater elevation contour maps in the spring. Therefore, new maps of spring groundwater levels were developed for this GSP. Spring groundwater elevation maps were developed from data collected between January and March for 2019 and 1995. The period from January to March usually reflects seasonal high groundwater levels in the Salinas Valley Groundwater Basin (MCWRA, 2015). The MCWRA Quarterly Salinas Valley Water Conditions report demonstrates that in 2019, the seasonal high groundwater elevations occurred in February (MCWRA, 2019a). In 1995, data collected in March were more representative of seasonal high groundwater elevations.

The following 8 maps present the Current (2019) and Historical (1995) groundwater elevation contours.

Table 5-1. Figures Showing Current and Historical Groundwater Elevation Contours for the Eastside Aquifer

Figure #	Year	Season	Zone
Figure 5-1	Current (2019)	Spring	Shallow
Figure 5-2	Current (2019)	August Trough	Shallow
Figure 5-3	Current (2019)	Spring	Deep
Figure 5-4	Current (2019)	August Trough	Deep
Figure 5-5	Historical (1995)	Spring	Shallow
Figure 5-6	Historical (1995)	August Trough	Shallow
Figure 5-7	Historical (1995)	Spring	Deep
Figure 5-8	Historical (1995)	August Trough	Deep

The groundwater elevation contours only cover the portions of the Subbasin monitored by MCWRA. Contours do not always extend to subbasin margins.

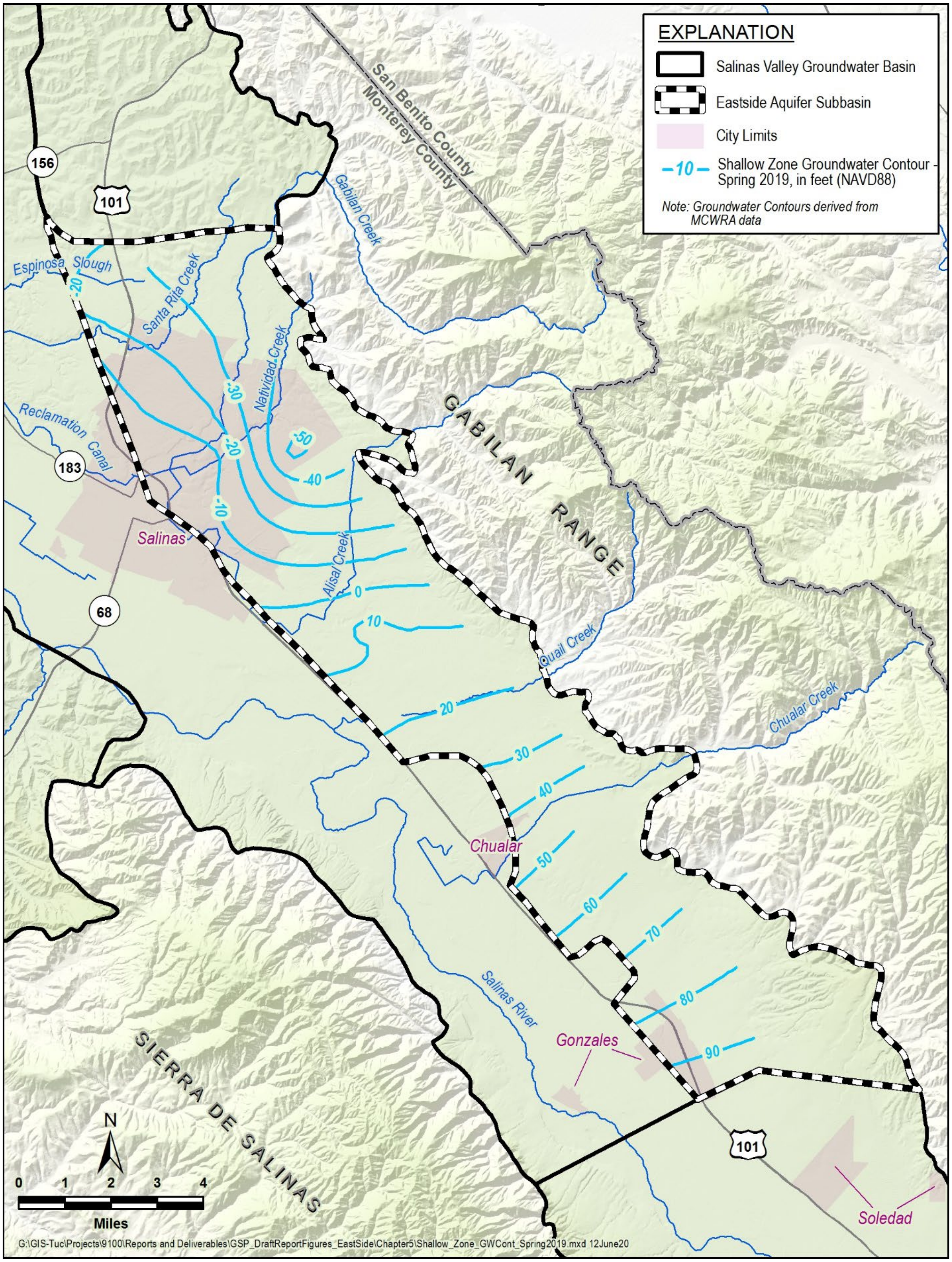


Figure 5-1. Spring 2019 Shallow Zone Groundwater Elevation Contours

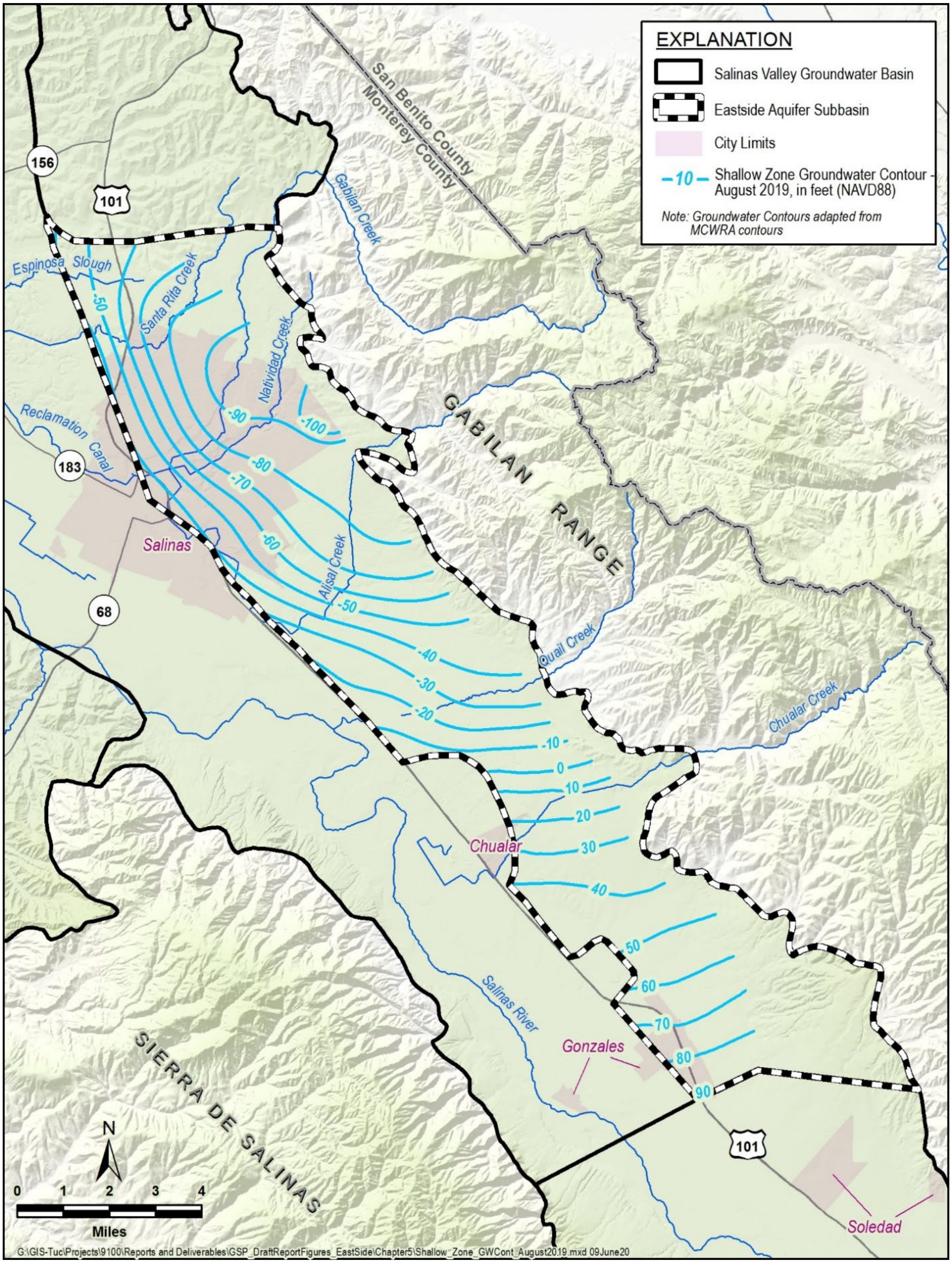


Figure 5-2. August 2019 Shallow Zone Groundwater Elevation Contours

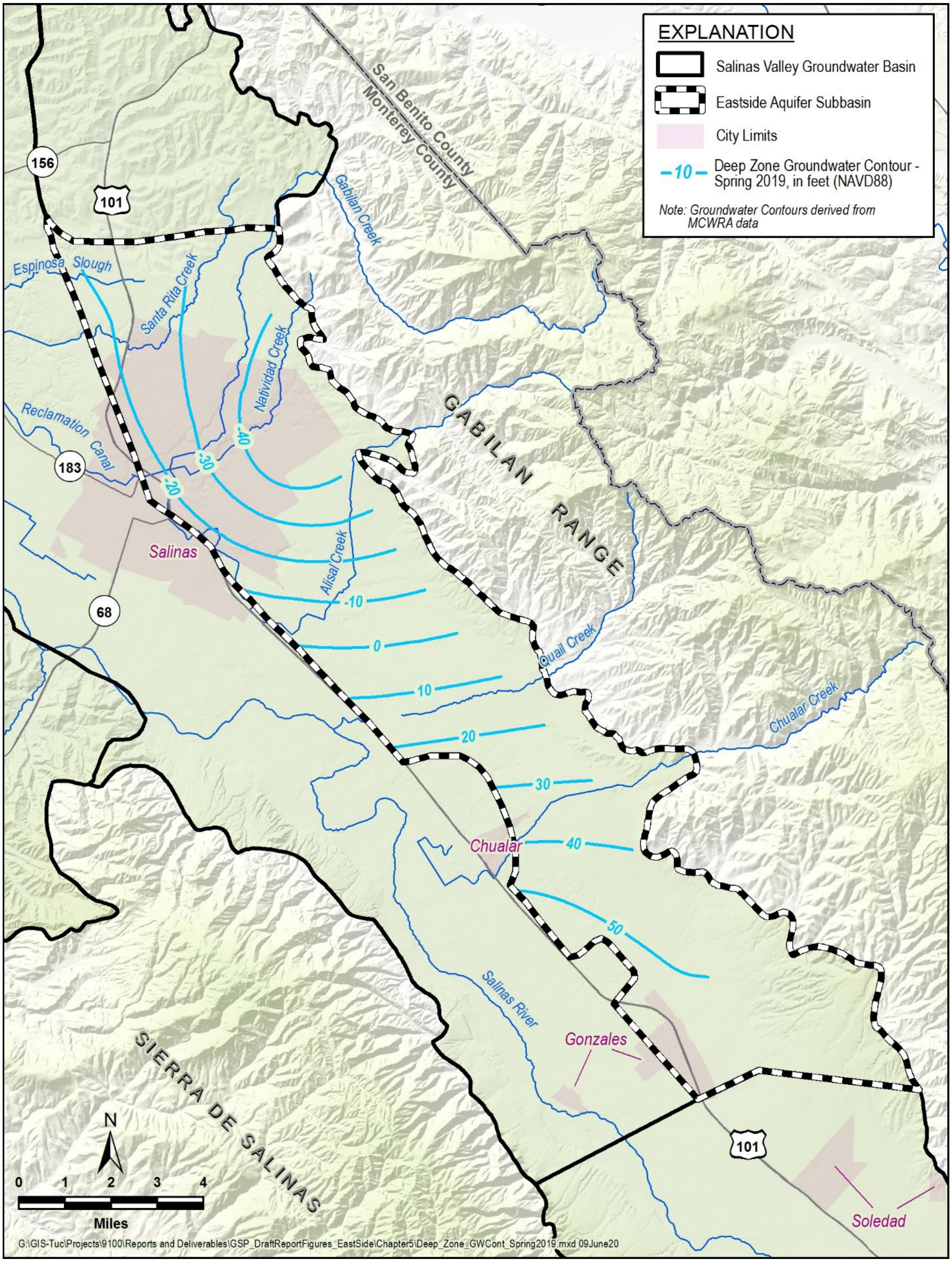


Figure 5-3. Spring 2019 Deep Zone Groundwater Elevation Contours

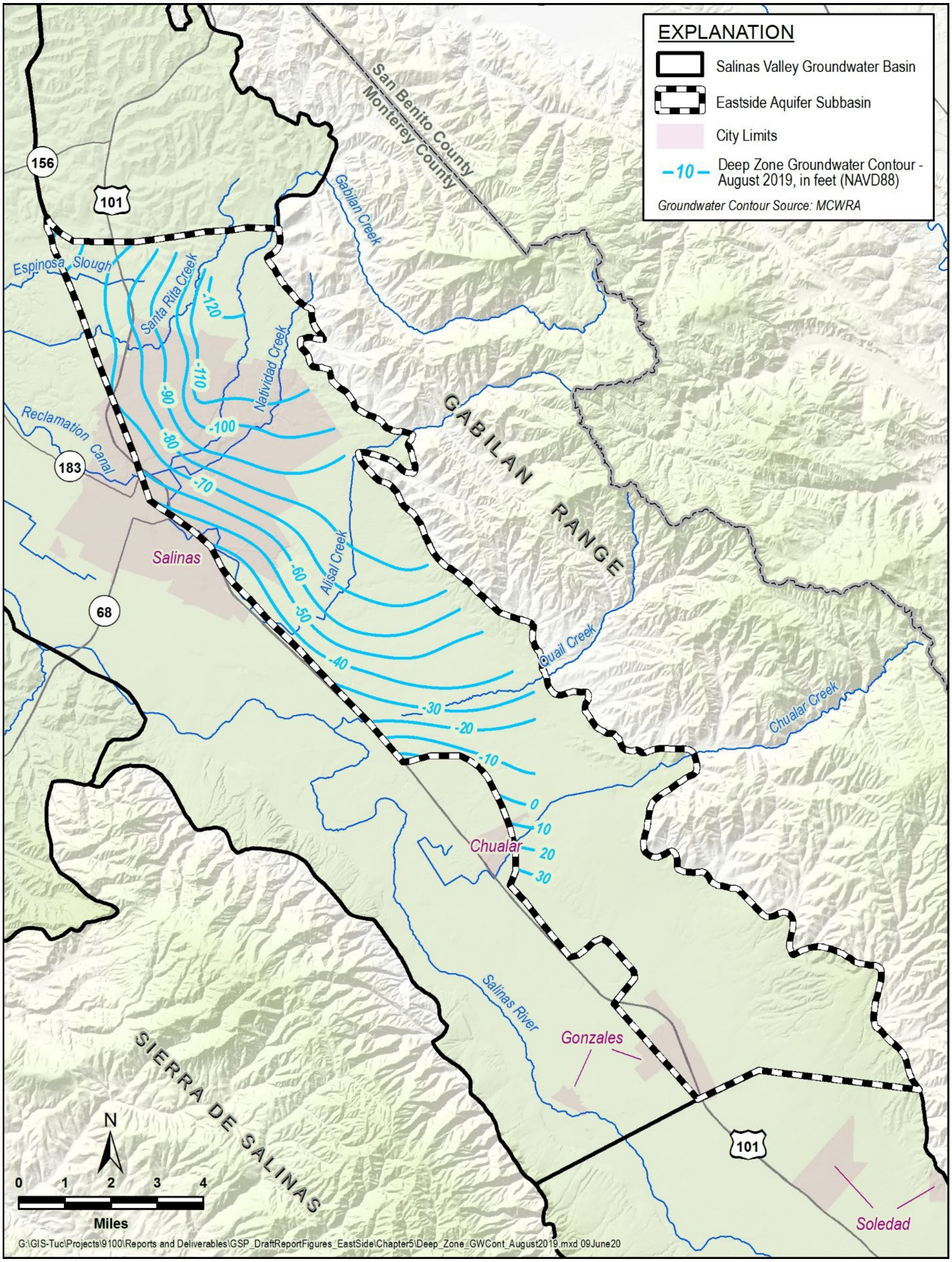


Figure 5-4. August 2019 Deep Zone Groundwater Elevation Contours

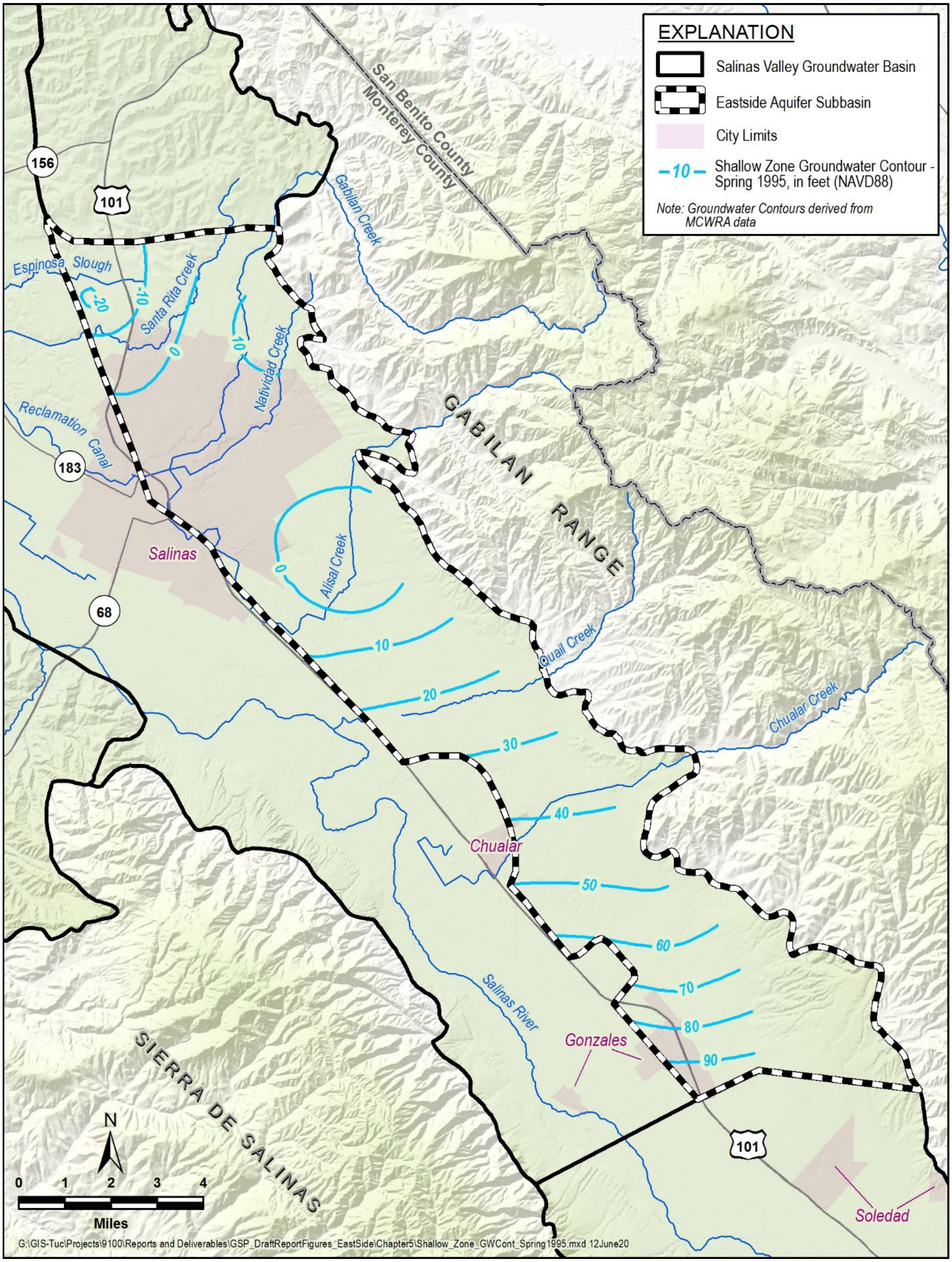


Figure 5-5. Spring 1995 Shallow Zone Groundwater Elevation Contours

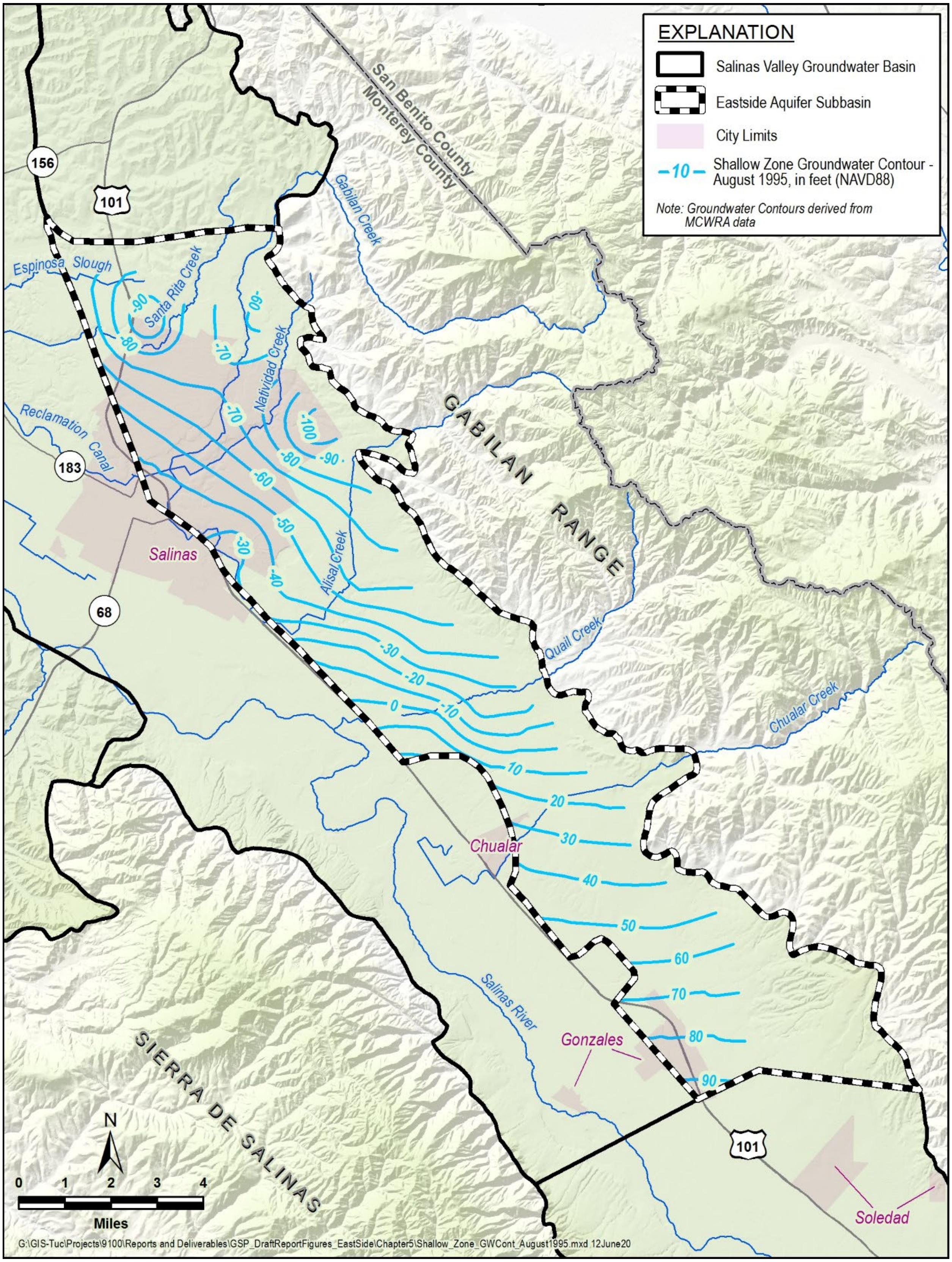


Figure 5-6. August 1995 Shallow Zone Groundwater Elevation Contours

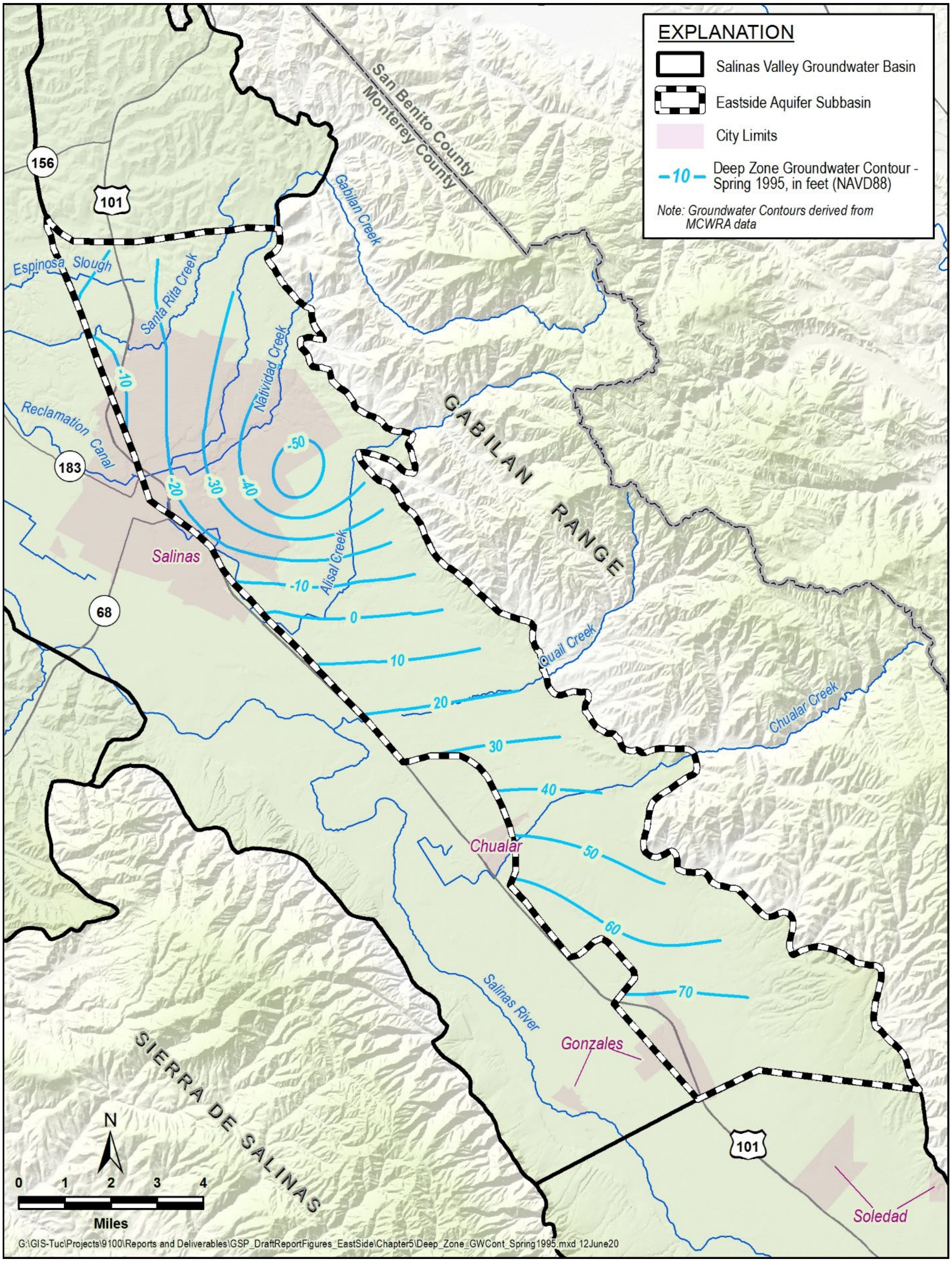


Figure 5-7. Spring 1995 Deep Zone Groundwater Elevation Contours

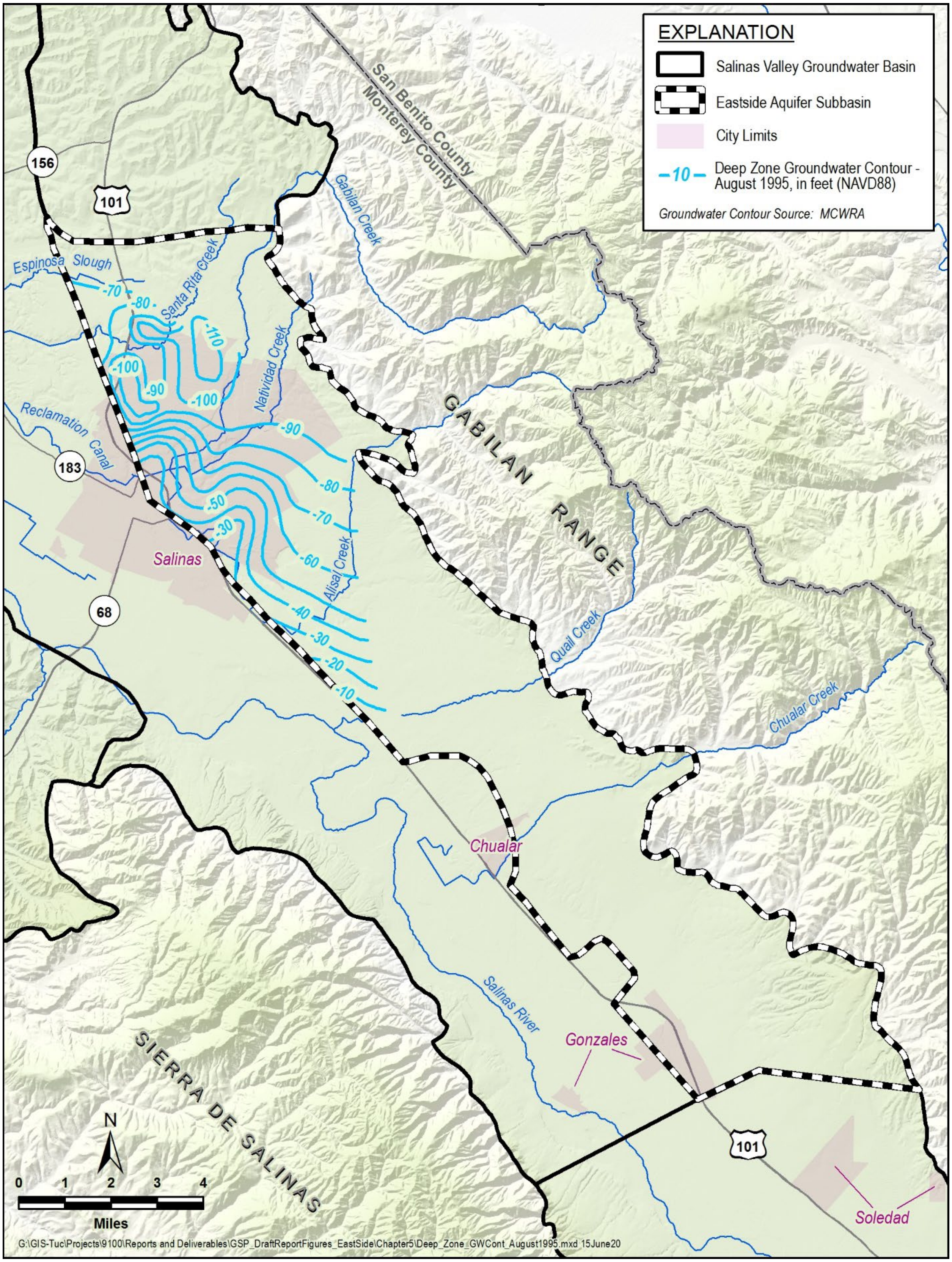


Figure 5-8. August 1995 Deep Zone Groundwater Elevation Contours

Groundwater generally flows from the south and from adjacent basins toward the north-northwest, with localized depressions around the pumping centers. The most notable pumping depression is located east of the City of Salinas. The contours indicate that groundwater flow directions are similar in the Shallow and Deep Zones of the Eastside Aquifer. However, based on these contours, groundwater elevations in the Deep Zone are generally lower than groundwater elevations in the Shallow Zone during both 1995 and 2019.

Under current conditions (Figure 5-1 to Figure 5-4, groundwater elevations in the northern two-thirds of the Subbasin are below sea level, estimated as zero feet NAVD88, as indicated by the negative values on the contour lines. The lowest groundwater elevations in the Subbasin occur in the pumping depression east of the City of Salinas. In the Shallow Zone, minimum groundwater elevations are approximately -50 feet NAVD88 during the Spring measurements (Figure 5-1) and -100 feet NAVD88 during the August measurements (Figure 5-2). In the Deep Zone, minimum groundwater elevations are approximately -40 feet NAVD88 during the Spring measurements (Figure 5-3) and -120 feet NAVD88 during the August measurements (Figure 5-4). The hydraulic gradient steepens in the vicinity of the pumping trough; however, gradients are difficult to quantify based on highly variable groundwater elevations throughout the subbasin.

Groundwater elevations in the Eastside Subbasin increase to the west toward the boundary with the adjacent 180/400 Foot Aquifer Subbasin. They also increase toward the southern boundary with the aquifer in the Forebay Subbasin where groundwater elevations are greater than 90 feet NAVD88 in the Shallow Zone (Figure 5-1 and Figure 5-2) and greater than 50 feet NAVD88 in the Deep Zone (Figure 5-3 and Figure 5-4). The Shallow and Deep Zones represent productive zones that are intermittently confined as a result of the characteristic alluvial fan sediment deposition in the Eastside Subbasin, which transitions to more fluvial-dominated sediments near the boundary with the Forebay Subbasin.

Under the historical conditions of 1995, a similar flow pattern to that of current conditions was present in both the Shallow and Deep Zones of the Eastside Aquifer; however, the magnitude of the pumping trough has varied over time. A discussion of historical groundwater elevation changes is presented in Section 5.1.3.

5.1.3 Hydrographs

Representative temporal trends in groundwater elevations can be assessed with hydrographs that plot changes in groundwater elevations over time. Groundwater elevation data from wells within the Subbasin are available from monitoring conducted and reported by MCWRA.

Figure 5-9 depicts the locations and hydrographs of example monitoring wells in the Subbasin. Larger versions of the hydrographs for these wells, as well as all representative monitoring wells, are included in Appendix 5A. The locations of all the representative monitoring wells are shown on Figure 5-10. Chapter 7 provides more information specific to the wells and the monitoring system.

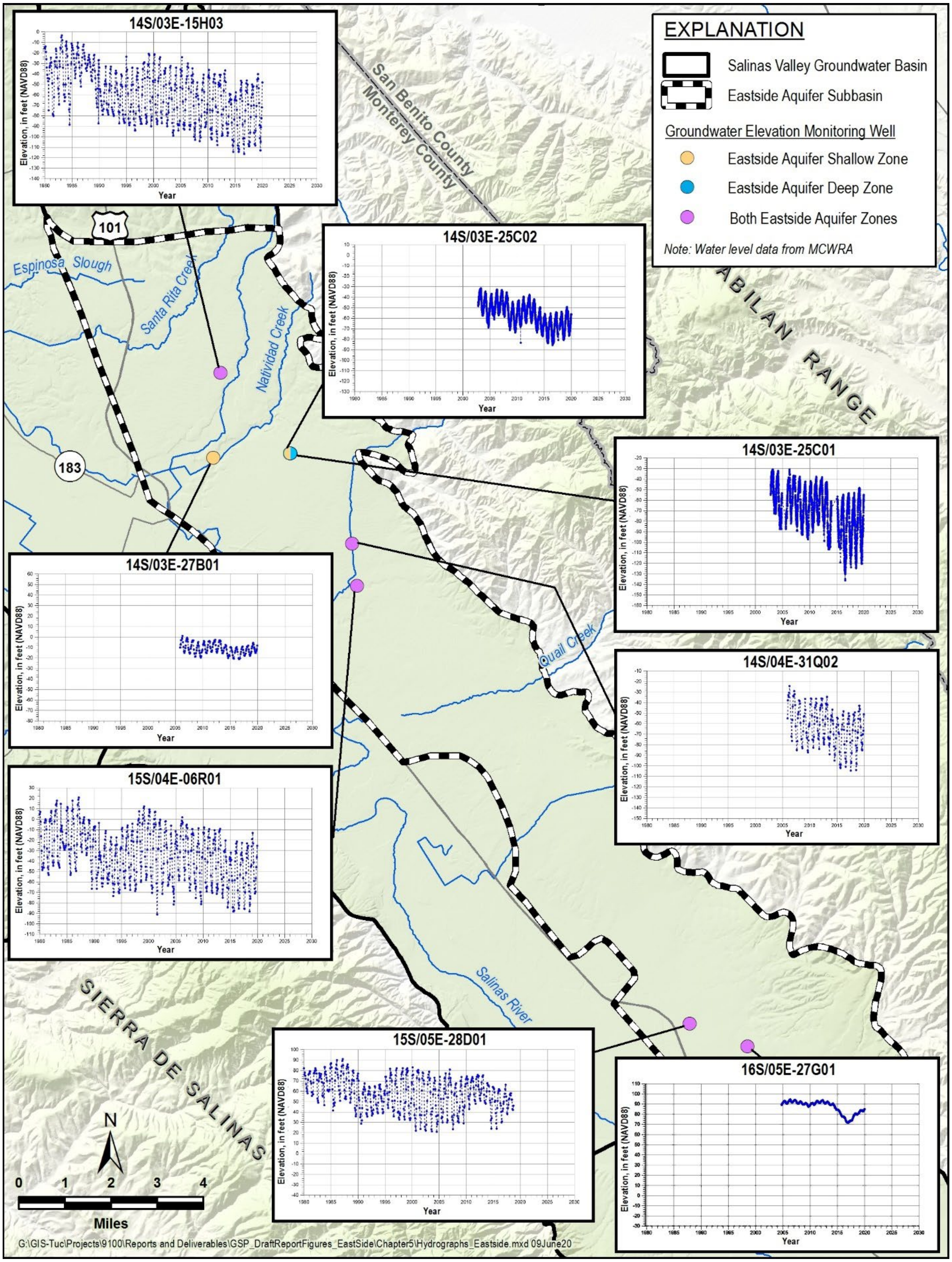


Figure 5-9. Map of Example Hydrographs

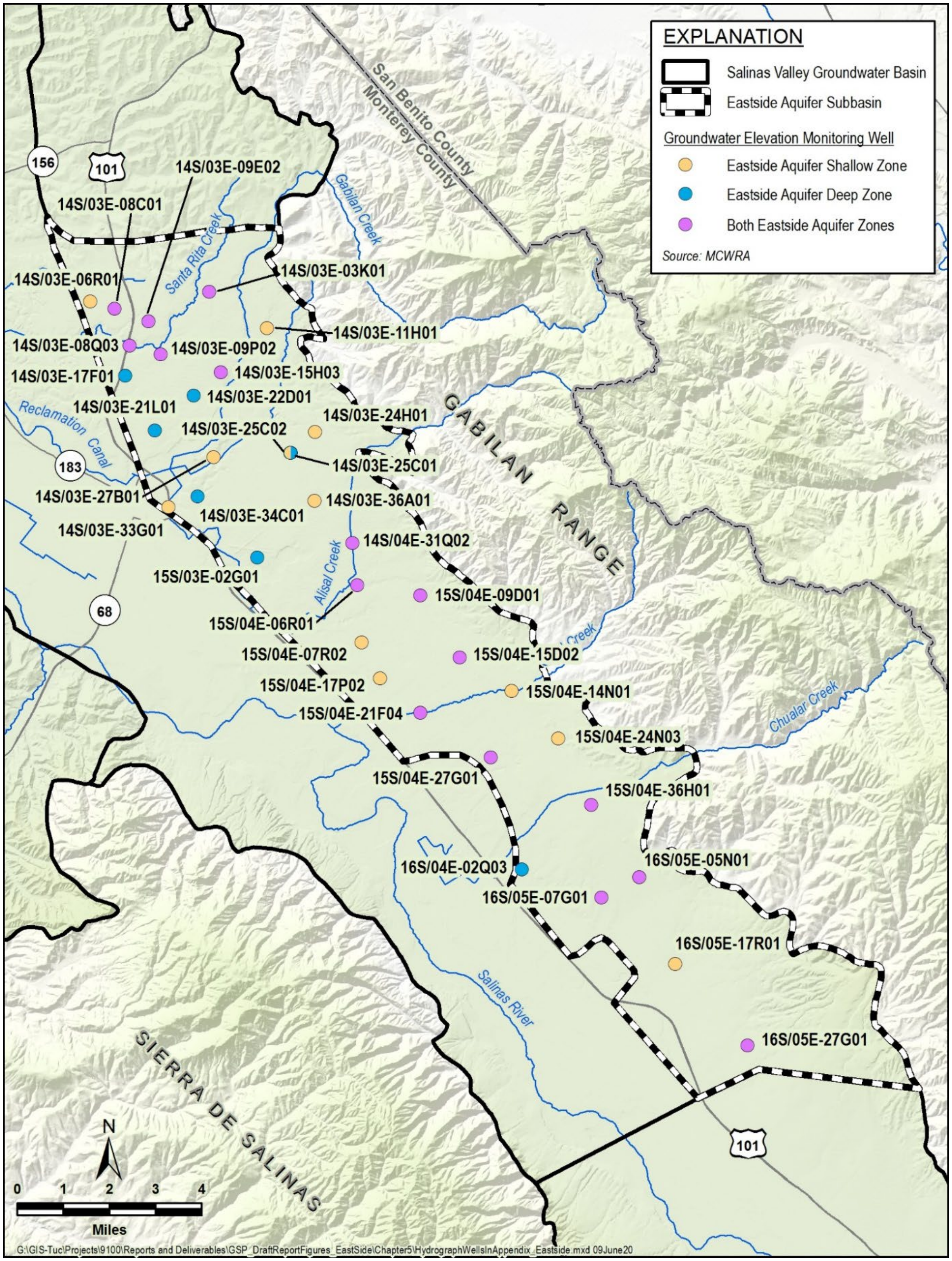


Figure 5-10. Locations of Wells with Hydrographs Included in Appendix 5A

Figure 5-11 presents a graph of cumulative groundwater elevation change for the Eastside Subbasin. The graph was initially developed by MCWRA and is based on averaged change in fall groundwater elevations for designated wells in the Eastside Subarea each year. MCWRA uses the Eastside Subarea for its groundwater elevation change analyses, which overlaps the Eastside Subbasin, as well as parts of the 180/400-Foot Aquifer and most of the Langley Subbasins, as shown on Figure 5-12. The figure was adapted to reflect the cumulative change in groundwater elevations specific to the Eastside Subbasin.

Fall measurements occur at the end of the irrigation season and before groundwater levels increase due to seasonal recharge by winter rains. These measurements record annual changes in storage reflective of groundwater recharge and withdrawals in the Subbasin. The cumulative groundwater elevation change plot is therefore an estimated average hydrograph for wells in the Subbasin. Although this plot does not reflect the groundwater elevation change at any specific location, it provides a general illustration of how the average groundwater elevation in the Subbasin changes in response to climatic cycles, groundwater extraction, and water resources management at the subbasin scale.

The cumulative elevation change graph and the specific hydrographs presented in Appendix 5A show that groundwater elevations in the Subbasin show a long-term decline over time.

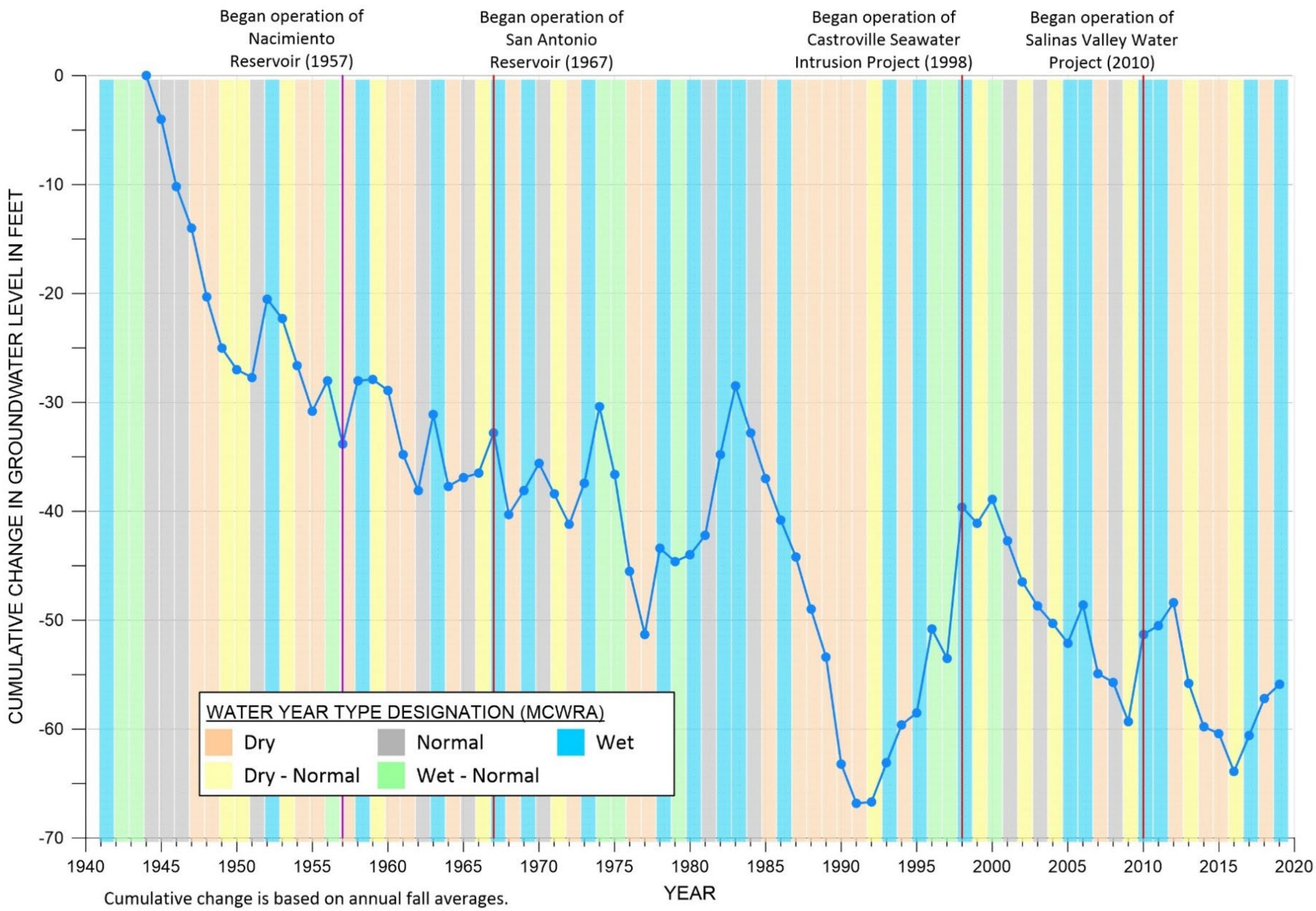


Figure 5-11. Cumulative Groundwater Elevation Change Graph for the Eastside Subbasin
(adapted from MCWRA, 2018a, personal communication)

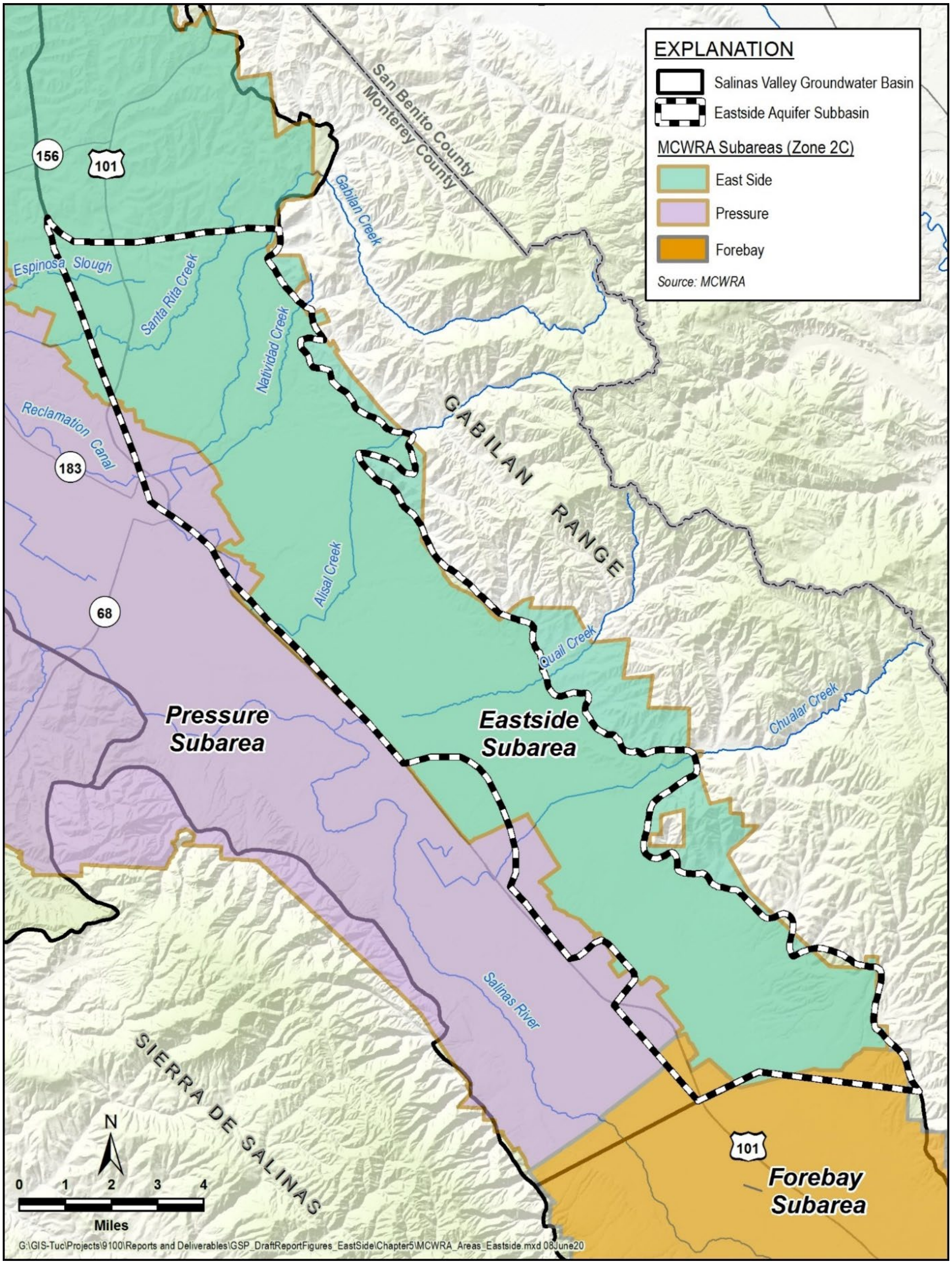


Figure 5-12. MCWRA Management Subareas

5.1.4 Vertical Groundwater Gradients

The Eastside Subbasin is considered a single aquifer with 2 generalized water-bearing zones. There is no identifiable, extensive aquitard separating the 2 zones. Figure 5-13 shows groundwater elevations at 2 well pairs in the Subbasin. The well pair consists of 2 adjacent wells with different well depths, 1 shallow (14S/03E-25C02 and 16S/05E-17R01) and the other deep (14S/03E-25C01 and 16S/05E-20R01). The northern well pair has different groundwater elevations at the 2 depths; however, both wells demonstrate similar seasonal fluctuations in groundwater elevations. The related seasonal fluctuations are indicative of the connection between the 2 zones. These hydrographs also show that the groundwater elevations in the Shallow Zone are generally higher than in the Deep Zone. This corroborates the data shown on the groundwater elevation contour maps. The southern well pair shows similar trends in groundwater elevations, despite the seasonal fluctuations of the deeper well (16S/05E-20R01) suggesting that these wells are also hydraulically connected.

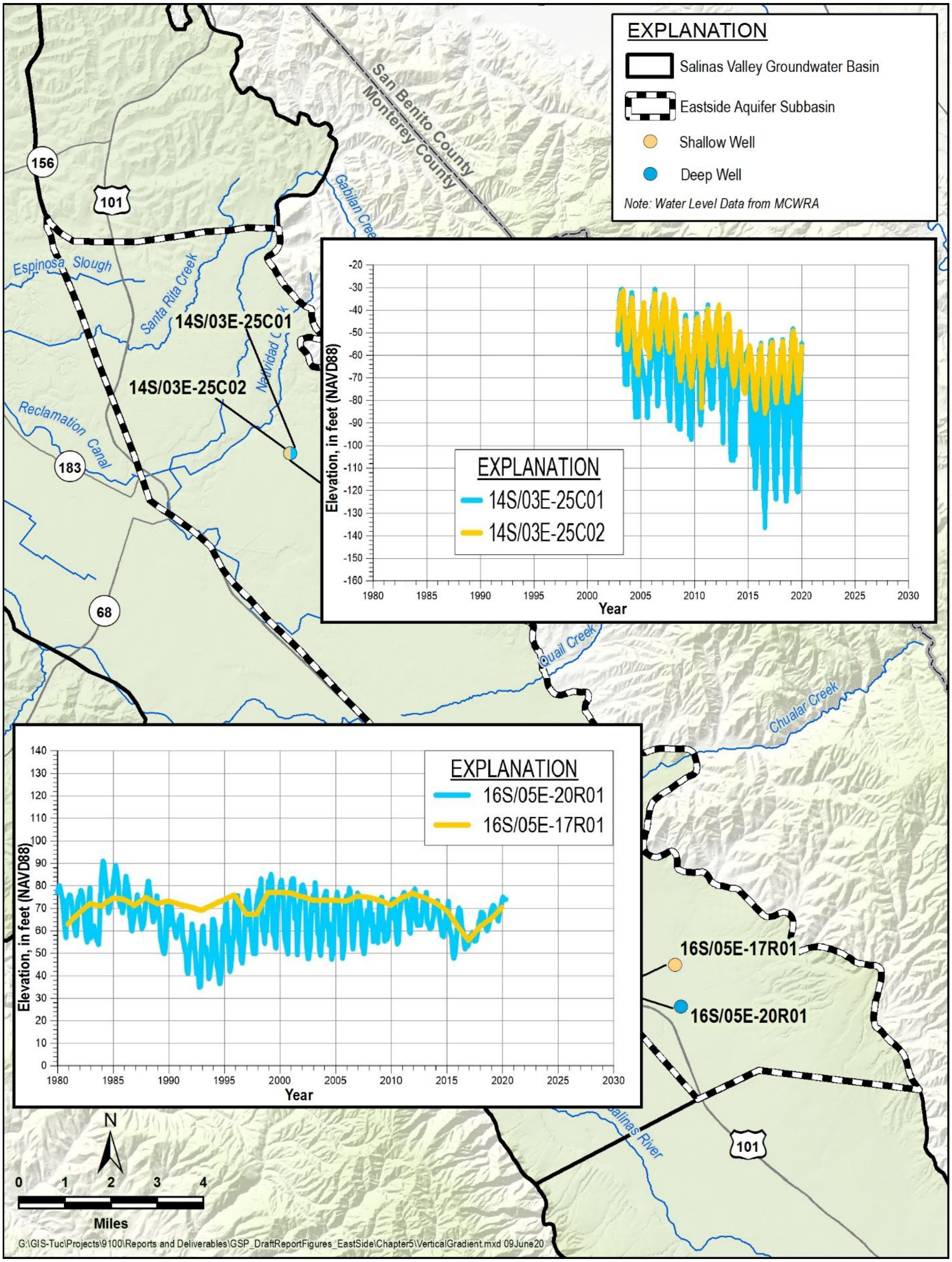


Figure 5-13. Vertical Gradients

5.2 Change in Groundwater Storage

5.2.1 Data Sources

Change in storage is developed based on MCWRA's fall groundwater elevation measurements. This includes historical groundwater elevations used to develop the cumulative change in groundwater elevation graph (Figure 5-11) that is used to estimate change in groundwater storage over time. Groundwater elevation measurements are also used to create fall groundwater elevation contour maps; MCWRA's fall 1995 and fall 2019 contour maps are used to determine the spatial distribution of storage change. Fall groundwater elevation contour maps are used rather than spring contour maps to retain consistency with the cumulative change in groundwater elevation graph.

5.2.2 Change in Groundwater Storage

Change in groundwater storage is derived from change in groundwater elevations in the Subbasin in 2 ways: 1) using the cumulative subbasin-wide average change in groundwater elevations and 2) subtracting the fall 1995 from the and fall 2019 groundwater elevation maps. Both approaches rely on observed groundwater elevation changes that provide a measure of the gain and loss of groundwater in storage each year. The change in storage is calculated by multiplying a change in groundwater elevation by a storage coefficient. Storage coefficients depend on the hydraulic properties of the aquifer materials and are commonly measured through long-term pumping tests or laboratory tests. The storage coefficient for the Eastside Subbasin was estimated at 0.08 based on the State of the Basin Report (Brown and Caldwell, 2015). The area of the Eastside Subbasin is approximately 57,500 acres.

Both approaches for calculating the change in storage using groundwater elevation changes are based on the following relationship:

$$\Delta S = \Delta WL \times A \times SC$$

Where: ΔS = Annual change in storage volume in the Subbasin (AF/yr.)

ΔWL = Annual change in average groundwater elevation in the Subbasin (ft/yr.)

A = Land area of Subbasin (acres)

SC = Storage coefficient (ft^3/ft^3)

Figure 5-14 shows estimated cumulative change in groundwater storage in the Eastside Subbasin from 1944 through 2019. This graph is based on MCWRA's cumulative change in fall groundwater elevation data (Figure 5-11). The magnitudes of the groundwater storage changes are calculated by multiplying the annual groundwater elevation change by the storage coefficient and size of the Subbasin. Figure 5-14 shows that the Eastside Subbasin has experienced a long-term decline in groundwater storage due to lowering groundwater elevations. Based on Figure 5-14, the average annual storage loss due to lowering groundwater elevations in the Eastside Subbasin between 1944 and 2019 is approximately 3,400 AF/yr. However, other analyses have estimated greater declines in storage (Brown and Caldwell, 2015). Groundwater elevations have fluctuated over this time period. The change in storage calculation is a reflection of groundwater elevations in the start and end years, which captures the chronic lowering of groundwater levels in the Subbasin. As noted in Section 6.3, uncertainties exist in all estimates of change in storage. Based on prior reports, groundwater elevations, and modeling, this GSP considers the average historical overdraft to be approximately 10,000 AF/yr.

Figure 5-15 shows the fall 1995 and fall 2019 groundwater elevation contours for the shallow zone of the Eastside Aquifer. Figure 5-16 shows the estimated change in groundwater storage in the Shallow Zone calculated by subtracting the 2 fall groundwater elevation maps. Similarly, Figure 5-17 shows the Fall 1995 and Fall 2019 groundwater elevation contours for the Deep Zones of the Eastside Aquifer; and Figure 5-18 show the associated Deep Zone change in groundwater storage from Fall 1995 to fall 2019. The 2 maps of change in groundwater storage show calculated change in storage for areas of approximately 32,000 acres rather than the total Subbasin area because that is the approximate area of the Subbasin that is contoured for both the Shallow and Deep Zones.

A loss in groundwater storage occurred in both the Shallow and Deep Zones in the northern portion of the Subbasin, south and east of the City of Salinas. Within the Salinas City boundaries, the loss in storage ranges from 0 to 2 AF per acre over an area of approximately 8,500 acres in the Shallow Zone and 0 to 2 AF per acre over an area of approximately 6,000 acres in the Deep Zone. Other noticeable areas with groundwater storage change are seen around the Cities of Chualar and Gonzales.

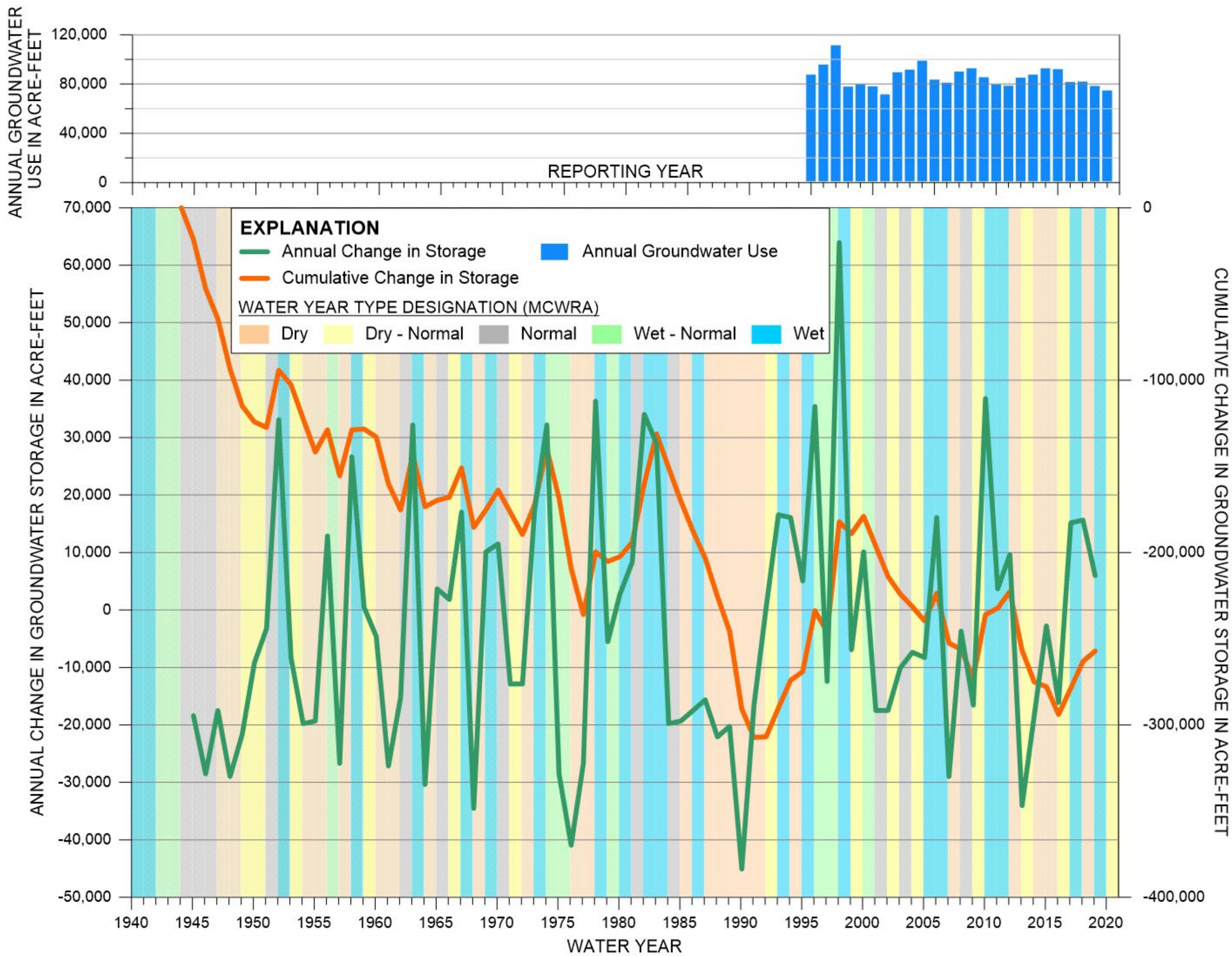


Figure 5-14. Annual and Cumulative Change in Groundwater Storage and Total Annual Groundwater Extraction in the Eastside Subbasin, Based on Groundwater Elevations (adapted from MCWRA, 2018a, personal communication)

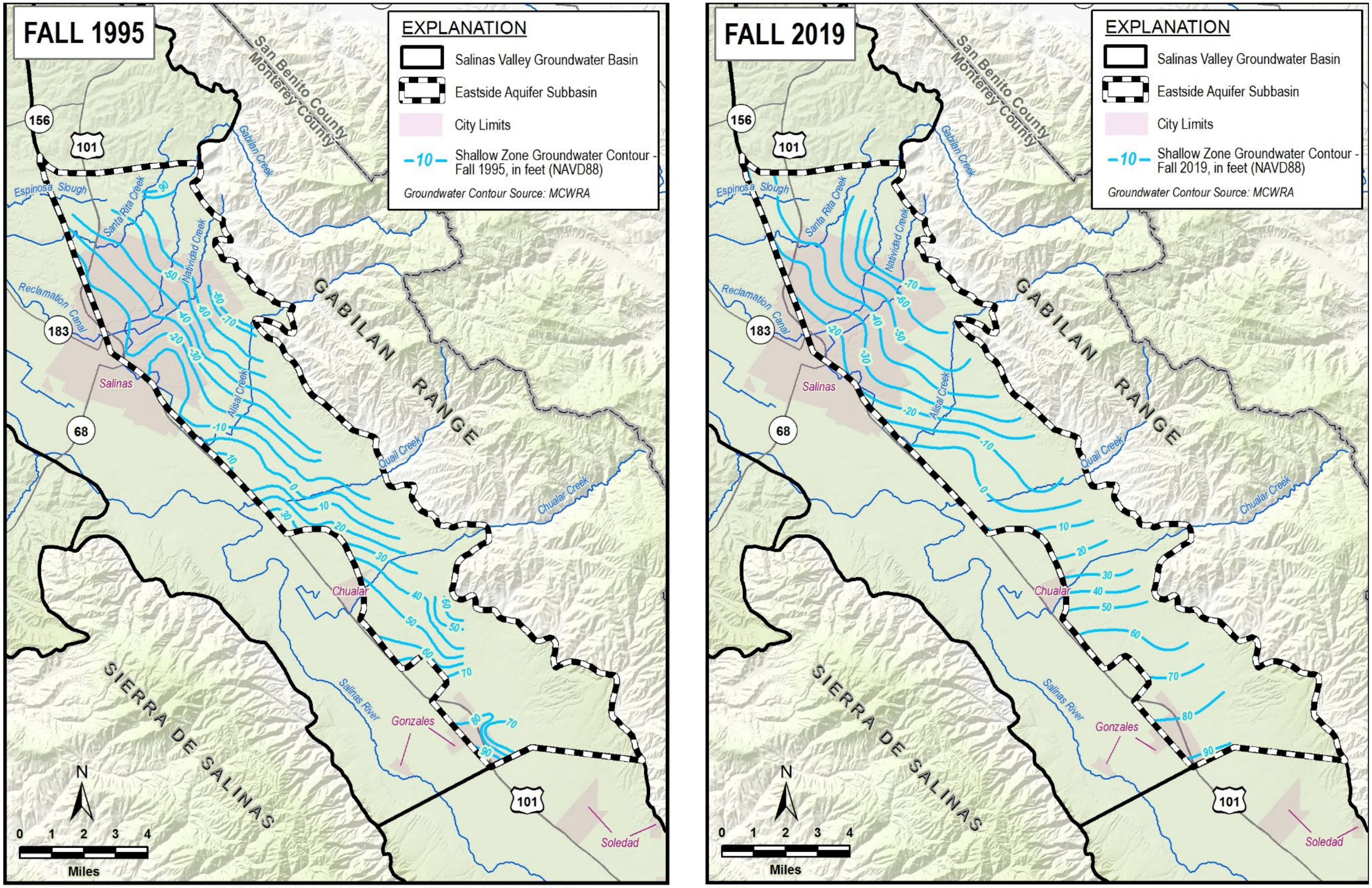


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Figure 5-15. Fall 1995 (left) and Fall 2019 (right) Shallow Zone Groundwater Elevation Contours

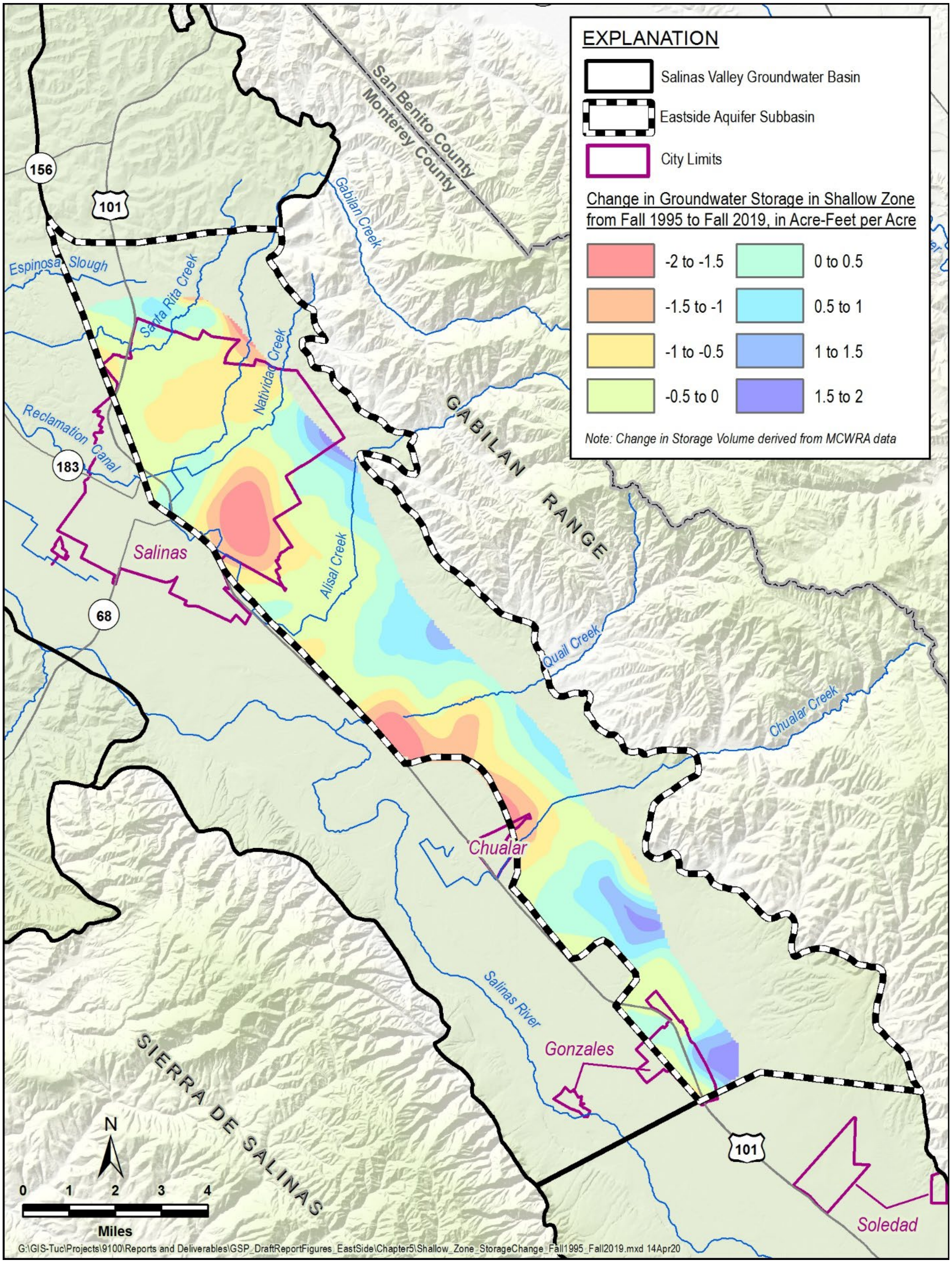

Figure 5-16. Change in Groundwater Storage in the Shallow Zone from Fall 1995 to Fall 2019

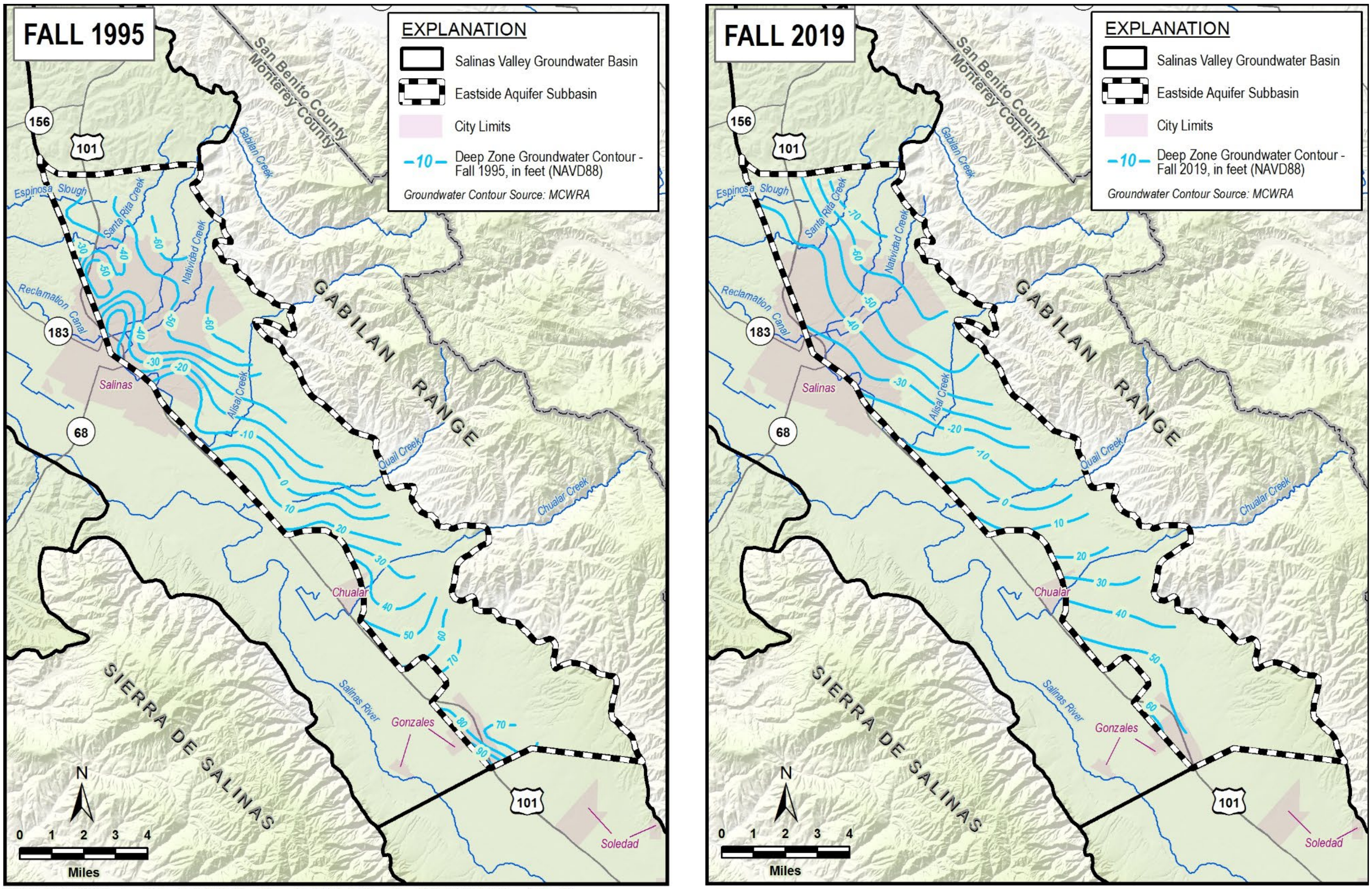

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Figure 5-17. Fall 1995 (left) and Fall 2019 (right) Deep Zone Groundwater Elevation Contours

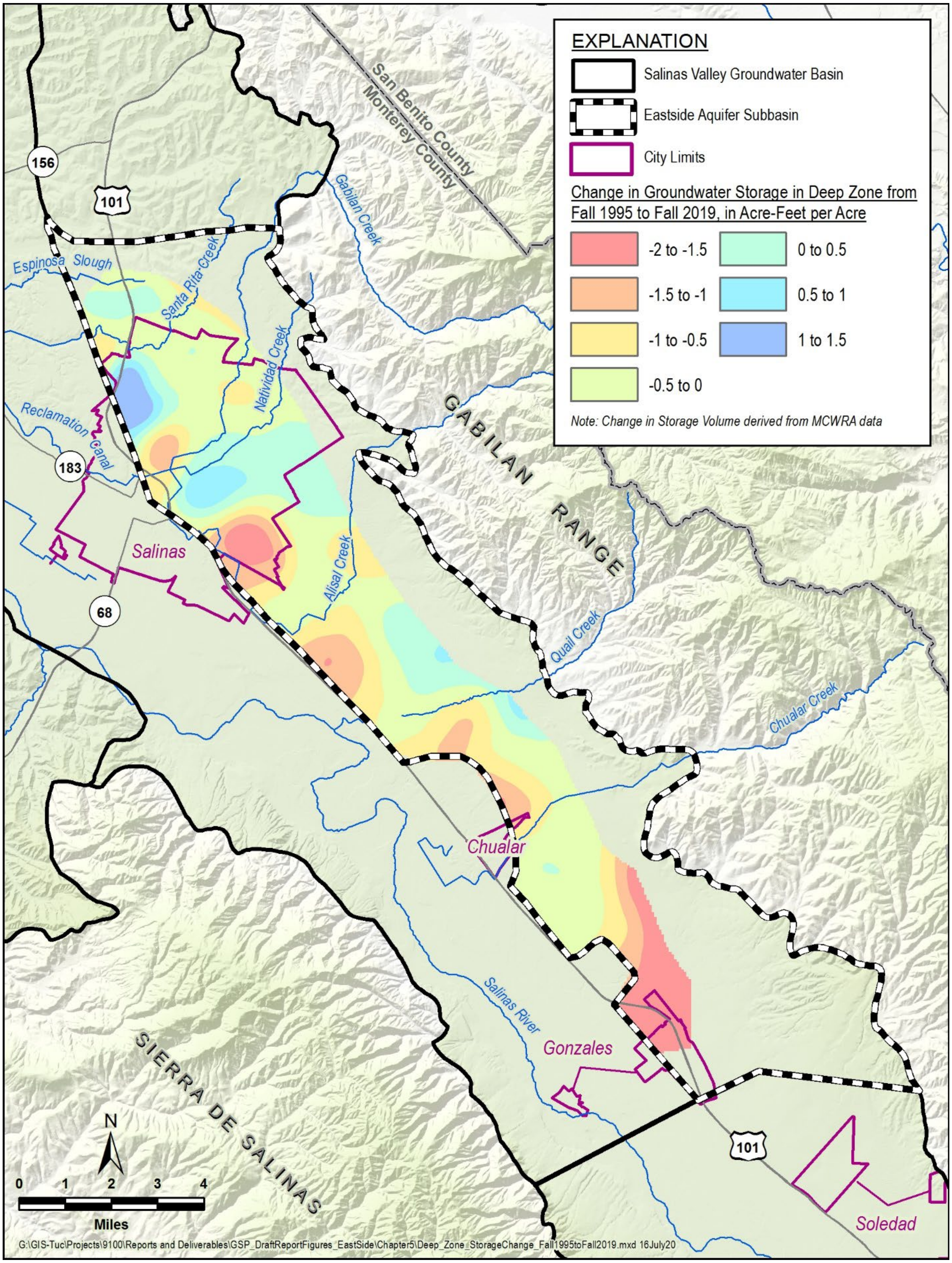

Figure 5-18. Change in Groundwater Storage in the Deep Zone from Fall 1995 to Fall 2019

5.3 Seawater Intrusion

There is currently no seawater intrusion in the Eastside Subbasin. However, the adjacent 180/400-Foot Aquifer Subbasin has been subject to seawater intrusion for more than 70 years. The negative impact of seawater intrusion on local water resources and the agricultural economy has been the primary motivation for many studies dating back to 1946 (DWR, 1946). The seawater intrusion in the 180/400-Foot Aquifer Subbasin is close enough to the Eastside Subbasin that seawater intrusion is considered an ongoing threat.

5.3.1 Data Sources

The extent and advance of seawater intrusion are monitored and reported by MCWRA. Monitoring seawater intrusion has been ongoing since the Agency formed in 1947, and currently includes a network of 151 dedicated monitoring and production wells that are sampled twice annually in June and August. Most of the wells are located in the 180/400-Foot Aquifer Subbasin; however, 2 monitoring wells are located within the Eastside Subbasin. The water samples are analyzed for general minerals; and the analytical results are used by MCWRA to analyze and report the following:

- Maps and graphs of historical chloride and specific conductivity trends
- Stiff diagrams and Piper diagrams
- Plots of chloride concentration vs. Na/Cl molar ratio trends

MCWRA publishes estimates of the extent of seawater intrusion every year. The MCWRA maps define the extent of seawater intrusion as the location of the 500 mg/L chloride concentration isocontour. This chloride concentration is significantly lower than the 19,000 mg/L chloride concentration typical of seawater; however, it represents a concentration that may begin to impact beneficial uses. The 500 mg/L threshold is considered the Upper Limit SMCL for chloride as defined by the EPA and is approximately 10 times the concentration of naturally occurring groundwater in the Subbasin.

5.3.2 Seawater Intrusion Maps and Cross Section

Figure 5-19 and Figure 5-20 show the MCWRA mapped extents of current and historical seawater intrusion near the Eastside Subbasin and in the neighboring 180/400-Foot Aquifer Subbasin. Two maps are shown, equating the 180-Foot Aquifer and the 400-Foot Aquifer in the neighboring Subbasin. In each of the 2 figures, the maximum extent of the shaded contours represents the extent of groundwater with chloride exceeding 500 mg/L during the 2019 monitoring period. The historical progression of the 500 mg/L extent is also illustrated on these figures through the colored overlays that represent the extent of seawater intrusion observed during selected years. These 2 maps show that seawater intrusion is close to the Eastside Subbasin but is not observed in the Subbasin.

Figure 5-19 and Figure 5-20 also show the mapped August 2019 groundwater elevations for the Eastside Aquifer and the adjacent 180/400-Foot Aquifer Subbasin. These maps show the groundwater elevations that are persistently below sea levels that, when paired with a pathway, enable seawater intrusion. The groundwater elevation contours show that groundwater travels toward the depression at the northern end of the Eastside Subbasin in both the Shallow and Deep Zones. If the magnitude of this depression increases, it may draw seawater intrusion into the Subbasin. However, the contours themselves are not fully representative of flow between the subbasins. The gradient relationship is not the only influence to groundwater flow between the 180/400-Foot and Eastside Subbasins, and needs to be considered along with all subsurface characteristics. The sediment relationships between the 180/400-Foot Aquifer Subbasin and the Eastside Subbasin demonstrate a dynamic environment where different sediments were deposited over time and subsequently, impact groundwater flow. The boundary between these two subbasins generally represents the furthest extents of the alluvial fans that are characterized by clays and other fine sediments. These sediments frequently act as an impediment to flow, if not fully a barrier in certain locations. The groundwater flow relationship between the Eastside and 180/400-Foot Subbasins are largely uncharacterized as a result of a lack of data both about the sediment changes and the groundwater elevations in the area. This is a data gap that will be addressed during implementation.

Because there is no seawater intrusion in the Subbasin, no cross sections are presented showing the vertical extent of seawater intrusion.

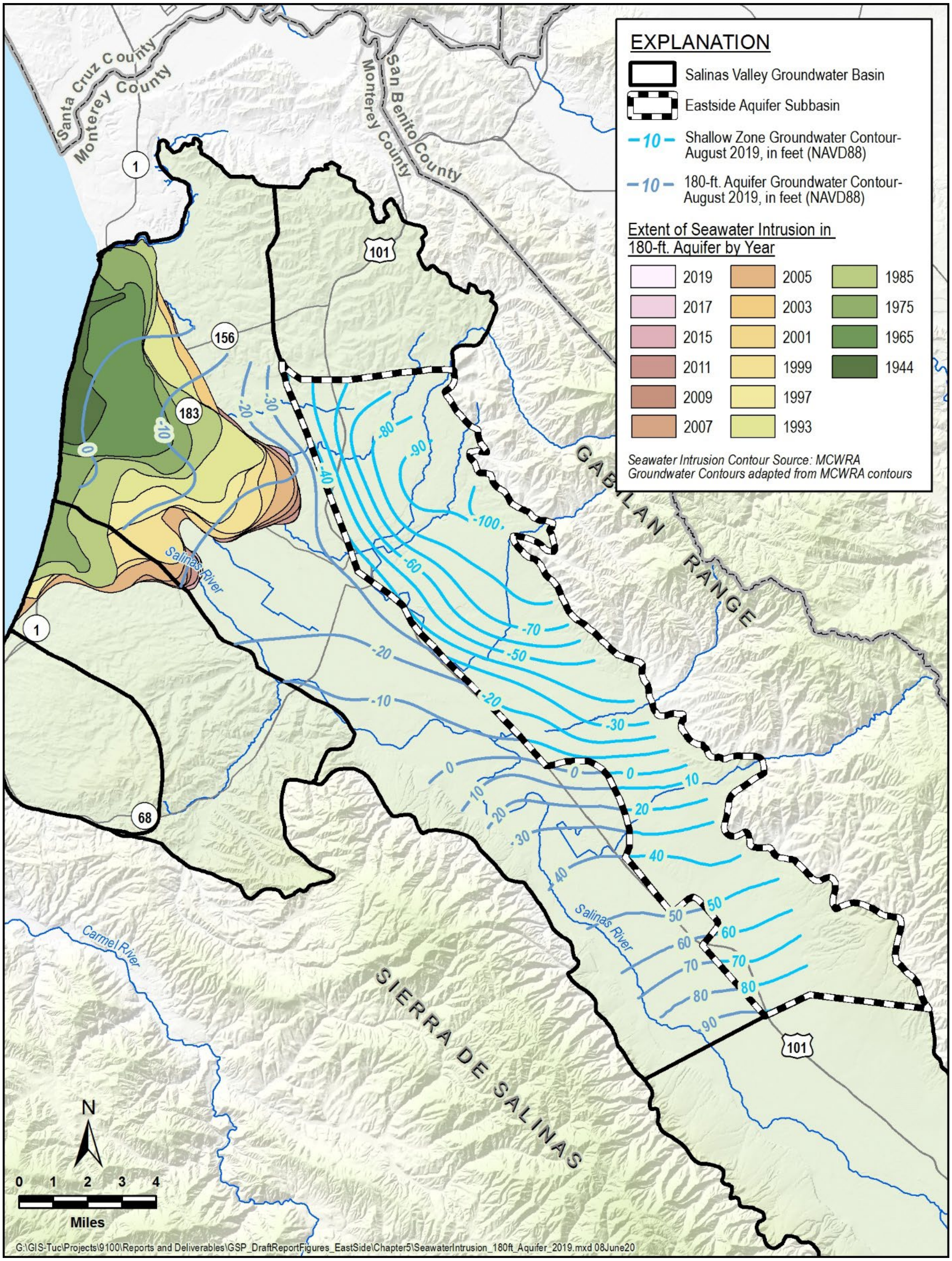

Figure 5-19. Seawater Intrusion in the 180-Foot Aquifer

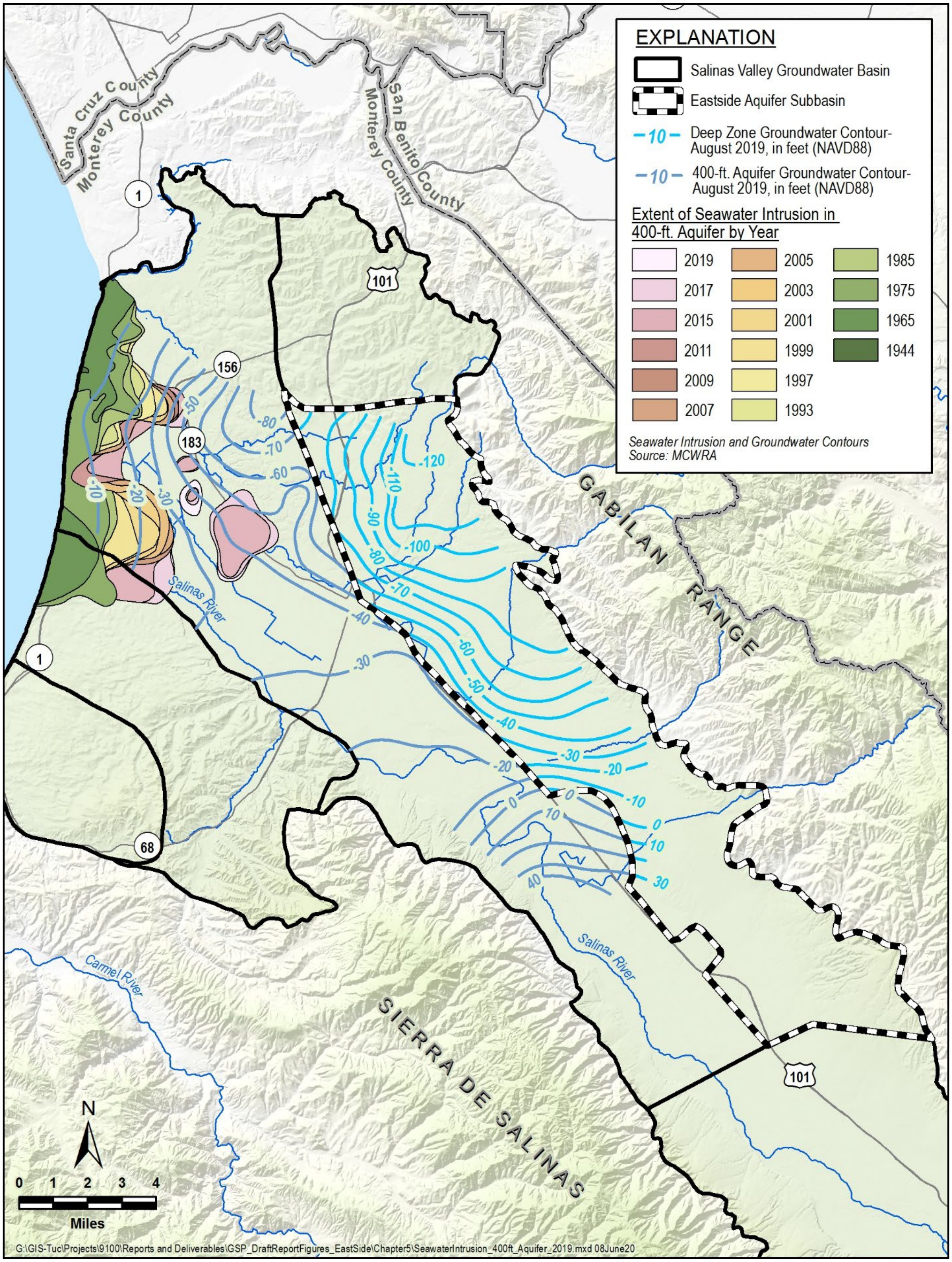

Figure 5-20. Seawater Intrusion in the 400-Foot Aquifer

5.4 Groundwater Quality Distribution and Trends

The SVBGSA does not have sole regulatory authority over groundwater quality and is not charged with improving groundwater quality in the Salinas Valley Groundwater Basin. Projects and actions implemented by the SVBGSA are not required to improve groundwater quality; however, they must not further degrade it.

5.4.1 Data Sources

Groundwater quality samples have been collected and analyzed in the Subbasin for various studies and programs. Groundwater quality samples have also been collected on a regular basis for compliance with regulatory programs. Groundwater quality data for this GSP were collected from:

- The Northern Counties Groundwater Characterization report (CCGC, 2015)
- The USGS' Groundwater Ambient Monitoring and Assessment Program (GAMA) reports (Kulongoski and Belitz, 2005; Burton and Wright, 2018)
- State Water Resources Control Board's GeoTracker Data Management System (SWRCB, 2020a)
- State Water Resources Control Board's GAMA Groundwater Information System (SWRCB, 2020b)
- The California Department of Toxic Substances Control's EnviroStor data management system (DTSC, 2020)

5.4.2 Point Sources of Groundwater Contaminants

Clean-up and monitoring of point source pollutants may be under the responsibility of either the Central Coast Regional Water Quality Control Board (CCRWQCB) or the Department of Toxic Substances Control (DTSC). The locations of these clean-up sites are visible in SWRCB's GeoTracker database map, publicly available at: https://geotracker.waterboards.ca.gov/. The GeoTracker database is linked to the DTSC's EnviroStor data management system that is used to track clean-up, permitting, and investigation efforts.

Table 5-2 and Figure 5-21 provide a summary of the active clean-up sites within the Subbasin. Table 5-2 does not include sites that have leaking underground storage tanks, which are not overseen by DTSC or the CCRWQCB.

Table 5-2. Active Cleanup Sites

Label	Site Name	Site Type	Status	Constituents of Concern (COC)	Address	City
1	Salinas Community School	School	Active	metals, organochlorine pesticides, polychlorinated biphenyls (PCBs)	615 Leslie Drive	Salinas
2	Berman Steel-Salinas	State Response or National Priorities List	Certified / Operation & Maintenance	copper and compounds, lead, PCBs, zinc	Highway 101 At Spence Road	Salinas

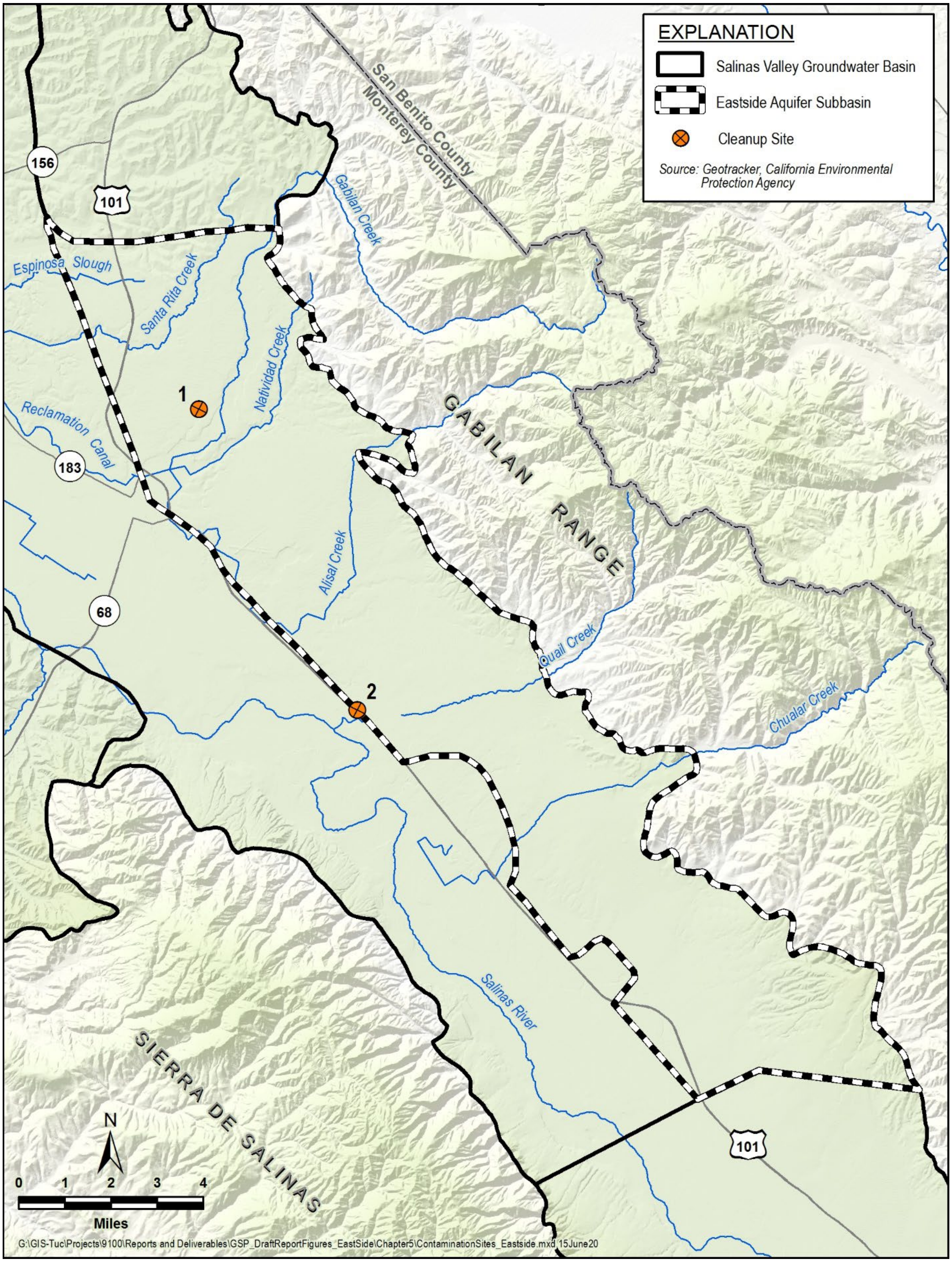

Figure 5-21. Active Cleanup Sites

5.4.3 Distribution and Concentrations of Diffuse or Natural Groundwater Constituents

In addition to the point sources described above, the CCRWQCB monitors and regulates activities and discharges that can contribute to non-point pollutants that are released to groundwater over large areas. In the Subbasin, the most prevalent non-point water quality concern is nitrate. The current distribution of nitrate was extensively monitored and evaluated by the CCGC and documented in a report submitted to the CCRWQCB (CCGC, 2015).

Figure 5-22 shows a map of nitrate distribution in the Subbasin prepared by CCGC. The orange and red areas illustrate the portions of the Subbasin where groundwater has nitrate concentrations above the drinking water MCL of 45 mg/L NO_3.

Figure 5-23 shows maps of measured nitrate concentration from 6 decades of monitoring for the entire Salinas Valley Groundwater Basin. These maps, prepared by MCWRA, indicate that elevated nitrate concentrations in groundwater were locally present in the 1960s, but significantly increased in 1970s and 1980s. Extensive distribution of nitrate concentrations above the drinking water MCL, as shown on Figure 5-22, has been present in the Eastside Subbasin for 20 to 30 years.

A May 2018 staff report to the CCRWQCB included a summary of nitrate concentrations throughout the Central Coast Region, including the Salinas Valley Groundwater Basin. The staff report includes data from 2008 to 2018, collected at 2,235 wells in the Salinas Valley Groundwater Basin, during Agricultural Orders 2.0 and 3.0 sampling events. The report states that 58% of on-farm domestic wells in the Eastside Subbasin exceeded the drinking water MCL, with a mean concentration of 139.4 mg/L NO_3. In addition, 61% of irrigation supply wells in the Subbasin exceeded this MCL with a mean concentration of 96.6 mg/L NO_3 (CCRWQCB, 2018).

Some COC can be concentrated at various aquifer depths. Nitrate is a surficial constituent derived from such sources as fertilizer, livestock, and septic systems. Because the sources are all near the surface, nitrate is usually highest near ground surface and decreases with depth. Raising groundwater levels may mobilize additional nitrate. By contrast, arsenic concentrations usually increase with depth, and lowering groundwater levels may mobilize additional arsenic. The distribution and concentrations of COC can be further complicated by location and rate of groundwater pumping. The extent to which pumping affects groundwater quality depends on aquifer properties, distance to contamination, constituent characteristics and transport rate, and the time at which contaminants entered the subsurface. The extent to which these general relationships are experienced within the Subbasin is unknown. No strong statistical correlation between groundwater elevations and the concentrations of COC has been established in the Subbasin. However, additional data is necessary to form more concrete conclusions.

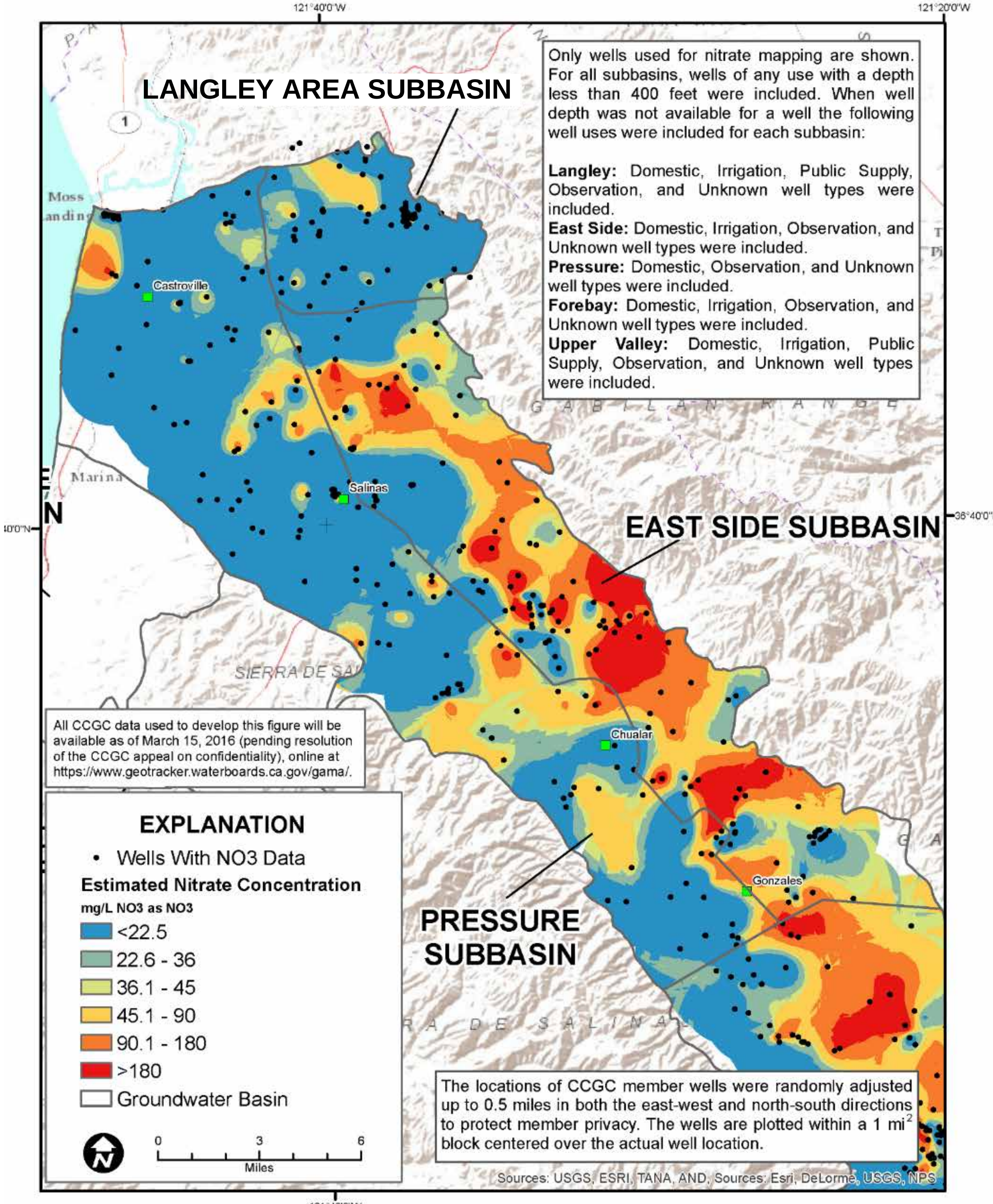

Figure 5-22. Estimated Nitrate Concentrations
(from CCGC, 2015)

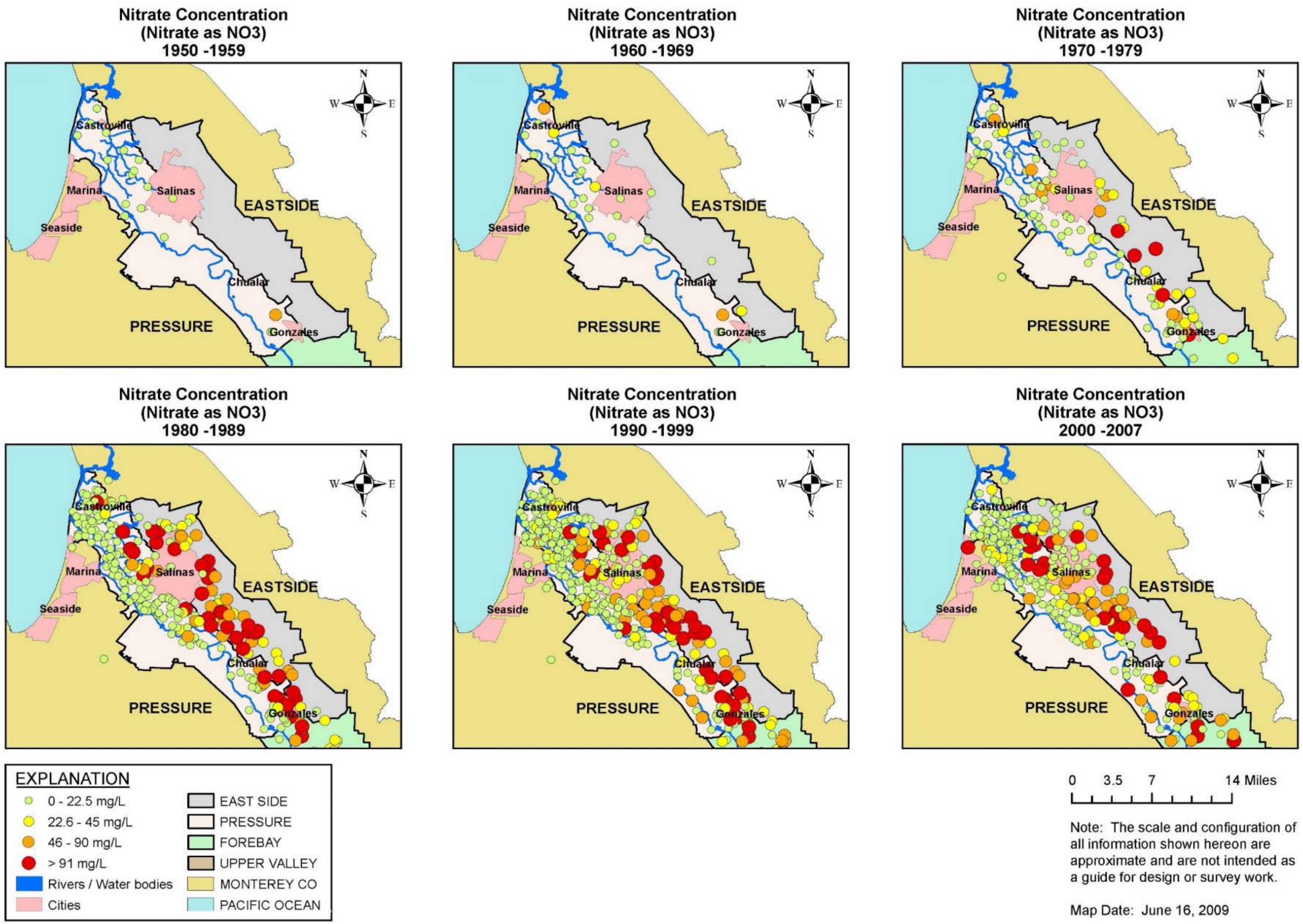

Figure 5-23. Nitrate Concentrations, 1950 to 2007
(modified from MCWRA data)

Additional groundwater quality conditions in the Basin are summarized in 2 USGS water quality studies in the Salinas Valley. The USGS 2005 GAMA study characterized deeper groundwater resources used for public water supply (Kulongoski and Belitz, 2005). The USGS 2018 GAMA study focused on domestic well water quality (Burton and Wright, 2018). The source data used in these 2 studies and additional publicly available water quality data can be accessed through the SWRCB GAMA groundwater information system at: https://gamagroundwater.waterboards.ca.gov/gama/datadownload.

The GAMA groundwater information system includes groundwater quality data for public water system supply wells from the SWRCB Division of Drinking Water (DDW), and on-farm domestic wells and irrigation supply wells from CCRWQCB's Irrigated Lands Regulatory Program (ILRP). This GSP relies on established thresholds for constituents of concern (COC): Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs) established by the State's Title 22 drinking water standards for public water system supply wells and on-farm domestic wells, and COC levels that may lead to reduced crop production for irrigation supply wells, as outlined in the CCRWQCB's Basin Plan (CCRWQCB, 2019).

Table 5-3 reports the COC in the Eastside Subbasin based on GAMA groundwater information system data up to 2019. The number of wells that exceed the regulatory standard for any given COC is based on the latest sample for each well in the monitoring network. Not all wells have been sampled for all COC. Therefore, the percentage of wells with exceedances is the number of wells that exceed the regulatory standard divided by the total number of wells that have ever been sampled for that COC. Additionally, Table 5-3 does not report all of the constituents that are monitored under Title 22 or the Basin Plan; it only includes the constituents that exceed a regulatory standard. The total list of constituents sampled in the water quality monitoring network are listed in Table 8-4. Maps with the locations of wells that exceeded the regulatory standard for any of the COC listed in Table 5-3 from 2013 to 2019 are provided in Appendix 5B.

Table 5-3. Water Quality Constituents of Concern and Exceedances

Constituent of Concern	Regulatory Exceedance Standard	Standard Units	Number of Wells Sampled for COC	Number of Wells Exceeding Regulatory Standard from latest sample	Percentage of Wells with Exceedances
DDW Wells (Data from December 1982 to December 2019)					
Arsenic	10	UG/L	75	4	5%
Lindane	0.2	UG/L	42	1	2%
Di(2-ethylhexyl) phthalate	4	UG/L	63	1	2%
Benzo(a)Pyrene	0.2	MG/L	62	1	2%
1,2 Dibromo-3-chloropropane	0.2	UG/L	53	3	6%
Dinoseb	7	UG/L	71	3	4%
Iron	300	UG/L	68	5	7%
Hexachlorobenzene	1	UG/L	41	1	2%
Manganese	50	UG/L	70	2	3%
Nitrate (as nitrogen)	10	MG/L	89	8	9%
Specific Conductance	1600	UMHOS/CM	76	1	1%
1,2,3-Trichloropropane	0.005	UG/L	78	10	13%
Total Dissolved Solids	1000	MG/L	70	3	4%
Vinyl Chloride	0.5	UG/L	91	8	9%
ILRP On-Farm Domestic Wells (Data from March 2013 to December 2019)					
Chloride	500	MG/L	109	3	3%
Iron	300	UG/L	18	4	22%
Manganese	50	UG/L	18	1	6%
Nitrate (as nitrogen)	10	MG/L	119	91	76%
Nitrate + Nitrite (sum as nitrogen)	10	MG/L	28	17	61%
Specific Conductance	1600	UMHOS/CM	114	27	24%
Sulfate	500	MG/L	109	2	2%
Total Dissolved Solids	1000	MG/L	96	22	23%
ILRP Irrigation Supply Wells (Data from May 2013 to December 2019)					
Chloride	350	MG/L	206	4	2%
Iron	5	MG/L	68	1	1%
Manganese	0.2	MG/L	68	2	3%

5.4.4 Groundwater Quality Summary

Based on the water quality information for the DDW and ILRP wells from GAMA groundwater information system, the following are the COC for drinking water supply wells in the Subbasin and will be included in the GSP monitoring program:

- 1,2 dibromo-3-chloropropane
- 1,2,3-trichloropropane
- arsenic
- benzo(a)pyrene
- chloride
- di(2-ethylhexyl) phthalate
- dinoseb
- hexachlorobenzene
- iron
- lindane
- manganese
- nitrate (as nitrogen)
- nitrate + nitrite (sum as nitrogen)
- specific conductance
- sulfate
- total dissolved solids
- vinyl chloride

The COC for agricultural supply wells that occur in the Subbasin and are known to cause reductions in crop production when irrigation water includes them in concentrations above agricultural water quality objectives include:

- chloride
- iron
- manganese

The COC for active cleanup sites listed in Table 5-2 are not part of the monitoring network described in Chapter 7. However, the status of these constituents at these sites will continue to be monitored by the DTSC or the CCRWQCB. Furthermore, the COC at these sites that have a regulatory standard under Title 22 for drinking water wells, or the Basin Plan for irrigation supply wells will be monitored in the DDW and ILRP wells that are part of the monitoring network.

This GSP relies on data from existing monitoring programs to measure changes in groundwater quality. Therefore, the GSA is dependent on the monitoring density and frequency of the DDW and ILRP. The monitoring system is further defined in Chapter 7.

5.5 Subsidence

Land subsidence is the lowering of the ground surface elevation. This is often caused by pumping below thick clay layers. Land subsidence can be elastic or inelastic. Elastic subsidence consists of small, lowering and rising of the ground surface is reversible, while inelastic subsidence is generally irreversible and is the focus of this GSP.

5.5.1 Data Sources

To estimate subsidence, DWR has made Interferometric Synthetic Aperture Radar (InSAR) satellite data available on their SGMA Data Viewer web map: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#landsub. These are the only data used for estimating subsidence in this GSP.

5.5.2 Subsidence Mapping

Figure 5-24 presents a map showing the average annual InSAR subsidence data in the Eastside Subbasin between June 2015 and June 2019 (DWR, 2020c). The yellow area on the map is the area with measured average annual changes in ground elevation of between -0.1 and 0.1 foot. As discussed in Section 8.9.2.1, because of measurement error in this methodology, any measured ground level changes between -0.1 and 0.1 foot are not considered subsidence. The white areas on the map are areas with no available data. The map shows that no measurable subsidence has been recorded anywhere in the Subbasin.

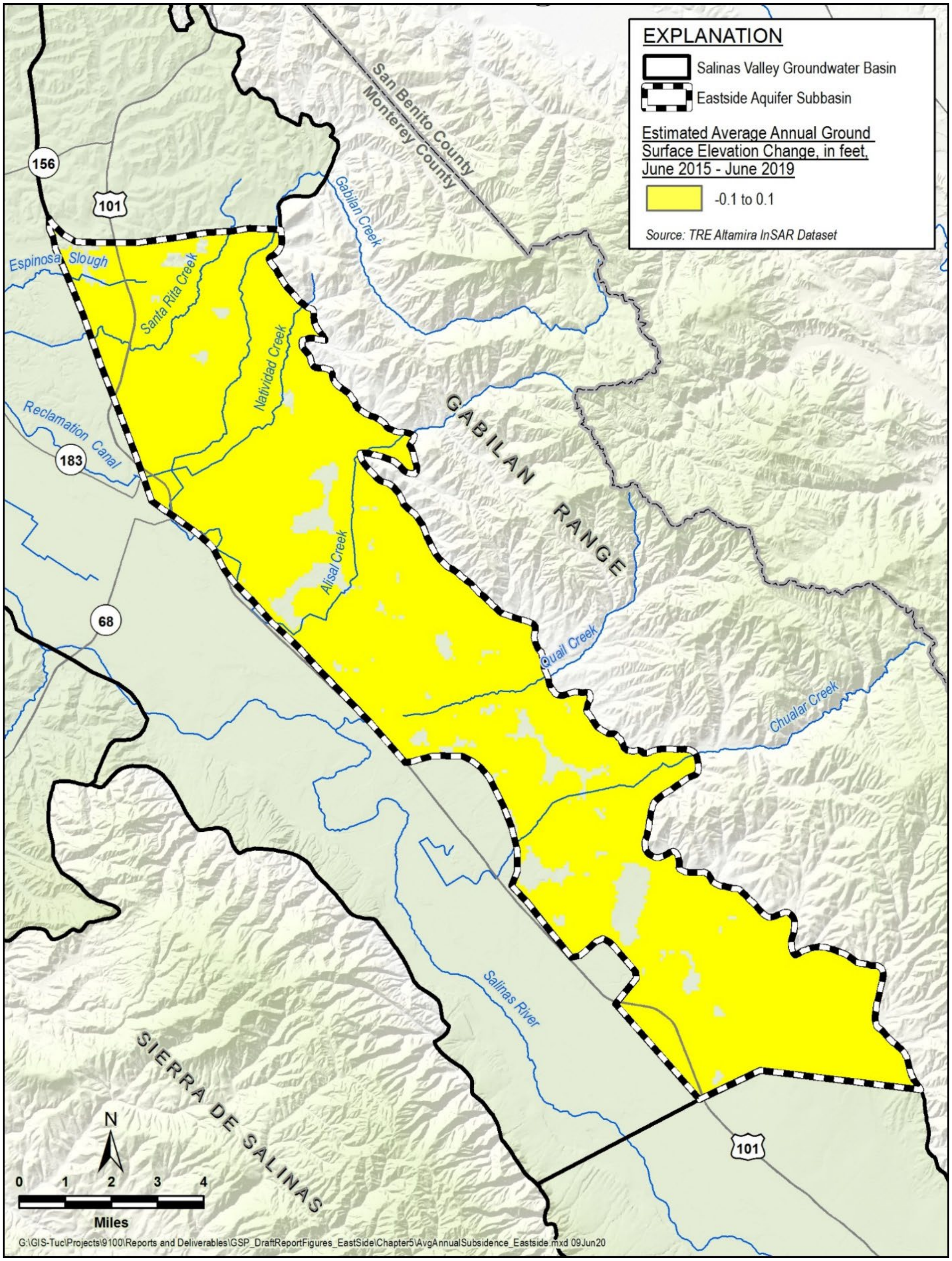

Figure 5-24. Estimated Average Annual InSAR Subsidence in Subbasin

5.6 Interconnected Surface Water

ISW is surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completed. If groundwater elevations are higher than the water level in the stream, the stream is said to be a gaining stream because it gains water from the surrounding groundwater. If the groundwater elevation is lower than the water level in the stream, it is termed a losing stream because it loses water to the surrounding groundwater. If the groundwater elevation is below the streambed elevation, the stream and groundwater are disconnected. SGMA does not require that disconnected stream reaches be analyzed or managed. These concepts are illustrated on Figure 5-25.

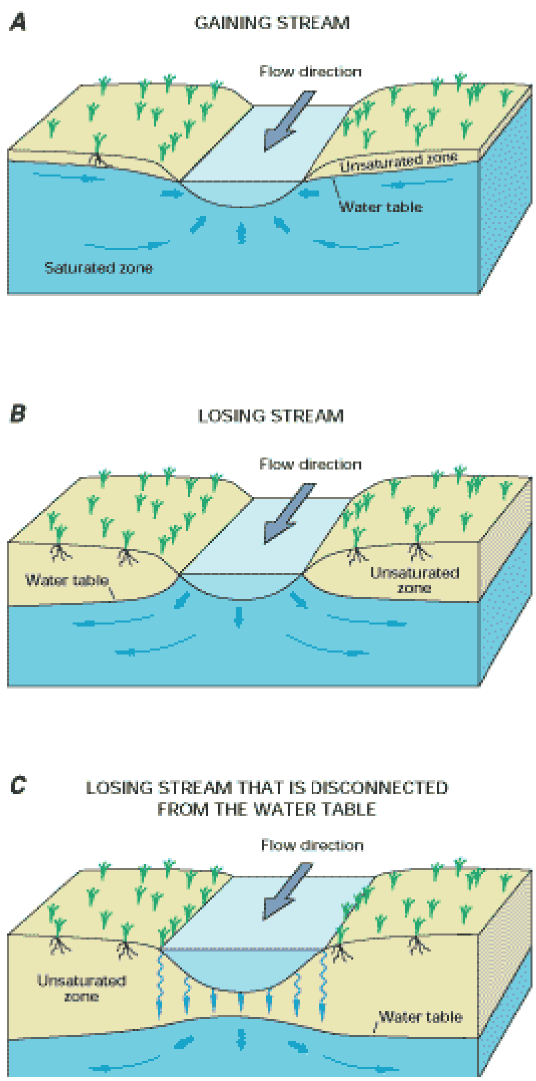

Figure 5-25. Conceptual Representation of Interconnected Surface Water (Winter, *et al.*, 1999)

5.6.1 Data Sources

The preliminary SVIHM is used to map the potential locations of ISW, as described in Chapter 4. As shown in Figure 4-9, there are currently no locations of ISW in the Eastside Subbasin; however, this GSP describes the process that would be used to evaluate surface water and groundwater interconnection should it exist in the future. There is no data that verifies the location and extent of surface water connection to groundwater, nor the extent to which groundwater extraction depletes surface water. Therefore, this section describes the hydraulic principles that establish the relationship between surface water and groundwater, upon which the current conditions and monitoring network are based.

5.6.2 Evaluation of Surface Water and Groundwater Interconnection

Groundwater extraction can alter flows between surface water and groundwater. Flow changes related to interconnected surface and groundwater could be due to reductions in groundwater discharge to surface water or increases in surface water recharge to groundwater. These 2 changes together constitute the change in the amount of surface water depletion.

Depletion of ISW is estimated by evaluating the change in the modeled stream leakage with and without pumping (i.e., water flowing from the stream into the groundwater system). A model simulation without any groundwater pumping in the model (i.e., SVIHM with no pumping) was compared to the model simulation with groundwater pumping (i.e., SVIHM with pumping). The difference in stream depletion between the 2 models is the depletion caused by the groundwater pumping. This comparison was undertaken for the entire area of the Salinas Valley included in the model and also for the Subbasin. The methodology for quantifying stream depletion is described in detail by Barlow and Leake (2012). There are no interconnected segments in the Subbasin, as shown in Figure 4-9, but if there is interconnection in the future the stream depletion differences would be estimated for the interconnected segments only.

6 WATER BUDGETS

This chapter summarizes the estimated water budgets for the Eastside Subbasin, including information required by the GSP Regulations and information that is important for developing an effective plan to achieve sustainability. In accordance with the GSP Regulations § 354.18, this water budget provides an accounting and assessment of the total annual volume of surface water and groundwater entering and leaving the basin, including historical, current, and projected water budget conditions, and the change in the volume of groundwater in storage. Water budgets are reported in graphical and tabular formats, where applicable.

6.1 Overview of Water Budget Development

The water budgets are presented in 2 subsections: (1) historical and current water budgets, and (2) future water budgets. Within each subsection a surface water budget and groundwater budget are presented.

Historical and current water budgets are developed using a provisional version of the Salinas Valley Integrated Hydrologic Model (SVIHM)[2], developed by the United States Geological Survey (USGS). The SVIHM is a numerical groundwater-surface water model that is constructed using version 2 of the MODFLOW-OWHM code (Boyce *et al.*, 2020). This code is a version of the USGS groundwater flow code MODFLOW that estimates the agricultural supply and demand, through the Farm Process.

The model area covers the Salinas Valley Groundwater Basin from the Monterey-San Luis Obispo County Line in the south to the Pajaro Basin in the north, including the offshore extent of the major aquifers. The model includes operations of the San Antonio and Nacimiento reservoirs.

The SVIHM is supported by 2 sub models: a geologic model known as the Salinas Valley Geologic Model (SVGM) and a watershed model known as the Salinas Valley Watershed Model (SVWM) which uses the Hydrologic Simulation Program – Fortran (HSPF) code. The SVIHM is not yet released by the USGS. Details regarding source data, model construction and calibration, and results for historical and current water budgets will be summarized in more detail once the model and associated documentation are available. Appendix 6A includes an overview of the development and progress of the SVIHM.

[2] These data (model and/or model results) are preliminary or provisional and are subject to revision. This model and model results are being provided to meet the need for timely best science. The model has not received final approval by the U.S. Geological Survey (USGS). No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the model and related material nor shall the fact of release constitute any such warranty. The model is provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the model.

Future water budgets are being developed using an evaluation version of the Salinas Valley Operational Model (SVOM), developed by the USGS and Monterey County Water Resources Agency (MCWRA). The SVOM is a numerical groundwater-surface water model constructed with the same framework and processes as the SVIHM. However, the SVOM is designed for simulating future scenarios and includes complex surface water operations in the Surface Water Operations (SWO) module. The SVOM is not yet released by the USGS. Appendix 6A includes an overview of the SVOM, its development, and inputs.

In accordance with GSP Regulations § 354.18, an integrated groundwater budget is developed for each principal aquifer for each water budget period. The Eastside Subbasin is pumped from only 1 principal aquifer.

6.1.1 Water Budget Components

The water budget is an inventory of the Subbasin's surface water and groundwater inflows and outflows. Some components of the water budget can be measured, such as groundwater pumping from metered wells, precipitation, and surface water diversions. Other components are not easily measured and can be estimated using groundwater models, such as the SVIHM; these include unmetered agricultural pumping, recharge from precipitation and applied irrigation, and change of groundwater in storage. Figure 6-1 presents a general schematic diagram of the hydrogeologic conceptual model that is included in the water budget (DWR, 2020d). Figure 6-2 delineates the zones and boundary conditions of the SVIHM.

The water budgets for the Subbasin are calculated within the following boundaries:

- Lateral boundaries. The perimeter of the Eastside Subbasin within the SVIHM is shown on Figure 6-2.
- Bottom. The base of the groundwater subbasin is described in the Hydrogeologic Conceptual Model and is defined as the base of the usable and productive unconsolidated sediments (Durbin et al. 1978). This ranges from less than 200 feet below ground surface along the Gabilan Range to almost 1,600 feet deep along the Subbasin's western edge. The water budget is not sensitive to the exact definition of this base elevation because the base is defined as a depth below where there is not significant inflow, outflow, or change in storage.
- **Top.** The top of the water budget area is above the ground surface, so that surface water is included in the water budget.

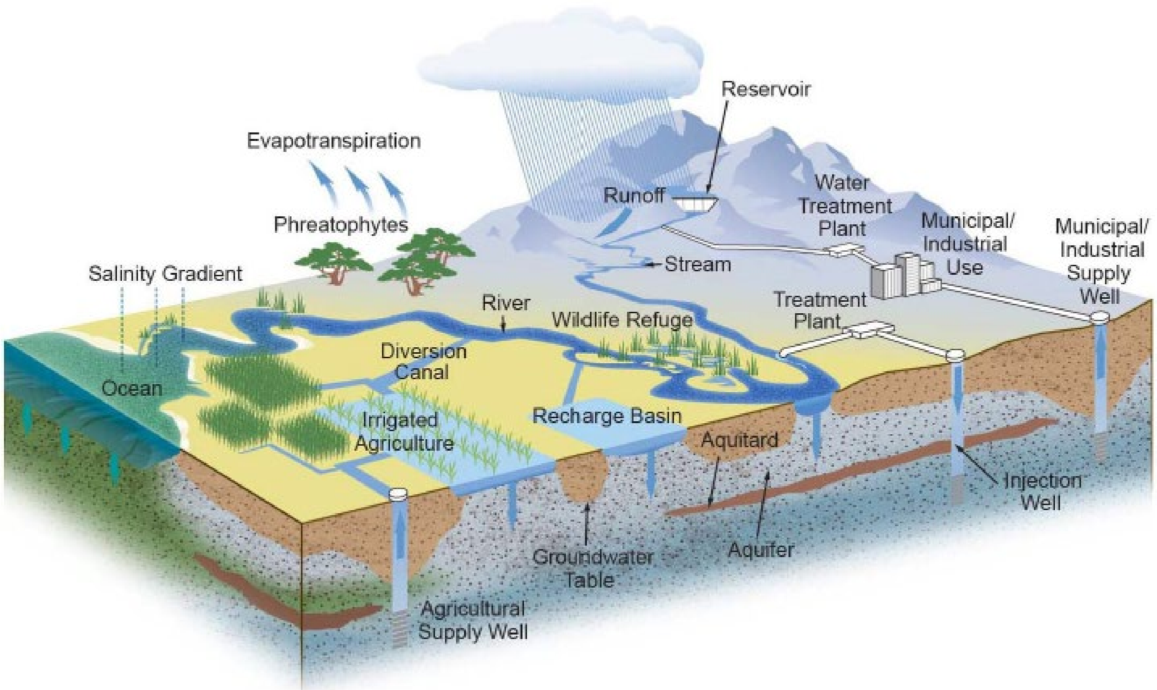

Figure 6-1. Schematic Hydrogeologic Conceptual Model (from DWR, 2020d)

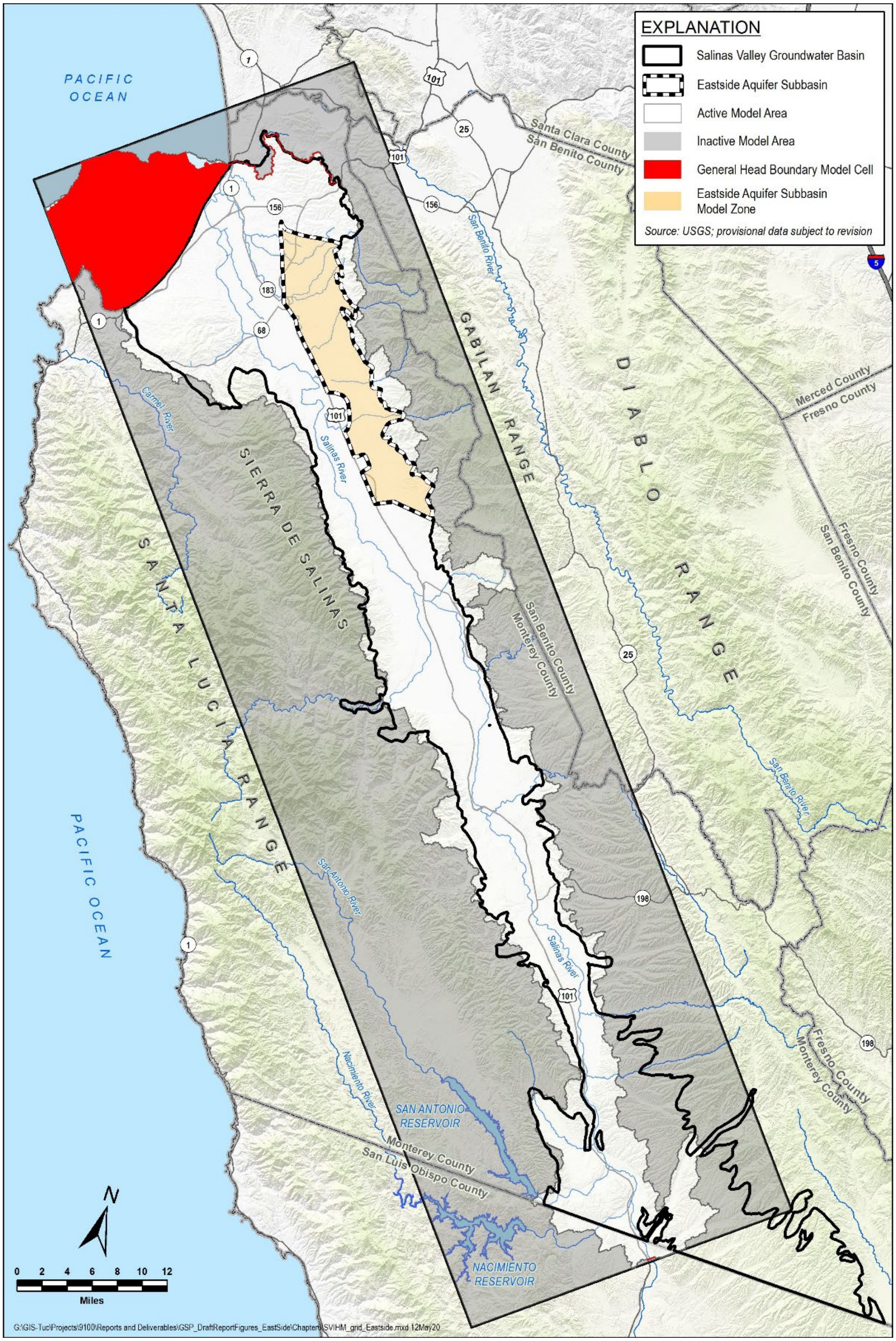

Figure 6-2. Zones and Boundary Conditions for the Salinas Valley Integrated Hydrologic Model

The Eastside Subbasin water budget includes the following components:

Surface Water Budget:

- Inflows
  - Runoff of precipitation
  - Surface water inflows from streams that enter the subbasin, including Chualar Creek, Quail Creek, Alisal Creek, Natividad Creek, Gabilan Creek, Santa Rita Creek, and several other smaller creeks
  - Groundwater discharge to streams
- Outflows
  - Stream discharge to groundwater
  - Outflow to neighboring subbasins along Gabilan Creek, Santa Rita Creek, and other smaller streams

Groundwater Budget:

- Inflows
  - Deep percolation from precipitation and applied irrigation
  - Stream discharge to groundwater
  - Subsurface inflows, including:
    - Inflow from the Forebay Subbasin
    - Inflow from the Langley Subbasin
    - Inflow from the 180/400-Foot Aquifer Subbasin
    - Inflow from the surrounding watershed that are not in other DWR subbasins
- Outflows
  - Crop and riparian evapotranspiration (ET)
  - Groundwater pumping, including urban, industrial, and agricultural
  - Groundwater discharge to streams
  - Groundwater discharge to drains
  - Subsurface outflows, including:
    - Outflow to the Forebay Subbasin

- Outflow to the Langley Subbasin
- Outflow to the 180/400-Foot Aquifer Subbasin
- Outflows to the surrounding watershed that are not in other DWR subbasins

The difference between groundwater inflows and outflows is equal to the change of groundwater in storage.

6.1.2 Water Budget Time Frames

Time periods must be specified for each of the 3 required water budgets. The GSP Regulations require water budgets for historical conditions, current conditions, and projected conditions, as follows:

- The historical water budget is intended to evaluate how past land use and water supply availability has affected aquifer conditions and the ability of groundwater users to operate within the sustainable yield. GSP Regulations require that the historical water budget include at least the most recent 10 years of water budget information. DWR's Water Budget Best Management Practices (BMP) document further states that the historical water budget should help develop an understanding of how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability to operate the basin within the sustainable yield. Accordingly, historical conditions should include the most reliable historical data that are available for GSP development and water budgets calculations.
- The current water budget is intended to allow the GSA and DWR to understand the existing supply, demand, and change in storage under the most recent population, land use, and hydrologic conditions. Current conditions are generally the most recent conditions for which adequate data are available and that represent recent climatic and hydrologic conditions. Current conditions are not well defined by DWR but can include an average over a few recent years with various climatic and hydrologic conditions.
- The projected water budget is intended to quantify the estimated future baseline conditions. The projected water budget estimates the future baseline conditions concerning hydrology, water demand, and surface water supply over a 50-year planning and implementation horizon. It is based on historical trends in hydrologic conditions which are used to project forward 50 years while considering projected climate change and sea level rise if applicable.

Although there is a significant variation between wet and dry seasons, the GSP does not consider separate seasonal water budgets for the groundwater budget. All water budgets are developed for complete water years. Selected time periods for the historical and current water budgets are summarized in Table 6-1 and on Figure 6-3. and described in Sections 6.1.2.1 and 6.1.2.2.

Table 6-1. Summary of Historical and Current Water Budget Time Periods

Time Period	Proposed Date Range	Water Year Types Represented in Time Period	Rationale
Historical	Water years 1980 through 2016	Dry: 11 Dry-Normal: 7 Normal: 5 Wet-Normal: 3 Wet: 11	Provides insights on water budget response to a wide range of variations in climate and groundwater use over an extensive period of record. Begins and ends in years with average precipitation.
Current	Water Year 2016	Dry-Normal: 1	Best reflection of current land use and water use conditions based on best available data.

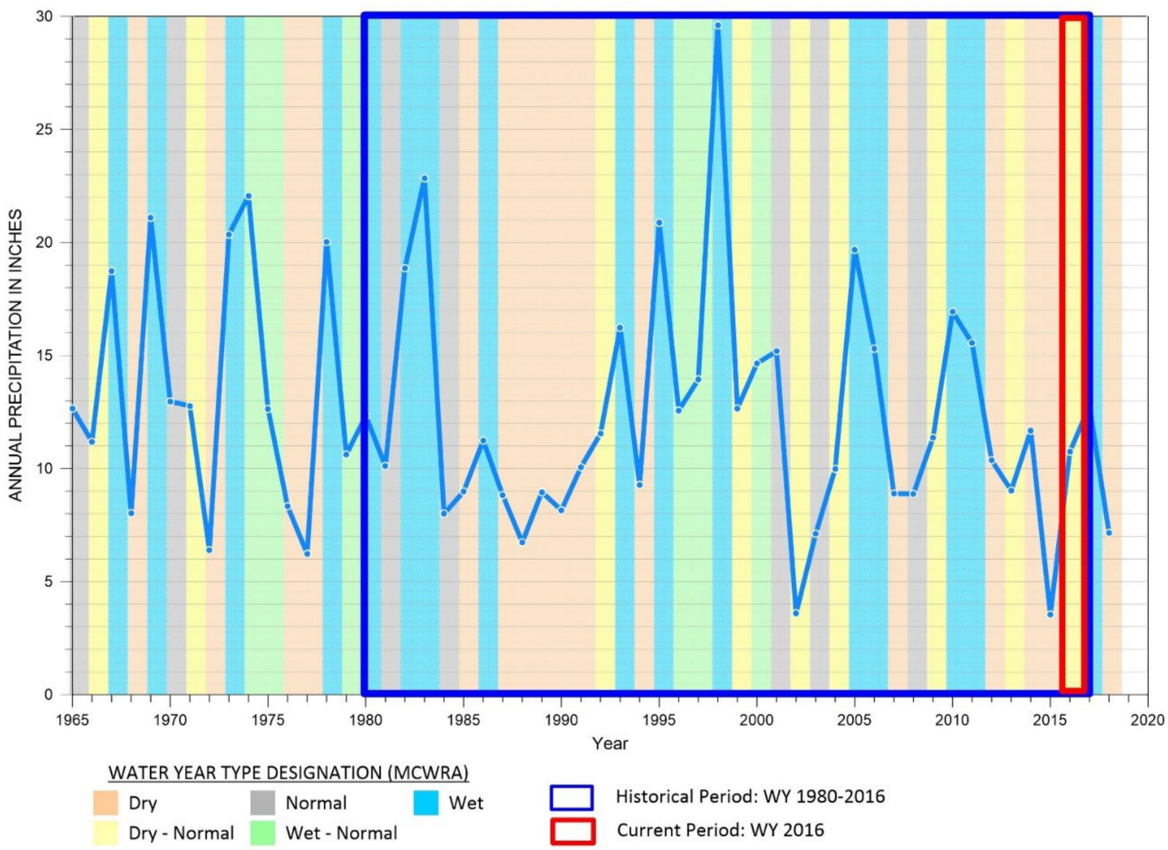

Figure 6-3. Climate and Precipitation for Historical and Current Water Budget Time Periods

6.1.2.1 Historical Water Budgets Time Period

GSP Regulations § 354.18 require that the historical water budget be based on at least 10 years of data. The water budget is computed using results from the SVIHM numerical model for the time period from October 1980 through September 2016. The SVIHM simulation covers water years 1967 through 2017; however, model results for years prior to 1980 and the year 2017 were not used for this water budget due to potential limitations and uncertainties in the provisional SVIHM. Water years 1980 through 2016 comprise a representative time period with both wet and dry periods in the Subbasin (Table 6-1, Figure 6-3).

6.1.2.2 Current Water Budget Time Period

The current water budget time period is also computed using the SVIHM numerical model and is based on water year 2016. Water year 2016 is classified as dry-normal and is reflective of current and recent patterns of groundwater use and surface water use. Although Water Year 2016 appropriately meets the regulatory requirement for using the "…most recent hydrology, water supply, water demand, and land use information" (23 California Code of Regulations § 354.18 (c)(1)), it is noted that water year 2016 was preceded by multiple dry or dry-normal years.

6.1.2.3 Future Projected Water Budgets Time Period

Future projected conditions are based on model simulations using the SVOM numerical flow model, using current reservoir operations rules, projected climate-change scenario, and estimated sea level rise. The projected water budget represents 47 years of future conditions. Following DWR guidance on implementing climate change factors, the future water budget simulations do not simulate a 47-year projected future, but rather simulate 47 likely hydrologic events that may occur in 2030, and 47 likely hydrologic events that may occur in 2070.

6.2 Overview of Data Sources for Water Budget Development

Table 6-2 provides the detailed water budget components and known model assumptions and limitations for each. A few water budget components are directly measured, but most water budget components are either estimated as input to the model or simulated by the model. Both estimated and simulated values in the water budgets are underpinned by certain assumptions. These assumptions can lead to uncertainty in the water budget. However, inputs to the preliminary SVIHM were carefully selected by the USGS and cooperating agencies using best available data, reducing the level of uncertainty.

In addition to the model assumptions, additional uncertainty stems from any model's imperfect representation of natural condition and level of calibration. The water budgets for the Eastside Subbasin are based on a preliminary version of the SVIHM, with limited documentation of model construction. The model is in internal review at the USGS, and a final version will likely not be released to the SVBGSA until after the GSP is submitted. Nonetheless, the SVIHM's calibration error is within reasonable bounds. Therefore, the model is the best available tool for estimating water budgets for the GSP.

As GSP implementation proceeds, the SVIHM will be updated and recalibrated with new data to better inform model simulations of historical, current, and projected water budgets. Model assumptions and uncertainty will be described in future updates to this chapter after model documentation is released by the USGS.

Table 6-2. Summary of Water Budget Component Data Source from the Salinas Valley Integrated Hydrologic Model

Water Budget Component	Source of Model Input Data	Limitations
Precipitation	Incorporated in calibrated model as part of land use process	Estimated for missing years
Surface Water Inflows		
Inflow from Streams Entering Basin	Simulated from calibrated model for all creeks	Not all creeks are gauged
Groundwater Discharge to Streams	Simulated from calibrated model	Based on calibration of streamflow to available data from gauged creeks
Overland Runoff	Simulated from calibrated model	Based on land use, precipitation, and soils specified in model
Surface Water Outflows		
Streambed Recharge to Groundwater	Simulated from calibrated model	Based on calibration of streamflow to available data from gauged creeks and groundwater level data from nearby wells
Diversions	Model documentation not available at this time	Based on calibration of streamflow to available data from gauged creeks
Outflow to Streams Leaving Basin	Simulated from calibrated model for all creeks	Not all creeks are gauged
Groundwater Inflows		
Streambed Recharge to Groundwater	Simulated from calibrated model	Based on calibration of streamflow to available data from gauged creeks and groundwater level data from nearby wells
Deep percolation of irrigation water	Simulated from demands based on crop, acreage, temperature, and soil zone processes	No measurements available; based on assumed parameters for crops and soils
Subsurface Inflow from neighboring basins	Simulated from calibrated model	Limited groundwater calibration data at adjacent subbasin boundaries
Subsurface Inflow from surrounding watershed other than neighboring basins	Simulated from calibrated model	Limited groundwater calibration data at adjacent subbasin boundaries
Groundwater Outflows		
Groundwater Pumping	Reported data for historical municipal and agricultural pumping, and some small water systems. Model documentation not available at this time.	Water budget pumping reported herein is from the SVIHM and might contain errors. Domestic pumping not simulated in model
Groundwater Discharge to Streams	Simulated from calibrated model	Based on calibration of streamflow to available data from gauged creeks and groundwater level data from nearby wells
Subsurface Outflow to Adjacent Basins	Simulated from calibrated model	Limited calibration data at adjacent subbasin boundaries
Riparian ET	Simulated from calibrated model	Based on representative plant group and uniform extinction depth

6.3 Historical and Current Water Budgets

Water budgets for the historical and current periods are presented below. The surface water budgets are presented first, followed by the groundwater budgets. These water budgets are based on the provisional SVIHM and are subject to change in the future. Water budgets will be updated in future GSP updates after the SVIHM is formally released by the USGS.

6.3.1 Historical and Current Surface Water Budget

The surface water budget accounts for the inflows and outflows for the streams within the Subbasin. This includes streamflows of rivers and tributaries entering and exiting the Subbasin, overland runoff to streams, and stream-aquifer interactions. Evapotranspiration by riparian vegetation along stream channels is estimated by the provisional SVIHM as part of the groundwater system and is accounted for in the groundwater budget.

Figure 6-4 shows the surface water network simulated in the provisional SVIHM. The model accounts for surface water flowing in and out across the subbasin boundary. For this water budget, boundary inflows and outflows are the sum of all locations that cross the Subbasin boundary. In some instances, a simulated stream might enter and exit the Subbasin boundary at multiple locations, such as Natividad Creek and Alisal Creek.

Figure 6-5 shows the surface water budget for the historical period, which also includes the current period. Table 6-3 shows the average values for components of the surface water budget for the historical and current periods. Positive values are inflows into the stream system, and negative values are outflows from the stream system. The 4 components of the surface water budget shown in Table 6-3 are roughly similar in magnitude. The flow between surface water and groundwater in the Subbasin is generally net negative, which indicates more deep percolation of streamflow to groundwater than groundwater discharge to streams.

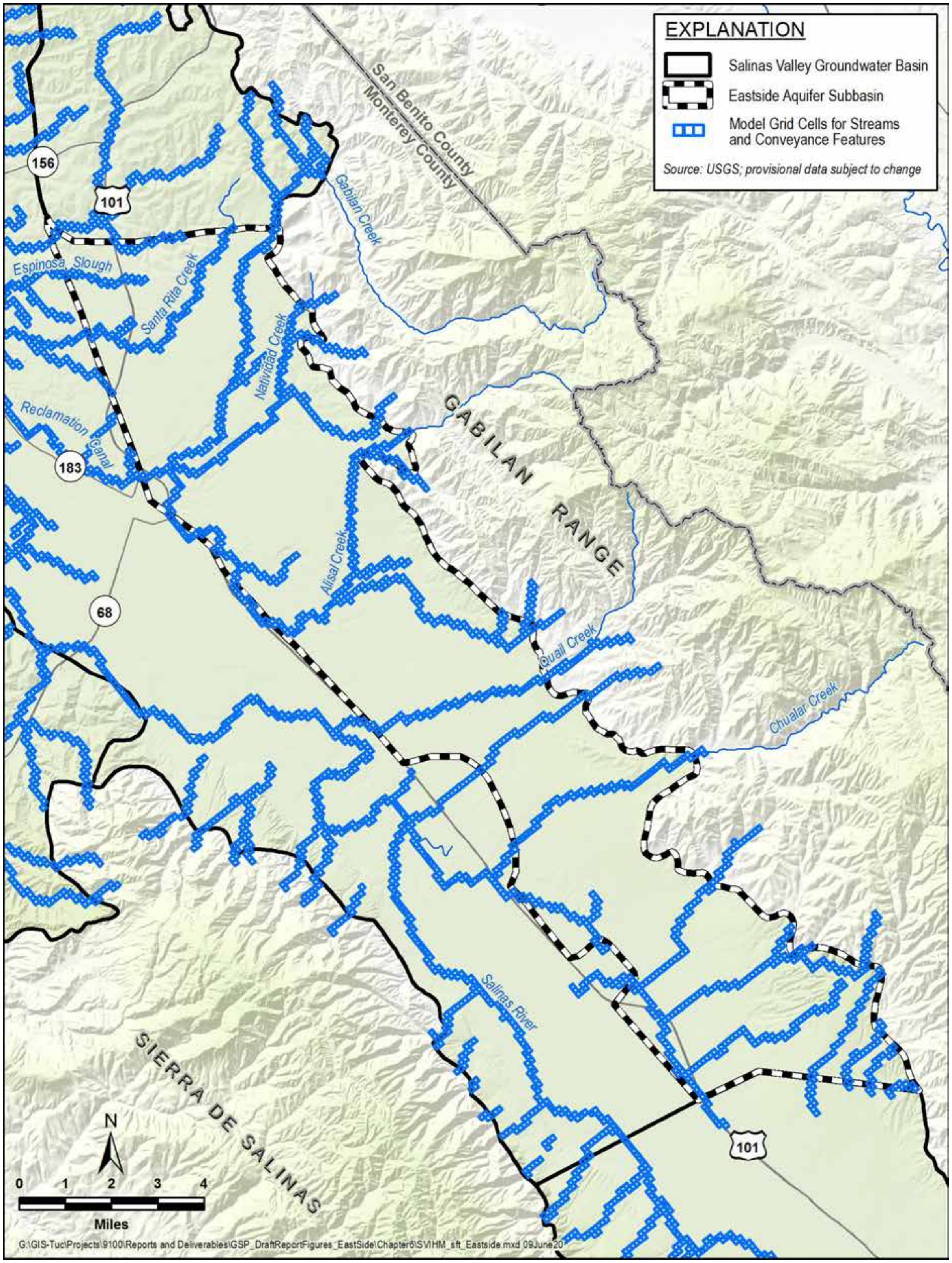

Figure 6-4. Surface Water Network in the Eastside Aquifer Subbasin from the Salinas Valley Integrated Hydrologic Model

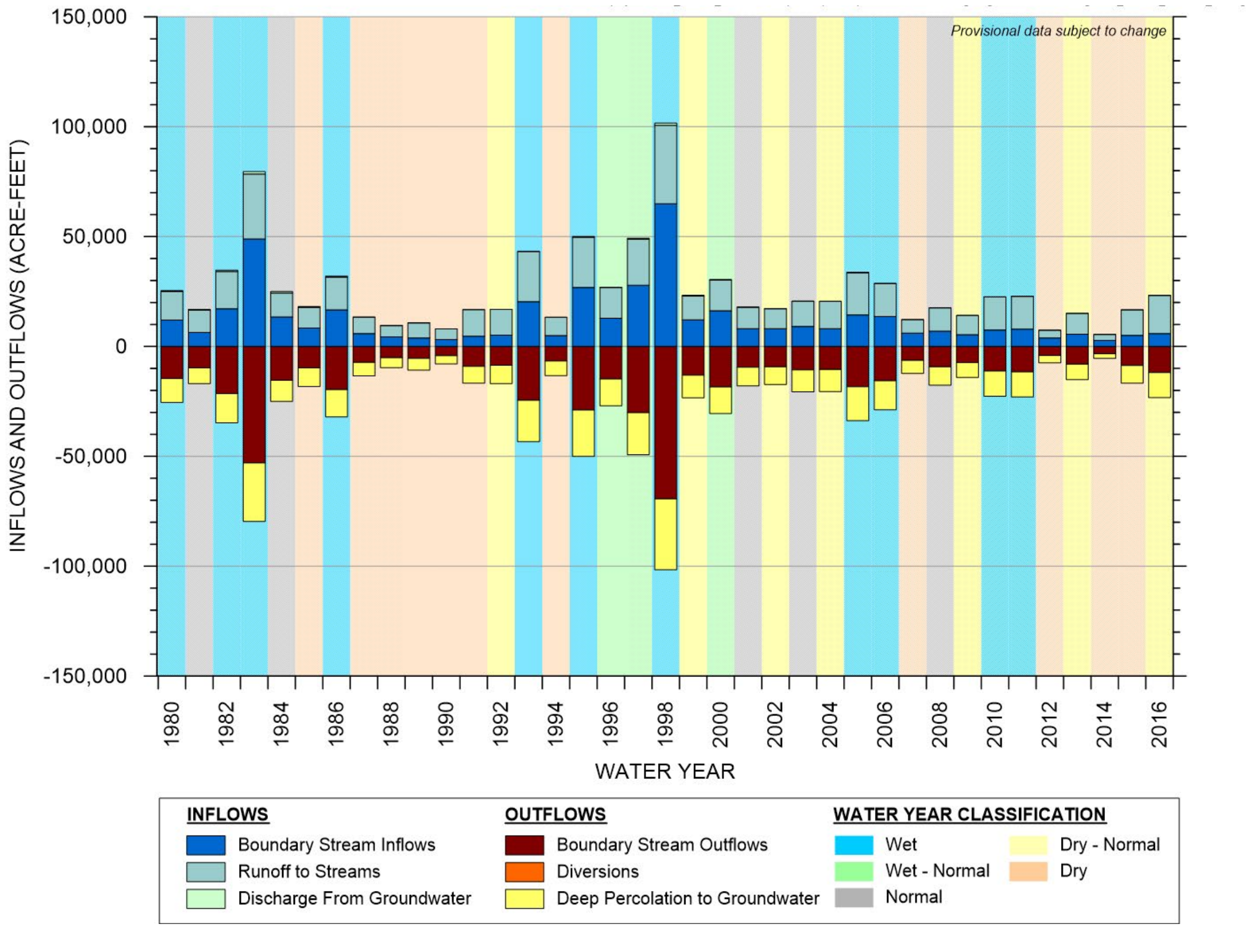

Figure 6-5. Historical and Current Surface Water Budget

Table 6-3. SVIHM Simulated Surface Water Budget Summary (AF/yr.)

	Historical Average (WY 1980-2016)	Current (WY 2016)
Overland Runoff to Streams	12,900	17,400
Boundary Stream Inflows	12,300	5,900
Net Flow between Surface Water and Groundwater	-10,500	-11,400
Boundary Stream Outflows	-14,700	-11,900

Note: provisional data subject to change.

6.3.2 Historical and Current Groundwater Budget

The groundwater budget accounts for the inflows and outflows to and from the Subbasin's aquifers, based on results from the SVIHM. This includes subsurface inflows and outflows of groundwater at the Subbasin boundaries, recharge, pumping, evapotranspiration, and net flow between surface water and groundwater.

Figure 6-6 shows SVIHM estimated annual groundwater inflows for the historical and current time periods. Inflows vary substantially from year to year. Table 6-4 provides average groundwater inflows for the historical and current period. The biggest inflow component is deep percolation of precipitation and applied irrigation, which ranged from about 8,000 AF in 2014 to more than 80,000 AF in 1998, with a historical average of about 33,000 AF/yr. The estimated historical average deep percolation of streamflow is about 11,000 AF/yr. The most consistent groundwater flows into the Subbasin are from the subsurface, which are almost always between 15,000 and 20,000 AF/yr. Total recharge for the current period is greater than average total recharge over the historical period.

Figure 6-7 shows the SVIHM estimated groundwater outflows for the historical and current time periods. Outflows vary from year to year; however, the annual variation is dampened compared to the inflows. Table 6-5 provides the SVIHM estimated average groundwater outflows of the historical and current periods. In both periods, pumping accounted for almost 90% of groundwater outflow in the Subbasin. Total average annual groundwater outflow was about 84,000 AF for the historical period and 75,000 AF for the current period. All outflows are shown as negative values.

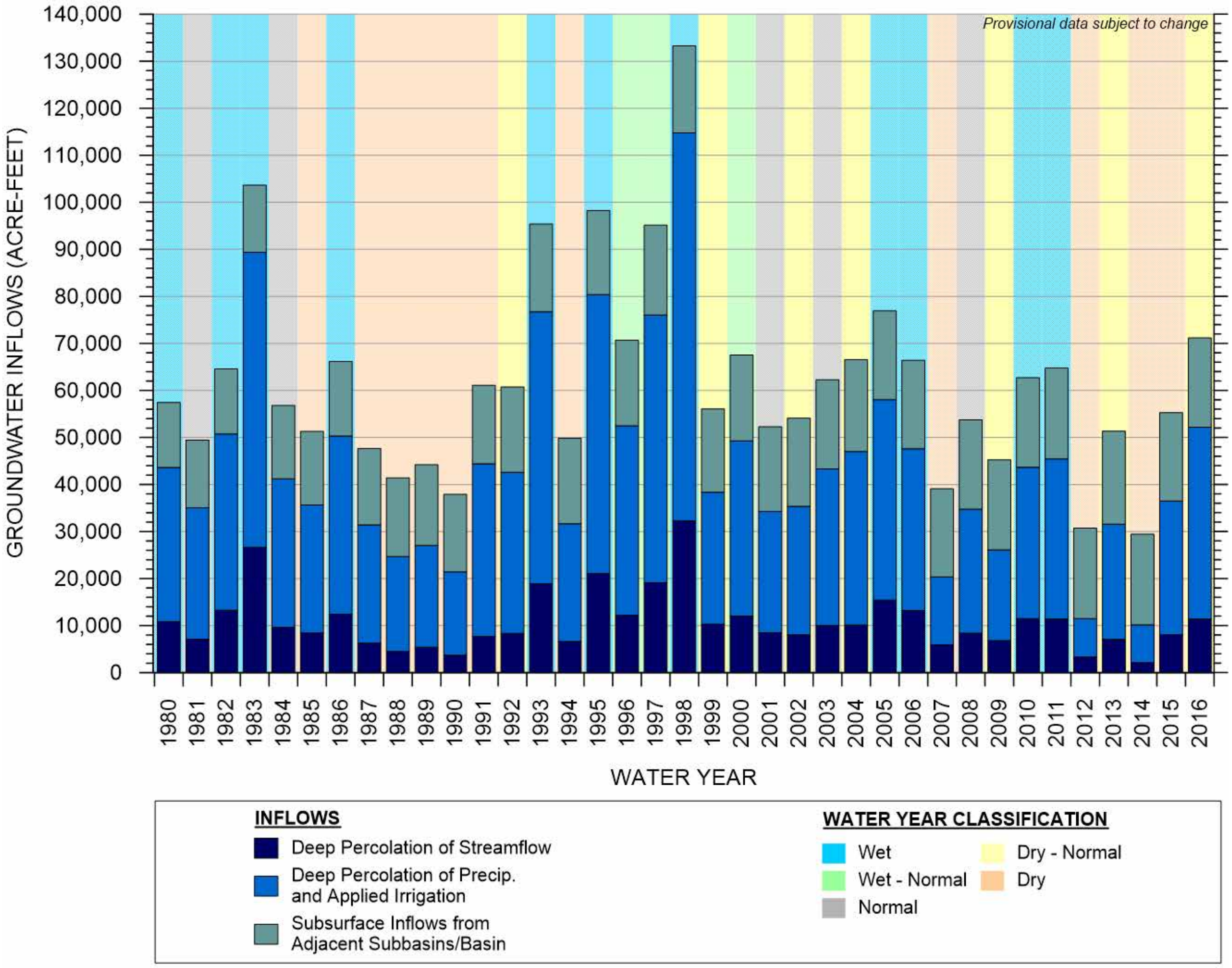

Figure 6-6. SVIHM Simulated Inflows to the Groundwater System

Table 6-4. SVIHM Simulated Groundwater Inflows Summary (AF/yr.)

	Historical Average (WY 1980-2016)	Current (WY 2016)
Deep Percolation of Streamflow	10,800	11,400
Deep Percolation of Precipitation and Applied Irrigation	33,400	40,800
Subsurface Inflow from Adjacent Subbasins/Basin	17,700	19,000

Note: provisional data subject to change.

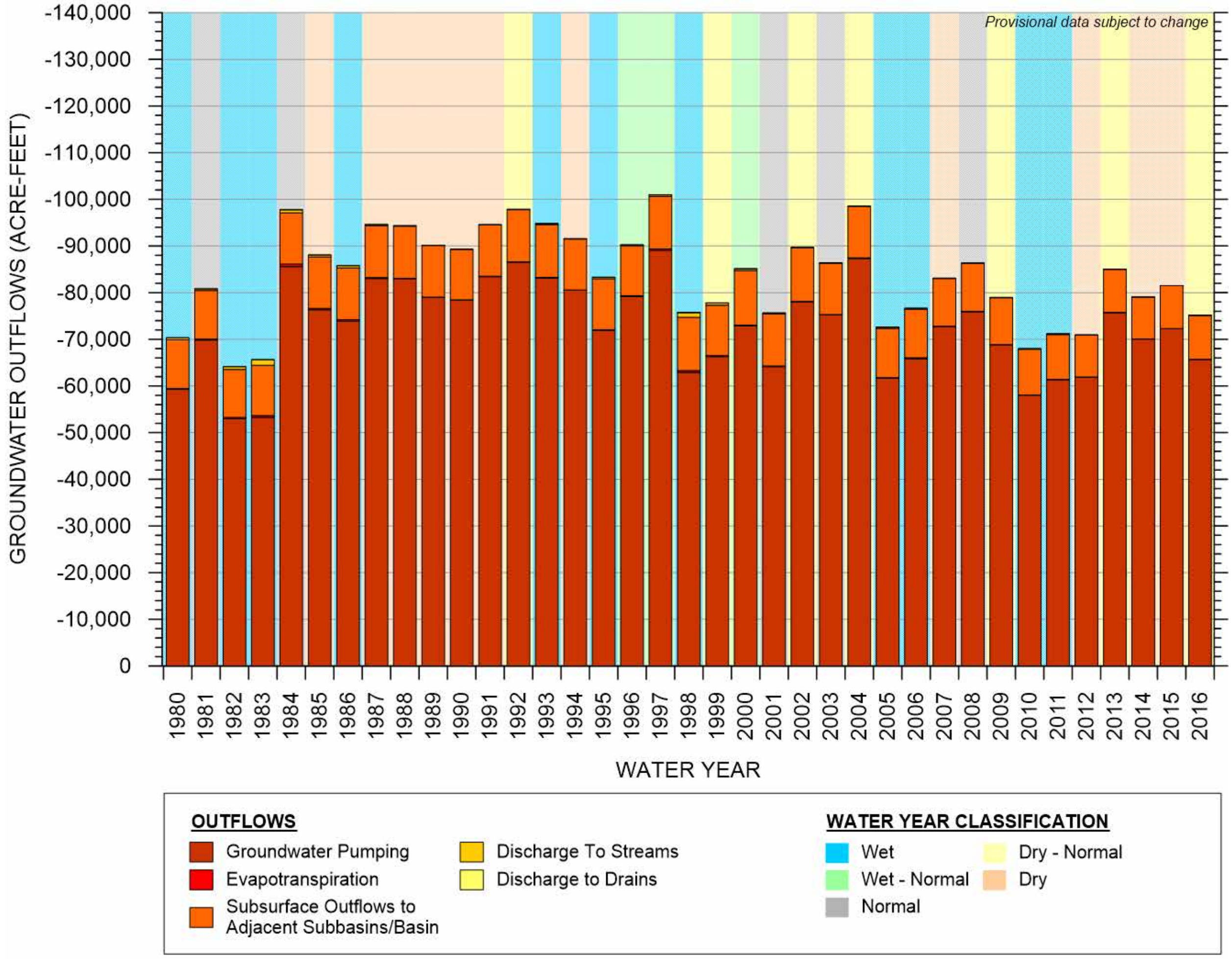

Figure 6-7. SVIHM Simulated Outflows from the Groundwater System

Table 6-5. SVIHM Simulated and Adjusted Groundwater Outflows Summary (AF/yr.)

	Simulated Historical Average (WY 1980-2016)	Simulated Current (WY 2016)	Adjusted Historical Average (WY 1980-2016)	Adjusted Current (WY 2016)
Groundwater Pumping	-72,600	-65,600	-90,600	-82,000
Groundwater Evapotranspiration	-200	-100	-200	-100
Subsurface Outflow to Adjacent Subbasins/Basin	-10,600	-9,400	-10,600	-9,400
Discharge to Streams	-200	0	-200	0
Discharge to Drains	0	0	0	0

Note: provisional data subject to change.

Adjusted pumping is described below.

Comparing SVIHM output to Groundwater Extraction Management System (GEMS) data reveals that, on average, the preliminary SVIHM estimates only approximately 80% of the pumping reported in the GEMS database for the Subbasin between 1995 and 2016. The historical average of extraction reported to GEMS is 88,000 AF/yr., and the current extraction is 82,700 AF/yr. These GEMS data are likely more representative of historical conditions than the model generated pumping numbers; however, reliable GEMS data are only available since 1995. To accurately estimate groundwater extraction for the full historical period, this 80% ratio was applied to the SVIHM simulated historical pumping shown in Table 6-5, yielding an adjusted historical average pumping rate of 89,600 AF/yr.

Figure 6-8 and Table 6-6 show SVIHM simulated groundwater pumping by water use sector. More than 80% of groundwater pumping in the Subbasin is used for agricultural purposes. Groundwater pumping varies from year to year; however, total pumping in the Subbasin has generally decreased since the early 1990s. Urban and agricultural pumping are simulated in the SVIHM; however, domestic pumping is not included in the model, including pumping that occurs from a well with a discharge pipe of less than 3 inches. The SVIHM does not simulate domestic pumping because it is a relatively small portion of overall groundwater pumping in Salinas Valley Basin, and it is not included in the Eastside Subbasin water budget. The simulated historical average in Table 6-6 is not strictly comparable to the GEMS historical average because the time periods used to calculate the averages are different; however, the ratio between these values is used to adjust simulated pumping to be more consistent with GEMS data.

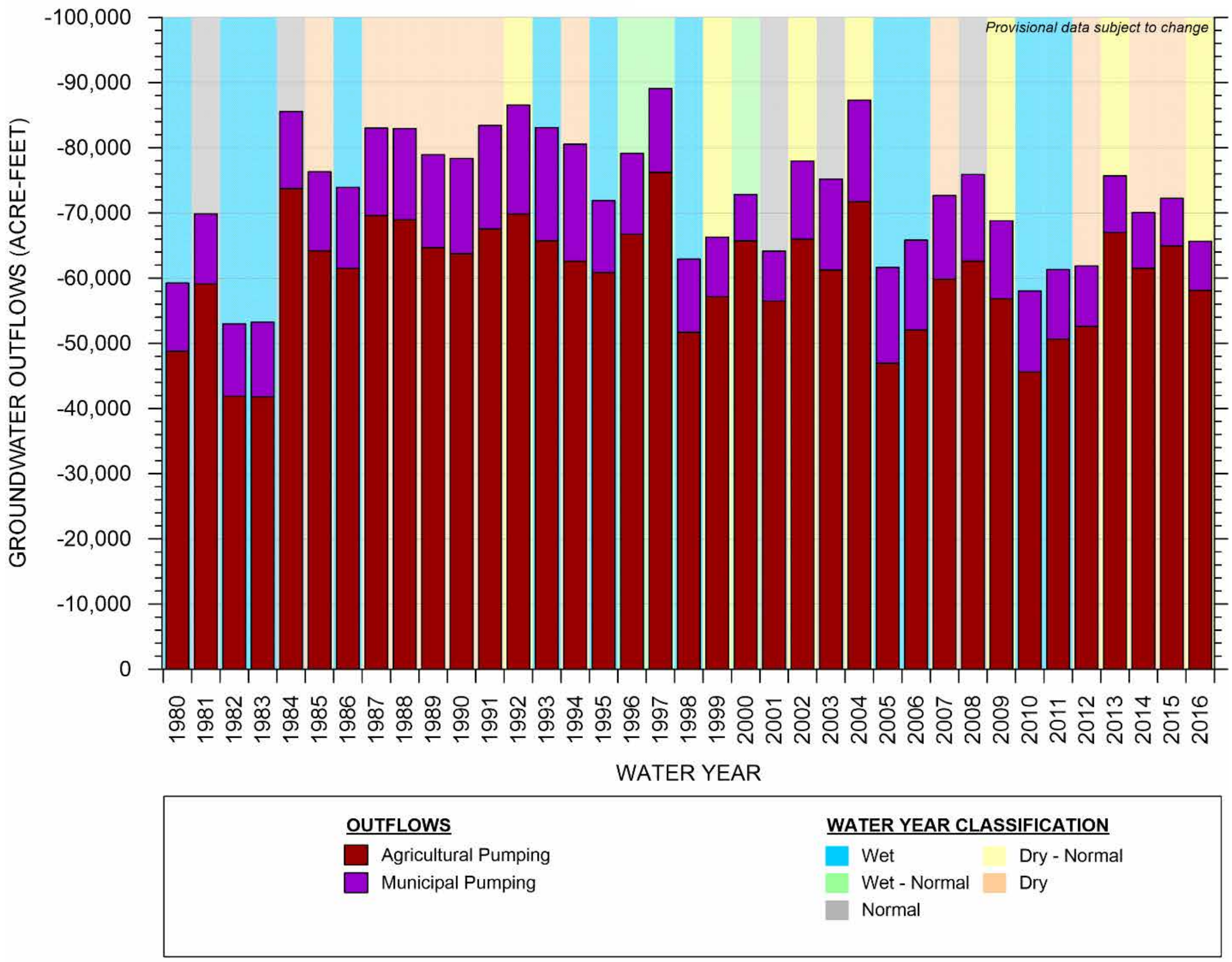

Figure 6-8. SVIHM Simulated Groundwater Pumping by Water Use Sector

Table 6-6. SVIHM Simulated and Adjusted Groundwater Pumping by Water Use Sector (AF/yr.)

	Simulated Historical Average (WY 1980-2016)	Simulated Current (WY 2016)	GEMS Historical Average (WY 1995-2016)	GEMS Current (WY 2016)	Adjusted Historical Average (WY 1980-2016)	Adjusted Current (WY 2016)
Municipal & Industrial	-12,100	-7,500	-13,500	-11,000	-15,100	-9,400
Agricultural	-60,400	-58,100	-74,300	-71,700	-75,500	-72,600
Uncategorized	0	0	-400	0	0	0
Total Pumping	-72,500	-65,600	-88,200	-82,700	-90,600	-82,000

Note: provisional data subject to change.

1 Adjusted agricultural pumping is based on the ratio between SVIHM and GEMS agricultural pumping, as described in text above.

Figure 6-9 shows the SVIHM estimated net subsurface flows entering and exiting the Subbasin by watershed and neighboring subbasin. In most years of the historical period, the Subbasin's subsurface inflows are about 50% larger than its subsurface outflows. Table 6-7 shows SVIHM estimated historical mean and current year subsurface flows. Net subsurface flow is positive from all 4 neighboring areas, indicating net subsurface flow into the Subbasin. The Langley Subbasin, the Forebay Subbasin, and the Gabilan Range that is listed as Other Areas in Table 6-7, are hydraulically upgradient from the Eastside Subbasin. Groundwater pumping near the city of Salinas has created a cone of depression (Figure 5-1 through Figure 5-4) that draws in groundwater into the Eastside Subbasin from the 180/400-Foot Aquifer Subbasin, which is naturally slightly downgradient in the Salinas area. Estimated groundwater inflows from the 180/400-Foot Aquifer Subbasin have increased by about 40% since 1980.

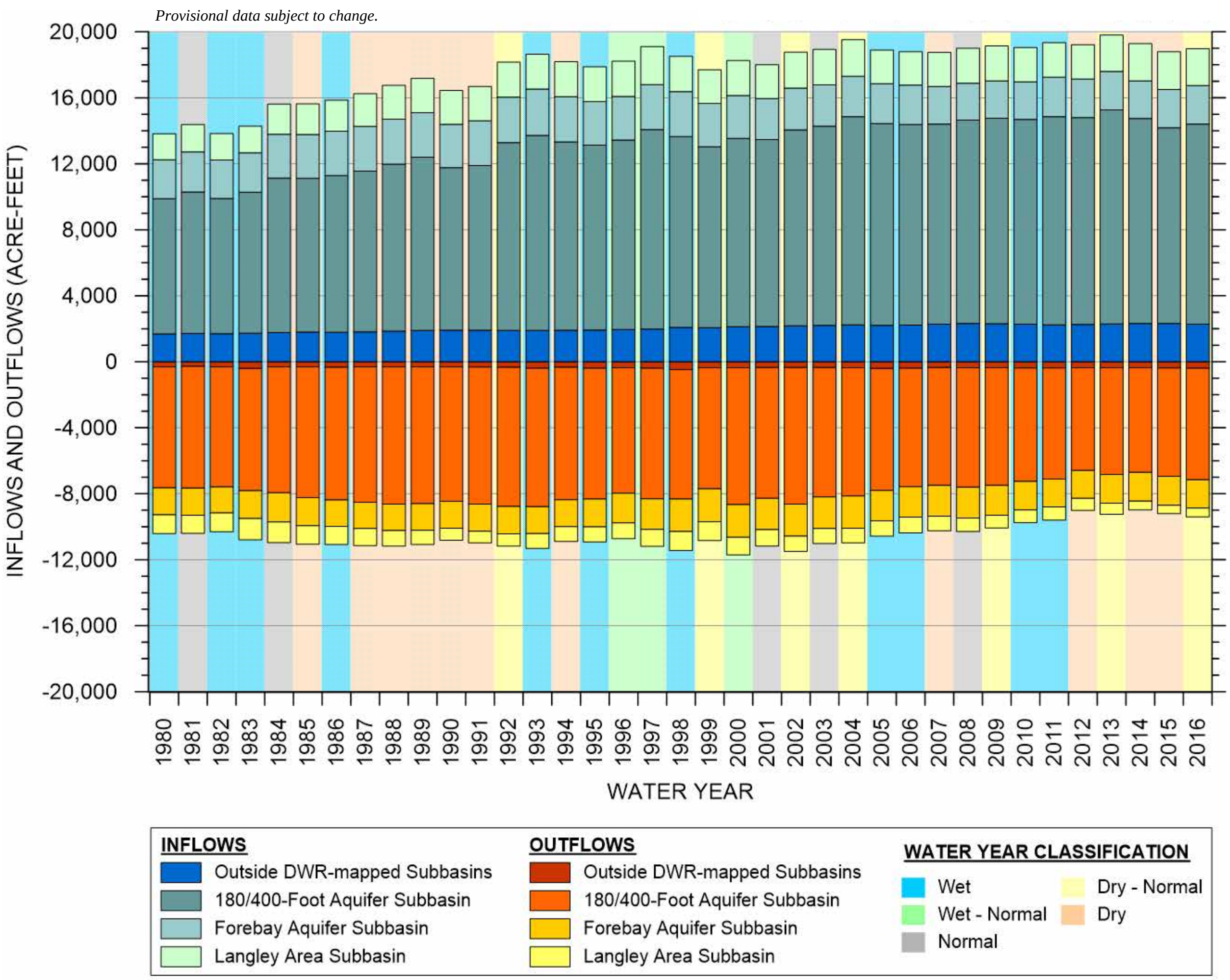

Figure 6-9. SVIHM Simulated Subsurface Inflows and Outflows from Watershed Areas and Neighboring Basins/Subbasins

Table 6-7. SVIHM Simulated Net Subbasin Boundary Flows (AF/yr.)

	Historical Average (WY 1980-2016)	Current (WY 2016)
Langley Area Subbasin	1,100	1,700
180/400-Foot Aquifer Subbasin	3,600	5,400
Forebay Aquifer Subbasin	800	600
Outside Areas	1,700	1,900

Note: provisional data subject to change.

Change in groundwater storage is equal to total inflows to storage (such as deep percolation) minus total outflows from storage (such as pumping). A negative change in groundwater storage value indicates groundwater storage depletion associated with lower groundwater levels; while a positive value indicates groundwater storage accretion associated with higher groundwater levels. Averaged over the historical period, the preliminary SVIHM estimates that the Eastside Subbasin is in overdraft by 21,700 AF/yr. However, this simulated overdraft contains significant variability and uncertainty. Figure 6-10 shows considerable variability in change in storage from one year to the next. In water year 1998, inflows exceeded outflows by more than 50,000 AF, while in 1988 outflows exceeded inflows by roughly 50,000 AF. These annual rates are snap shots in time showing variability within the model simulation and are not necessarily representative of actual current conditions.

Assuming a specific yield of 0.13 over the entire 57,500 acres of the Subbasin, the 21,700 AF/yr. simulated overdraft equates to a groundwater elevation drop of approximately 35 inches per year, or approximately 110 feet over the historical period. While groundwater elevations have dropped nearly 100 feet at some wells, measurements from most wells in the Subbasin have not shown this level of decline. Simulated change in groundwater storage is likely overestimated, possibly as a result of uncertainties in simulated aquifer properties.

The decline in groundwater storage based on measured groundwater elevations from 1944 through 2019 is estimated to be 3,400 AF/yr. in the Subbasin, as described in Section 5.2.2. Furthermore, the State of the Basin report (Brown and Caldwell, 2015) reports that groundwater storage in the Eastside Subarea decreased at an average rate of 5,000 AF/yr. from 1944 through 2013, based on analysis of measured groundwater elevations. During the drought years of 1984 through 1991, the State of the Basin report states that groundwater storage in the Eastside Subarea is estimated to have declined by 25,000 to 35,000 AF/yr. The SVIHM simulated change in groundwater storage is more consistent with drought year estimates than the long-term historical average estimates. These reported values are not fully comparable with SVIHM estimates because the 2 studies use slightly different study areas, this GSP representing the Eastside Subbasin and the State of the Basin study encompassing the Eastside Subarea, which includes both the Eastside and Langley Subbasins delineated in DWR Bulletin 118. Uncertainties exist in groundwater storage estimates from both the SVIHM and the analyses using groundwater level measurements. The more reliable estimate is unclear at this time. Therefore, based on the average of these reported values, this GSP considers 10,000 AF as the average annual decline in storage.

6.3.3 Historical and Current Groundwater Budget Summary

The main groundwater inflows into the Subbasin are: (1) deep percolation of precipitation and irrigation water, (2) subsurface inflow from adjacent DWR groundwater basins and subbasins, and (3) stream recharge. Groundwater pumping is the predominant groundwater outflow. The smaller outflow terms are subsurface outflows to adjacent subbasins, evapotranspiration, discharge to streams, and flows to drains.

Figure 6-10 shows the entire groundwater water budget from the SVIHM and includes annual change in groundwater storage. Changes in groundwater storage are strongly correlated with changes in deep percolation of precipitation and stream flows. For example, 1983 and 1998 were comparatively very wet years and represent the greatest increases in deep percolation and, correspondingly, the greatest increases in groundwater storage over the historical period. Estimated cumulative change in groundwater storage has steadily declined over time with slight increases in response to wet periods.

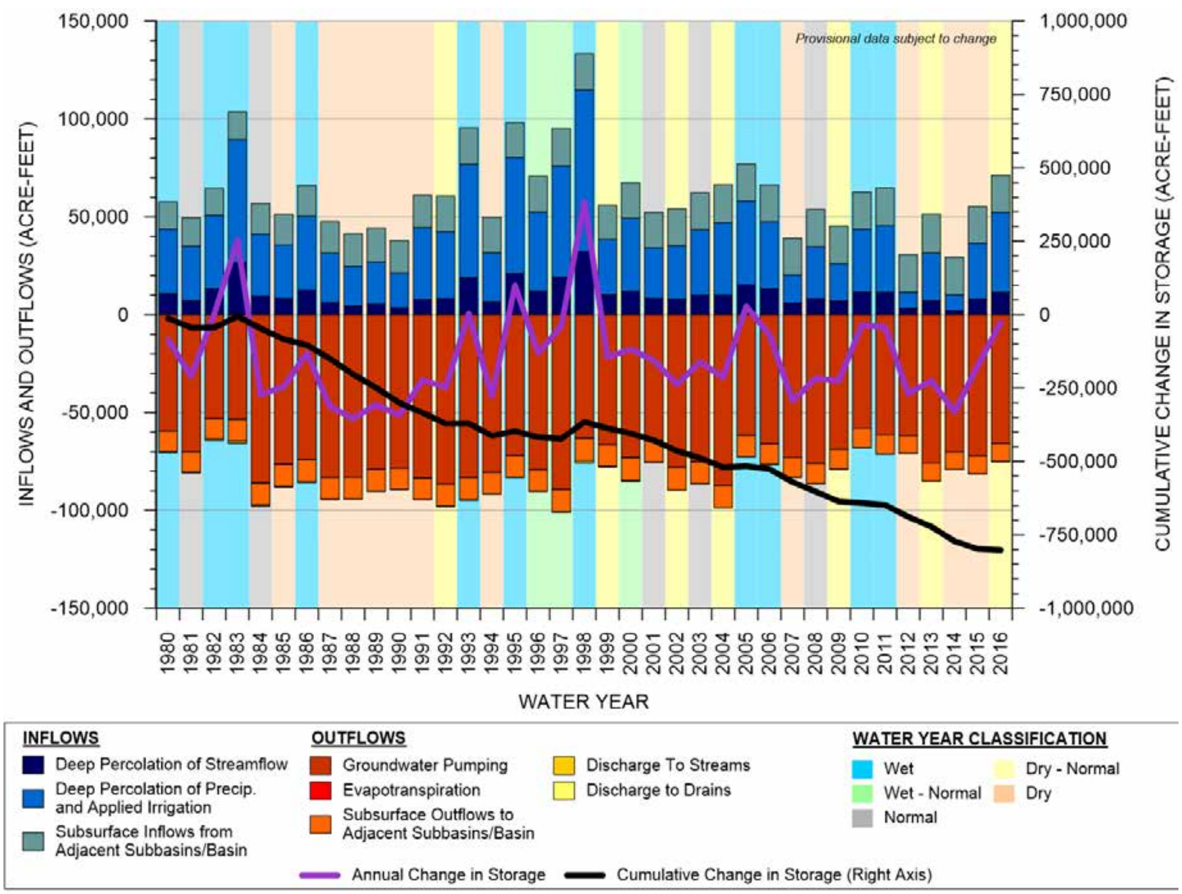

Figure 6-10. SVIHM Simulated Historical and Current Groundwater Budget

The SVIHM estimated the historical annual decline in storage to be 21,700 AF/yr. However, this decline is greater than estimated in previous reports, and this GSP considers the average annual historical decline in storage to be 10,000 AF/yr., as explained above.

A comparison of the historical and current groundwater budgets is shown in Table 6-8. The values in the table are based on the inflows and outflows presented in previous tables and reflect the adjustment to change in groundwater storage for the historical average. Negative values indicate outflows or depletions. This table is informative in showing the relative magnitude of various water budget components; however, these results are based on a provisional model and will be updated in future updates to this GSP after the SVIHM is completed and released by the USGS.

Table 6-8. Summary of Groundwater Budget (AF/yr.)

	Historical Average (WY 1980-2016)	Current (WY 2016)
Groundwater Pumping	-90,600	-82,000
Flows to Drains	0	0
Net Stream Exchange (gain from streams)	10,500	11,400
Deep Percolation of Precipitation and Applied Irrigation	33,400	40,800
Net flow to Adjacent Subbasins/Basin	7,100	9,600
Groundwater Evapotranspiration	-200	-100
Net Storage Gain (+) or Loss (-)	-10,000	-4,000

Note: provisional data subject to change.

The net storage value is the estimated historical overdraft based on observed groundwater levels, as described in Sections 5.2.2 and 6.3.2. Water budget error, as reflected in change in storage, for the historical average period is 48%, which is considered unreasonably large and will be addressed and improved in future updates to the GSP.

6.3.4 Historical and Current Sustainable Yield

The historical and current sustainable yields reflect the amount of Subbasin-wide pumping reduction needed to balance the water budget, resulting in no net decrease in storage. The sustainable yield can be estimated as:

Sustainable yield = pumping + change in storage

Table 6-9 provides a likely range of sustainable yields based on the GEMS derived historical pumping.

This range represents the average GEMS reported pumping from 1995 to 2016, as shown in Table 6-7, plus and minus 1 standard deviation. In addition, the adjusted loss in groundwater storage of 10,000 AF/yr., described in Section 6.3.2, is used for this calculation. These values are the likely range of the sustainable yield of the subbasin. This GSP adopts this range of likely sustainable yields as the best estimate for the Subbasin.

Table 6-9. Historical Sustainable Yield for the Eastside Subbasin Derived from GEMS and Observed Groundwater Levels (AF/yr.)

	Low Historical Average (1995-2016)	High Historical Average (1995-2016)
Total Subbasin Pumping	79,300	96,700
Change in Storage	-10,000	-10,000
Estimated Sustainable Yield	69,300	86,700

Note: Pumping is shown as positive value for this computation. Change in storage value is based on observed groundwater measurements, as previously described in the text.

6.4 Projected Water Budgets

Projected water budgets are extracted from the SVOM, which simulates future hydrologic conditions with anticipated climate change. Two projected water budgets are presented, one incorporating estimated 2030 climate change projections and one incorporating estimated 2070 climate change projections.

The climate change projections are based on data provided by DWR (2018). Projected water budgets are useful for showing that sustainability will be achieved in the 20-year implementation period and maintained over the 50-year planning and implementation horizon. However, the projected water budgets are based on a provisional version of the SVOM and are subject to change. Model information and assumptions summarized in this section of the report are based on provisional documentation on the model. Additional information will be provided in future GSP updates after the model is released by the USGS.

6.4.1 Assumptions Used in Projected Water Budget Development

The assumptions incorporated into the SVOM for the projected water budget simulations include:

- Land Use: The land use is assumed to be static, aside from a semi-annual change to represent crop seasonality. The annual pattern is repeated every year in the model. Land use specified in the model by USGS reflects the 2014 land use.
- No urban growth is included in this simulation to remain consistent with USGS assumptions. If urban growth is infill, this assumption may result in an underestimate of net pumping increases and an underestimate of the Subbasin's future overdraft. If urban growth replaces agricultural irrigation, the impact may be minimal because the urban growth will replace existing agricultural water use.

- Reservoir Operations: The reservoir operations reflect MCWRA's current approach to reservoir management.
- Stream Diversions: The SVOM explicitly simulates only 2 stream diversions in the Salinas Valley Basin: Clark Colony and the Salinas River Diversion Facility (SRDF). The Clark Colony diversion is located along Arroyo Seco and diverts stream water to an agricultural area nearby. The SRDF came online in 2010 and diverts water from the Salinas River to the Castroville Seawater Intrusion Project (CSIP) area. Clark Colony diversions are repeated from the historical record to match the water year. SRDF diversions are made throughout the duration of the SVOM whenever reservoir storage and streamflow conditions allow during the period from April through October. For purposes of the projected water budgets, SRDF diversions are specified at a rate of 18 cubic feet per second.
- Recycled Water Deliveries: Recycled water has been delivered to the CSIP area since 1998 as irrigation supply. The SVOM includes recycled water deliveries throughout the duration of the model.

6.4.1.1 Future Projected Climate Assumptions

Several modifications were made to the SVOM in accordance with recommendations made by DWR in their *Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development* (2018). Three types of datasets were modified to account for 2030 and 2070 projected climate change: climate data including precipitation and potential evapotranspiration, streamflow, and sea level.

Climate Data. This GSP uses the climate change datasets provided by DWR for use by GSAs. The climate scenarios were derived by taking the historical interannual variability from 1915 through 2011 and increasing or decreasing the magnitude of events based on projected changes in precipitation and temperature from general circulation models. These datasets of climate projections for 2030 and 2070 conditions were derived from a selection of 20 global climate projections recommended by the Climate Change Technical Advisory Group as the most appropriate projections for California water resources evaluation and planning. Because the DWR climate datasets are only available through December 2011 and the SVOM uses a climate time series through December 2014, monthly change factors for January 2012 to December 2014 are assumed. DWR provided climate datasets for central tendency scenarios, as well as extreme wet and dry scenarios; the future water budgets described herein are based on the DWR central tendency scenarios for 2030 and 2070. Historical data were analyzed from the Salinas Airport precipitation gauge record to identify years from 1968 to 2011 that were most similar to conditions in 2012, 2013 and 2014. Based on this analysis, climate data from 1981, 2002, and 2004 are applied as the climate inputs for 2012, 2013, and 2014, respectively.

The modified monthly climate data for the entire model period are applied as inputs to the model, which reads precipitation and potential evapotranspiration data on a monthly basis.

Streamflow. DWR provided monthly change factors for unimpaired streamflow throughout California. For the Salinas Valley and other areas outside of the Central Valley, these change factors are provided as a single time series for each major watershed. Streamflows along the margins of the Basin are modified by the monthly change factors. As with the climate data, an assumption is required to extend the streamflow change factor time series through December 2014. It is assumed that the similarity in rainfall years at the Salinas Airport rainfall gauge could reasonably be expected to produce similar amounts of streamflow; therefore, the same years of 1981, 2002, and 2004 are repeated to represent the 2012, 2013, and 2014 streamflows.

Sea Level. DWR guidance recommends using a single static value of sea level rise for each of the climate change scenarios (DWR, 2018). For the 2030 climate change scenario, the DWR-recommended sea level rise value of 15 centimeters is used. For the 2070 climate change scenario, the DWR-recommended sea level rise value of 45 centimeters is used. The amount of sea level rise is assumed to be static throughout the duration of each of the climate change scenarios.

6.4.2 Projected Surface Water Budget

Average projected surface water budget inflows and outflows for the future simulation period with 2030 and 2070 climate change assumptions are quantified in Table 6-10. As with the current water budget, the 4 components of the projected surface water budget are similar in magnitude.

Table 6-10. SVOM Simulated Average Surface Water Inflow and Outflow Components for Projected Climate Change Conditions (AF/yr.)

Projected Climate Change Timeframe	2030	2070
Overland Runoff to Streams	13,600	14,400
Boundary Inflows	13,600	15,100
Flow Between Surface Water and Groundwater	-13,800	-14,400
Boundary Outflows	13,400	15,100

Note: provisional data subject to change.

6.4.3 Projected Groundwater Budget

Average projected groundwater budget inflows for the future simulation period with 2030 and 2070 climate change assumptions are quantified in Table 6-11. In both the 2030 and 2070 simulations, the biggest contributors to groundwater inflows are deep percolation of stream flow, and deep percolation of precipitation and irrigation.

Table 6-11. SVOM Simulated Average Groundwater Inflow Components for Projected Climate Change Conditions (AF/yr.)

Projected Climate Change Timeframe	2030	2070
Deep Percolation of Stream Flow	13,900	14,500
Deep Percolation of Precipitation and Irrigation	33,200	36,000
Underflow from Forebay Subbasin	2,400	2,500
Underflow from Langley Area Subbasin	2,000	2,000
Underflow from 180/400-Foot Subbasin	11,100	11,300
Underflow from Surrounding Watersheds	1,900	2,000
Total Inflows	64,500	68,300

Note: provisional data subject to change.

Average SVOM projected groundwater budget outflows for the future simulation period with 2030 and 2070 climate change assumptions are quantified in Table 6-12. As in the historical and current water budgets, the greatest outflow is groundwater pumping. Negative values are shown in Table 6-12 to represent outflows. Projected pumping is summarized below in Section 6.4.4.

Table 6-12. SVOM Simulated and Adjusted Average Groundwater Outflow Components for Projected Climate Change Conditions (AF/yr.)

Projected Climate Change Timeframe	2030 (Simulated)	2070 (Simulated)	2030 (Adjusted)	2070 (Adjusted)
Groundwater Pumping	-72,300	-75,600	-90,400	-94,500
Flows to Drains	-100	-100	-100	-100
Flow to Streams	-100	-100	-100	-100
Groundwater Evapotranspiration	-700	-800	-700	-800
Underflow to Forebay Subbasin	-1,800	-2,000	-1,800	-2,000
Underflow to 180/400-Foot Subbasin	-8,400	-8,800	-8,400	-8,800
Underflow to Langley Area Subbasin	-1,100	-1,100	-1,100	-1,100
Underflow to Surrounding Watersheds	-400	-400	-400	-400
Total Outflows	-84,900	-88,900	-103,000	-107,800

Note: provisional data subject to change.

[1] Adjusted pumping is based on the ratio between historical average SVIHM and GEMS agricultural pumping, as described in Section 6.3.2.

As described for the historical water budget, data indicate that the Subbasin has historically been in overdraft (on the order of 10,000 AF/yr. decline), as described in Section 5.2.2. Even though the SVOM anticipates -20,400 AF/yr. change in storage for both 2030 and 2070, the historical decline in storage is used with the adjusted pumping estimates to provide a likely more reasonable estimate for projected sustainable yield. The model includes increased precipitation from climate change; however, it does not account for the frequency and magnitude of storm events. If storm events concentrate precipitation within short periods, more water may run off than infiltrate. More analysis needs to be done with regards to future recharge. Therefore, this projected water budget adopts the historical annual change in storage as the most reasonable estimate, assuming extraction continues. This is reflected in the adjusted average change in storage in Table 6-13, which is set to a decline of 10,000 AF/yr.

Combining Table 6-11 and Table 6-12 yields the SVOM simulated net groundwater inflow and outflow data for the future simulation with 2030 and 2070 climate change assumptions. These flows are shown in Table 6-13. Negative values indicate outflows or depletions.

Table 6-13. Average SVOM Simulated and Adjusted Annual Groundwater Budget for Projected Climate Change Conditions (AF/yr.)

Projected Climate Change Timeframe	2030 (Simulated)	2070 (Simulated)	2030 (Adjusted1)	2070 (Adjusted1)
Groundwater Pumping	-72,300	-75,600	-90,400	-94,500
Flow to Drains	-100	-100	-100	-100
Net Stream Exchange	13,800	14,400	13,800	14,400
Deep Percolation	33,200	36,000	33,200	36,000
Net Flow to Forebay Subbasin	700	500	700	500
Net Flow to Surrounding Watersheds	1,600	1,600	1,600	1,600
Net Flow to Langley Area Subbasin	900	900	900	900
Net Flow to 180/400-Foot Subbasin	2,700	2,500	2,700	2,500
Groundwater Evapotranspiration	-700	-800	-700	-800
Net Storage Gain (+) or Loss (-)	-20,400	-20,400	-10,000	-10,000

Note: provisional data subject to change.

Based on the adjusted change in storage, which is the historical average decline as described in the text, model error is 44% for 2030 and 43% for 2070; these error values are unreasonably large and will be addressed and improved in future updates to the GSP.

[1] Adjusted pumping is based on the ratio between historical average SVIHM and GEMS agricultural pumping, as described in Section 6.3.2.

SVOM projected groundwater pumping by water use sector is summarized in Table 6-14. Because the model assumes no urban growth, future municipal pumping was assumed to be equal to current municipal pumping. Future agricultural pumping is then calculated as the total projected pumping minus the current municipal pumping. The 2030 and 2070 model simulations predict that agriculture will account for about 90% of pumping. Similar to the SVIHM, domestic pumping is not included in the SVOM future projections simulation.

Table 6-14. SVOM Simulated Projected Annual Groundwater Pumping by Water Use Sector (AF/yr)

Water Use Sector	2030 (Simulated)	2070 (Simulated)	2030 (Adjusted1)	2070 (Adjusted1)
Urban Pumping	-7,500	-7,500	-9,400	-9,400
Agricultural Pumping	-64,800	-68,100	-81,000	85,100
Total Pumping	-72,300	-75,600	-90,400	-94,500

Note: provisional data subject to change.

[1] Adjusted pumping is based on the ratio between historical average SVIHM and GEMS agricultural pumping, as described in Section 6.3.2.

6.4.4 Projected Sustainable Yield

Projected sustainable yield is the long-term pumping that can be sustained once all undesirable results have been addressed. However, it is not the amount of pumping needed to stop undesirable results before sustainability is reached. The SVBGSA recognizes that depending on the success of various proposed projects and management actions there may be some years when pumping must be held at a lower level to achieve necessary rises in groundwater elevation. The actual amount of allowable pumping from the Subbasin will be adjusted in the future based on the success of projects and management actions.

To retain consistency with the historical sustainable yield, projected sustainable yield can be estimated by summing all the average groundwater extractions and subtracting the average loss in storage. This represents the change in pumping that results in no change in storage, assuming no other projects or management actions are implemented. For this sustainable yield discussion and associated computations, groundwater pumping outflows are reported as positive values, which is opposite of how the values are reported in the water budget tables. As discussed earlier, the current, preliminary version of the SVIHM, and by inference the SVOM, appears to overestimate the historical overdraft in the Subbasin and therefore underestimate the historical sustainable yield. The sustainable yield value will be updated in future GSP updates as more data are collected and additional analyses are conducted.

Table 6-15 provides estimates of the future sustainable yield using estimated future pumping calculated in Table 6-14 and a correction for change in groundwater storage. As described for the historical water budget, data indicate that the Subbasin has historically been in overdraft (on the order of 10,000 AF/yr. decline), as described in Section 5.2.2. This historical decline in storage is used with the adjusted SVOM pumping estimates to provide a likely more reasonable estimate for projected sustainable yield. Therefore, although change in storage projected by the preliminary SVOM is -20,400 AF/yr., the average change in storage in Table 6-15 is set to a decline of 10,000 AF/yr.

Table 6-15. Adjusted Projected Sustainable Yields (AF/yr.)

	2030 Projected Sustainable Yield	2070 Projected Sustainable Yield	Historical Sustainable Yield Range
Groundwater Pumping	90,400	94,500	79,300 to 96,700
Change in Storage	-10,000	-10,000	-10,000
Projected Sustainable Yield	80,400	84,500	69,300 to 86,700

Table 6-15 includes the adjusted estimate of historical sustainable yield for comparison purposes. Although the sustainable yield values provide guidance for achieving sustainability, simply reducing pumping to within the sustainable yield is not proof of sustainability. Sustainability must be demonstrated through the SMC. The sustainable yield value will be modified and updated as more data are collected, and more analyses are performed.

6.4.5 Uncertainties in Projected Water Budget Simulations

Models are mathematical representations of physical systems. They have limitations in their ability to represent physical systems exactly and due to limitations in the data inputs used. There is also inherent uncertainty in groundwater flow modeling itself, since mathematical (or numerical) models can only approximate physical systems and have limitations in how they compute data. However, DWR (2018) recognizes that although models are not exact representations of physical systems because mathematical depictions are imperfect, they are powerful tools that can provide useful insights.

There is additional inherent uncertainty involved in projecting water budgets with projected climate change based on the available scenarios and methods. The recommended 2030 and 2070 central tendency scenarios that are used to develop the projected water budgets with the SVIHM provide a dataset that can be interpreted as what might be considered the most likely future conditions; there is an approximately equal likelihood that actual future conditions will be more stressful or less stressful than those described by the recommended scenarios (DWR, 2018).

As stated in DWR (2018):

> *"Although it is not possible to predict future hydrology and water use with certainty, the models, data, and tools provided [by DWR] are considered current best available science and, when used appropriately should provide GSAs with a reasonable point of reference for future planning."*

6.5 Subbasin Water Supply Availability and Reliability

Water is not imported into the Eastside Subbasin from other basins, and the Salinas River does not flow through the Eastside. The Salinas River recharges the groundwater upgradient of the Eastside Subbasin. This upgradient recharge is derived from reservoir releases that regulate Salinas River streamflow. The historical water budget incorporates years when there was little availability of surface water flow. The annual variability of stream flow does not directly affect the annual Eastside groundwater elevations and therefore does not directly affect the ability to operate within the sustainable yield. Although there is not a direct effect, Salinas River flows do affect long-term water supply availability. The projected water budgets are developed with the SVOM, which is based on historical surface water flows and groundwater conditions, and therefore projected water budgets incorporate reasonable fluctuations in water supply availability. MCWRA plans to revise the Habitat Conservation Plan (HCP) for the Salinas River, which may change the current reservoir release schedule. A revised reservoir release schedule could influence the reliability of groundwater recharge.

6.6 Uncertainties in Water Budget Calculations

The level of accuracy and certainty is highly variable between water budget components. A few water budget components are directly measured, but most water budget components are either estimated inputs to the model or simulated by the model. Additional model uncertainty stems from an imperfect representation of natural condition and is reflected in model calibration error. However, inputs to the models are carefully selected using best available data, the model's calculations represent established science for groundwater flow, and the model calibration error is within acceptable bounds. Therefore, the models are the best available tools for estimating water budgets. The model results are provisional and subject to change in future GSP updates after the models are released by the USGS.

The following list groups water budget components in increasing order of uncertainty.

- Measured: metered municipal, agricultural, and some small water system pumping
- Estimated: domestic pumping, including depth, rate, and location
- Simulated primarily based on climate data: precipitation, evapotranspiration, irrigation pumping
- Simulated based on calibrated model: all other water budget components

Simulated components based on calibrated model have the most uncertainty because those simulated results encompass uncertainty of other water budget components used in the model in addition to model calibration error.

7 MONITORING NETWORKS

This chapter describes the networks that will monitor the SMC explained further in Chapter 8. This description of the monitoring network has been prepared in accordance with the GSP Regulations § 354.32 *et seq.* to include monitoring objectives, monitoring protocols, and data reporting requirements.

7.1 Introduction

7.1.1 Monitoring Network Objectives

SGMA requires monitoring networks to collect data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the Subbasin, and to evaluate changing conditions that occur as the Plan is implemented. The monitoring networks are intended to:

- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.
- Demonstrate progress toward achieving measurable objectives.
- Monitor impacts to the beneficial uses or users of groundwater.
- Quantify annual changes in water budget components.

7.1.2 Approach to Monitoring Networks

Monitoring networks are developed for each of the 6 sustainability indicators that are relevant to the Subbasin:

1. Chronic lowering of groundwater levels
2. Reduction in groundwater storage
3. Seawater intrusion
4. Degraded water quality
5. Land subsidence
6. Depletion of ISW

Other monitoring networks, such as groundwater extraction, that are necessary to comply with GSP Regulations are also included in this chapter. Representative Monitoring Sites (RMS) are a subset of the monitoring network and are limited to sites with data that are publicly available and not confidential.

The SVBGSA estimated the density of monitoring sites and the frequency of measurements required to demonstrate short-term, seasonal, and long-term trends. If the required monitoring site density does not currently exist, the SVBGSA will expand monitoring networks during GSP implementation. Filling data gaps and developing more extensive and complete monitoring networks will improve the SVBGSA's ability to demonstrate sustainability and refine the existing conceptual and numerical hydrogeologic models. Chapter 10 provides a plan and schedule for resolving data gaps. The SVBGSA will review the monitoring network in each 5-year assessment, including a determination of uncertainty and whether there are remaining data gaps that could affect the ability of the Plan to achieve the sustainability goal for the Subbasin.

7.1.3 Management Areas

No management areas have been defined for the Eastside Subbasin.

7.2 Groundwater Level Monitoring Network

The sustainability indicator for chronic lowering of groundwater levels is evaluated by monitoring groundwater elevations in designated monitoring wells. The regulations require a network of monitoring wells sufficient to demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features.

Figure 7-1 shows 63 wells in the Subbasin monitored by MCWRA for groundwater elevations that are used to develop groundwater elevation contours and have publicly available data on the SVBGSA Web Map.

Of the wells shown in Figure 7-1, 35 are selected for inclusion in the groundwater level monitoring network as RMS wells, and are shown on Figure 7-2. Criteria for selecting wells as part of the RMS network include:

- RMS wells must have known depths and well completion data.
- RMS wells should have a relatively long period of historical data.
- Hydrographs of RMS wells should be visually representative of the hydrographs from surrounding wells. Appendix 5A includes the hydrograph comparisons used to establish that RMS wells are representative of surrounding wells.
- RMS locations must cover the basin and provide data near basin boundaries.
- RMS should be selected for each aquifer. There is only1 aquifer in the Eastside Subbasin.
- Data from RMS wells is public data and will be used for groundwater elevation maps and analysis. SVBGSA notified well owner of intent to include well in monitoring network.

The RMS wells in the water level monitoring network are listed in Table 7-1. The need for any additional wells is discussed in Section 7.2.2. Appendix 5A presents well construction information and historical hydrographs for each RMS well.

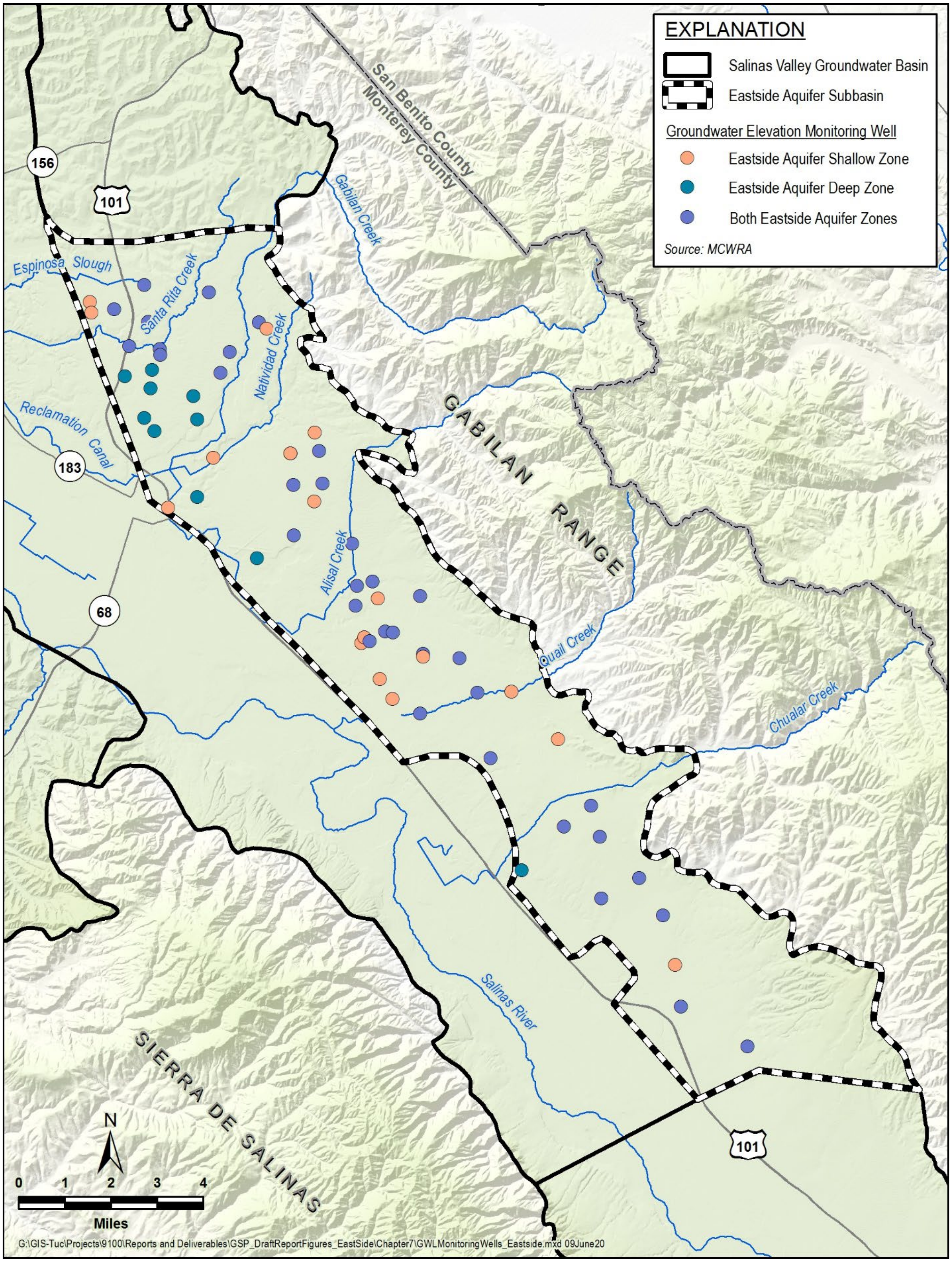

Figure 7-1. Eastside Aquifer Monitoring Network for Groundwater Levels

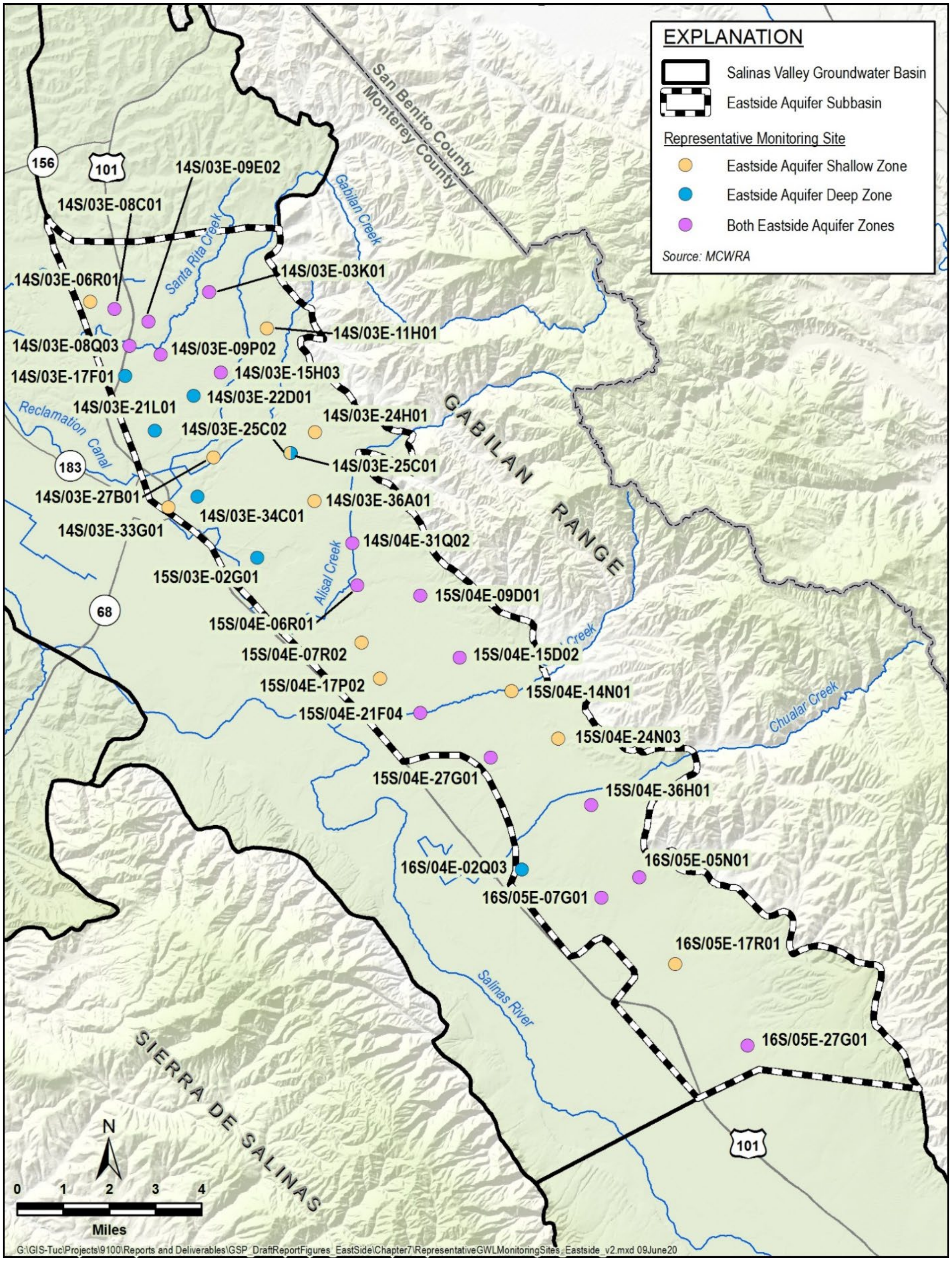

Figure 7-2. Eastside Aquifer Representative Monitoring Network for Groundwater Levels

Table 7-1. Eastside Aquifer Groundwater Level Representative Monitoring Site Network

State Well Number	CASGEM Well Number	Local Well Designation	Well Use	Total Well Depth (ft)	Reference Point (ft, NAVD88)	Latitude (NAD 83)	Longitude (NAD 83)	Period of Record (years)
Shallow Zone								
14S/03E-06R01	N/A	901	Irrigation	385	91.9	36.73863	-121.67404	24
14S/03E-11H01	N/A	2330	Other	390	142.3	36.73235	-121.59659	24
14S/03E-24H01	N/A	1974	Irrigation	375	156	36.69942	-121.58495	24
14S/03E-25C02	366927N1215940W001	FALA22619	Observation	370	141	36.69273	-121.59403	17
14S/03E-27B01	366906N1216242W001	15126	Irrigation	348	42	36.69061	-121.62420	61
14S/03E-33G01	N/A	595	Municipal	331	45	36.67462	-121.64126	24
14S/03E-36A01	N/A	1577	Irrigation	490	139.9	36.66688	-121.59191	24
15S/04E-07R02	N/A	10343	Irrigation	304	80	36.63365	-121.56449	24
15S/04E-14N01	N/A	709	Irrigation	400	240	36.61971	-121.50558	74
15S/04E-17P02	N/A	2260	Irrigation	467	97	36.62258	-121.55684	24
15S/04E-24N03	N/A	16343	Irrigation	370	272	36.60506	-121.48682	62
16S/05E-17R01	N/A	10410	Irrigation	299	181	36.53513	-121.43898	88
Deep Zone								
14S/03E-17F01	N/A	1825	Municipal	620	92	36.71552	-121.65950	24
14S/03E-21L01	N/A	671	Municipal	668	80	36.69859	-121.64738	24
14S/03E-22D01	N/A	1969	Municipal	550	102	36.70994	-121.63268	24
14S/03E-25C01	366928N1215941W001	FALB22618	Observation	680	141	36.69275	-121.59406	17
14S/03E-34C01	N/A	686	Municipal	580	67	36.67812	-121.63009	24
15S/03E-02G01	N/A	685	Municipal	630	74	36.65946	-121.60600	24
16S/04E-02Q03	N/A	1303	Irrigation	1023	136	36.56360	-121.49969	24
Both Zones								
14S/03E-03K01	N/A	574	Irrigation	668	168.8	36.74267	-121.62760	24
14S/03E-08C01	N/A	867	Irrigation	785	109.5	36.73652	-121.66438	24
14S/03E-08Q03	N/A	57	Irrigation	806	75	36.72506	-121.65818	24

State Well Number	CASGEM Well Number	Local Well Designation	Well Use	Total Well Depth (ft)	Reference Point (ft, NAVD88)	Latitude (NAD 83)	Longitude (NAD 83)	Period of Record (years)
14S/03E-09E02	N/A	1831	Municipal	650	121	36.73275	-121.65105	24
14S/03E-09P02	N/A	1572	Irrigation	755	114.5	36.72259	-121.64592	24
14S/03E-15H03	367174N1216222W001	752	Irrigation	784	126	36.71741	-121.62217	61
14S/04E-31Q02	366661N1215694W001	806	Irrigation	710	104	36.66611	-121.56939	14
15S/04E-06R01	366517N1215669W001	1726	Irrigation	786	93.7	36.65172	-121.56693	66
15S/04E-09D01	N/A	1678	Irrigation	461	127	36.64892	-121.54205	24
15S/04E-15D02	N/A	1599	Irrigation	510	185.7	36.62978	-121.52612	24
15S/04E-21F04	N/A	1235	Irrigation	498	127	36.61197	-121.54079	24
15S/04E-27G01	N/A	773	Irrigation	608	189	36.59853	-121.51298	24
15S/04E-36H01	N/A	294	Irrigation	488	334.2	36.58446	-121.47331	24
16S/05E-05N01	N/A	633	Irrigation	550	248	36.56205	-121.45384	24
16S/05E-07G01	N/A	1345	Irrigation	476	193	36.55535	-121.46851	24
16S/05E-27G01	365122N1214080W001	2519	Irrigation	1122	272	36.51224	-121.40796	15

7.2.1 Groundwater Level Monitoring Protocols

Chapter 4 of the MCWRA CASGEM monitoring plan includes a description of existing groundwater elevation monitoring procedures (MCWRA, 2015). The CASGEM groundwater elevation monitoring protocols established by MCWRA are adopted by this GSP and are included in Appendix 7A. Groundwater elevation measurements will be collected at least 2 times per year to represent seasonal low and seasonal high groundwater conditions. The monitoring protocols described in Appendix 7A cover multiple monitoring methods for collecting data by hand and by automated pressure transducers. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.2.2 Groundwater Level Monitoring Network Data Gaps

Based on GSP Regulations and BMPs published by DWR on monitoring networks (DWR, 2016b), a visual analysis of the existing monitoring network was performed using professional judgment to evaluate whether there are data gaps in the groundwater level monitoring network.

While there is no definitive requirement on monitoring well density, the BMP cites several studies (Heath, 1976; Sophocleous, 1983; Hopkins and Anderson, 2016) that recommend 0.2 to 10 wells per 100 square miles. The BMP notes that professional judgment should be used to design the monitoring network to account for high-pumping areas, proposed projects, and other subbasin-specific factors.

The Eastside Subbasin encompasses 90 square miles. If the BMP guidance recommendations are applied to the Subbasin, the well network should include between 1 and 9 wells. The current network includes 35 wells. The number of groundwater elevation monitoring wells in the Subbasin exceeds the range of the BMP guidance. Furthermore, visual inspection of Figure 7-2 shows that wells in the RMS network are adequately distributed across the Subbasin, and there is no significant spatial data gap in the network.

Groundwater elevation measurements for most of the wells in the monitoring network in the Subbasin occur only once a year. SVBGSA will work with MCWRA to have groundwater levels collected at least twice a year, as outlined in Section 7.2.1. Furthermore, some of the wells in the monitoring network have unknown well construction information and that is a data gap that will be addressed during GSP implementation.

7.3 Groundwater Storage Monitoring Network

As discussed in Chapter 8, the sustainability indicator for reduction of groundwater storage is measured using groundwater elevations as proxies. Thus, the groundwater storage monitoring network is the same as the groundwater level monitoring network.

7.4 Seawater Intrusion Monitoring Network

The sustainability indicator for seawater intrusion is evaluated using the location of a chloride isocontour, based on chloride concentration measured at an existing network of monitoring wells. MCWRA develops annual maps of the 500 mg/L chloride isocontour (Figure 5-21 and Figure 5-22). Seawater intrusion does not exist in this Subbasin but does exist in the adjacent 180/400-Foot Aquifer Subbasin. Should seawater intrusion enter the Subbasin, the SVBGSA's Seawater Intrusion Working Group (SWIG) will consider expanding the existing seawater intrusion monitoring network.

Table 7-2 lists the wells currently used by MCWRA to monitor seawater intrusion in the Subbasin. All the wells used by MCWRA are part of the RMS network. Figure 7-2 shows the locations of these wells.

Table 7-2. Eastside Aquifer Seawater Intrusion Well Network

State Well Number	Total Well Depth (ft)	Latitude (NAD 83)	Longitude (NAD 83)
14S/03E-06F01	Unknown	36.7457	-121.6804
14S/03E-21M54	550	36.6954	-121.6478

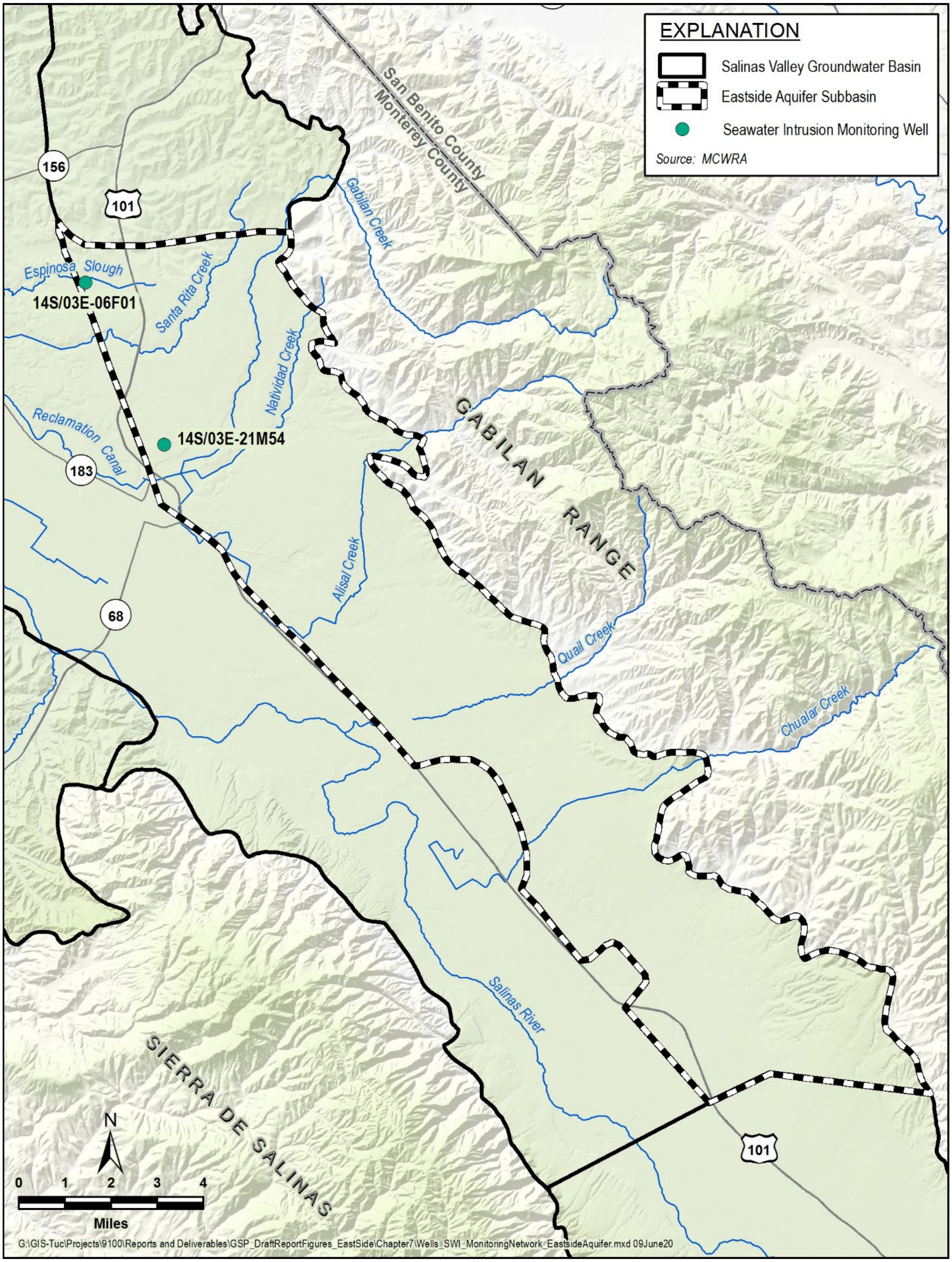

Figure 7-3. Eastside Aquifer Monitoring Network for Seawater Intrusion

7.4.1 Seawater Intrusion Monitoring Protocols

The protocols established by MCWRA for collecting groundwater quality data from monitoring wells and analyzing those data for seawater intrusion are adopted by this GSP. The groundwater quality data and seawater intrusion monitoring protocols are available in the Monterey County Quality Assurance Project Plan (QAPP),and included in Appendix 7B. MCWRA also established chloride data contouring protocols to establish the isocontour map, provided in Appendix 7C. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.4.2 Seawater Intrusion Monitoring Data Gaps

There are no data gaps in the seawater intrusion monitoring program.

7.5 Groundwater Quality Monitoring Network

The sustainability indicator for degraded water quality is evaluated by adopting the SWRCB DDW and CCRWQCB ILRP groundwater quality networks. The water quality monitoring network for the Subbasin is composed of public water system supply wells monitored under DDW, and on-farm domestic wells and irrigation supply wells monitored under ILRP.

As described in Chapter 8, separate minimum thresholds are set for the COC for public water system supply wells, on-farm domestic wells, and irrigation supply wells. Therefore, although there is a single groundwater quality monitoring network, different wells in the network are reviewed for different constituents. COC for drinking water are assessed at public water supply wells and on-farm domestic wells, and COC for crop health are assessed at agricultural supply wells. The COC for the 3 sets of wells are listed in Chapter 5.

The public water system supply wells included in the monitoring network were identified by reviewing data from the SWRCB DDW. The SWRCB collects data for 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. The RMS network consists of 70 DDW wells, as shown on Figure 7-4 and listed in Appendix 7D.

All on-farm domestic wells and irrigation supply wells that have been sampled through the CCRWQCB's IRLP are included in the RMS network. Under the existing Ag Order, there are 358 ILRP wells, consisting of 225 irrigation supply wells and 133 on-farm domestic wells that are all part of the RMS network. The locations of these wells are shown on Figure 7-5 and listed in Appendix 7D. The SVBGSA assumes that Ag Order 4.0 will have a similar representative geographic distribution of wells within the Subbasin. The agricultural groundwater quality monitoring network will be revisited and revised when the Ag Order 4.0 monitoring network is finalized.

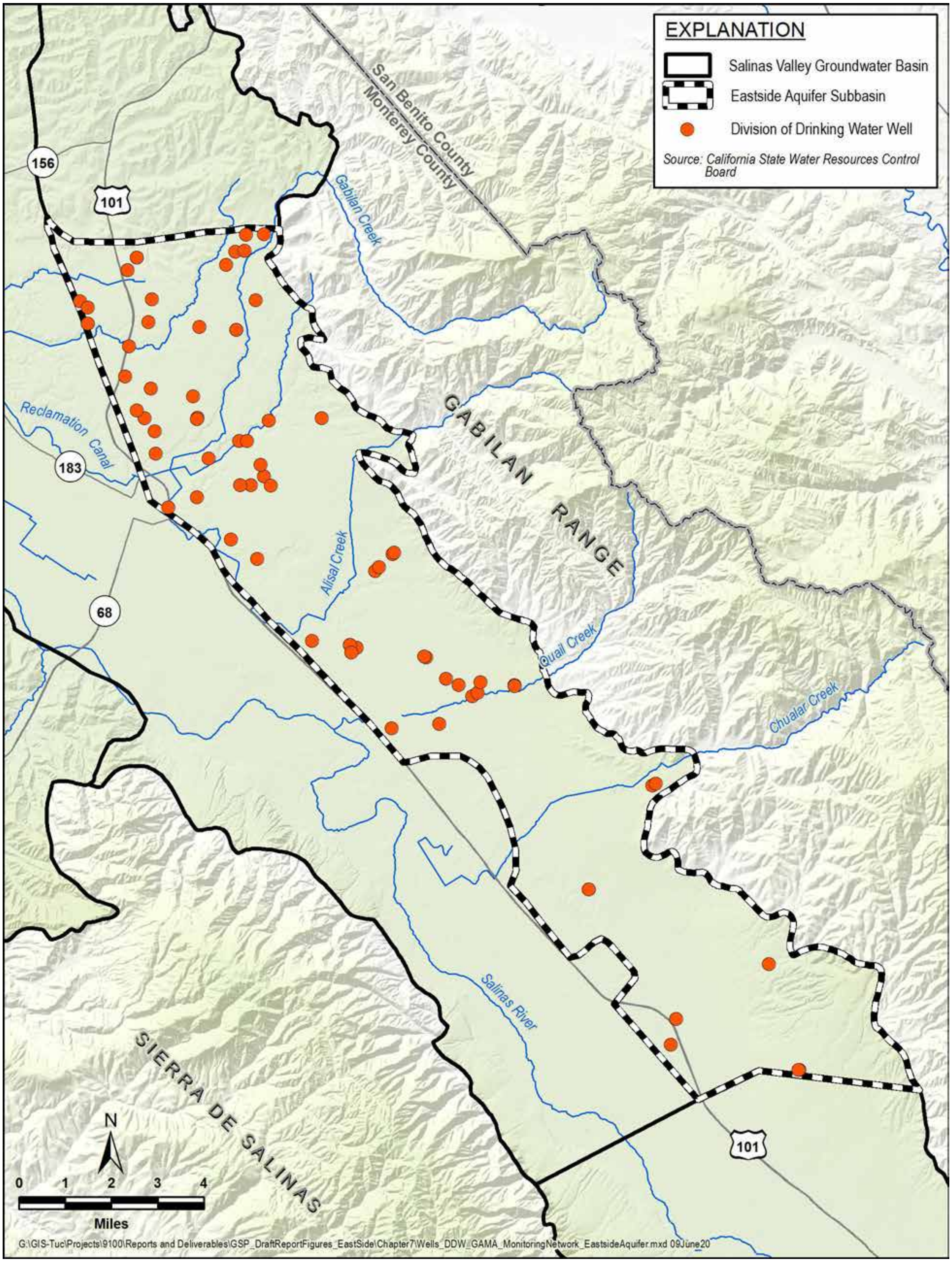

Figure 7-4. DDW Public Water System Supply Wells in the Groundwater Quality Monitoring Network

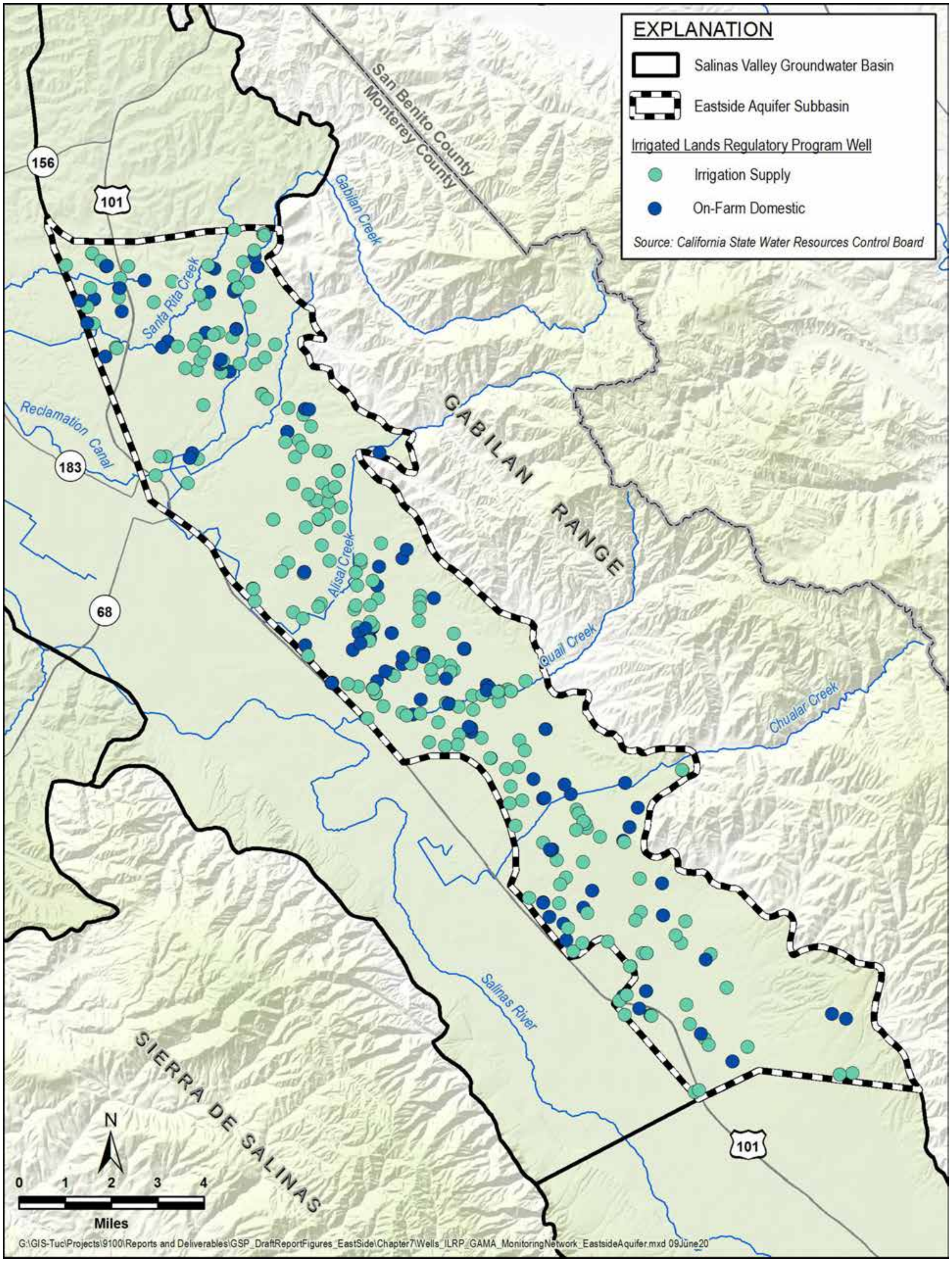

Figure 7-5. ILRP Wells in the Groundwater Quality Monitoring Network

7.5.1 Groundwater Quality Monitoring Protocols

The SVBGSA does not independently sample wells for any COC. Instead, the GSA analyzes water quality data that are collected through the DDW and ILRP. Therefore, the GSA is dependent on the monitoring density and frequency of DDW and ILRP.

Water quality data from public water systems are collected, analyzed, and reported in accordance with protocols that are reviewed and approved by the SWRCB DDW, in accordance with the state and federal Safe Drinking Water Acts. Monitoring protocols may vary by agency.

ILRP data are currently collected under CCRWQCB Ag Order 3.0. ILRP samples are collected under the Tier 1, Tier 2, or Tier 3 monitoring and reporting programs. Under Ag Order 4.0, ILRP data will be collected in 3 phases and each groundwater basin within the Central Coast Region has been assigned to one or more of these phases. The designated phase for each ILRP well is provided in SWRCB's GeoTracker database and is publicly accessible at: https://geotracker.waterboards.ca.gov/. Ag Order 4.0 will take effect in the Subbasin beginning in 2025. Copies of the Ag Orders 3.0 and 4.0 monitoring and reporting programs are included in Appendix 7E and are incorporated into this GSP. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.5.2 Groundwater Quality Monitoring Data Gaps

The DDW and ILRP monitoring network provide sufficient spatial and temporal data to determine groundwater quality trends for water quality indicators to address known water quality issues. Additionally, there is adequate spatial coverage in the water quality monitoring network to assess impacts to beneficial uses and users.

7.6 Land Subsidence Monitoring Network

As described in Section 5.5, DWR collects land subsidence data using InSAR satellite data and makes these data available to GSAs. This subsidence dataset represents the best available science for the Eastside Subbasin and is therefore used as the subsidence monitoring network.

7.6.1 Land Subsidence Monitoring Protocols

Land Subsidence monitoring protocols are the ones used by DWR for InSAR measurements and interpretation. DWR adapted their methods to measure subsidence on hard surfaces only and interpolate between them to minimize the change in land surface elevation captures in soft surfaces that are likely not true subsidence. The cell size of this interpolated surface is 302 feet by 302 feet. If the annual monitoring indicates subsidence is occurring at a rate greater than the minimum thresholds, then additional investigation and monitoring may be warranted. In particular, the GSAs will implement a study to assess if the observed subsidence can be correlated to groundwater elevations, and whether a reasonable causality can be established. These protocols are consistent with data and reporting standards described in GSP Regulation § 352.4.

7.6.2 Land Subsidence Data Gaps

There are no data gaps associated with the subsidence monitoring network.

7.7 Interconnected Surface Water Monitoring Network

The primary tool for assessing depletion of ISW due to pumping will be shallow monitoring wells adjacent to streams in the Subbasin. The SVIHM did not identify any locations of ISW in the Subbasin, as shown in Figure 4-9. However, there is a location of ISW along the Gabilan Creek just north of the Eastside Subbasin, and there could potentially be connection between surface water and groundwater in the Eastside Subbasin in the future. Figure 7-6 shows the location of a proposed new monitoring well along Gabilan Creek that will help monitor the ISW within the Langley Subbasin. This well will be located within the Eastside Subbasin so that it can be paired with the USGS gauge on Gabilan Creek shown on Figure 7-6. All ISW monitoring wells are RMS. More information on the development of the ISW monitoring network is provided in Appendix 7F.

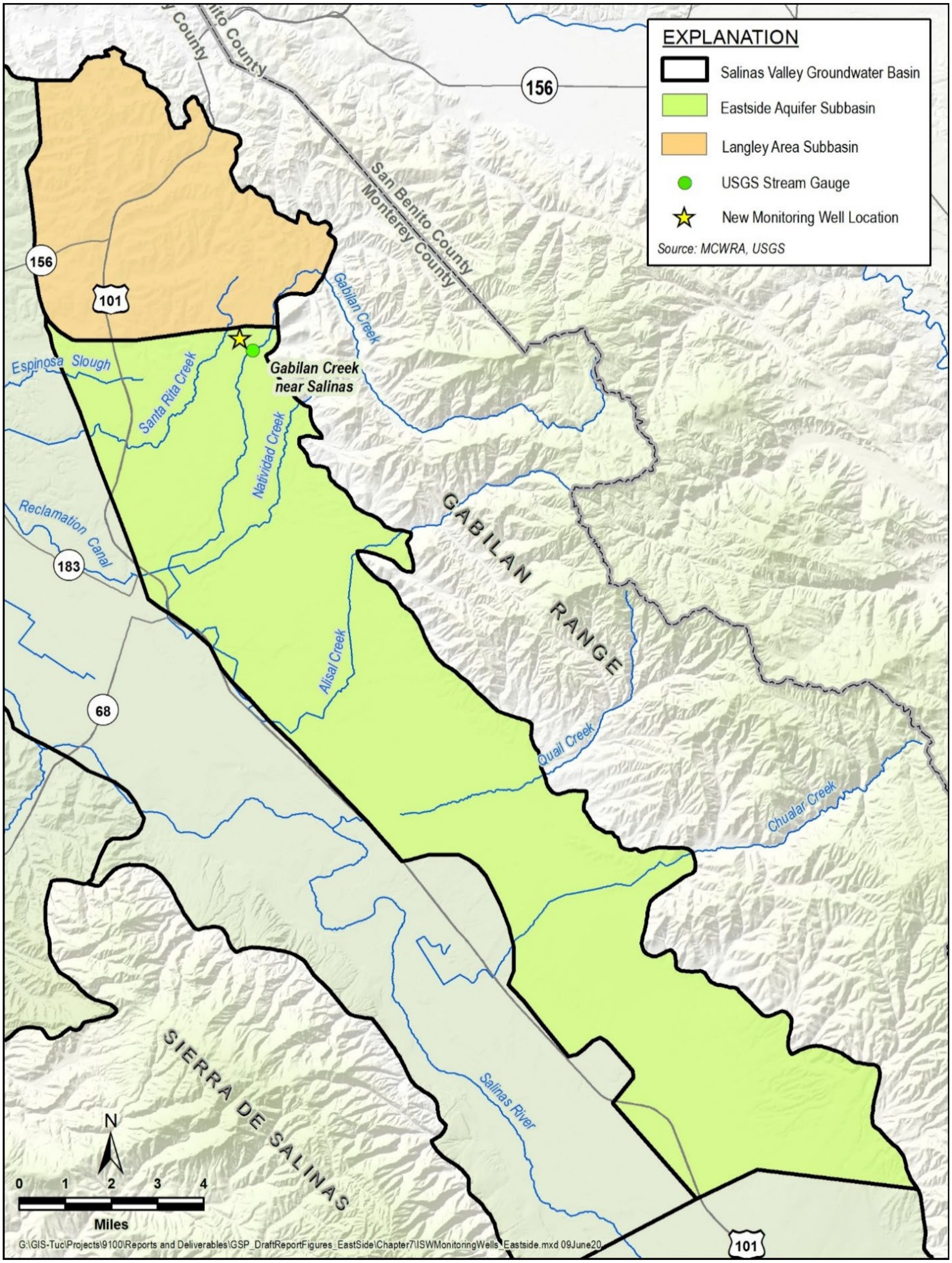

Figure 7-6. Interconnected Surface Water Monitoring Network

7.7.1 Interconnected Surface Water Monitoring Protocols

Monitoring protocols for shallow wells monitoring ISW will be identical to MCWRA's current groundwater elevation monitoring protocols, included in Appendix 7A. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4. Additionally, each well that is added to the monitoring network will be equipped with a data logger that will allow SVBGSA to access if seasonal pumping is resulting in streamflow depletions.

7.7.2 Interconnected Surface Water Data Gaps

There are no data gaps in the ISW monitoring network in the Eastside Subbasin, but the data gap in the Langley Subbasin will be filled with a new well added along the Gabilan Creek, as discussed in Chapter 10. The new shallow well will be added to MCWRA's groundwater elevation monitoring program.

7.8 Other Monitoring Networks

7.8.1 Groundwater Extraction Monitoring Network

SGMA requires that Annual Reports include annual groundwater extraction for the Subbasin. MCWRA's GEMS will be used to monitor urban and agricultural extraction in the Subbasin. Under Monterey County Ordinance No. 3717, public water systems and agricultural pumpers using wells with an internal discharge pipe greater than 3 inches within Zones 2, 2A, and 2B report extractions annually to GEMS. Extraction is self-reported by well owners or operators. Agricultural wells report their data based on MCWRA's reporting year that runs from November 1 through October 31 Urban and industrial wells report extraction on a calendar year basis. When extraction data is summarized annually, MCWRA combines industrial and urban extractions into a single urban water use. As depicted in Figure 3-3, these zones provide sufficient coverage of the Eastside Subbasin.

SVBGSA will work with MCWRA to obtain the GEMS data through a coordinated reporting program such that wells owners can provide a single annual reporting to fulfill the requirements of both the GSP and the existing County Ordinances No. 3717 and No. 3718.

7.8.1.1 Groundwater Extraction Monitoring Protocols

Groundwater extraction monitoring is accomplished using the GEMS data provided by MCWRA. Existing GEMS protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.8.1.2 Groundwater Storage Monitoring Data Gaps

Accurate assessment of the amount of pumping requires an accurate count of the number of municipal, agricultural, and domestic wells in the GSP area. As proposed in Chapter 9, SVBGSA will undertake well registration during implementation to develop a database of existing and active groundwater wells. This database will draw from the existing MCWRA database, DWR's OSWCR database, and the Monterey County Health Department database of state small and local small water systems. As part of the assessment, the SVBGSA will verify well completion information and location, and whether the well is active, abandoned, or destroyed as is discussed further in Chapter 9.

The accuracy and reliability of groundwater pumping reported through GEMS is constantly being updated. SVBGSA will work with MCWRA to evaluate methods currently in place to assure data reliability. Based on the results of that evaluation, the protocols for monitoring may be revised and a protocol for well meter calibration may be developed. SVBGSA will work with MCWRA to consider the value of developing protocols for flowmeter calibration and other potential enhancements to the GEMS programs that are discussed in Chapter 9.

7.8.2 Salinas River Watershed Diversions

Salinas River watershed monthly diversion data are collected annually in the SWRCB's Electronic Water Rights Information Management System (eWRIMS). eWRIMS is used track information of water rights in the state and is publicly accessible at: https://ciwqs.waterboards.ca.gov/ciwqs/ewrims/reportingDiversionDownloadPublicSetup.do. These data include diversions from tributaries of the Salinas River.

7.8.2.1 Salinas River Watershed Diversions Monitoring Protocols

Salinas River watershed diversion monitoring protocols are those that the SWRCB has established for the collection of water right information. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.8.2.2 Salinas River Watershed Diversions Monitoring Data Gaps

These data are lagged by a year because the reporting period does not begin until February of the following year.

7.9 Data Management System and Data Reporting

The SVBGSA has developed a DMS in adherence to GSP Regulations § 352.6 and § 354.40 that is used to store, review, and upload data collected as part of the GSP development and implementation.

The SVBGSA DMS consists of 2 SQL databases. The HydroSQL database stores information about each well and time-series data for water level and extraction. Fields in the HydroSQL database include:

- Subbasin
- Cadastral coordinates
- Planar coordinates
- Well owner
- Well name
- Well status
- Well depth
- Screened interval top and bottom
- Well type
- Water level elevation
- Annual pumping volume

Well owner and annual pumping information will be stored in HydroSQL; however, neither will be publicly accessible due to confidentiality requirements. Streamflow gauge data from the USGS is stored in the HydroSQL database similarly to the well water level information.

Water quality data are stored in the EnviroSQL database, which is linked to the HydroSQL database for data management purposes. Fields in the EnviroSQL database include:

- Station
- Parameter
- Sample Date
- Detection (detect or non-detect)
- Value
- Unit

The data used to populate the SVBGSA DMS are listed in Table 7-3. Categories marked with an X indicate datasets that were used in populating the DMS, including data that are publicly accessible or that are available to SVBGSA from MCWRA . Some data, such as groundwater extraction is confidential, and cannot be made publicly accessible by SVBGSA unless aggregated. Additional datasets will be added in the future as appropriate, such as recharge or diversion data.

Table 7-3. Datasets Available for Use in Populating the DMS

Data Sets	Data Category					
	Well and Site Information	Well Construction	Water Level	Groundwater Extraction [1]	Streamflow	Water Quality
DWR (CASGEM)	X	X				
MCWRA	X	X	X	X		
GAMA Groundwater Information System	X					X
USGS Gauge Station					X	

[1] Pumping data not publicly accessible

Data are compiled and reviewed to comply with quality objectives. The review included the following checks:

- Removing or flagging questionable data being uploaded in the DMS. This includes identifying outliers that may have been introduced during the original data entry process and plotting each well hydrograph to identify and remove anomalous data points.
- Loading into the database and checking for errors and missing data.

In the future, well log information will be entered for selected wells and other information will be added as needed to satisfy the requirements of the SGMA regulations.

The DMS also includes a publicly accessible web map hosted on the SVBGSA website; accessible at https://svbgsa.org/gsp-web-map-and-data/. This web map gives interested parties access to non-confidential technical information used in the development of the GSP and annual reports, and includes public well data and analysis such as water level contour maps and seawater intrusion, as well as various local administrative boundaries. In addition, the web-map has functionalities to graph time series of water levels and search for specific wells in the database. This web-map will be regularly updated as new information is made available to the SVBGSA.

8 SUSTAINABLE MANAGEMENT CRITERIA

This chapter defines the conditions that constitute sustainable groundwater management; and establishes minimum thresholds, measurable objectives, and undesirable results for each sustainability indicator. The minimum thresholds, measurable objectives, and undesirable results detailed in this chapter define the Subbasin's future conditions and commit the GSA to actions that will meet these criteria. This chapter includes adequate data to explain how SMC were developed and how they influence all beneficial uses and users.

The chapter is structured to address all the GSP Regulations § 354.22 *et. seq* regarding SMC. To retain an organized approach, the SMC are grouped by sustainability indicator. The discussion of each sustainability indicator follows a consistent format that contains all the information required by the GSP Regulations, and as further clarified in the SMC BMP (23 CCR § 352.22 *et seq.*; DWR, 2017).

8.1 Definitions

The SGMA legislation and GSP Regulations contain terms relevant to the SMC. The definitions included in the GSP Regulations are repeated below. Where appropriate, additional explanatory text is added in italics. This explanatory text is not part of the official definitions of these terms.

- **Sustainability indicator** refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in California Water Code § 10721(x).

  The 6 sustainability indicators relevant to this subbasin include chronic lowering of groundwater levels; reduction of groundwater storage; degraded water quality; land subsidence; seawater intrusion; and depletion of ISW.

- Significant and unreasonable

Significant and unreasonable is not defined in the Regulations. However, the definition of undesirable results states, "Undesirable results occur when significant and unreasonable effects … are caused by groundwater conditions…." This GSP adopts the phrase significant and unreasonable to be the qualitative description of undesirable conditions due to inadequate groundwater management. Minimum thresholds are the quantitative measurement of the significant and unreasonable conditions.

- **Minimum threshold** refers to a numeric value for each sustainability indicator used to define undesirable results.

  Minimum thresholds are indicators of an unreasonable condition.

- **Measurable objective** refers to a specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

  Measurable objectives are goals that the GSP is designed to achieve.

- **Interim milestone** refers to a target value representing measurable groundwater conditions, in increments of 5 years, set by an Agency as part of a Plan.

  Interim milestones are targets such as groundwater elevations that will be achieved every 5 years to demonstrate progress towards sustainability.

- Undesirable result

  Undesirable result is not defined in the Regulations. However, the description of undesirable result states that it should be a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the subbasin. An example undesirable result is more than 10% of the measured groundwater elevations being lower than the minimum thresholds. Undesirable results should not be confused with significant and unreasonable conditions. Significant and unreasonable conditions are qualitative descriptions of conditions to be avoided; an undesirable result is a quantitative assessment based on minimum thresholds.

8.2 Sustainability Goal

The sustainability goal of the Eastside Aquifer Subbasin is to manage groundwater resources for long-term community, financial, and environmental benefits to the Subbasin's residents and businesses. The goal of this GSP is to ensure long-term viable water supplies while maintaining the unique cultural, community, and business aspects of the Subbasin. It is the express goal of this GSP to balance the needs of all water users in the Subbasin.

Several projects and management actions are included in this GSP and detailed in Chapter 9. It is not necessary to implement all projects and actions listed in this GSP to achieve sustainability. However, some combination of these will be implemented to ensure the Subbasin is operated within its sustainable yield and achieves sustainability. These projects include 2 recharge projects, 3 projects that divert surface water for in lieu use or recharge, and 4 projects are alternative water supplies, 2 of which are multi-subbasin. Chapter 9 also includes the options of promoting conservation and agricultural BMPs, land fallowing, and pumping allocations and controls, which provide for demand management if necessary. Three projects involve the Salinas River and will likely have indirect benefits for the Eastside Subbasin and may reduce the need for projects within the Subbasin. Finally, Chapter 9 includes implementation actions that do not directly help meet the SMC, but contribute to GSP implementation through data collection, assistance to groundwater users, and collaboration with partner agencies. This suite of projects and management actions provide sufficient options to achieve sustainability in the Eastside Subbasin throughout GSP implementation.

The management actions and projects are designed to achieve sustainability within 20 years by one or more of the following means:

- Educating stakeholders and prompting changes in behavior to improve chances of achieving sustainability.
- Increasing awareness of groundwater pumping impacts to promote voluntary reductions in groundwater use through improved water use practices or fallowing crop land.
- Increasing basin recharge.
- Developing new alternative water supplies for use in the Subbasin to offset groundwater pumping.

8.3 Achieving Long-Term Sustainability

The GSP addresses long-term groundwater sustainability. Correspondingly, the SVBGSA intends to develop SMC to avoid undesirable results under future hydrologic conditions. The understanding of future conditions is based on historical precipitation, evapotranspiration, streamflow, and reasonable anticipated climate change, which have been estimated on the basis of the best available climate science (DWR, 2018). These parameters underpin the estimated future water budget over the planning horizon (see Section 6.4). The average hydrologic conditions include reasonably anticipated wet and dry periods. Groundwater conditions that are the result of extreme climatic conditions and are worse than those anticipated do not constitute an undesirable result. However, SMC may be modified in the future to reflect observed future climate conditions.

The GSA will track hydrologic conditions during GSP implementation. These observed hydrologic conditions will be used to develop a value for average hydrologic conditions, which will be compared to predicted future hydrologic conditions. This information will be used to interpret the Subbasin’s performance against SMC. Year-by-year micro-management is not the intent of this GSP; this GSP is developed to avoid undesirable results with long-term, deliberate groundwater management. For example, groundwater extractions may experience variations caused by reasonably anticipated hydrologic fluctuations. However, under average hydrologic conditions, there will be no chronic depletion of groundwater storage.

Further, since the GSP addresses long-term groundwater sustainability, exceedance of some SMC during an individual year does not constitute an undesirable result. Pursuant to SGMA regulations (California Water Code § 10721(w)(1)), “Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater levels may temporarily exceed minimum thresholds during prolonged droughts, which could be more extreme than those that have been anticipated based on historical data and anticipated climate change conditions. Such temporary exceedances do not constitute an undesirable result.

The SMC presented in this chapter are developed on the basis of historically observed hydrologic conditions and, in most cases, reasonably anticipated climate change. These SMC may be updated in future drafts to reflect changes in anticipated climate conditions and climate change based upon groundwater modeling results.

8.4 General Process for Establishing Sustainable Management Criteria

The SMC presented in this chapter were developed using publicly available information, feedback gathered during public meetings including subbasin committee meetings, hydrogeologic analysis, and meetings with SVBGSA staff and Advisory Committee members. The general process included:

- Presenting to subbasin committees on the general SMC requirements and implications. These presentations outlined the approach to developing SMC and discussed initial SMC ideas.
- Providing supplemental data to the subbasin committees to guide the approach to setting SMC.
- Polling and receiving feedback from the subbasin committees to establish preferences for establishing SMC.
- Obtaining additional input on SMC from with GSA staff and GSA Board Members.
- Modifying minimum thresholds and measurable objectives based on input from the public, GSA staff, and GSA Board Members, if needed.

8.5 Sustainable Management Criteria Summary

Table 8-1 provides a summary of the SMC for each of the 6 sustainability indicators. Measurable objectives are the goals that reflect the Subbasin's desired groundwater conditions for each sustainability indicator. These provide operational flexibility above the minimum thresholds. The minimum thresholds are quantitative indicators of the Subbasin's locally defined significant and unreasonable conditions. The undesirable result is a combination of minimum threshold exceedances that show a significant and unreasonable condition across the Subbasin as a whole. This GSP is designed to not only avoid undesirable results, but to achieve the sustainability goals within 20 years, along with interim milestones every 5 years that show progress. The management actions and projects provide sufficient options for reaching the measurable objectives within 20 years and maintaining those conditions for 30 years for all 6 sustainability indicators. The rationale and background for developing these criteria are described in detail in the following sections.

The SMC are individual criteria that will each be met simultaneously, rather than in an integrated manner. For example, the groundwater elevation and seawater intrusion SMC are 2 independent SMC that will be achieved simultaneously. The groundwater elevation SMC do not hinder the seawater intrusion SMC, but also, they do not ensure the halting of seawater intrusion by themselves. The SMC presented in Table 8-1 are part of the GSA's 50-year management plan: SGMA allows for 20 years to reach sustainability and requires the Subbasin have no undesirable results for the subsequent 30 years.

Table 8-1. Sustainable Management Criteria Summary

Sustainability Indicator	Measurement	Minimum Threshold	Measurable Objective	Undesirable Result
Chronic lowering of groundwater levels	Measured through groundwater level representative monitoring well network.	Minimum thresholds are set to 2015 groundwater elevations. See Table 8-2.	Measurable objectives are set to 1999 groundwater elevations. See Table 8-2	More than 15% of groundwater elevation minimum thresholds are exceeded. Allows for 4 exceedances per year in the Eastside Subbasin.
Reduction in groundwater storage	Measured by proxy through groundwater level representative monitoring well network.	Minimum thresholds are established by proxy using groundwater elevations. The reduction in groundwater storage minimum thresholds are the same as the chronic lowering of groundwater levels minimum thresholds.	Measurable objectives are established by proxy using groundwater elevations. The reduction in groundwater storage measurable objectives are the same as the chronic lowering of groundwater levels measurable objectives.	More than 15% of groundwater elevation minimum thresholds are exceeded. The undesirable result for reduction in groundwater storage is established by proxy using groundwater elevations.
Seawater intrusion	Seawater intrusion maps developed by MCWRA.	Minimum threshold is the 500 mg/L chloride isocontour at the Subbasin boundary.	Measurable objective is identical to the minimum threshold, resulting in no seawater intrusion in the Eastside Subbasin.	Any exceedance of the minimum threshold, resulting in mapped seawater intrusion within the Subbasin boundary.
Degraded groundwater quality	Groundwater quality data downloaded annually from GAMA groundwater information system.	Minimum threshold is zero additional exceedances of either the regulatory drinking water standards (potable supply wells) or the Basin Plan objectives (irrigation supply wells) for groundwater quality COC. Exceedances are only measured in public water system supply wells and ILRP on-farm domestic and irrigation supply wells. See Table 8-4.	Measurable objective is identical to the minimum threshold.	Future or new minimum thresholds exceedances are caused by a direct result of GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction.
Land subsidence	Measured using DWR provided InSAR data.	Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors.	Measurable objective is identical to the minimum threshold, resulting in zero net long-term subsidence.	There is an exceedance of the minimum threshold for subsidence due to lowered groundwater elevations.
Depletion of interconnected surface water	Groundwater elevations in shallow wells adjacent to locations of ISW identified using the SVIHM.	Minimum thresholds are established by proxy using shallow groundwater elevations observed in 2015 near locations of ISW.	Measurable objectives are established by proxy using shallow groundwater elevations observed in 1999 near locations of ISW.	There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor ISW.

8.6 Chronic Lowering of Groundwater Levels SMC

8.6.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable groundwater elevations in the Subbasin are those that:

- Are at or below the observed groundwater elevations in 2015. Public and stakeholder input identified these historical groundwater elevations as significant and unreasonable.
- Cause low groundwater elevations in a significant number of domestic and small water system wells that lead to inadequate water production
  - Interfere with other sustainability indicators

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

8.6.2 Minimum Thresholds

> *The minimum thresholds for chronic lowering of groundwater levels are set to 2015 groundwater elevations in this Subbasin.*

The minimum threshold values for each well within the groundwater level representative monitoring network are provided in Table 8-2. The minimum threshold contour maps, along with the RMS well locations for the Eastside Subbasin are shown on Figure 8-1 and Figure 8-2 for the Shallow and Deep Zones, respectively.

As indicated in Table 8-2, 16 out of 35 RMS are screened in both the Shallow and Deep Zones of the Eastside Aquifer. Depending on the year, these wells could be more representative of either the Shallow or Deep Zone. Thus, these wells are shown on the minimum threshold and measurable objective maps for both the Shallow and Deep Zones.

Table 8-2. Chronic Lowering of Groundwater Levels Minimum Thresholds and Measurable Objectives

Monitoring Site	Minimum Threshold (ft)	Measurable Objective (ft)
Shallow Zone		
14S/03E-06R01	-29.7	-24.9*
14S/03E-11H01	25.2	88.3
14S/03E-24H01	-84.1	-54.5
14S/03E-25C02	-65.4	-42.2*
14S/03E-27B01	-12.8	-5.0*
14S/03E-33G01	-18.0	-6.9*
14S/03E-36A01	-55.2	-29.7
15S/04E-07R02	-4.6	17.8
15S/04E-14N01	-34.6	14.0*
15S/04E-17P02	-18.0	17.5
15S/04E-24N03	-15.8	26.0
16S/05E-17R01	61.9	77.1
Deep Zone		
14S/03E-17F01	-44.0	-27.5*
14S/03E-21L01	-36.0	-22.6*
14S/03E-22D01	-62.0	-50.0
14S/03E-25C01	-64.9	-41.7*
14S/03E-34C01	-31.0	-13.3*
15S/03E-02G01	-36.0	-8.8*
16S/04E-02Q03	32.5	57.8
Both Zones		
14S/03E-03K01	-63.1	-40.7
14S/03E-08C01	-48.0	-31.5
14S/03E-08Q03	-41.0	-31.0
14S/03E-09E02	-54.0	-38.2*
14S/03E-09P02	-33.1	-19.7
14S/03E-15H03	-55.3	-36.7
14S/04E-31Q02	-61.0	-25.6*
15S/04E-06R01	-30.5	-4.1
15S/04E-09D01	-52.0	-29.2
15S/04E-15D02	-26.5	-0.2
15S/04E-21F04	-12.2*	16.5*
15S/04E-27G01	3.8	33.5
15S/04E-36H01	12.9	56.2
16S/05E-05N01	29.1	62.5
16S/05E-07G01	38.7	69.3
16S/05E-27G01	77.7	88.4*

*Groundwater elevation was estimated.

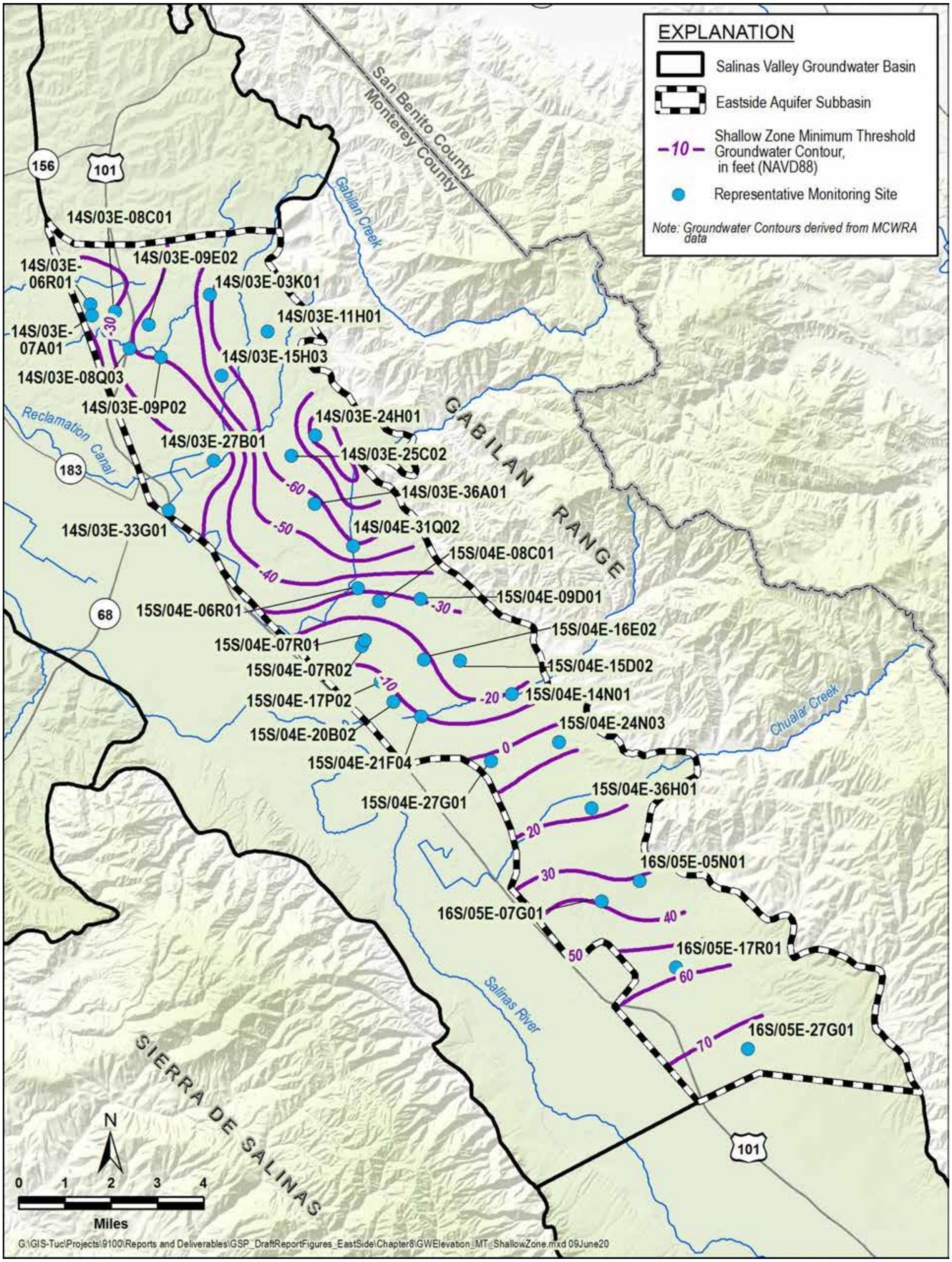

Figure 8-1. Groundwater Level Minimum Threshold Contour Map for the Shallow Zone of the Eastside Aquifer

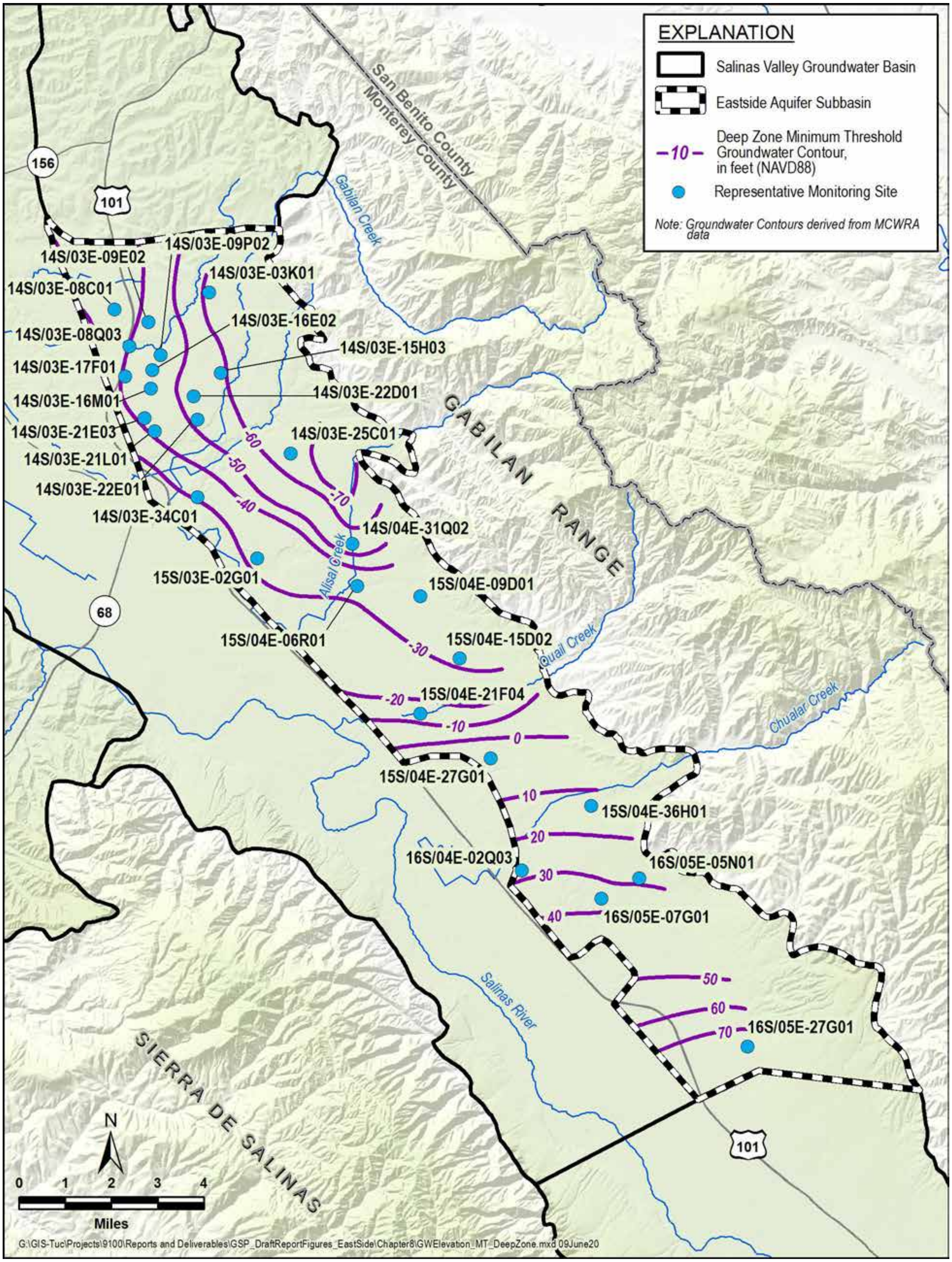

Figure 8-2. Groundwater Level Minimum Threshold Contour Map for the Deep Zone of the Eastside Aquifer

8.6.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The development of both minimum thresholds and measurable objectives followed similar processes and are described in this section. The information used includes:

- Feedback from discussions with the Subbasin Committee on challenges and goals
- Historical groundwater elevation data and hydrographs from wells monitored by the MCWRA
- Maps of current and historical groundwater elevation data
- Analysis of the impact of groundwater elevations on domestic wells

The general steps for developing minimum thresholds and measurable objectives were:

1. The Subbasin Committee selected an approach and criteria for to setting the groundwater level minimum thresholds and measurable objectives.
2. SVBGSA used MCWRA's average groundwater elevation change hydrographs to select representative years that could define minimum thresholds and measurable objectives for the Subbasin. Groundwater elevations like those experienced during the representative climatic cycle between 1967 and 1998 were used to identify minimum thresholds and measurable objectives to ensure that they were achievable under reasonably expected climatic conditions. This representative period corresponds to important water management milestones for the Salinas Valley Groundwater Basin; water year 1967 marks the beginning of operations at San Antonio Reservoir, with first water releases in November 1966. The Castroville Seawater Intrusion Project (CSIP) began operating in 1998.

   The average groundwater elevation change hydrograph with minimum threshold and measurable objectives lines for the Eastside Subbasin are shown on Figure 8-3. The average 2015 groundwater elevations in the Eastside Subbasin are considered significant and unreasonable. When looking at the groundwater elevation changes within the representative climatic cycle, the historical lowest elevations occurred in 1991, at approximately 6 feet lower than 2015 elevations. The minimum thresholds were therefore set to the 2015 groundwater elevations. The measurable objective is set to 1999 groundwater elevations, which is an achievable goal for the Subbasin under reasonably expected climatic conditions.

SVBGSA identified the appropriate minimum thresholds and measurable objectives on the respective monitoring well hydrographs. Each hydrograph was visually inspected to check if the minimum threshold and measurable objective was reasonable. If an RMS did not have measurements from the minimum threshold or measurable objective years, the SMC were interpolated from the groundwater elevation contours. The RMS location was intersected with groundwater elevation contour maps to estimate the minimum thresholds and measurable objectives. Moreover, if the minimum threshold seemed unreasonable for an RMS, it was adjusted to be more reflective of recently low groundwater elevations and changes in groundwater elevations experienced due to climatic cycles. Additionally, measurable objectives were revised in order to set a more realistically achievable goal based on historic water levels. The interpolated or adjusted minimum thresholds and measurable objectives are indicated by an asterisk in Table 8-2

Hydrographs with well completion information showing minimum thresholds for each RMS are included in Appendix 8A.

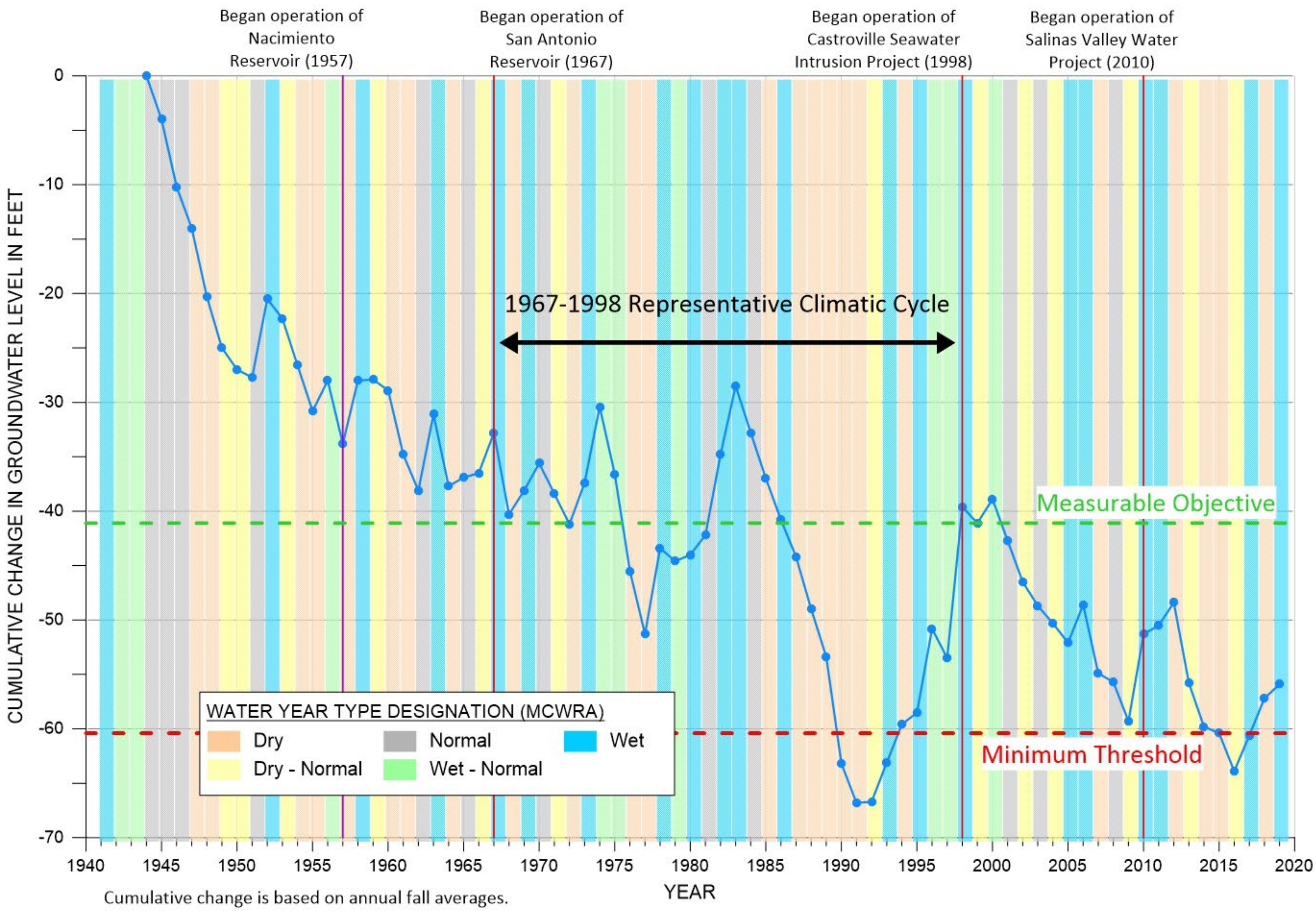

Figure 8-3. Cumulative Groundwater Elevation Change Hydrograph with Selected Measurable Objective and Minimum Threshold for the Eastside Aquifer Subbasin

8.6.2.2 Minimum Thresholds Impact on Domestic Wells

To address the human right to water, minimum thresholds for groundwater levels are compared to the range of domestic well depths in the Subbasin using DWR's Online System for Well Completion Reports (OSWCR) database. This check was done to assure that the minimum thresholds maintain operability in a reasonable percentage of domestic wells. The proposed minimum thresholds for groundwater levels do not necessarily protect all domestic wells because it is impractical to manage a groundwater basin in a manner that fully protects the shallowest wells. The average computed depth of domestic wells in the Subbasin is 361 feet using the Public Land Survey System sections data in the OSWCR database.

While this approach is reasonable, there are some adjustments that had to be made to improve the accuracy of the analysis. These include:

- The OSWCR database does not eliminate wells that have been abandoned, destroyed, or replaced, such as if the user switched to a water system, and abandoned or destroyed wells would have no detrimental impacts from lowered groundwater levels. For example, the Subbasin experienced a prolonged drought from 1986 to 1992, causing many new wells to be drilled. Thus, wells drilled prior to 1991 are likely abandoned if they were not modified.
- Only wells likely to be in the principal aquifer were considered, since some domestic wells may draw water from shallow, perched groundwater that is not managed under this GSP.
- Only wells that had accurate locations were included, since some wells in the OSWCR database are not accurately located, it could lead to inaccurate estimations of depth to water in the wells.
- The depth to water is derived from a smoothly interpolated groundwater elevation contour map. Errors in the map may result in errors in groundwater elevation at the selected domestic wells.

Given the limitations listed above, the analysis included 20 wells out of the total 206 domestic wells in the OSWCR database. The analysis of domestic wells showed that in the Eastside Subbasin all domestic wells will have at least 25 feet of water in them as long as groundwater elevations remain above minimum thresholds; therefore, all domestic wells will have at least 25 feet of water in them when measurable objectives are achieved. These percentages were considered reasonable despite the limitations of this analysis. Since data for the analysis is limited, further assessment may be done when more data becomes available.

8.6.2.3 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The SVBGSA compared minimum thresholds between RMSs to understand the relationship between RMSs (i.e., describe why or how a water level minimum threshold set at a particular RMS is similar to or different from water level thresholds in nearby RMS). The groundwater level minimum thresholds are derived from historical and/or smoothly interpolated groundwater elevations in the Subbasin. Therefore, the minimum thresholds are unique at every well, but when combined represent a reasonable and potentially realistic groundwater elevation map. Because the underlying groundwater elevation map is a reasonably achievable condition, the individual minimum thresholds at RMSs do not conflict with each other.

Groundwater level minimum thresholds can influence other sustainability indicators. SVBGSA reviewed the groundwater level minimum thresholds' relationship with each of the other sustainability indicators' minimum thresholds to ensure a groundwater level minimum threshold would not trigger an undesirable result for any of the other sustainability indicators. The groundwater level minimum thresholds are selected to avoid undesirable results for other sustainability indicators.

- **Reduction in groundwater storage.** The chronic lowering of groundwater levels minimum thresholds are identical to the groundwater storage minimum thresholds. Thus, the groundwater level minimum thresholds will not result in an undesirable loss of groundwater storage.
- **Seawater intrusion.** The chronic lowering of groundwater level minimum thresholds are set above historical lows. Therefore, the groundwater elevation minimum thresholds are intended to not exacerbate, and may help control, the rate of seawater intrusion.
- **Degraded water quality**. The chronic lowering of groundwater levels minimum could affect groundwater quality through 2 processes:
    1. Changes in groundwater elevation could change groundwater gradients, which could cause poor quality groundwater to flow toward production and domestic wells that would not have otherwise been impacted. These groundwater gradients, however, are only dependent on differences between groundwater elevations, not on the groundwater elevations themselves. Therefore, the minimum threshold groundwater levels do not directly lead to a significant and unreasonable degradation of groundwater quality in production and domestic wells.
    2. Decreasing groundwater elevations can mobilize COC that are concentrated at depth, such as arsenic. The groundwater level minimum thresholds are near or above historical lows. Therefore, any depth dependent constituents have previously been mobilized by historical groundwater levels. Maintaining groundwater elevations

above the minimum thresholds assures that no new depth dependent COC are mobilized and are therefore protective of beneficial uses and users.

- **Land subsidence.** The chronic lowering of groundwater levels minimum thresholds are set at or above recent low groundwater elevations. Thus, avoiding the dewatering and compaction of clay-rich sediments that causes subsidence in response to lowering groundwater elevations.
- **Depletion of ISW.** The chronic lowering of groundwater levels minimum thresholds are identical to the ISW minimum thresholds. Therefore, the groundwater level minimum thresholds will not result in a significant or unreasonable depletion of ISW, including GDEs.

8.6.2.4 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.6.2.5 Effects on Beneficial Users and Land Uses

The groundwater level minimum thresholds may have several effects on beneficial users and land uses in the Subbasin.

Agricultural land uses and users. The groundwater level minimum thresholds prevent continued lowering of groundwater elevations in the Subbasin. Unless sufficient recharge projects are undertaken, this may have the effect of limiting the amount of groundwater pumping in the Subbasin. Limiting the amount of groundwater pumping may limit the amount and type of crops that can be grown in the Subbasin. The groundwater level minimum thresholds could therefore limit expansion of the Subbasin's agricultural economy. This could have various effects on beneficial users and land uses:

- Agricultural land currently under irrigation may become more valuable as bringing new lands into irrigation becomes more difficult and expensive.
- Agricultural land not currently under irrigation may become less valuable because it may be too difficult and expensive to irrigate.

Urban land uses and users. The groundwater level minimum thresholds may reduce the amount of groundwater pumping in the Subbasin. This may limit urban growth or result in urban areas obtaining alternative sources of water. This may result in higher water costs for public drinking water system users.

Domestic land uses and users. The groundwater level minimum thresholds are intended to protect most domestic wells, including small state and small local system wells. Therefore, the minimum thresholds will likely have an overall beneficial effect on existing domestic land uses by protecting the ability to pump from domestic wells. However, extremely shallow domestic wells may become dry, requiring owners to drill deeper wells. Additionally, the groundwater level minimum thresholds may limit the number of new domestic wells or small state and small local system wells that can be drilled to limit future declines in groundwater elevations.

Ecological land uses and users. The groundwater level minimum thresholds may limit the amount of groundwater pumping in the Subbasin and may limit both urban and agricultural growth. This outcome may benefit ecological land uses and users by curtailing the conversion of native vegetation to agricultural or domestic uses, and by reducing pressure on existing ecological land caused by declining groundwater elevations.

8.6.2.6 Relevant Federal, State, or Local Standards

No federal, state, or local standards exist for chronic lowering of groundwater levels.

8.6.2.7 Method for Quantitative Measurement of Minimum Thresholds

Groundwater level minimum thresholds will be directly measured from the representative monitoring well network. The groundwater elevation monitoring will be conducted in accordance with the monitoring plan outlined in Chapter 7. Furthermore, the groundwater elevation monitoring will meet the requirements of the technical and reporting standards included in the GSP Regulations.

As noted in Chapter 7, the current groundwater level representative monitoring network in the Subbasin includes 35 wells. Data gaps were identified in Chapter 7 and will be resolved during implementation of this GSP.

8.6.3 Measurable Objectives

The measurable objectives for chronic lowering of groundwater levels represent target groundwater elevations that are higher than the minimum thresholds. These measurable objectives provide operational flexibility to ensure that the Subbasin can be managed sustainably over a reasonable range of hydrologic variability.

The measurable objectives for the chronic lowering of groundwater levels are set to 2011 groundwater elevations.

The measurable objectives are summarized in Table 8-2 and are also shown on the hydrographs for each RMS in Appendix 8A.

8.6.3.1 Methodology for Setting Measurable Objectives

The methodology for establishing measurable objectives is described in detail in Section 8.6.2.1. A year from the relatively recent past was selected for setting measurable objectives to ensure that objectives are achievable. Groundwater elevations from 1999 were selected as representative of the measurable objectives for the Eastside Subbasin. The measurable objective contour maps for the Eastside Subbasin along with the representative monitoring network wells are shown on Figure 8-4 and Figure 8-5 for the Shallow and Deep Zones, respectively.

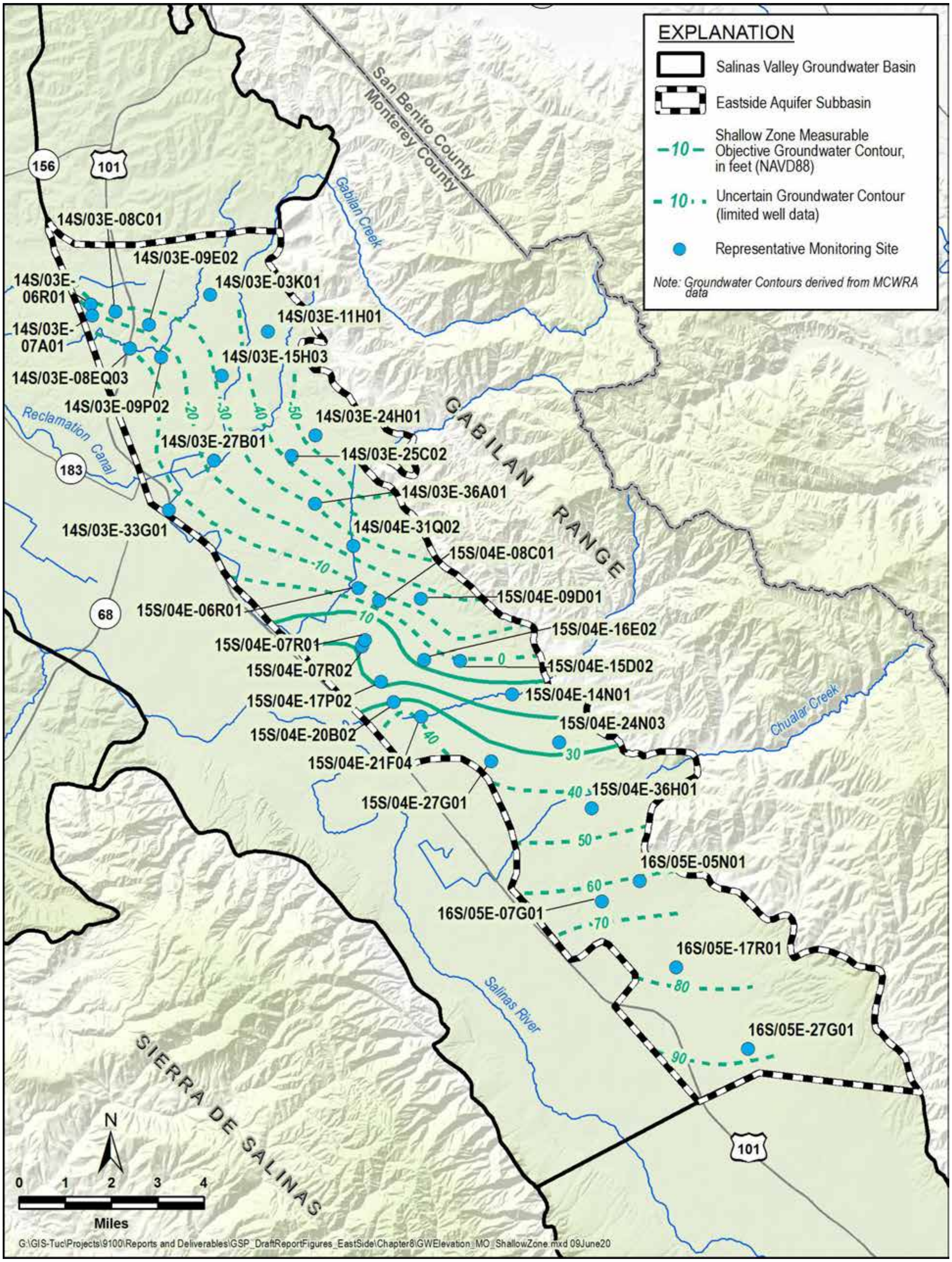

Figure 8-4. Groundwater Level Measurable Objective Contour Map for the Shallow Zone of the Eastside Aquifer

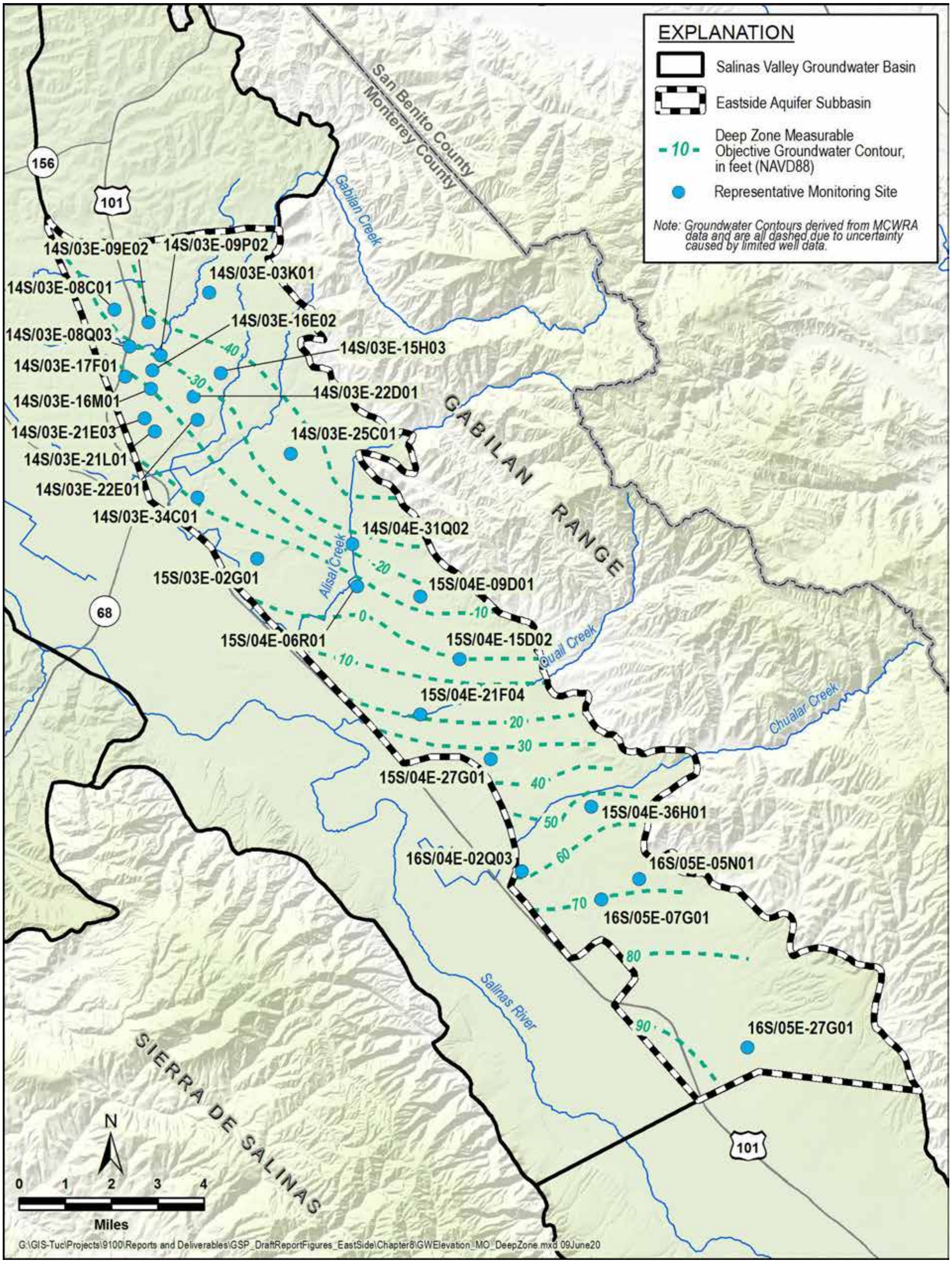

Figure 8-5. Groundwater Level Measurable Objective Contour Map for the Deep Zone of the Eastside Aquifer

8.6.3.2 Interim Milestones

Interim milestones for groundwater levels are shown in Table 8-3. These are only initial estimates of interim milestones. Interim milestones for groundwater levels will be modified as better data, analyses, and project designs become available.

Table 8-3. Chronic Lowering of Groundwater Levels Interim Milestones

Monitoring Site	Current Groundwater Elevation (ft)	Interim Milestone at Year 2027 (ft)	Interim Milestone at Year 2032 (ft)	Interim Milestone at Year 2037 (ft)	Measurable Objective (ft) (goal to reach at 2042)
Shallow Zone					
14S/03E-06R01	-26.5	-32.2	-32.2	-29.1	-24.9*
14S/03E-11H01	66.2	59.0	67.5	76.0	88.3
14S/03E-24H01	-77.6	-84.3	-84.3	-72.0	-54.5
14S/03E-25C02	-59.4	-71.5	-71.5	-59.5	-42.2*
14S/03E-27B01	-8.2	-13.1	-13.1	-9.7	-5.0*
14S/03E-33G01	-13.0	-15.8	-15.8	-12.1	-6.9*
14S/03E-36A01	-49.4	--56.8	-56.8	-45.5	-29.7
15S/04E-07R02	6.4	-5.8	-5.8	4.0	17.8
15S/04E-14N01	-37.4*	-42.0	-42.0	-19.0	14.0*
15S/04E-17P02	1.2	-14.2	-14.2	-1.0	17.5
15S/04E-24N03	-10.3	-23.5	-23.5	-3.1	26.0
16S/05E-17R01	70.4	62.1	62.1	68.3	77.1
Deep Zone					
14S/03E-17F01	-36.0	-45.0	-45.0	-37.8	-27.5*
14S/03E-21L01	-32.0	-42.8	-42.8	-34.5	-22.6*
14S/03E-22D01	-48.0	-50.0	-50.0	-50.0	-50.0*
14S/03E-25C01	-61.2	-76.3	-76.3	-62.0	-41.7*
14S/03E-34C01	-27.0	-31.5	-31.5	-24.0	-13.3*
15S/03E-02G01	-23.0	-31.4	-31.4	-22.0	-8.8*
16S/04E-02Q03	40.5	26.0	26.0	39.0	57.8
Both Zones					
14S/03E-03K01	-58.8	-67.1	-67.1	-56.3	-40.7
14S/03E-08C01	-48.1	-38.1	-36.1	-34.2	-31.5
14S/03E-08Q03	-46.0	-48.3	-43.4	-38.1	-31.0*
14S/03E-09E02	-48.0	-65.3	-65.3	-54.2	-38.2*
14S/03E-09P02	-24.8	-32.3	-32.3	-27.0	-19.7
14S/03E-15H03	-48.1	-59.7	-59.7	-50.3	-36.7
14S/04E-31Q02	-51.2	-65.3	-65.3	-49.0	-25.6*

Monitoring Site	Current Groundwater Elevation (ft)	Interim Milestone at Year 2027 (ft)	Interim Milestone at Year 2032 (ft)	Interim Milestone at Year 2037 (ft)	Measurable Objective (ft) (goal to reach at 2042)
15S/04E-06R01	-25.3	-39.1	-39.1	-24.5	-4.1
15S/04E-09D01	-43.2	-55.4	-55.4	-44.7	-29.2
15S/04E-15D02	-21.1	-33.3	-33.3	-19.5	-0.2
15S/04E-21F04	-0.2	-12.0	-12.0	-0.2	16.5*
15S/04E-27G01	15.4	0.7	0.7	14.5	33.5
15S/04E-36H01	22.3	8.6	8.6	28.5	56.2
16S/05E-05N01	38.7	26.0	26.0	41.0	62.5
16S/05E-07G01	51.7	37.5	37.5	50.8	69.3
16S/05E-27G01	84.9	76.0	76.0	81.0	88.4*

*Groundwater elevation was estimated.

8.6.4 Undesirable Results

8.6.4.1 Criteria for Defining Chronic Lowering of Groundwater Levels Undesirable Results

The chronic lowering of groundwater levels undesirable result is a quantitative combination of groundwater level minimum threshold exceedances. The undesirable result is:

More than 15% of the groundwater elevation minimum thresholds are exceeded.

Since the GSP addresses long-term groundwater sustainability, exceedances of groundwater levels minimum thresholds during a drought do not constitute an undesirable result. Pursuant to SGMA Regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater levels may temporarily exceed minimum thresholds during droughts, and do not constitute an undesirable result, as long as groundwater levels rebound.

Undesirable results provide flexibility in defining sustainability. Increasing the percentage of allowed minimum threshold exceedances provides more flexibility but may lead to significant and unreasonable conditions for some beneficial users. Reducing the percentage of allowed minimum threshold exceedances ensures strict adherence to minimum thresholds but reduces flexibility due to unanticipated hydrogeologic conditions. The undesirable result was set at 15% to balance the interests of beneficial users with the practical aspects of groundwater management under uncertainty.

The 15% limit on minimum threshold exceedances in the undesirable result allows for 4 exceedances in the 35 existing representative monitoring wells. This was considered a reasonable number of exceedances given the hydrogeologic uncertainty of aquifer characteristics of the Subbasin. As the monitoring system grows, additional exceedances will be allowed. One additional exceedance will be allowed for approximately every 7 new monitoring wells.

8.6.4.2 Potential Causes of Undesirable Results

An undesirable result for chronic lowering of groundwater levels does not currently exist, since groundwater elevations in 32 out of 35 representative monitoring wells (91%) in the Subbasin were above the minimum threshold in the Fall 2019 groundwater elevation measurements. Conditions that may lead to an undesirable result include the following:

- **Localized pumping clusters**. Even if regional pumping is maintained within the sustainable yield, clusters of high-capacity wells may cause excessive localized drawdowns that lead to undesirable results.
- **Expansion of *de minimis* pumping**. Individual *de minimis* pumpers do not have a significant impact on groundwater elevations. However, many *de minimis* pumpers are often clustered in specific residential areas. Pumping by these *de minimis* users is not regulated under this GSP. Adding additional domestic *de minimis* pumpers in these areas may result in excessive localized drawdowns and undesirable results.
- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought**. Minimum thresholds were established based on historical groundwater elevations and reasonable estimates of future climatic conditions and groundwater elevations. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater elevations and undesirable results.

8.6.4.3 Effects on Beneficial Users and Land Uses

The primary detrimental effect on beneficial users from allowing multiple exceedances occurs if more than 1 exceedance occurs in a small geographic area. Allowing 15% exceedances is reasonable if the exceedances are spread out across the Subbasin, and as long as any 1 well does not regularly exceed its minimum threshold. If the exceedances are clustered in a small area, it will indicate that significant and unreasonable effects are being borne by a localized group of landowners.

8.7 Reduction in Groundwater Storage SMC

8.7.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable conditions in groundwater storage in the Subbasin are those that:

- Lead to chronic, long-term reduction in groundwater storage, or
- Interfere with other sustainability indicators

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

8.7.2 Minimum Thresholds

The minimum thresholds for reduction in groundwater storage are established by proxy using groundwater elevations. The reduction in groundwater storage minimum thresholds are identical to the chronic lowering of groundwater levels minimum thresholds.

Although not the metric for establishing change in groundwater storage, the GSAs are committed to pumping at or less than the Subbasin's long-term sustainable yield. SGMA allows 20 years to reach sustainability.

8.7.2.1 Information and Methodology Used to Establish Minimum Thresholds

Since groundwater storage and groundwater elevation minimum thresholds are identical, the methodology used to the establish minimum thresholds for reduction in groundwater storage are detailed in Section 8.6.2.1.

The general relationship between groundwater storage and groundwater elevations is described in greater detail in Chapter 4, Section 4.4.2. The Subbasin-specific data analysis to establish the proxy relationship between groundwater storage and groundwater is discussed below.

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

Figure 8-6 compares the Subbasin's cumulative change in storage, plotted on the black line, with the average annual change in groundwater elevation, plotted on the blue line. The groundwater elevation change data are derived from the groundwater elevation network; the cumulative change in groundwater storage is derived from the SVIHM. Although the data come from 2 sources, the data show similar patterns between 1998 and 2016. The decrease in storage modeled by the SVIHM from 1983 to 1998 is not reflected in the change in groundwater elevations blue line, because the modeled storage is dependent on the simulated groundwater elevations in the SVIHM.

Figure 8-7 shows a scatter plot of cumulative change in storage and average change in groundwater elevation. The blue data points show data for the entire model period from 1980 to 2016 and the orange data points show data from 1998 to 2016. Although, the data for the entire model period demonstrate a weak correlation (R^2=0.4512), a more significant positive correlation exists between groundwater elevations and the amount of groundwater in storage between 1998 and 2016 (R^2=0.8149). The correlation for the 1998 to 2016 period is sufficient to show that groundwater elevations are an adequate proxy for groundwater storage.

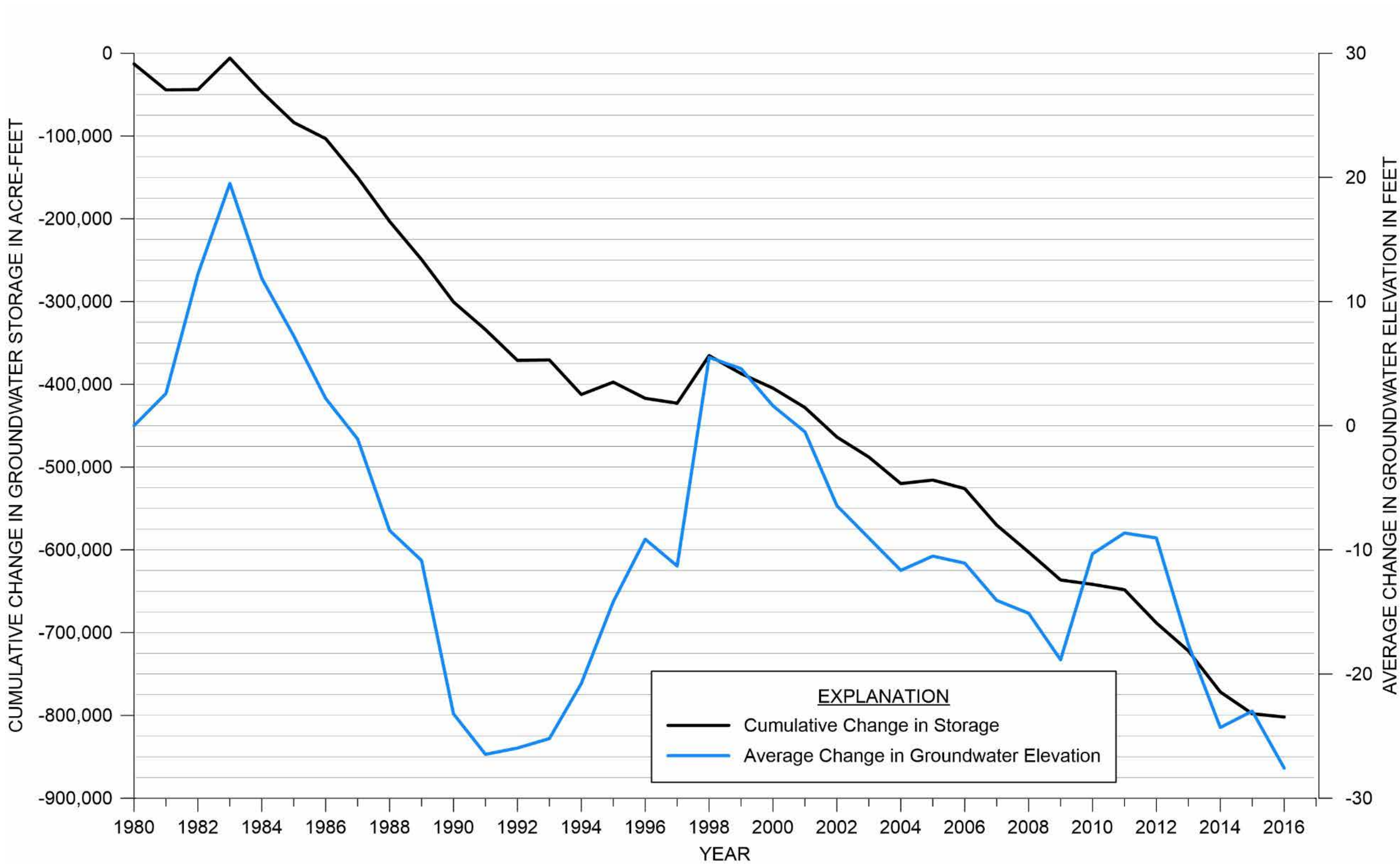

Figure 8-6. Cumulative Change in Storage and Average Change in Groundwater Elevation in the Eastside Aquifer Subbasin

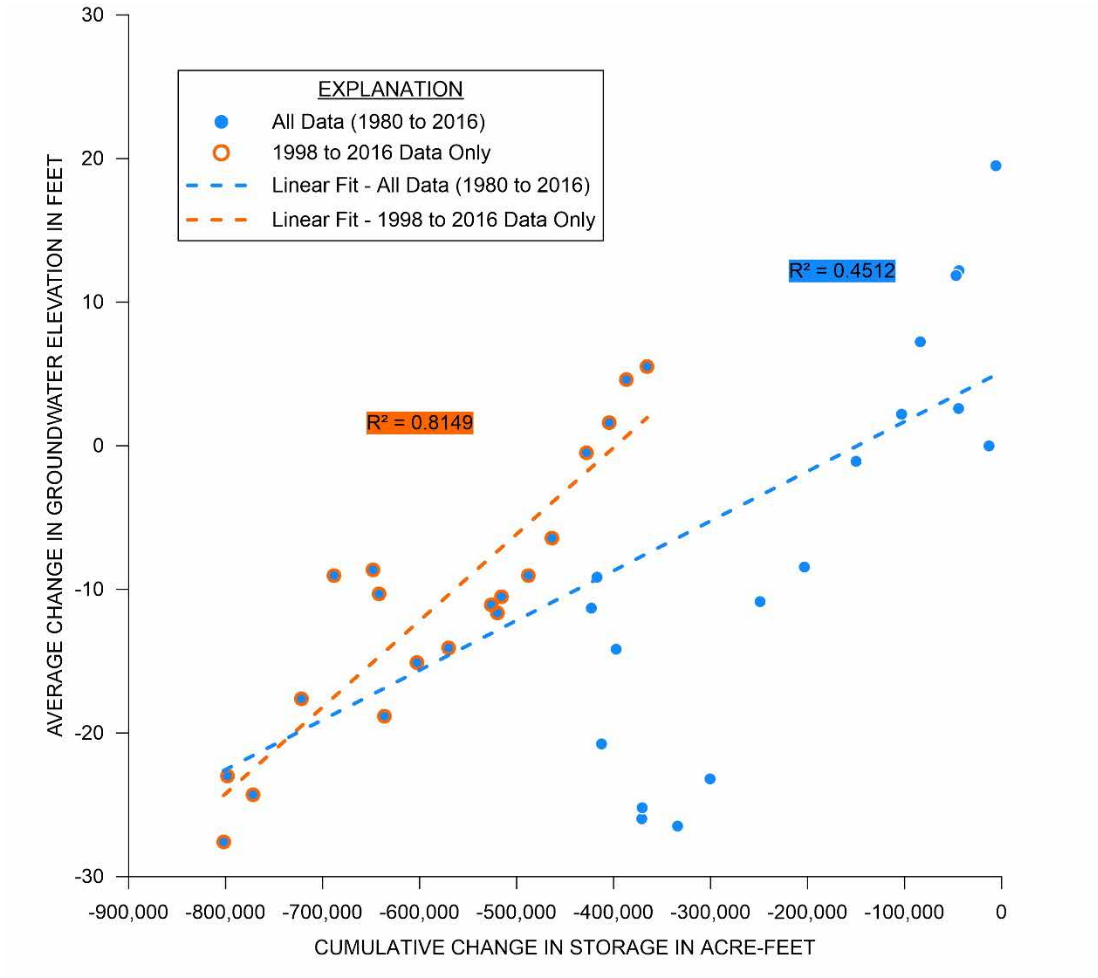

Figure 8-7. Correlation Between Cumulative Change in Storage and Average Change in Groundwater Elevation

8.7.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The groundwater storage minimum thresholds are identical to groundwater level minimum thresholds, which are consistent with other sustainability indicators, as described in Section 8.6.2.3.

8.7.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south

- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.7.2.4 Effect on Beneficial Uses and Users

Because the groundwater storage minimum thresholds are defined based on groundwater level minimum thresholds, the effects of groundwater storage minimum threshold on beneficial uses and users are identical to those described in Section 8.6.2.5.

8.7.2.5 Relation to State, Federal, or Local Standards

No federal, state, or local standards exist for reductions in groundwater storage.

8.7.2.6 Method for Quantitative Measurement of Minimum Threshold

The groundwater level minimum thresholds will be used as proxies for reduction of groundwater storage, therefore, the measurement of change in groundwater storage will be measured as outlined in Section 8.6.2.7 using the groundwater level monitoring network described in Chapter 7.

8.7.3 Measurable Objectives

The measurable objectives for reduction in groundwater storage are established by proxy using groundwater elevations. The reduction in groundwater storage measurable objectives are identical to the chronic lowering of groundwater levels measurable objectives.

8.7.3.1 Methodology for Setting Measurable Objectives

As stated in Section 8.6.3, the groundwater level measurable objectives for chronic lowering of groundwater levels provide an adequate margin of operational flexibility for managing the Subbasin. Therefore, the change in storage measurable objectives were set to be identical to the groundwater level measurable objectives: providing the same margin of operation flexibility.

8.7.3.2 Interim Milestones

The groundwater level interim milestones described in Table 8-3 and Section 8.6.3.2 will serve as proxies for the reduction of groundwater storage interim milestones.

8.7.4 Undesirable Results

8.7.4.1 Criteria for Defining Reduction in Groundwater Storage Undesirable Results

The criteria used to define undesirable results for reduction of groundwater storage are based on minimum thresholds established for chronic lowering of groundwater levels. The reduction of storage undesirable result is:

More than 15% of groundwater elevation minimum thresholds are exceeded. The undesirable result for reduction in groundwater storage is established by proxy using groundwater elevations.

Since the GSP addresses long-term groundwater sustainability, exceedances of groundwater storage minimum thresholds during a drought do not constitute an undesirable result. Pursuant to SGMA Regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater storage may temporarily exceed minimum thresholds during droughts, and do not constitute an undesirable result, as long as groundwater levels rebound.

8.7.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the reduction in groundwater storage sustainability indicator include the following:

- Expansion of agricultural or municipal pumping. Additional agricultural or municipal pumping may result in exceedance of the long-term sustainable yield, an undesirable result.
- Expansion of de minimis pumping. Pumping by de minimis users is not regulated under this GSP. Adding domestic de minimis pumpers in the Subbasin may result in excessive pumping and exceedance of the long-term sustainable yield, an undesirable result.
- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought.** Minimum thresholds are established based on reasonable anticipated future climatic conditions and groundwater elevations. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater recharge and unanticipated high pumping rates that could cause an exceedance of the long-term sustainable yield.

8.7.4.3 Effects on Beneficial Users and Land Use

The practical effect of the reduction in groundwater storage undesirable result is no chronic, long-term net change in groundwater storage. Therefore, beneficial uses and users will have access to a similar amount of water in storage, and the undesirable result will not have an additional negative effect on the beneficial users and uses of groundwater. However, pumping at the long-term sustainable yield during dry years will temporarily reduce the amount of groundwater in storage. If this occurs, there could be short-term impacts from a reduction in groundwater in storage on all beneficial users and uses of groundwater.

8.8 Seawater Intrusion SMC

8.8.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable seawater intrusion in the Subbasin is defined as follows:

- Any seawater intrusion in the Subbasin is significant and unreasonable.

This significant and unreasonable condition was determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

8.8.2 Minimum Thresholds

The minimum threshold for seawater intrusion is defined as the 500 mg/L chloride concentration isocontour at the Subbasin boundary.

Figure 8-8 presents the minimum threshold, shown in red, for seawater intrusion in the Eastside Subbasin as represented by the 500 mg/L chloride concentration isocontour. The purple line shows the current extent of seawater intrusion in the 180-Foot Aquifer. The minimum threshold in this GSP applies to any seawater intrusion into the Subbasin and does not apply to seawater intrusion outside of the Subbasin.

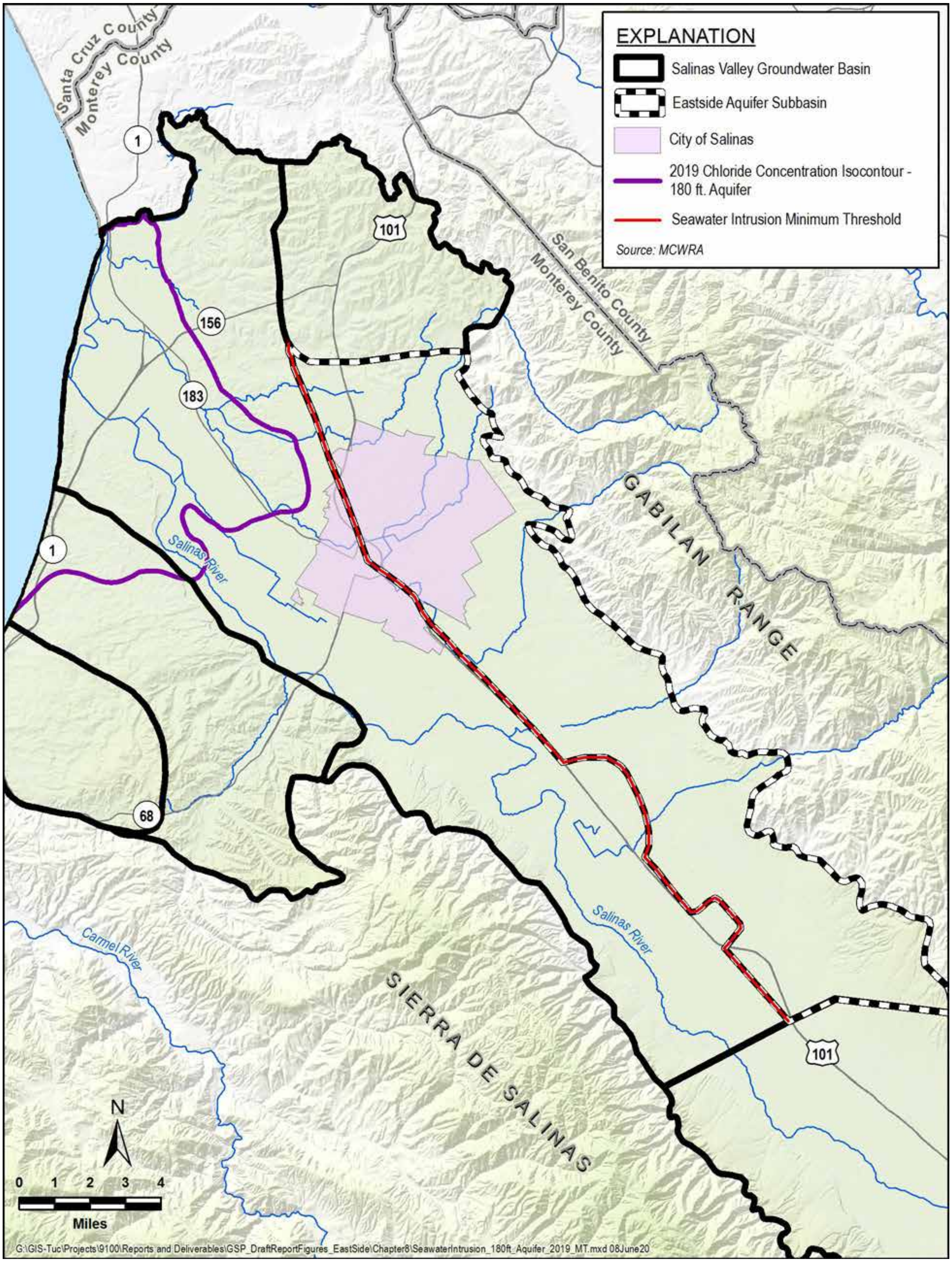

Figure 8-8. Minimum Threshold for Seawater Intrusion in the Eastside Aquifer Subbasin

8.8.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The seawater intrusion minimum threshold is based on seawater intrusion maps developed by MCWRA. MCWRA publishes estimates of the extent of seawater intrusion every year. The MCWRA maps define the extent of seawater intrusion as the inferred location of the 500 mg/L chloride isocontour. These maps are developed through analysis and contouring of groundwater quality measured at privately-owned wells and dedicated monitoring wells near the coast. The map of current and historical seawater intrusion is included in Chapter 5.

The groundwater model that will be used to assess the effectiveness of projects and management actions on seawater intrusion specifically incorporates assumptions for future sea level rise. Therefore, the actions to avoid undesirable results will address sea level rise.

8.8.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The relationship between the seawater intrusion minimum threshold and other sustainability indicators are as follows:

- **Chronic lowering of groundwater levels.** The seawater intrusion minimum threshold does not promote additional pumping that could cause groundwater elevations to decrease in the Subbasin. Therefore, the seawater intrusion minimum threshold will not result in significant or undesirable groundwater elevations.
- **Reduction in groundwater storage.** The seawater intrusion minimum threshold does not promote additional pumping in excess of the sustainable yield. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the groundwater storage minimum threshold. Groundwater storage, as measured by pumping, will not be affected by the seawater intrusion minimum thresholds.
- **Degraded water quality**. The seawater intrusion minimum threshold does not promote decreasing groundwater elevations that could lead to exceedances of groundwater quality minimum thresholds. In fact, the seawater intrusion minimum threshold may have a beneficial impact on groundwater quality by preventing increases in chloride concentrations in supply wells.
- **Land Subsidence.** The seawater intrusion minimum threshold does not promote additional pumping that could cause subsidence. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the subsidence minimum threshold.
- **Depletion of ISW.** The seawater intrusion minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the

seawater intrusion minimum threshold will not result in a significant or unreasonable depletion of ISW.

8.8.2.3 Effect of Minimum Threshold on Neighboring Basins and Subbasin

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.8.2.4 Effects on Beneficial Users and Land Uses

Agricultural land uses and users. The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's agricultural water users. Preventing seawater intrusion into the Subbasin ensures that a supply of usable groundwater will exist for agricultural use.

Urban land uses and users. The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's urban water users. Preventing seawater intrusion into the Subbasin will help ensure an adequate supply of groundwater for municipal supplies.

Domestic land uses and users. The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's domestic water users. Preventing seawater intrusion into the Subbasin will help ensure an adequate supply of groundwater for domestic supplies.

Ecological land uses and users. Although the seawater intrusion minimum threshold does not directly benefit ecological uses, it can be inferred that the seawater intrusion minimum thresholds provide generally positive benefits to the Subbasin's ecological water uses. Preventing seawater intrusion into the Subbasin will help prevent unwanted high salinity levels from impacting ecological groundwater uses.

8.8.2.5 Relevant Federal, State, or Local Standards

No federal, state, or local standards exist for seawater intrusion.

8.8.2.6 Method for Quantitative Measurement of Minimum Threshold

Chloride concentrations are measured in groundwater samples collected from the MCWRA's seawater intrusion monitoring network. These samples are used to develop the inferred location of the 500 mg/L chloride isocontour. The methodology and protocols for collecting samples and developing the 500 mg/L chloride isocontour are detailed in Appendix 7B and Appendix 7C.

8.8.3 Measurable Objectives

The measurable objective for seawater intrusion is identical to the minimum threshold that is shown on Figure 8-8.

> *The measurable objective for seawater intrusion is defined as the 500 mg/L chloride concentration isocontour at the Subbasin boundary.*

8.8.3.1 Methodology for Setting Measurable Objectives

In the Eastside Subbasin, the measurable objective for the seawater intrusion SMC is the same as the minimum threshold: preventing the 500 mg/L chloride isocontour from entering the Subbasin. The methodology used to set measurable objectives is discussed in Section 8.8.2.1.

8.8.3.2 Interim Milestones

The interim milestones for seawater intrusion are the same as the measurable objective, which is no exceedance of the 500 mg/L chloride isocontour at the subbasin boundary.

8.8.4 Undesirable Results

8.8.4.1 Criteria for Defining Seawater Intrusion Undesirable Results

The seawater intrusion undesirable result is a quantitative combination of chloride concentrations minimum threshold exceedances. Because even localized seawater intrusion is not acceptable, the subbasin-wide undesirable result is zero exceedances of the minimum threshold. For the Subbasin, the seawater intrusion undesirable result is:

Any exceedance of the minimum threshold, resulting in mapped seawater intrusion within the Subbasin boundary.

8.8.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include the following:

- Increased pumping in the Eastside Subbasin
- Increased coastal pumping in the adjacent 180/400-Foot Aquifer Subbasin that could draw seawater farther inland
- Unanticipated high sea level rise

8.8.4.3 Effects on Beneficial Users and Land Use

The primary detrimental effect on beneficial users and land uses from allowing seawater intrusion to occur in the Subbasin is that the pumped groundwater may become saltier. Thus, preventing seawater intrusion into the Subbasin prevents impacts to domestic, municipal, and agricultural wells and associated land uses.

8.9 Degraded Water Quality SMC

8.9.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable changes in groundwater quality in the Subbasin are increases in a COC caused by a direct result of a GSA groundwater management action that either:

- Results in groundwater concentrations in a potable water supply well above an established MCL or SMCL, or
- Lead to significantly reduced crop production

These significant and unreasonable conditions were determined based on input from the Subbasin Committee and discussions with GSA staff.

8.9.2 Minimum Thresholds

The minimum thresholds for degraded water quality are zero additional exceedances of the regulatory drinking water standards (potable supply wells) or Basin Plan objectives (irrigation supply wells) beyond those observed in 2019 for groundwater quality constituents of concern.

The minimum thresholds for DDW public water system supply wells and ILRP on-farm domestic wells reflect California’s Title 22 drinking water standards. The minimum thresholds for irrigation supply wells are based on the water quality objectives listed in the Basin Plan (CCRWQCB, 2019). The minimum threshold values for the COC for all 3 sets of wells are provided in Table 8-4 and are based on data up to 2019. Full discussion of these current conditions is included in Chapter 5. Because the minimum thresholds reflect no additional exceedances, the minimum thresholds are set to the number of existing exceedances. Surpassing the number of existing exceedances for any of the listed constituents will lead to an undesirable result. Not all wells in the monitoring network are sampled for every COC.

Table 8-4. Degradation of Groundwater Quality Minimum Thresholds

Constituent of Concern (COC)	Minimum Threshold/Measurable Objective – Number of Wells Exceeding Regulatory Standard from latest sample (May 1985 to December 2019)
DDW Wells	
Arsenic	4
Lindane	1
Di(2-ethylhexyl)phthalate	1
Benzo(a)Pyrene	1
1,2 Dibromo-3-chloropropane	3
Dinoseb	3
Iron	5
Hexachlorobenzene	1
Manganese	2
Nitrate (as nitrogen)	8
Specific Conductance	1
1,2,3-Trichloropropane	10
Total Dissolved Solids	3
Vinyl Chloride	8
ILRP On-Farm Domestic Wells	
Chloride	3
Iron	4
Manganese	1
Nitrate (as nitrogen)	91
Nitrate + Nitrite (sum as nitrogen)	17
Specific Conductance	27
Sulfate	2
Total Dissolved Solids	22
ILRP Irrigation Supply Wells	
Chloride	4
Iron	1
Manganese	2

8.9.2.1 Information and Methodology Used to Establish Water Quality Minimum Thresholds and Measurable Objectives

As noted in the GSP Regulations, minimum thresholds are based on a degradation of groundwater quality, not an improvement of groundwater quality (23 CCR § 354.28 (c)(4)). Therefore, this GSP is designed to avoid taking any action that may inadvertently move groundwater constituents already in the Subbasin in such a way that the constituents have a significant and unreasonable impact that would not otherwise occur. COC must meet 2 criteria:

1. They must have an established level of concern such as an MCL or SMCL for drinking water, or a level known to affect crop production.
2. They must have been found in the Subbasin at levels above the level of concern.

Based on the review of groundwater quality in Chapter 5, the COC that may affect drinking water supply wells include those for DDW and ILRP on-farm domestic wells listed in Table 8-4. The COC that are known to cause reductions in crop production are those for ILRP irrigation supply wells listed in Table 8-4.

As discussed in Chapter 7, 3 existing water quality monitoring networks were reviewed and used for developing SMC:

- Public water system supply wells regulated by the SWRCB DDW.
- On-farm domestic wells monitored as part of CCRWQCB ILRP. This dataset was obtained from the SWRCB through the GAMA groundwater information system. The ILRP data were separated into 2 data sets, 1 for on-farm domestic wells and the other for irrigation supply wells (discussed below) for purposes of developing initial draft minimum thresholds and measurable objectives for each type of well. The monitoring well network for the ILRP will change when the monitoring network for Ag Order 4.0 is finalized. At that time, the new ILRP domestic monitoring network will be incorporated into this GSP, replacing the current network, for water quality monitoring.
- Irrigation supply wells monitored as part of ILRP. As mentioned above, this dataset was obtained from the SWRCB through the GAMA groundwater information system. Like the on-farm domestic well dataset, the IRLP irrigation supply monitoring network will change when Ag Order 4.0 is finalized.

Each of these well networks are monitored for a different set of water quality parameters. Furthermore, some groundwater quality impacts are detrimental to only certain networks. For example, high nitrates are detrimental to public water system supply wells and on-farm domestic wells but are not detrimental to irrigation supply wells. The constituents monitored in each well network are indicated by an X in Table 8-5. An X does not necessarily indicate that the constituents have been found above the regulatory standard in that monitoring network.

Table 8-5. Summary of Constituents Monitored in Each Well Network

Constituent	Public Water System Supply	On-Farm Domestic[1]	Irrigation Supply
Boron	X	X	X
Chloride	X	X	X
Iron	X	X	X
Manganese	X	X	X
Nitrite	X	X	X
Nitrate (as nitrogen)	X	X	X
Nitrate + Nitrite (sum as nitrogen)		X	X

Constituent	Public Water System Supply	On-Farm Domestic[1]	Irrigation Supply
Specific Conductance	X	X	X
Sulfate	X	X	X
Total Dissolved Solids	X	X	X
Silver	X		
Aluminum	X		
Alachlor	X		
Arsenic	X		
Atrazine	X		
Barium	X		
Beryllium	X		
Lindane	X		
Di(2-ethylhexyl) phthalate	X		
Bentazon	X		
Benzene	X		
Benzo(a)Pyrene	X		
Toluene	X		
Cadmium	X		
Chlordane	X		
Chlorobenzene	X		
Cyanide	X		
Chromium	X		
Carbofuran	X		
Carbon Tetrachloride	X		
Copper	X		
Dalapon	X		
1,2 Dibromo-3-chloropropane	X		
1,1-Dichloroethane	X		
1,2-Dichloroethane	X		
1,2-Dichlorobenzene	X		
1,4-Dichlorobenzene	X		
1,1-Dichloroethylene	X		
cis-1,2-Dichloroethylene	X		
trans-1,2-Dichloroethylene	X		
Dichloromethane (a.k.a. methylene chloride)	X		
1,2-Dichloropropane	X		
Dinoseb	X		
Diquat	X		
Di(2-ethylhexyl) adipate	X		
Ethylbenzene	X		
Endrin	X		
Fluoride	X		
Trichlorofluoromethane	X		
1,1,2-Trichloro-1,2,2-Trifluoroethane	X		
Foaming Agents (MBAS)	X		
Glyphosate	X		

Constituent	Public Water System Supply	On-Farm Domestic[1]	Irrigation Supply
Hexachlorocyclopentadiene	X		
Hexachlorobenzene	X		
Heptachlor	X		
Mercury	X		
Molinate	X		
Methyl-tert-butyl ether (MTBE)	X		
Methoxychlor	X		
Nickel	X		
Oxamyl	X		
1,1,2,2-Tetrachloroethane	X		
Perchlorate	X		
Polychlorinated Biphenyls	X		
Tetrachloroethene	X		
Pentachlorophenol	X		
Picloram	X		
Antimony	X		
Selenium	X		
2,4,5-TP (Silvex)	X		
Simazine	X		
Styrene	X		
1,1,1-Trichloroethane	X		
1,1,2-Trichloroethane	X		
1,2,4-Trichlorobenzene	X		
Trichloroethene	X		
1,2,3-Trichloropropane	X		
Thiobencarb	X		
Thallium	X		
Toxaphene	X		
Vinyl Chloride	X		
Xylenes	X		
Zinc	X		

[1]Basin plan states domestic wells are monitored for Title 22 constituents; however, GAMA groundwater information system only provides data for the constituents listed above.

8.9.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Preventing degradation of groundwater quality may affect other sustainability indicators or may limit activities needed to achieve minimum thresholds for other sustainability indicators as described below:

- Chronic lowering of groundwater levels. The degradation of groundwater quality minimum thresholds could influence groundwater level minimum thresholds by limiting the types of water that can be used for recharge to maintain or raise groundwater elevations. Water used for recharge cannot exceed any groundwater quality standards.

- Reduction in groundwater storage. The degradation of groundwater quality minimum thresholds do not promote lower groundwater elevations. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the groundwater storage minimum threshold.
- Seawater intrusion. The degradation of groundwater quality minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the seawater intrusion minimum threshold.
- Land subsidence. The degradation of groundwater quality minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the subsidence minimum threshold.
- **Depletion of ISW.** The degradation of groundwater quality minimum thresholds do not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable depletion of ISW.

8.9.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.9.2.4 Effect on Beneficial Uses and Users

Agricultural land uses and users. The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's agricultural water users. Preventing any GSA actions that would result in additional agricultural supply wells exceeding levels that could reduce crop production ensures that a supply of usable groundwater will exist for beneficial agricultural use.

Urban land uses and users. The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's urban water users. Preventing any GSA actions that would result in COC in additional drinking water supply wells exceeding MCLs or SMCLs ensures adequate groundwater quality for public water system supplies.

Domestic land uses and users. The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's domestic water users. Preventing any GSA actions that would result in COC in additional drinking water supply wells exceeding MCLs or SMCLs ensures adequate groundwater quality for domestic supplies.

Ecological land uses and users. Although the groundwater quality minimum thresholds do not directly benefit ecological uses, it can be inferred that the degradation of groundwater quality minimum thresholds provide generally positive benefits to the Subbasin's ecological water uses. Preventing any GSA actions that would result in COC migrating will prevent unwanted contaminants from impacting ecological groundwater uses.

8.9.2.5 Relation to State, Federal, or Local Standards

The groundwater quality minimum thresholds specifically incorporate state and federal standards for drinking water and basin plan objectives.

8.9.2.6 Method for Quantitative Measurement of Minimum Thresholds

Degradation of groundwater quality minimum thresholds will be directly measured from existing public water system supply wells, on-farm domestic wells, and irrigation supply wells. Groundwater quality will be measured with SWRCB GAMA groundwater information system data submitted through existing monitoring programs—DDW and ILRP—as discussed in Chapter 7.

- Exceedances of MCLs and SMCLs in public water system supply wells will be monitored with annual water quality data submitted to the DDW.
- Exceedances of MCLs and SMCLs in on-farm domestic wells will be monitored with ILRP data.
- Exceedances of water quality objectives for crop production will be monitored with ILRP data.

Initially, the review of drinking water MCLs, SMCLs, and water quality objectives that maintain adequate crop production will be centered around the COC identified above. If during review of the water quality data additional constituents appear to exceed any of the regulatory standards, these additional constituents will be added to the list of COC for the Subbasin.

8.9.3 Measurable Objectives

The measurable objectives for degradation of groundwater quality represent target groundwater quality distributions in the Subbasin. SGMA does not mandate the improvement of groundwater quality. Therefore, the measurable objectives are based on no groundwater quality degradation and are identical to the minimum thresholds, as defined in Table 8-4.

The measurable objectives for degraded water quality are zero additional exceedances of the regulatory drinking water standards (potable supply wells) or Basin Plan objectives (irrigation supply wells) beyond those observed in 2019 for groundwater quality constituents of concern.

8.9.3.1 Methodology for Setting Measurable Objectives

As described above, measurable objectives are set to be identical to the minimum thresholds and therefore follow the same method as detailed in Section 8.8.2.1.

8.9.3.2 Interim Milestones

There is no anticipated degradation of groundwater quality during GSP implementation that results from the implementation of projects and actions as described in Chapter 9. Therefore, the expected interim milestones are identical to current conditions.

8.9.4 Undesirable Results

8.9.4.1 Criteria for Defining Undesirable Results

The degradation of groundwater quality becomes an undesirable result when a quantitative combination of groundwater quality minimum thresholds is exceeded. For the Subbasin, the exceedance of minimum thresholds is unacceptable as a direct result of GSP implementation. Some groundwater quality changes are expected to occur independent of SGMA activities; because these changes are not related to SGMA activities, nor GSA management, they do not constitute an undesirable result. Additionally, SGMA states that GSAs are not responsible for addressing water quality degradation that was present before January 1, 2015 (California Water Code § 10727.2(b)(4)). Therefore, the degradation of groundwater quality reaches an undesirable result when:

Future or new minimum thresholds exceedances are caused by a direct result of GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction.

The groundwater level SMC is designed and intended to help protect groundwater quality. Setting the groundwater level minimum thresholds at or above historical lows assures that no new depth dependent constituents of water quality concern are mobilized. The GSA may pursue projects or management actions to ensure that groundwater levels do not fall below groundwater level minimum thresholds.

This undesirable result recognizes there is an existing regulatory framework in the form of the California Porter Cologne Act and the federal Clean Water Act that addresses water quality management; and considers existing federal, state, and local groundwater quality standards, which were used in the development of minimum thresholds in the GSP. SVBGSA is not responsible for enforcing drinking water requirements or for remediating violations of those requirements that were caused by others (Moran and Belin, 2019). The existing regulatory regime does not require nor obligate the SVBGSA to take any affirmative actions to manage or control existing groundwater quality. However, SVBGSA is committed to monitoring and disclosing changes in groundwater quality and ensuring its groundwater management actions do not cause drinking water or irrigation water to be unusable.

SVBGSA will work closely with the Central Coast Regional Water Quality Control Board and other entities that have regulatory authority over water quality. SVBGSA will lead the Water Quality Coordination Group, as described in Chapter 9, which includes meeting annually with these partner agencies to review the status of water quality data and discuss any action needed to address water quality degradation.

If the GSA has not implemented any groundwater management actions in the Subbasin, including projects, management actions, or pumping management, no such management actions constitute an undesirable result. If minimum thresholds are exceeded after the GSA has implemented actions in the Subbasin, the GSA will review groundwater quality and groundwater gradients in and around the project areas to assess if the exceedance resulted from GSA actions to address sustainability indicators, or was independent of GSA activities. Both the implementation of actions and assessment of exceedances will occur throughout the GSP timeframe of 50 years as required by SGMA. The general approach to assess if a minimum threshold exceedance is due to GSA action will include:

- If no projects, management actions, or other GSP implementation actions have been initiated in a subbasin, or near the groundwater quality impact, then the impact was not caused by any GSA action.
- Many projects will likely include a new monitoring network. If data from the project-specific monitoring network do not show groundwater quality impacts, this will suggest that the impact was not caused by any GSA actions.
- If a GSA undertakes a project that changes groundwater gradients, moves existing constituents, or results in the exceedance of minimum thresholds, SVBGSA will undertake a more rigorous technical study to assess local, historical groundwater quality distributions, and the impact of the GSA activity on that distribution.

For SGMA compliance, undesirable results for groundwater quality are not caused by (1) lack of action; (2) GSA required reductions in pumping; (3) exceedances in groundwater quality minimum thresholds that occur, if there are fewer exceedances than if there had been a lack of management; (4) exceedances in groundwater quality minimum thresholds that would have occurred independent of projects or management actions implemented by the GSA; (5) past harm.

8.9.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include the following:

- **Required Changes to Subbasin Pumping.** If the location and rates of groundwater pumping change as a result of projects implemented under the GSP, these changes could alter hydraulic gradients and associated flow directions, and cause movement of one of the COC towards a supply well at concentrations that exceed relevant standards.
- **Groundwater Recharge.** Active recharge of imported water or captured runoff could modify groundwater gradients and move one of the COC towards a supply well in concentrations that exceed relevant limits.
- **Recharge of Poor-Quality Water.** Recharging the Subbasin with water that exceeds an MCL, SMCL, or level that reduces crop production could lead to an undesirable result.

8.9.4.3 Effects on Beneficial Users and Land Use

The undesirable result for degradation of groundwater quality is avoiding groundwater degradation caused by a direct result of a GSA groundwater management action. Therefore, the undesirable result will not impact the use of groundwater and will not have a negative effect on the beneficial users and uses of groundwater. This undesirable result does not apply to groundwater quality changes that occur due to other causes.

8.10 Land Subsidence SMC

8.10.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable subsidence in the Subbasin is defined as follows:

- Any inelastic land subsidence that is caused by lowering of groundwater elevations in the Subbasin or
- Any inelastic subsidence that causes an increase of flood risk.

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

Subsidence can be elastic or inelastic. Elastic subsidence is the small, reversible lowering and rising of the ground surface. Inelastic subsidence is generally irreversible. This SMC only concerns inelastic subsidence.

8.10.2 Minimum Thresholds

The minimum threshold for land subsidence is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement measured subsidence to account for InSAR measurement errors.

8.10.2.1 Information Used and Methodology for Establishing Subsidence Minimum Thresholds

The minimum threshold was established using InSAR data available from DWR. The general minimum threshold is for no long-term irreversible subsidence in the Subbasin. The InSAR data provided by DWR, however, is subject to measurement error. DWR stated that, on a statewide level, for the total vertical displacement measurements between June 2015 and June 2019, the errors are as follows (DWR, 2019, personal communication):

1. The error between InSAR data and continuous GPS data is 16 mm (0.052 foot) with a 95% confidence level.
2. The measurement accuracy when converting from the raw InSAR data to the maps provided by DWR is 0.048 foot with 95% confidence level.

By adding errors 1 and 2, the combined error is 0.1 foot. While this is not a robust statistical analysis, it does provide an estimate of the potential error in the InSAR maps provided by DWR.

Additionally, the InSAR data provided by DWR reflects both elastic and inelastic subsidence. While it is difficult to compensate for elastic subsidence, visual inspection of monthly changes in ground elevations suggest that elastic subsidence is largely seasonal. To minimize the influence of elastic subsidence on the assessment of long-term, permanent subsidence, changes in ground level will only be measured annually from June of one year to June of the following year.

8.10.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The subsidence minimum threshold has little or no impact on other minimum thresholds, as described below:

- **Chronic lowering of groundwater levels.** The land subsidence minimum threshold will not decrease groundwater elevations and therefore will not result in significant or unreasonable groundwater elevations.

- **Reduction in groundwater storage.** The land subsidence minimum threshold will not change the amount of pumping and therefore will not result in a significant or unreasonable change in groundwater storage.
- **Seawater intrusion.** The land subsidence minimum threshold does not promote additional pumping that could exacerbate seawater intrusion. Therefore, the subsidence minimum threshold will not induce additional advancement of seawater intrusion along the coast.
- **Degraded water quality.** The land subsidence minimum threshold does not promote decreasing groundwater elevations that lead to exceedance of groundwater quality minimum thresholds and therefore will not result in significant of unreasonable degradation of water quality.
- **Depletion of ISW.** The land subsidence minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the subsidence minimum threshold will not result in a significant or unreasonable depletion of ISW.

8.10.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.10.2.4 Effects on Beneficial Uses and Users

The subsidence minimum threshold is set to prevent any long-term inelastic subsidence. Available data indicate that there is currently no long-term subsidence occurring in the Subbasin, and therefore the minimum threshold has no impact on current pumping rates. The subsidence minimum threshold does not require any additional reductions in pumping and there is no negative impact on any beneficial user. Increased pumping, however, could initiate subsidence and require pumping restrictions.

8.10.2.5 Relation to State, Federal, or Local Standards

There are no federal, state, or local regulations related to subsidence.

8.10.2.6 Method for Quantitative Measurement of Minimum Threshold

The minimum threshold will be assessed using DWR-supplied InSAR data.

8.10.3 Measurable Objectives

The measurable objective for subsidence represents a target subsidence rates in the Subbasin. Because the minimum threshold of zero net long-term subsidence is the best achievable outcome, the measurable objective is identical to the minimum threshold.

The measurable objective for land subsidence is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement measured subsidence to account for InSAR measurement errors.

8.10.3.1 Methodology for Setting Measurable Objectives

The measurable objective will be assessed using DWR-supplied InSAR data.

8.10.3.2 Interim Milestones

The subsidence measurable objective is set at current conditions of no long-term subsidence. There is no change between current conditions and sustainable conditions. Therefore, the interim milestones are identical to current conditions of zero long-term subsidence, and annual measurements of no more than 0.1 foot of subsidence per year.

8.10.4 Undesirable Results

8.10.4.1 Criteria for Defining Undesirable Results

By regulation, the land subsidence undesirable result is a quantitative combination of subsidence minimum threshold exceedances. For the Subbasin, no long-term subsidence is acceptable. Therefore, the land subsidence undesirable result is:

There is an exceedance of the minimum threshold for land subsidence due to lowered groundwater elevations.

Should potential subsidence be observed, the SVBGSA will first assess whether the subsidence may be due to elastic subsidence. If the subsidence is not elastic, the SVBGSA will undertake a program to assess whether the subsidence is caused by lowered groundwater elevations. The first step in the assessment will be to check if groundwater elevations have dropped below historical lows. If groundwater elevations remain above historical lows, the GSA shall assume that any observed subsidence was not caused by lowered groundwater levels. If groundwater levels have dropped below historical lows, the GSA will attempt to correlate the observed subsidence with measured groundwater elevations. Additionally, if the Subbasin experiences subsidence in multiple consecutive years that are due to InSAR measurement error, the GSAs will confirm if the error is not actually net long-term subsidence.

8.10.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include a shift in pumping locations. A significant increase in the amount of pumping in an area that is susceptible to subsidence could trigger subsidence that has not been observed before.

8.10.4.3 Effects on Beneficial Users and Land Use

The undesirable result for subsidence does not allow any subsidence to occur in the Subbasin. Therefore, there is no negative effect on any beneficial uses and users.

8.11 Depletion of Interconnected Surface Water SMC

Areas with ISW occur where shallow groundwater may be connected to the surface water system. This SMC applies only to locations of ISW, and as shown on Figure 4-9, there are currently no locations of ISW in the Eastside Subbasin. This section describes the locally defined significant and unreasonable conditions, how minimum thresholds and measurable objectives will be set, and undesirable results if locations of ISW are identified in the future.

The SVIHM is used to identify the locations of ISW and to develop an estimate of the quantity and timing of stream depletions due to pumping during current and historical groundwater conditions. Shallow groundwater and surface water levels simulated by the SVIHM are used to identify the location of interconnection and evaluate the frequency with which different stream reaches are connected with groundwater in the underlying aquifer. The process for evaluating the magnitude of stream depletions in relation to shallow groundwater elevations in interconnected reaches is described in Chapter 5.

8.11.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable depletion of ISW in the Subbasin is defined as:

- Depletions from groundwater extraction that would result in a significant and unreasonable impact on other beneficial uses and users such as riparian water rights holders, appropriative surface water rights holders, ecological surface water users, and recreational surface water uses.
- Depletion from groundwater extraction more than observed in 2015, as measured by shallow groundwater elevations near locations of interconnected surface water. While a

documented determination of whether past depletions was significant is not available, staying above 2015 depletions was determined to be a reasonable balance for all the beneficial uses and users.

These significant and unreasonable conditions were determined based on input collected Subbasin Committee meetings and discussions with GSA staff. There is currently no data that determines what level of depletion from groundwater extraction has a significant adverse effect on a beneficial use or user of ISW. Should there be a determination regarding what level of depletion from groundwater extraction is significant, SVBGSA will take that into consideration as it reviews how it locally defines significant and unreasonable conditions for the SMC in the 5-Year Update.

8.11.2 Minimum Thresholds

The minimum thresholds are established to maintain consistency with the chronic lowering of groundwater elevation and reduction in groundwater storage minimum thresholds, which are also established based on groundwater elevations.

The minimum thresholds for depletion of interconnected surface water are established by proxy using shallow groundwater elevations observed in 2015 near locations of interconnected surface water.

The locations of ISW identified with the SVIHM are based on best available data but contain uncertainty, which is discussed in Chapters 4, 5, and 6. Additional stream and groundwater level data are needed to reduce uncertainty, verify with observed conditions, and track changes over time. The shallow groundwater monitoring well will be used to supplement the analysis of locations of connectivity provided by the SVIHM. These monitoring point will also become part of the ISW monitoring network that is discussed in Chapter 7. Data from the ISW monitoring network will be used to monitor and evaluate the interconnection through time.

As discussed in Chapter 7, a monitoring network for ISW composed of shallow groundwater monitoring wells is in the process of development. A new shallow well will be added to the monitoring network. The monitoring network is dependent on the location and magnitude of stream reaches determined by the SVIHM. Once the monitoring well is installed, if it indicates that groundwater and surface water are connected, SMC will be determined using the wells' groundwater elevations during the minimum threshold and measurable objective years, or interpolated values from the groundwater elevation contour maps for wells that do not have shallow groundwater elevation measurements for those years.

8.11.2.1 Information Used and Methodology for Establishing Depletion of Interconnected Surface Water Minimum Thresholds and Measurable Objectives

8.11.2.1.1 Establishing Groundwater Elevations as Proxies

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

The evaluation of ISW in the Salinas Valley Groundwater Basin is based on an approach recommended by the Environmental Defense Fund (EDF, 2018) that uses groundwater elevations as surrogates for streamflow depletion rates caused by groundwater use. Basic hydraulic principles state that groundwater flow is proportional to the difference between groundwater elevations at different locations along a flow path. Using this basic principle, groundwater flow to a stream, or conversely seepage from a stream to the underlying aquifer, is proportional to the difference between water elevation in the stream and groundwater elevations at locations away from the stream. Assuming the elevation in the stream is relatively stable, changes in interconnectivity between the stream and the underlying aquifer is determined by changes in groundwater levels in the aquifer. Thus, the change in hydraulic gradient between stream elevation and surrounding groundwater elevations is representative of change in interconnection between surface water and groundwater. Monitoring the hydraulic gradient in the aquifer adjacent to the stream monitors the interconnectivity between stream and aquifer. Therefore, the gradient can be monitored by measuring and evaluating groundwater elevations at selected shallow monitoring wells near streams. No existing estimations of the quantity and timing of depletions of ISW exist, nor data available to make estimations, so the hydraulic principles provide the best available information.

8.11.2.1.2 Review of Beneficial Uses and Users of Surface Water

The various beneficial uses and users of surface waters were addressed when setting the ISW depletion minimum thresholds. The classes of beneficial uses and users that were reviewed include riparian rights holders, appropriative rights holders, ecological surface water users, and recreational surface water users. This is not a formal analysis of public trust doctrine, but it is a reasonable review of all uses and users in an attempt to balance all interests. This was not an assessment about what constitutes a reasonable beneficial use under Article X, Section 2 of the California Constitution. The minimum thresholds for depletion of ISW are developed using the definition of significant and unreasonable conditions described above, public information about critical habitat, locations of ISW derived from the SVIHM, and public information about water rights described below.

Riparian water rights holders. Table 8-6 provides a summary of water diversions reported to the SWRCB by water rights holders on the Salinas River and its tributaries within the Eastside

Subbasin. The diversion data were obtained from queries of the SWRCB eWRIMS water rights management system. The diversion data are self-reported by water rights holders with points of diversion located within the Subbasin. Any riparian rights holders are reported in Table 8-6.

The SVBGSA is not aware of any current water rights litigation or water rights enforcement complaints by any riparian water rights holders in the Subbasin. Therefore, SVBGSA assumes that the current level of depletion has not injured any riparian water rights holders in the Subbasin.

Table 8-6. Reported Annual Surface Water Diversions in the Eastside Aquifer Subbasin

Diversions (Acre-Feet)	2011	2012	2013	2014	2015	2016	2017	2018	2019
Statement of Diversion and Reported Riparian Diversion	5	0	1,039	1,018	902	751	598	644	548

Appropriative water rights holders. There are no appropriative water right holders in the Eastside Subbasin. The SVBGSA is not aware of any current water rights litigation or water rights enforcement complaints by any appropriative rights holders in the Subbasin. Therefore, SVBGSA assumes that the current level of depletion has not injured any appropriative water rights holders in the Subbasin.

Ecological surface water users. There are no known flow prescriptions on any surface water bodies in the Subbasin. Therefore, the current level of depletion has not violated any ecological flow requirements. This is not meant to imply that depletions do not impact potential species living in or near surface water bodies in the Subbasin. However, any impacts that may be occurring have not risen to the level that triggers regulatory intervention. Therefore, the impacts from current rates of depletion on ecological surface water users is not unreasonable.

Recreational surface water users. No recreational activities such as boating regularly occur on surface water bodies in the Subbasin.

As shown by the analysis above, the current rate of surface water depletion is not having an unreasonable impact on the various surface water uses and users in the Subbasin. Therefore, the minimum thresholds are based on 2015 groundwater elevations, when surface water depletions were not unreasonable.

8.11.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The minimum thresholds for depletion of ISW will be set to 2015 groundwater elevations in the shallow monitoring wells within the Subbasin. The minimum thresholds all reference the same historical year and have existed simultaneously in the past. Therefore, no conflict exists between minimum thresholds measured at various locations within the Subbasin.

The depletion of ISW minimum thresholds could influence other sustainability indicators as follows:

- **Chronic lowering of groundwater levels.** The depletion of ISW minimum thresholds are identical to the groundwater level minimum thresholds. Therefore, the ISW minimum thresholds will not result in chronic lowering of groundwater elevations.
- **Reduction in groundwater storage.** The depletion of ISW minimum threshold are identical to the change in storage minimum thresholds, which are the same as the groundwater level minimum thresholds. Therefore, the depletion of ISW interconnected minimum thresholds will not result in an undesirable loss of groundwater storage.
- **Seawater intrusion.** The depletion of ISW minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, seawater intrusion will not be affected by the ISW minimum thresholds.
- **Degraded water quality.** The depletion of ISW minimum thresholds do not promote decreasing groundwater elevations that lead to exceedance of groundwater quality minimum thresholds. Therefore, groundwater quality will not be affected by the ISW minimum thresholds.
- **Land subsidence.** The depletion of ISW minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, subsidence will not be affected by the ISW minimum thresholds.

8.11.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Forebay Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley and Forebay Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Subbasin will be reviewed relative to information developed for the neighboring subbasins’ GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

8.11.2.4 Effect on Beneficial Uses and Users

The depletion of ISW minimum thresholds may have varied effects on beneficial users and land uses in the Subbasin. Creeks in the Eastside Subbasin are ephemeral, so uses and users of any ISW are seasonal.

Agricultural land uses and users. The depletion of ISW minimum thresholds prevent lowering of groundwater elevations adjacent to certain parts of streams beyond historical lows. While the measurable objectives are higher, this leaves flexibility for needed groundwater extraction during droughts. If the minimum thresholds were higher than these historical levels, it might affect the quantity and type of crops that can be grown in the land adjacent to streams and the ability of crops to withstand droughts.

Urban land uses and users. The depletion of ISW minimum thresholds prevent lowering of groundwater elevations adjacent to certain parts of streams beyond historical lows. While the measurable objective is higher, this leaves flexibility for needed groundwater extraction during droughts. If the minimum thresholds were higher than these historical levels, it may limit the amount of urban pumping near streams, which could limit urban growth in these areas to historical levels. Also, if pumping is limited beyond historical levels, municipalities may have to obtain alternative sources of water to achieve urban growth goals. If this occurs, this may result in higher water costs for municipal water users.

Domestic land uses and users. The depletion of ISW minimum thresholds protect existing domestic land users and uses near locations of ISW from groundwater elevation declines below historical lows by maintaining shallow groundwater elevations near streams and protecting the operability of relatively shallow domestic wells.

Ecological land uses and users. The depletion of ISW minimum thresholds address ecological uses and users by preventing depletion of ISW from groundwater pumping beyond what was historically experienced. Additionally, by setting future groundwater levels at or above recent lows, there should be less impact to ecological users than has been seen to date.

8.11.2.5 Relation to State, Federal, or Local Standards

There are no explicit federal, state, or local standards for depletion of ISW. However, both state and federal provisions call for the protection and restoration of conditions necessary for endangered and threatened species.

8.11.2.6 Method for Quantitative Measurement of Minimum Threshold

The SVIHM is used to preliminarily identify areas of ISW. Groundwater elevations measured in shallow wells adjacent to these areas of potential ISW will serve as the primary approach for monitoring depletion of ISW. As discussed in Chapter 7, an existing shallow well will be added, or a new shallow well will be installed to monitor groundwater elevations adjacent to surface water bodies during GSP implementation.

The new shallow monitoring well installed pursuant to the GSP will not have data from 2015. A minimum threshold for that well will be estimated by either correlation with nearby deeper wells with water-level records that include 2015, or from groundwater model results.

8.11.3 Measurable Objectives

The measurable objectives for depletion of ISW target groundwater elevations that are higher than the minimum thresholds. The measurable objectives are established to maintain consistency with the chronic lowering of groundwater elevation and reduction in groundwater storage minimum thresholds, which are also established based on groundwater elevations.

The measurable objectives for depletion of interconnected surface water are established by proxy using shallow groundwater elevations observed in 1999 near locations of interconnected surface water.

8.11.3.1 Method for Setting Measurable Objectives

The depletion of ISW measurable objectives are set to be identical to the groundwater level measurable objectives. The methodology for establishing measurable objectives is outlined in Section 8.6.2.1. Groundwater elevations from 1999 were selected as representative of the measurable objectives for the Eastside Subbasin.

8.11.3.2 Interim Milestones

The interim milestones leading to the depletion of ISW measurable objectives will be added when the monitoring network is established if the monitoring well indicates that groundwater and surface water are connected.

8.11.4 Undesirable Results

8.11.4.1 Criteria for Defining Undesirable Results

By regulation, the depletion of ISW undesirable result is a quantitative combination of minimum threshold exceedances. The undesirable result for depletion of ISW is:

There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor interconnected surface water.

Streamflow depletion in the Subbasin is complicated by many factors, such as recharge of the aquifer from streamflow, losses to vegetation, and evapotranspiration. The ISW SMC applies to depletion of ISW from groundwater use. For SGMA compliance purposes, the default assumption is that any depletions of surface water beyond the level of depletion that occurred prior to 2015, as evidenced by reduction in groundwater levels, represent depletions that are significant and unreasonable. Any additional depletions of surface water flows caused by groundwater conditions in excess of conditions as they were in 2015 would likely be an undesirable result that must be addressed under SGMA.

8.11.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the depletion of ISW include the following:

- **Localized pumping increases.** Even if the Subbasin is adequately managed at the Subbasin scale, increases in localized pumping near ISW bodies could reduce shallow groundwater elevations.
- **Expansion of riparian water rights.** Riparian water rights holders often pump from wells adjacent to streams. Pumping by these riparian water rights holder users is not regulated under this GSP. Additional riparian pumpers near interconnected reaches of rivers and streams may result in excessive localized surface water depletion.
- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought.** Minimum thresholds were established based on anticipated future climatic conditions. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater elevations that increase surface water depletion rates.

8.11.4.3 Effects on Beneficial Users and Land Use

The depletion of ISW undesirable result is to have no net increase in surface water depletion due to groundwater use, as determined by shallow groundwater elevations. The effects of undesirable results on beneficial users and land use are the same as the effects of minimum thresholds on beneficial uses and users, as described in Section 8.11.2.4.

SVBGSA will collaborate with partner agencies and organizations to further evaluate the effects of the ISW measurable objectives, minimum thresholds, and undesirable results on surface water flows and beneficial users.

9 PROJECTS AND MANAGEMENT ACTIONS

9.1 Introduction

This chapter describes the projects and management actions that will allow the Subbasin to attain sustainability in accordance with GSP Regulations § 354.42 and § 354.44. This chapter includes a description of proposed projects and proposed groundwater management actions. The set of projects and management actions included provide sufficient options for reaching sustainability; however, not all projects need to be implemented. In this GSP, projects are activities supporting groundwater sustainability that require infrastructure or physical change to the environment. Projects include green infrastructure projects that achieve benefits through alteration of vegetation or soils, such as removal of invasive species and floodplain restoration. The term management actions generally refers to activities that support groundwater sustainability without infrastructure.

The projects and management actions adopted in this GSP are designed to achieve a number of outcomes including:

- Achieving groundwater sustainability by meeting Subbasin-specific SMC by 2042
- Providing equity between those who benefit from projects and those who pay for projects
- Providing incentives to constrain groundwater pumping within the sustainable yield

The projects and management actions included in this chapter outline a framework for achieving sustainability, however, many details must be developed before any of the projects and management actions can be implemented. Costs will be additional to the agreed-upon funding to sustain the operational costs of the SVBGSA and funding needed for monitoring and reporting.

This GSP is developed as part of an integrated effort by the SVBGSA to achieve groundwater sustainability in all 6 subbasins of the Salinas Valley under its authority. Therefore, the projects and actions included in this GSP are part of a larger set of integrated projects and actions for the entire Valley, all of which account for the uncertainty associated with the basin setting. Projects implemented in other subbasins may have indirect benefits for the Eastside Subbasin, and projects implemented within the Eastside Subbasin may have indirect benefits for other subbasins .

The projects and management actions are based on existing infrastructure, including the reservoirs and their spillways. They assume continued operation of that infrastructure at current capacity. If current infrastructure is operated differently or other projects are implemented within the Valley that affect groundwater conditions, SVBGSA will consider the effect of any such changes in meeting sustainability goals and will act in furtherance of reaching such goals.

Discussions and decisions regarding specific projects will continue throughout GSP implementation and will be part of the adaptive management of the Subbasin. Members of the GSA and stakeholders in the Subbasin should view these projects and management actions as a starting point for more detailed discussions. Where appropriate, details that must be agreed upon are identified for each project or management action.

As a means to compare projects, this chapter estimates the cost per AF of water. The cost per AF is the amortized cost of the project divided by the annual yield. It is not the cost of water for irrigation or the domestic cost of drinking water for households on water systems. The cost is included to help compare projects; however, more refined cost analyses and future benefit analyses will be completed during GSP implementation.

The specific design for implementing management actions and projects will provide landowners and public entities flexibility in how they manage water and how the Subbasin achieves groundwater sustainability. Not all projects and management actions need to be implemented. Eastside stakeholders will work collaboratively to determine which projects and management actions to implement in order to maintain sustainability of the Eastside Subbasin and will pursue adaptive management if conditions change.

9.2 General Process for Developing Projects and Management Actions

9.2.1 Process for Developing Projects and Management Actions

The general process for developing the projects and management actions presented in this chapter included a combination of reviewing publicly available information, gathering feedback during public meetings including Subbasin Committee meetings, conducting hydrogeologic analysis, consulting with SVBGSA staff, and meeting with Advisory Committee and Board members.

Developing projects and management actions for this GSP involved building on, revising, and adding to the projects and management actions developed for the entire Salinas Valley as part of the 180/400-Foot Aquifer Subbasin GSP. This initial list of projects in the 180/400-Foot Aquifer Subbasin GSP was developed with stakeholder input, including a brainstorming workshop for stakeholders to propose and discuss their ideas. The list of projects and management actions developed in this workshop were then narrowed down based on feasibility, likelihood of stakeholder acceptance, and ability to address groundwater conditions. These projects were included in the 180/400-Foot Aquifer Subbasin GSP. The projects that could benefit the Eastside Subbasin were provided to the Subbasin Committee for consideration and refined for this GSP.

Building off the previously identified projects, SVBGSA undertook an iterative process at the subbasin level to develop the projects and management actions in this GSP. An overview of the purpose and types of projects and management actions was presented to the Subbasin

Committee, and initial ideas were solicited. Subbasin Committee members completed a survey for feedback and further solicitation of ideas. After these ideas were gathered, a list of potential projects and management actions was presented to the Subbasin Committee and discussed. Special workshops and meetings were held with the purpose of considering pumping reductions. Potential projects and management actions were also discussed in terms of meeting the SMC outlined in Chapter 8.

9.2.2 Cost Assumptions Used in Developing Projects

Project cost estimates are provided in Appendix 9A. Assumptions and issues for each project need to be carefully reviewed and revised during the pre-design phase of each project. Project designs, and therefore costs, could change considerably as more information is gathered.

The cost estimates included for each SVBGSA project are order-of-magnitude estimates. These estimates were made with little to no detailed engineering data. The expected accuracy range for such an estimate is within plus 50% or minus 30%. The cost estimates are based on perceptions of current conditions at the project location and reflect professional opinions of costs at this time and are subject to change as project designs mature.

For infrastructure projects, capital costs include major infrastructure components such as pipelines, pump stations, customer connections, turnouts, injection wells, recharge basins, and storage tanks. Capital costs also include 30% contingency for plumbing appurtenances, 15% increase for general conditions, 15% for contractor overhead and profit, and 9.25% for sales tax. Engineering, legal, administrative, and project contingencies were assumed as 30% of the total construction cost and included within the capital cost. For capital projects, land acquisition at $45,000/acre was also included within capital costs.

Annual operations and maintenance (O&M) fees include the costs to operate and maintain new project infrastructure. O&M costs also include any pumping costs associated with new infrastructure. O&M costs do not include O&M or pumping costs associated with existing infrastructure, such as existing Salinas Valley Reclamation Plant (SVRP) costs, because these are assumed to be part of water purchase costs. Water purchase costs are assumed to include repayment of loans for existing infrastructure; however, these purchase costs will need to be negotiated. The terms of such a negotiation could vary widely.

Capital costs were annualized over 25 years and added with annual O&M costs and water purchase costs to determine an annualized dollar per acre-foot ($/AF) cost for each project.

9.3 Overview of Projects and Management Actions

This GSP is part of an integrated plan for managing groundwater in all 6 subbasins of the Salinas Valley that are managed by the SVBGSA. This GSP focuses on the projects that directly help the

Eastside Subbasin reach its sustainability goals, but also includes Salinas multi-subbasin projects outside the Subbasin that will likely benefit the Subbasin and reduce the need for additional projects and management actions.

Following are the major types of projects that can be developed to supplement the Eastside Subbasin's groundwater supplies:

- Direct recharge through recharge basins or injection/dry wells
- In-lieu recharge through direct delivery of water to replace groundwater pumping
- Demand management
- Indirect recharge through decreased ET
- Reoperation of reservoir releases to achieve greater or more regular recharge

The projects and management actions for this GSP are listed in Table 9-1.

Table 9-1. Projects and Management Actions

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
A – INCREASED RECHARGE					
A1	Managed Aquifer Recharge with Overland Flow	Construct basins for managed aquifer recharge of overland flow before it reaches streams	Groundwater recharge, less stormwater and erosion, more regular surface temperature	400 AF/yr. in increased recharge.	Capital Cost: $4,128,000 Unit Cost: $870/AF
A2	Floodplain Enhancement and Recharge	Restore creeks and floodplains to slow the flow of water	More infiltration, less erosion, less flooding	2,300 AF/yr. of water available for recharge. 1,000 AF/yr. increase in storage.	Capital Cost: $12,596,000 Unit Cost: $1,050/AF
B – SURFACE WATER DIVERSIONS					
B1	11043 Diversion at Chualar	Build a new facility near Chualar that would be allowed to divert water from the Salinas River when streamflow is high	Less groundwater pumping, moderately less seawater intrusion in other subbasins	Annual average of 6,000 AF/yr. of excess streamflow for in lieu use or recharge, resulting in approximately 4,600 AF/yr. increase in storage.	Capital Cost: $55,684,000 Unit Cost: $1,280/AF
B2	11043 Diversion at Soledad	Build a new facility near Soledad that would be allowed to divert water from the Salinas River when streamflow is high	Less groundwater pumping, slightly less seawater intrusion in other subbasins	Annual average of 6,000 AF/yr. of excess streamflow is diverted for in lieu use or recharge, resulting in approximately 4,600 AF/yr. increase in storage.	Capital Cost: $104,688,000 Unit Cost: $2,110/AF
B3	Surface Water Diversion from Gabilan Creek	Build a new facility on Gabilan Creek that would be allowed to divert water when streamflow is high.	Collects streamflow that would otherwise be lost to the ocean	On average, 350 AF/yr. of excess streamflow available for recharge.	Capital Cost: $10,074,000 Unit Cost: $2,350/AF

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
C – ALTERNATIVE WATER SUPPLIES					
C1	Eastside Irrigation Water Supply Project (or Somavia Road Project)	Import groundwater from the 180/400-Foot Aquifer Subbasin	Less groundwater pumping in the Eastside Subbasin	3,000 AF/yr. of imported water for in lieu use or recharge.	Capital Cost: $139,928,000 Unit Cost: $3,980/AF
C2	Salinas Scalping Plant	Build a water treatment facility to recycle wastewater for agricultural use	Less groundwater pumping	Recycling water for irrigation reduces groundwater extraction by 280 to 560 AF/yr. of groundwater	Capital Cost: $10,000,000 Unit Cost: $4,730/AF (plant only)
D – REGIONAL ALTERNATIVE WATER SUPPLIES					
D1	Regional Municipal Supply Project	Build a regional desalination plant that would treat brackish water extracted from seawater intrusion barrier and supply drinking water to municipalities in the Eastside Subbasin and other subbasins	Less groundwater pumping, reduced risk of seawater intrusion	Regional benefit: 15,000 AF/yr. of imported desalinated water reduces groundwater extraction. Portion of this benefiting the Eastside Subbasin has yet to be determined.	Regional Capital Cost: $375-$395 million Unit Cost: $2,830-$2,950/AF
D2	CSIP Optimization and Expansion	Expand CSIP into the northwest corner of the Eastside Subbasin	Less groundwater pumping	Regional benefit for 3,500-acre expansion: 9,900 AF/yr. of recycled and river water provided for irrigation	Regional Capital Cost for 3,500-acre expansion: $73,366,000 Unit Cost: $630/AF
E – DEMAND MANAGEMENT					
E1	Conservation and Agricultural BMPs	Promote agricultural best management practices and support use of ET data as an irrigation management tool for growers	Better tools assist growers to use water more efficiently; decreased groundwater extraction	Unable to quantify benefits until specific BMPs are identified and promoted.	Approximately $100,000 for 4 workshops, grant writing, and demonstration trials. Cost could be reduced if shared between subbasins.

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
E2	Fallowing, Fallow Bank, and Agricultural Land Retirement	Includes voluntary fallowing, a fallow bank whereby anybody fallowing land could draw against the bank to offset lost profit from fallowing, and retirement of agricultural land	Decreased groundwater extraction for irrigated agriculture	Dependent on program participation	$590-$1,730/AF if land is fallowed $1,140-$2,820/AF if land is retired
E3	Pumping Allocations and Controls	Proactively determines how extraction should be fairly divided and controlled if needed	Decreases extraction if needed	Range of potential project benefits	Approximately $400,000 for establishment of pumping allocations and pumping controls
F – SALINAS RIVER PROJECTS AND MANAGEMENT ACTIONS *(projects will likely have indirect benefits for the Eastside Subbasin that may reduce the need for other projects and management actions)*					
F1	Multi-benefit Stream Channel improvements	Prune native vegetation and remove non-native vegetation, manage sediment, and enhance floodplains for recharge. Includes 3 components: Stream Maintenance Program Invasive Species Eradication Floodplain Enhancement and Recharge	Groundwater recharge, flood risk reduction, returns streams to a natural state of dynamic equilibrium	Component 1: Multi-subbasin benefits not quantified Component 2: Multi-subbasin benefit of 2,790 to 20,880 AF/yr. of increased recharge Component 3: Multi-subbasin benefit of 1,000 AF/yr. from 10 recharge basins	Component 1 Multi-subbasin Cost: $150,000 for annual administration and $95,000 for occasional certification; $780,000 for the first year of treatment on 650 acres, and $455,000 for annual retreatment of all acres Component 2 Multi-subbasin Average Cost: $16,500,000 Unit Cost: $60 to $600/AF Component 3 Multi-subbasin Cost: $11,160,000 Unit Cost: $930/AF
F2	MCWRA Drought Reoperation	Support the existing Drought Technical Advisory Committee (D-TAC) when it develops plans for how to manage reservoir releases during drought	Multi-subbasin benefits: more regular seasonal reservoir releases; drought resilience	Unable to quantify benefits since drought operations have yet to be triggered	Minimal SVBGSA staffing costs for participation. No additional MCWRA costs since already formed.

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
F3	Reservoir Reoperation	Collaborate with MCWRA to evaluate potential reoperation scenarios, which could be paired with projects such as the Interlake Tunnel, seasonal reservoir releases with aquifer storage and recovery, or other potential projects.	Additional regular annual reservoir releases; drought resilience	Unable to quantify benefits until feasibility study is completed	Multi-subbasin: Approximately $400,000 - $500,000
G - IMPLEMENTATION ACTIONS					
G1	Well Registration	Register all production wells, including domestic wells	Better informed decisions, more management options	N/A – Implementation Action	Not estimated at this time
G2	Groundwater Extraction Management System (GEMS) Expansion and Enhancement	Update current GEMS program by collecting groundwater extraction data from wells in areas not currently covered by GEMS and improving data collection	Better informed decisions	N/A – Implementation Action	Not estimated at this time
G3	Dry Well Notification System	Develop a system for well owners to notify the GSA if their wells go dry. Refer those owners to resources to assess and improve their water supplies. Form a working group if concerning patterns emerge.	Support affected well owners with analysis of groundwater elevation decline	N/A – Implementation Action	Not estimated at this time
G4	Water Quality Coordination Group	Form a working group for agencies and organizations to collaborate on addressing water quality concerns	Improve water quality	N/A – Implementation Action	Not estimated at this time
G5	Support Protection of Areas of High Recharge	Work with land use agencies to protect land with high recharge potential	Help prevent decline of infiltration capacity	N/A – Implementation Action	Not estimated at this time
G6	Deep Aquifers Study	Complete study of the Deep Aquifers to enable better management of groundwater and seawater intrusion	Increase understanding of Deep Aquifers	N/A – Implementation Action	$1,000,000
G7	Land Use Jurisdiction Coordination Program	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.	Better aligned land use and water use planning	N/A – Implementation Action	Not estimated at this time

9.4 Projects and Management Actions Planned to Reach Sustainability

The projects and management actions that are planned to reach sustainability were the most reliable, implementable, cost-effective, and acceptable to stakeholders. Descriptions of these project and management actions are included below and are not in order of priority. Generalized costs are also included for planning purposes. Components of these projects and actions may change in future analyses, including facility locations, recharge mechanisms, and other details. Therefore, each of the projects and management actions described in this GSP should be treated as a generalized project representative of a range of potential project configurations.

Increased Recharge

9.4.1 Project A1: Managed Aquifer Recharge of Overland Flow (Overland Flow MAR)

This program incentivizes development of groundwater recharge basins that recharge overland flow and stormwater runoff from the Gabilan Range before they reach streams and the Salinas River. This program is structured similar to the program instituted in Pajaro Valley, whereby agricultural landowners dedicate a portion of their land to recharge ponds and direct overland flood flows into the ponds. This could include some type of incentive for recharge basins that would be situated to collect runoff before it enters a local stream and allowed to infiltrate. It could also be combined with Project A2 and include multi-benefit projects along the floodplain to increase recharge capacity, since floodplains generally have high recharge.

This program will require additional analysis on actual available runoff from each of the watersheds. It assumes that the stormwater is not being diverted upstream; however, many of the mountain ranges have diversion operations already occurring upstream in the watershed. Rain gauges and studies will be required to determine the true estimate of water available from each subwatershed.

This project currently plans for 4 recharge basins, each with a recharge capacity of about 100 AF/yr. Their locations will be chosen based on site availability and suitability. The most suitable sites have clean soil and high recharge potential. Soil tests will guide site selection so that contaminants do not leach into groundwater and contaminate drinking water. Aquifer recharge potential is highest where there are areas of highly permeable soils, good connection to underlying aquifers, and topography that directs surface runoff toward retention/catchment areas. The SVBGSA will investigate where recharge ponds would yield the greatest amount of groundwater recharge, combining data on soil permeability, stratigraphy, and land use to map areas of high potential recharge.

The program would reach out to landowners to increase awareness of the benefits of recharge basins and work with local stakeholders to identify lands with high recharge capacity. It could also work with interested landowners to identify sites, undertake potential site analyses with cone penetration tests (push tests), and design recharge basins. This program will involve monitoring water quality and could potentially improve stormwater quality and reduce stormwater volume, which is regulated under the Irrigated Lands Program. Water recharged will comply with regulatory standards. The project could potentially include development of a permit coordination program for recharge projects. The program could also work with various organizations and government agencies to connect existing incentivization programs and funding to landowners interested in collaborative recharge projects that require land and access.

9.4.1.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By routing stormwater and runoff from streams into recharge facilities and restored floodplains, more water will be added to the principal aquifer. This water will be slowed down and allowed to infiltrate, which has the effect of additional water to the aquifer. Adding water into the principal aquifer will raise groundwater elevations over time.
- **Groundwater storage measurable objective.** Adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.
- **Land subsidence measurable objectives.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within 2 miles of the Eastside Subbasin. Increasing groundwater recharge will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.1.2 Expected Benefits and Evaluation of Benefits

This project will increase sustainable yield and groundwater elevations through enhanced infiltration of runoff. Runoff occurs when the rate of rainfall exceeds the soil infiltration rate. This runoff then flows over the land surface before accumulating into washes and streams as measurable stream flow. In the initial phases of overland flow, this water often infiltrates into the soils, which enhances soil moisture and facilitates recharge to the aquifer. The benefits to increased soil moisture go beyond increased opportunity for recharge. Enhanced soil moisture contributes to erosion protection as well as near-surface temperature regulating processes (Rivas, 2006; Mittelbach *et al.*, 2011). Four recharge basins sized at 100 AF/yr. are planned for this project with a combined benefit of about 400 AF/yr. in increased recharge.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage. Land subsidence will be measured using InSAR data provided by the DWR. Seawater intrusion will be measured using select RMS wells.

9.4.1.3 Circumstances for Implementation

The overland flow MAR project will be implemented if stakeholders determine it is necessary to reach or maintain sustainability. A number of agreements and rights must be secured before the project is implemented. Primarily, a more formal cost/benefit analysis must be completed to determine if the on-farm modifications will provide quantifiable benefits to the principal aquifer. Recharge basins installed as part of this project could be directly funded by the SVBGSA or grant funding, or SVBGSA could develop an incentive program. Funding must be approved by the SVBGSA Board of Directors.

9.4.1.4 Permitting and Regulatory Process

Projects described in this section may require a CEQA environmental review process and may require an Environmental Impact Report (EIR) or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, permits from a variety of state and federal agencies may be necessary, and any project that coordinates with federal facilities or agencies may require National Environmental Policy Act (NEPA) documentation.

In addition, permits from the following government organizations that may be required for overland flow MAR projects include:

- ***United States Army Corps of Engineers (USACE)* –** A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***California Department of Fish and Wildlife (CDFW)* –** A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9* –**NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.

- ***National Marine Fisheries Service (NMFS)*** **–** A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***State Water Board Stormwater Pollution Prevention Plan (SWPPP)*** – A General Permit to Discharge Stormwater may be required depending on how stormwater is rerouted.
- ***California Department of Transportation (Caltrans)*** **–** An Encroachment Permit is required if any state highway will be obstructed.

9.4.1.5 Implementation Schedule

If selected, the proposed implementation schedule for this project is presented on Figure 9-1. The schedule will depend on whether programmatic permitting can be obtained or whether each individual project needs its own feasibility, permitting, and design.

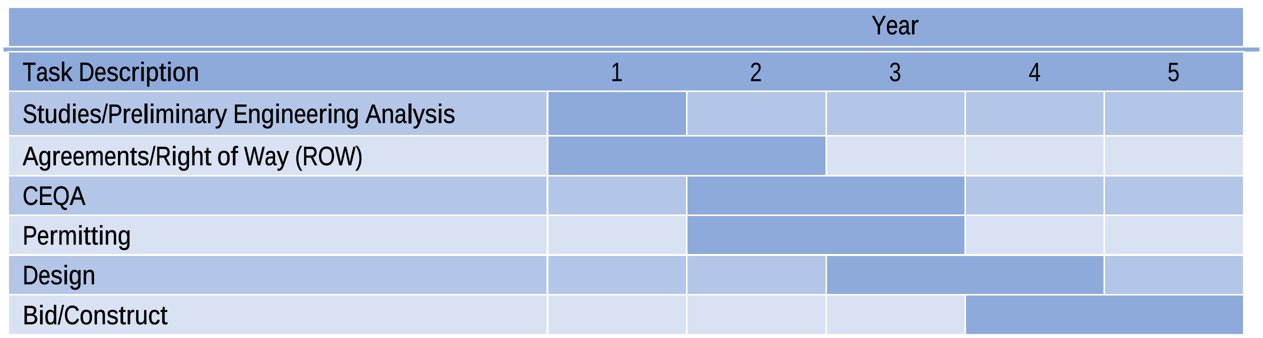

Figure 9-1. Implementation Schedule for Overland Flow MAR

9.4.1.6 Legal Authority

Pursuant to California Water Code § 10726.2 (a) and (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement a recharge project. A permit to appropriate water may not needed to infiltrate overland flow if constructed on a parcel without a USGS blue line stream. If a blue line stream crosses the parcel, SVBGSA will evaluate whether a permit is needed. SVBGSA recognizes that this process takes several years to complete. If a permit is needed, SVBGSA will pursue a SWRCB 5-year temporary permit under the Streamlined Permit Process while it applies for the diversion permit.

9.4.1.7 Estimated Cost

This project proposes the construction of 4 recharge basins, each with an expected benefit of 100 AF/yr. and a capital cost of $1,032,000 for a total of $4,128,000. Spread over 25 years and assuming a 6% discount rate, the annualized cost is $86,700 per recharge basin, including annual maintenance. The unit cost is $870/AF. These costs were estimated assuming that only 1 recharge basin would be built, but there may be economies of scale that lower the cost if more are built. These costs are approximate; exact costs will depend on site specifics.

9.4.1.8 Public Noticing

Before SVBGSA begins construction on any project as part of GSP implementation, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- GSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
  - A description of the undesirable result(s) that may occur if action is not taken
  - A description of the proposed project
  - An estimated cost and schedule for the proposed project
  - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.2 Project A2: Floodplain Enhancement and Recharge

This project restores and enhances areas along creeks and floodplains to slow and sink stormwater and encourage streambed and floodplain infiltration. SVBGSA could partner with the RWMG, CCWG, and other organizations to support existing creek and floodplain restoration efforts and encourage inclusion of features that would enhance recharge.

Restored floodplain and riparian habitat along creeks can slow down the velocity of creeks and encourage greater infiltration. Due to agricultural and urban encroachment, streams have become more highly channelized, and flow has increased in velocity, particularly during storm events. This flow has resulted in greater erosion and loss of functional floodplains. Floodplain restoration efforts could be focused on lands directly adjacent to creeks, so as not to interfere with active farming. In addition, efforts to restore creeks and floodplains could be extended to the foothills to slow water closer to its source or incorporate features such as check dams to encourage greater recharge.

For initial scoping of this project, 5 locations for floodplain restoration have been identified that focus on the watersheds in the northern part of the Eastside Subbasin, where recharge potential is higher and groundwater elevations are low. These are initial project locations identified for the purpose of estimating project benefits and costs; however, more site analysis, project design, and outreach to nearby landowners are needed before specific projects are selected. Additional sites may also be added under this project. The effect of increased recharge on surrounding groundwater quality will be considered when selecting sites.

The 5 locations identified for floodplain restoration and stormwater recharge are noted on Figure 9-2. These locations consist of recharge basins or detention ponds to be included as part of floodplain restoration or stormwater recharge. Water recharged will comply with regulatory standards. The initial projects were identified as part of Monterey County's Stormwater Management Plan, and these 5 were selected for inclusion in this GSP project due to their potential for groundwater recharge (Hunt *et. al.*, 2019). These concept project locations need further work with respect to contacting landowners, assessing regulatory challenges, considering adjacent land use, and securing agency/landowner commitment to long-term management.

One example of floodplain restoration is the Gabilan Floodplain Enhancement Project put forth by the CCWG and RWMG. Stormwater generated in the uplands of the Gabilan Creek Watershed is a flood risk to Salinas and other downstream land users. This proposed project includes buying or leasing 80 acres of land in the floodplain above Salinas and implementing floodplain restoration projects. These projects would reduce 20-year maximum flows by 43%, or 326 cubic feet per second (cfs), and provide benefits such as increased infiltration, water supply reliability, decreased flood volume risk, environmental improvement, and increased urban green space (RWMG, 2018).

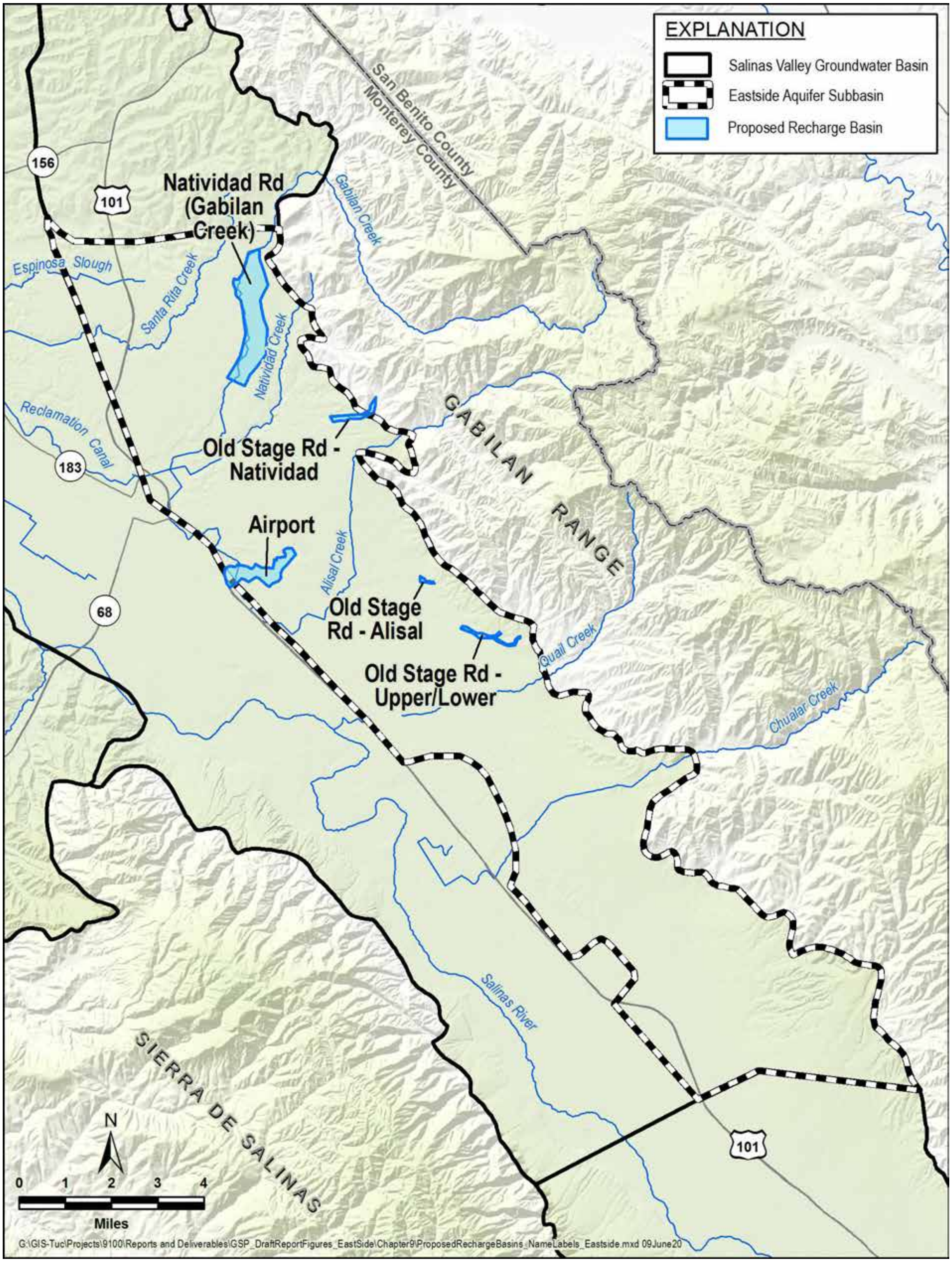

Figure 9-2. Potential Floodplain Restoration and Stormwater Recharge Projects in the Eastside Aquifer Subbasin

9.4.2.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By routing stormwater and runoff from streams into recharge facilities and restored floodplains, more water will be added to the principal aquifer. This water will be slowed down and allowed to infiltrate, which has the effect of additional water to the aquifer. Adding water into the principal aquifer will raise groundwater elevations over time.
- **Groundwater storage measurable objective.** Adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater recharge will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.2.2 Expected Benefits and Evaluation of Benefits

The primary benefit is increased groundwater elevations near the utilized floodplains. However, the number of reengaged floodplains, the size of floodplain basins, and the number and species of plants will determine how much water may infiltrate into the subsurface. The Stormwater Management Plan used 2 models to characterize current conditions and estimate project flood management benefits of potential site locations. One is a MODFLOW water balance model that simulates rainfall-runoff relationships, and the other is a HEC-RAS flood model that simulates channel and floodplain hydraulics. Initial modeling of stormwater runoff is reported in Table 9-2. In addition, a groundwater modeling simulation using the SVOM is used to determine the potential groundwater benefits for recharge of that water. Initial model runs indicate an increase of 1,000 AF/yr. in groundwater storage for the Eastside Subbasin. Additional analyses will be conducted to refine this value should this project be considered for implementation.

Table 9-2. Selected Watershed and Basin Benefits

Watershed Treatment Basin	Wet Season Daily Mean Flow (cfs)	Dry Season Daily Mean Flow (cfs)	Wet Season Annual Volume Captured (AF)	Dry Season Annual Volume Captured (AF)	Conceptual detention size (acres)
Natividad Road (Gabilan Creek)	3	0.3	1073	107	40
Old Stage Road - Natividad	0.25	0.2	89	7	1.1
Airport	2.67	0.52	955	186	32.7
Old Stage Road - Alisal	0.32	0.06	114	21	7.1
Old Stage Road - Upper/Lower	0.13	0.02	47	7	18.1

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage. Land subsidence will be measured using InSAR data provided by the Department of Water Resources (DWR). Seawater intrusion will be measured using select Representative Monitoring Sites (RMS) wells.

9.4.2.3 Circumstances for Implementation

The floodplain restoration and stormwater recharge project will be implemented if additional water is required to reach sustainability. A number of agreements and rights must be secured before the project is implemented. Primarily, a more formal cost/benefit analysis must be completed to determine how many site options are preferable. Water diversion rights must be secured to divert stormwater, which may take many years.

9.4.2.4 Permitting and Regulatory Process

This project may require a CEQA review process, which would likely result in either an EIR or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, any project that coordinates with federal facilities or agencies may require NEPA documentation.

There will be a number of local, county and state permits, right of ways, and easements required depending on pipeline alignments, stream crossings, and project type. Projects with wells will require a well construction permit from MCWRA. Permits that may be required for floodplain enhancement include:

- ***United States Army Corps of Engineers (USACE)*** – A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.

- ***California Department of Fish and Wildlife (CDFW)*** **–** A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9*** **–**NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.
- ***National Marine Fisheries Service (NMFS)*** **–** A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***California Natural Resources Agency*** **–** An Initial Study Mitigated Negative Declaration (IS/MND) is required to comply with CEQA.

9.4.2.5 Implementation Schedule

If selected, the implementation schedule for floodplain enhancement and recharge is presented on Figure 9-3. Components of this project could be implemented separately and may take less time to implement or may be spread out over a longer time horizon.

Task Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Years 7+
Studies/Preliminary Engineering Analysis							
Agreements/ROW							
CEQA							
Permitting							
Design							
Bid/Construct							
Maintenance							

Figure 9-3. Implementation Schedule for Floodplain Enhancement and Stormwater Recharge

9.4.2.6 Legal Authority

The SVBGSA has the right to divert and store water once it has access to the appropriate water rights. Water rights are not needed to infiltrate on-farm runoff. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement the project.

9.4.2.7 Estimated Cost

The capital cost of floodplain enhancement and recharge is estimated at $12,596,000 for recharge basins of the estimated sizes. This only includes the costs of recharge basins and not additional riparian restoration work that may be done as part of this overall project. There may also be additional costs for site feasibility studies, such as pilot boreholes to assess recharge capacity, and for dry wells or injection wells if recharge basins lack permeability. Annual O&M costs are anticipated to be approximately $64,000. If there are no additional costs, the amortized cost of water for 1,000 AF/yr. increased storage is estimated at $1,050/AF.

9.4.2.8 Public Noticing

Before any project initiates construction, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
  - A description of the undesirable result(s) that may occur if action is not taken
  - A description of the proposed project
  - An estimated cost and schedule for the proposed project
  - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

Surface Water Diversions

9.4.3 Project B1: 11043 Diversion at Chualar

MCWRA holds SWRCB Permit 11043 (Permit), which is a diversion right on the Salinas River. The current amended permit allows diversion at 2 identified locations: 1 location near Soledad called the Eastside Canal Intake, and 1 location near Chualar called the Castroville Canal Intake (Figure 9-4). The Permit has an annual maximum diversion limit of 135,000 AF. Permit

Condition 13 only allows water to be diverted when there are natural flows in the river that exceed minimum specified criteria. In addition, under Condition 13, the maximum allowed diversion is 400 cfs. Based on the conditions of the permit, a 400 cfs diversion and historical natural flows, a conservative estimate is that a long-term average of up to approximately 35,000 AF/yr. of water could be diverted from either diversion point between the months of December and March. Based on physical limitations of a 50 cfs diversion structure, this number is likely considerably less; approximately 6,000 AF/yr.

Per Permit Condition 13, the natural flow shall be calculated by subtracting reservoir releases from Nacimiento and San Antonio Reservoirs from total flows at the Soledad gaging station on a 3-day running average. The water right holder shall not divert water unless the natural flow of the Salinas River at Eastside Canal Intake (NAD 83, Zone 4, North 2,038,821 feet, and East 5,891,976 feet) is greater than the amounts listed in Table 9-3.

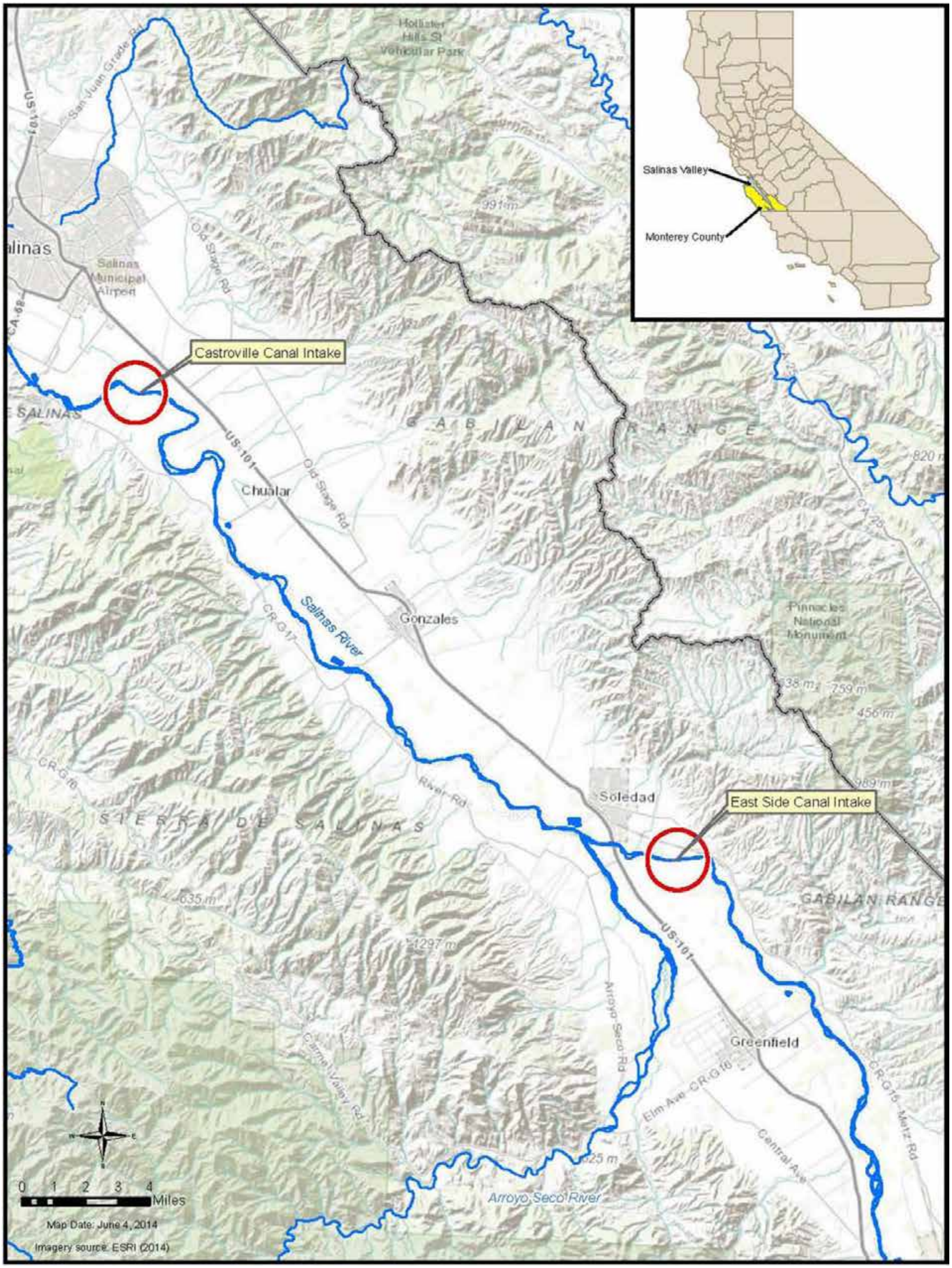

Figure 9-4. 11043 Diversion Locations

Table 9-3. Salinas River Natural Flow Rates by Month

Month	Amount (cfs)
January	3.3
February	6.2
March	6.41
April	16.43
May	17.21
June	20.62
July	24.02
August	18.89
September	20.97
October	10.51
November	4.56
December	2.64

This project proposes constructing extraction facilities at the Chualar location and pumping the water to the Eastside Subbasin where the water can be infiltrated into the groundwater basin through recharge basins at known pumping depressions and areas of poor water quality. Recharging areas of poor water quality can dilute contaminants already in the water. Projects will assess contaminants in the soil as part of project development to ensure they will avoid groundwater contamination and protect nearby domestic drinking water sources. Groundwater quality would be monitored throughout the project to ensure that it is not worsening. The diversion facility would be sized to provide approximately 6,000 to 10,000 AF/yr. to farmland in the Eastside Subbasin between Chualar and Salinas.

In addition to sending this water to recharge basins for groundwater recharge, diverted water under this permit could also be used for direct delivery for municipal supply. Under direct delivery use, this water would act as in-lieu recharge by reducing the need for pumping from municipal wells resulting in less groundwater demand. Through the in-lieu recharge component of direct delivery, the saved water can still be pumped in the summer to meet CSIP demands. Diverted water under this permit would first need to be sent to a treatment plant prior to delivery. Other important considerations for direct use of seasonal releases include water quality differences between groundwater and surface water, timing and availability of flows compared to municipal demand schedules, and other infrastructure needs. Direct delivery of seasonal releases may be a less expensive option but will need further analysis.

For cost estimating purposes, the project is evaluated at a diversion rate of 6,000 AF/yr. To obtain this volume of water, a diversion structure that can pump between 25 and 50 cfs is required. The diversion structure could be sized to extract more than 10,000 AF/yr.; however, it may not be economical to construct a larger facility. This issue can be further evaluated during the preliminary design stages of the project. The SVBGSA will coordinate and consult with MCWRA on planning, construction, and operation of this project. The project would require a radial collector well diversion facility, 4.5 miles of transmission pipe, and recharge basins that could be farmed in the summer and fallowed during the winter. Water recharged will comply with regulatory standards. An alternative to the infiltration basins is to construct a filtration and chlorination treatment facility and injection wells. This alternative is more expensive but potentially more effective at addressing lowering groundwater levels than the infiltration basins. Opportunities and constraints associated with this alternative will be further assessed and refined prior to the design phase of this project.

9.4.3.1 Relevant Measurable Objectives

Relevant multi-subbasin measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By recharging diversions when water is available, more water will be added to the principal aquifer. Adding water into the principal aquifer will either raise groundwater elevations or reduce the rate of groundwater elevation decline over time.
- **Groundwater storage measurable objective.** Adding water to the principal aquifer will have the effect of increasing groundwater in storage.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater recharge will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.3.2 Expected Benefits and Evaluation of Benefits

This project directly benefits the Eastside Subbasin. The primary expected benefit of this project is to provide an alternative water supply source to recharge the Eastside Subbasin, thereby either raising groundwater elevations or lowering the rate of groundwater elevation decline. The project may also have an indirect effect of reducing seawater intrusion.

The groundwater-related expected benefits are increased groundwater elevations in the vicinity of the recharge, increased groundwater in storage, and protection against any potential land subsidence caused by groundwater depletion. Initial model runs indicate that if an average of approximately 6,000 AF/yr. is diverted, there will be an increase of approximately 4,600 AF/yr. in groundwater storage for both the Eastside and 180/400-Foot Aquifer Subbasins, with the remaining diverted water lost to ET. Additional analyses will be conducted to refine this value and delineate the storage benefits for each subbasin should this project be considered for implementation.

The groundwater model simulations estimated the baseline Salinas River expected flows during the calendar year, as the diversion permit is based on calendar year caps. The diversions then are determined by analyzing the amount of natural flow available once all other existing releases and flow requirements are met. No additional reservoir releases are assumed for this model simulation, and the diversion does not impact the reservoir operations. The water diverted is excess natural flows only. Furthermore, climate change predictions provided by DWR indicate both warmer and wetter climate in the future, which means the flows for the Salinas River may have more water for diversion. This model does not account for the uncertainty surrounding greater variations in precipitation, timing, intensities, and subsequent flows.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage. Land subsidence will be measured using InSAR data provided by the Department of Water Resources. Seawater intrusion will be measured using select RMS wells.

9.4.3.3 Circumstances for Implementation

The 11043 diversion at Chualar project needs to be more fully scoped and evaluated prior to implementation. This includes the identification of the end use of diverted water and the planning of the distribution system. A number of land and access agreements and permits will be needed before the project can be implemented.

9.4.3.4 Permitting and Regulatory Process

MCWRA holds the SWRCB Permit 11043 diversion right. Implementing this project will require close coordination with MCWRA and may require changes to the Permit approved by SWRCB. The project will be implemented in full compliance with the conditions of the Permit.

This project will require a CEQA review process. Additionally, any project that coordinates with federal facilities or agencies may require NEPA documentation.

There will be a number of local, county, and state permits, right of ways, and easements required depending on pipeline alignments, stream crossings, and project type. Permits that may be required for the 11043 diversion include, but may not be limited to:

- ***United States Army Corps of Engineers (USACE)*** – A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.

- ***State Water Resources Control Board (SWRCB)*** – A permit to operate a public water system is required from SWRCB's DDW. Construction that disturbs 1 acre or more of land and that discharges stormwater requires a General Construction Stormwater Permit (Water Quality Order No. 2009-0009-DWQ).
- ***National Marine Fisheries Service (NMFS)*** – A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***California Department of Fish and Wildlife (CDFW)*** – Projects that may result in the take of a threatened or endangered species require an Incidental Take Permit (California Endangered Species Act Title 14, §783.2). This project may also require a Lake and Streambed Alteration Agreement.
- ***California Department of Transportation (Caltrans)*** – Work that may obstruct a State highway requires an Encroachment Permit.
- ***Environmental Protection Agency (EPA) Region 9*** –NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.

9.4.3.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-5 below.

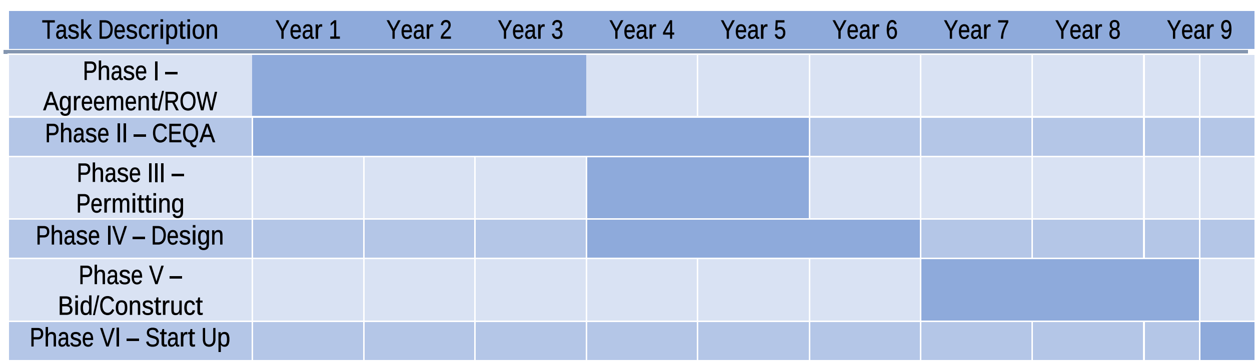

Figure 9-5. Implementation Schedule

9.4.3.6 Legal Authority

MCWRA, the holder of the 11043 permit, is a member of the SVBGSA. Either MCWRA will use the permit as a member of the SVBGSA, or MCWRA will need to transfer the permit to SVBGSA in order to implement this project.

The SVBGSA has the right to divert and store water once it has the approval to utilize the 11043 Permit. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement the project.

9.4.3.7 Estimated Cost

The capital cost for the 11043 Chualar Diversion Facilities is estimated at $55,684,000. Annual O&M costs for the diversion project are anticipated to be approximately $1,538,700. The amortized cost of the benefit of 4,600 AF/yr. of water added to storage for this project is estimated at $1,280/AF.

9.4.3.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board and the MCWRA Board in publicly noticed meetings. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board and the MCWRA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

The permitting and implementation of the diversion will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members as well as all permit and regulatory holding agencies such as DWR, CEQA, NOAA, USACE, and others. In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.4 Project B2: 11043 Diversion at Soledad

MCWRA holds SWRCB Permit 11043 (Permit), which is a diversion right on the Salinas River. The current amended permit allows diversion at 2 identified locations: 1 location near Soledad called the East Side Canal Intake, and 1 location near Chualar called the Castroville Canal Intake (Figure 9-4). The Permit has an annual maximum diversion limit of 135,000 AF. Permit Condition 13 only allows water to be diverted when there are natural flows in the river that exceed minimum specified criteria. In addition, under Condition 13, the maximum allowed diversion is 400 cfs. Based on the conditions of the permit, a 400 cfs diversion and historical flows, a conservative estimate is that a long-term average of up to approximately 35,000 AF/yr. of water could be diverted from either diversion point between the months of December and March. Based on physical limitations of a 50 cfs diversion structure, this number is likely considerably less; approximately 6,000 AF/yr.

Per Permit Condition 13, the natural flow shall be calculated by subtracting reservoir releases from Nacimiento and San Antonio Reservoirs from total flows at the Soledad gauging station on a 3-day running average. The water right holder shall not divert water unless the natural flow of the Salinas River at Eastside Canal Intake (NAD 83, Zone 4, North 2,038,821 feet, and East 5,891,976 feet) is greater than the amounts listed in Table 9-4.

Table 9-4. Salinas River Natural Flow Rates by Month

Month	Amount (cfs)
January	3.3
February	6.2
March	6.41
April	16.43
May	17.21
June	20.62
July	24.02
August	18.89
September	20.97
October	10.51
November	4.56
December	2.64

This project proposes constructing extraction facilities at the Soledad location and pumping the water to the Eastside Subbasin where the water can be infiltrated into the groundwater basin at known pumping depressions and areas of poor water quality. Recharging areas of poor water quality can dilute contaminants already in the water. Projects will assess contaminants in the soil as part of project development to ensure they will avoid groundwater contamination and protect nearby domestic drinking water sources. Groundwater quality would be monitored throughout the project to ensure that it is not worsening. The diversion facility would be sized to provide approximately 6,000 to 10,000 AF/yr. to farmland in the Eastside Subbasin between Soledad and Gonzales.

In addition to sending this water to recharge basins for groundwater recharge, diverted water under this permit could also be used for direct delivery for municipal supply. Under direct delivery use, this water would act as in-lieu recharge by reducing the need for pumping from municipal wells resulting in less groundwater demand. Through the in-lieu recharge component of direct delivery, the saved water can still be pumped in the summer to meet CSIP demands. Diverted water under this permit would first need to be sent to a treatment plant prior to delivery. Other important considerations for direct use of seasonal releases include water quality differences between groundwater and surface water, timing and availability of flows compared to municipal demand schedules, and other infrastructure needs.

For cost estimating purposes, the project is evaluated at a diversion rate of 6,000 AF/yr. To obtain this volume of water, a diversion structure that can pump between 25 and 50 cfs is required. The diversion structure could be sized to extract more than 10,000 AF/yr.; however, it may not be economical to construct a larger facility. This issue can be further evaluated during the preliminary design stages of the project. The SVBGSA will coordinate and consult with MCWRA on planning, construction, and operation of this project. The project would require a radial collector well diversion facility, 12.5 miles of transmission pipe, and recharge basins that could be farmed in the summer and fallowed in the winter. Water recharged will comply with regulatory standards. An alternative to the infiltration basins is to construct a filtration and chlorination treatment facility and injection wells. This alternative is more expensive but potentially more effective at addressing lowering groundwater levels than the infiltration basins. Opportunities and constraints associated with this alternative will be further assessed and refined prior to the design phase of this project.

9.4.4.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By recharging diversions when water is available, more water will be added to the principal aquifer. Adding water into the principal aquifer will either raise groundwater elevations or reduce the rate of groundwater elevation decline over time.
- **Groundwater storage measurable objective.** Adding water to the principal aquifer will have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a

couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.4.2 Expected Benefits and Evaluation of Benefits

This project directly benefits the Eastside Subbasin. The primary expected benefit of this project is to provide an alternative water supply source to recharge the Eastside Subbasin, thereby either raising groundwater elevations or lowering the rate of groundwater elevation decline. This project likely will have an indirect effect of reducing seawater intrusion.

The groundwater-related expected benefits are increased groundwater elevations in the vicinity of the recharge, increased groundwater in storage, protection against any potential land subsidence caused by groundwater depletion, and water quality benefits. Initial model runs of the 11043 diversion at Chualar indicate that if 6,000 AF/yr. is diverted, there will be an increase of 4,600 AF/yr. in groundwater storage for both the Eastside and 180/400-Foot Aquifer Subbasins, with the remaining diverted water lost to ET. Although scoping of specific recharge locations has yet to be determined for the 11043 project at either diversion point, the groundwater storage benefit for the Soledad diversion is assumed to be the same as for the Chualar diversion. The difference between the projects is the location of diversion and piping to reach the recharge locations in the Eastside. Additional analyses will be conducted to refine this value and delineate the storage benefits for each subbasin should this project be considered for implementation.

The groundwater model simulations estimated the baseline Salinas River expected flows during the calendar year, as the diversion permit is based on calendar year caps. The diversions then are determined by analyzing the amount of natural flow available once all other existing releases and flow requirements are met. No additional reservoir releases are assumed for this model simulation, and the diversion does not impact the reservoir operations. The water diverted is excess natural flows only. Furthermore, climate change predictions provided by DWR indicate both warmer and wetter climate in the future, which means the flows for the Salinas River may have more water for diversion. This model does not account for the uncertainty surrounding greater variations in precipitation, timing, intensities, and subsequent flows.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage. Land subsidence will be measured using InSAR data provided by the Department of Water Resources. Seawater intrusion will be measured using select RMS wells.

9.4.4.3 Circumstances for Implementation

The 11043 diversion at Soledad project needs to be more fully scoped and evaluated prior to implementation. This includes the identification of the end use of diverted water and the planning of the distribution system. A number of land and access agreements and permits will be needed before the project can be implemented.

9.4.4.4 Permitting and Regulatory Process

MCWRA holds the SWRCB Permit 11043 diversion right. Implementing this project will require close coordination with MCWRA and may require changes to the Permit approved by SWRCB. The project will be implemented in full compliance with the conditions of the Permit.

This project will require a CEQA review process. Additionally, any project that coordinates with federal facilities or agencies may require NEPA documentation.

There will be a number of local, county, and state permits, right of ways, and easements required depending on pipeline alignments, stream crossings, and project type. Permits that may be required for the 11043 diversion include, but may not be limited to:

- ***United States Army Corps of Engineers (USACE)*** **–** A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***State Water Resources Control Board (SWRCB)*** **–** A permit to operate a public water system is required from SWRCB's DDW. Construction that disturbs 1 acre or more of land and that discharges stormwater requires a General Construction Stormwater Permit (Water Quality Order No. 2009-0009-DWQ).
- ***National Marine Fisheries Service (NMFS)*** **–** A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***California Department of Fish and Wildlife (CDFW)*** **–** Projects that may result in the take of a threatened or endangered species require an Incidental Take Permit (California Endangered Species Act Title 14, §783.2). This project may also require a Lake and Streambed Alteration Agreement.
- ***California Department of Transportation (Caltrans)*** **–** Work that may obstruct a State highway requires an Encroachment Permit.
- ***Environmental Protection Agency (EPA) Region 9*** **–**NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.

9.4.4.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-6 below.

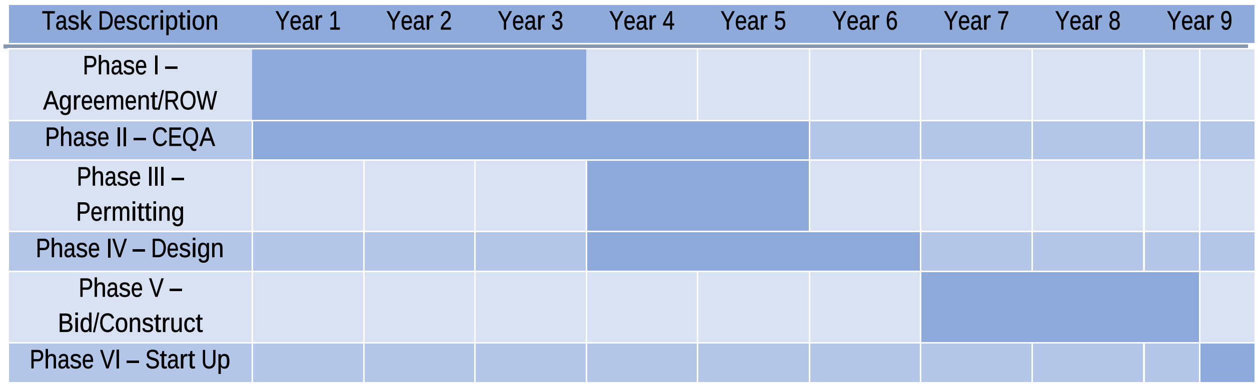

Figure 9-6. Implementation Schedule

9.4.4.6 Legal Authority

MCWRA, the holder of the 11043 permit, is a member of the SVBGSA. Either MCWRA will use the permit as a member of the SVBGSA, or MCWRA will need to transfer the permit to SVBGSA in order to implement this project.

The SVBGSA has the right to divert and store water once it has the approval to utilize the 11043 Permit. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement the project.

9.4.4.7 Estimated Cost

The capital cost for the 11043 Soledad Diversion Facilities is estimated at $104,688,000. Annual O&M costs for the diversion project are anticipated to be approximately $1,538,700. The amortized cost of the benefit of 4,600 AF/yr. of water added to storage for this project is estimated at $2,110/AF.

9.4.4.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board and the MCWRA Board in publicly noticed meetings. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board and the MCWRA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

The permitting and implementation of the diversion will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members as well as all permit and regulatory holding agencies such as DWR, CEQA, NOAA, USACE, and others. In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.5 Project B3: Surface Water Diversion from Gabilan Creek

This project entails diverting flood flows from Gabilan Creek and recharging this water at a nearby location in either recharge basins or dry wells.

Gabilan Creek drains north from the Gabilan Range and briefly runs through the Langley Subbasin where it turns south before entering the Eastside Subbasin. A stream gage on the Creek recorded an average flow of 20 cfs from 1971 to 2014. Flows are highly variable depending on whether it is a dry or wet year, as shown on Figure 9-7.

Historical data from the Gabilan Creek stream gage indicates that it receives the highest flows in the winter, and that it is highly variable between years, with some years receiving little to no flow. Given the potential for state permits to divert stream water, flows over the historical 90th percentile for that day of the year were calculated, and during those days, no more than 20% of the total flow for that day were diverted. With current permitting, the resulting water that could have been available for diversion under historical conditions is shown on Figure 9-7. This figure shows that water for recharge is highly variable. Based on historical data, the mean annual diversion is about 450 AF, but with a standard deviation of more than 1,000 AF. The median is 200 AF/yr.

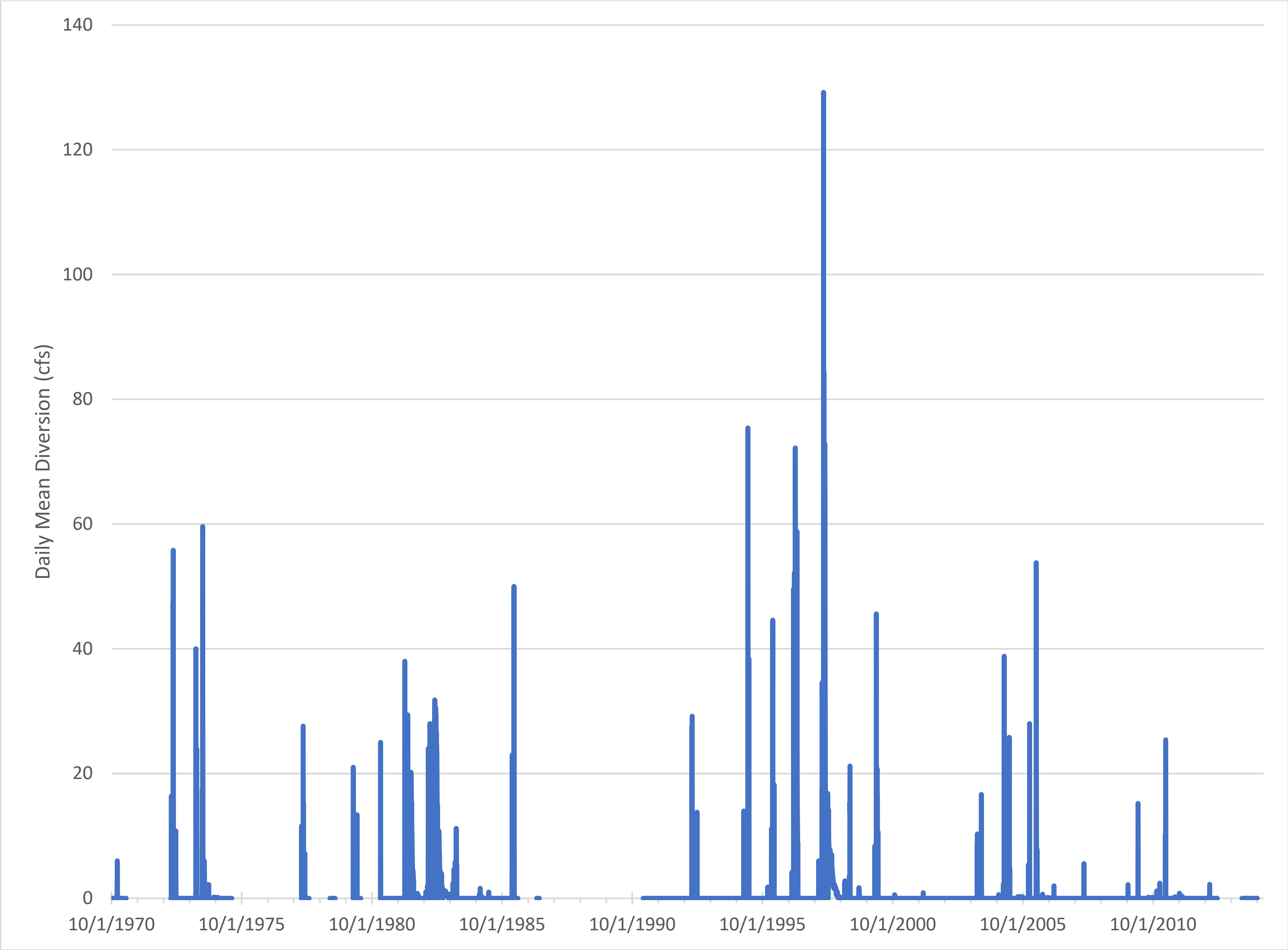

Figure 9-7. Gabilan Creek Streamflow Analysis Results by Water Year

Based on this analysis, mean annual diversions were calculated to determine the potential diversion amounts for diversion structures ranging from capacities of 5 to 50 cfs. A diversion capacity of 20 cfs would be expected to potentially capture a mean of 350 AF per year. For each 5 cfs of capacity added beyond that to a diversion structure, the expected diversion grows by less than 10%.

Water must be able to permeate the subsurface sediments for dry wells and recharge basins to be effective. The analysis of the permeability of subsurface sediments looked at which zones are good to site a recharge basin or screen a dry well in for recharge purposes. An initial analysis of the subsurface conditions in the vicinity of Gabilan Creek show frequent occurrences of clay and granite gravel from the Gabilan Range. Well construction logs analyzed show coarser sediments from approximately 30 feet below land surface to 130 feet below land surface. However, these sediments include a mix of decomposed granite, clay, gravel, sand, and fractured granite. Well construction logs show depth to water from approximately 80 feet to 100 feet below land surface as recorded at the time of well installation, which ranges from 20 to 80 years ago. The actual siting would require a more detailed subsurface analysis of sediments and more thorough analysis of depth to water for all seasonal conditions, such that the bottom of the dry well would remain above the water table for groundwater quality protection purposes. Sites with contaminated soils will be avoided, and water recharged will comply with regulatory standards.

Given the challenge of finding a good recharge location, along with the potentially low water yield benefit of a diversion structure, a preliminary cost analysis was not pursued at this stage. Multiple pilot holes would likely need to be drilled to identify a good recharge pond and/or dry well location. A diversion structure of 20 cfs would be costly for the quantity of water that would be diverted since only flows over the 90^{th} percentile would be diverted. Based on the historical record, there may not be flows for several years, and other flows may be very unreliable. This would negate both the investment in the diversion structure and the recharge infrastructure.

Under the current State permitting process, SVBGSA would likely only be able to divert flood flows that are over the 90th percentile on any given day. SVBGSA performed a preliminary analysis of the streamflow that would meet the 90th percentile threshold and be diverted. Additionally, SVBGSA looked at the potential for recharge through a recharge basin or dry well. If pursued, a more detailed analysis of diversion and recharge locations would need to occur, along with discussions with landowners.

9.4.5.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By routing stormwater and runoff from streams into recharge facilities and restored floodplains, there will be more water added to the principal aquifer. This water will be slowed down and allowed to infiltrate, which has the effect of addition water to the aquifer. Adding water into the principal aquifer will raise groundwater elevations over time.

- **Groundwater storage measurable objective.** Adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.
- **Seawater intrusion measurable objective.** Seawater intrusion occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.5.2 Expected Benefits and Evaluation of Benefits

The primary benefit from this project is increased groundwater recharge due to recharged 90th percentile flood flows diversion.

Based on analysis of historical data, a diversion structure with a capacity of 20 cfs will capture about 350 AF/yr., on average. However, annual variation is high. Diversions were simulated over a 44-year historical period and the median diversion was only 9 AF/yr., because there were many years when no water was diverted and a couple years when thousands of AF were diverted. During the implementation period, these numbers will be refined with flood studies that are more regionally specific and accurate. Recharge of 350 AF/yr. will result in a smaller change in groundwater storage due to loss to ET; however, the exact amount is unknown at this point.

The benefit is greatest at the location of the recharge facilities, which would likely be sited relatively close to the stream due to anticipated infrastructure costs and subsurface sediments.

Increased storage of flood waters can also increase groundwater elevations in the vicinity of the recharge facilities. This typically will be seen as groundwater mounding. However, as more water is emplaced in the subsurface, more water will flow laterally, thereby expanding the zone of influence from the recharge facility outward and raise groundwater elevations laterally. Additionally, water stored underground is not subject to ET in the same way water stored above ground is. This increases the return on the investment, by reducing recharge system losses. Even with recharge basins, proper maintenance can minimize recharge system losses and maximize potential storage.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations and storage will be measured with a network of wells that is monitored by MCWRA. A direct correlation between flood water recharge and changes in groundwater elevations is mostly possible because this project will likely include monitoring wells or will be close enough to the existing monitoring network for the impacts to be measured. Various volumetric measurement methods will be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage. Seawater intrusion will be measured using select RMS wells.

9.4.5.3 Circumstances for Implementation

This streamflow diversion and recharge project will decrease flood flows along Gabilan Creek, which could detract from projects other stakeholders are undertaking, such as the Gabilan Floodplain Enhancement Project being undertaken by the RWMG and CCWG. Prior to implementation, the effect on other potential projects under consideration by SVBGSA or other entities must be considered. Site specific analyses are required to determine the potential recharge benefit. Land access and water diversion rights must be secured, which may take a significant number of years. A diversion permit or SWRCB 5-year temporary permit must be obtained prior to diversion.

9.4.5.4 Permitting and Regulatory Process

A diversion permit is needed to divert water from the Gabilan Creek. SVBGSA recognizes that this process takes several years to complete. SVBGSA will pursue a SWRCB 5-year temporary permit under the Streamlined Permit Process while it applies for the diversion permit.

The project described in this section will require a CEQA environmental review process and may require an EIR or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). In addition, permits from the following government organizations may be required:

- ***United States Army Corps of Engineers (USACE) –*** A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***California Department of Fish and Wildlife (CDFW) –*** A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9 –***NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.
- ***National Marine Fisheries Service (NMFS) –*** A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***Monterey County –*** A Use Permit may be required. A Grading Permit is required if 100 cubic yards or more of soil materials are imported, moved, or exported. An Encroachment Permit is required if objects will be placed in, on, under, or over any County highway.

9.4.5.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-8. This schedule will begin after a SWRCB temporary permit for diversion and recharge of high flows is secured.

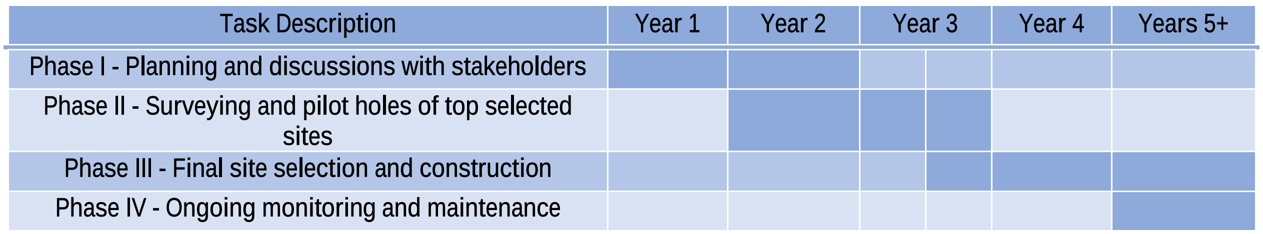

Figure 9-8. Implementation Schedule for Surface Water Diversion from Gabilan Creek

9.4.5.6 Legal Authority

Pursuant to California Water Code § 10726.2 (a) and (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement a recharge project. A diversion permit or a SWRCB 5-year temporary permit is required for the authority to divert water.

9.4.5.7 Estimated Cost

Capital costs were estimated at $10,074,000. On an annualized basis, assuming a 6% discount rate, and 25-year term, this amounts to $788,100. Including an annual O&M cost of $34,000 generates a total annualized cost of $822,100. Assuming 350 AF/yr. is recharged, the unit cost for water stored is estimated at $2,350/AF. This unit cost estimate is based on the amount of water available for recharge because the groundwater storage benefit is unknown at this point. Therefore, the unit cost for the storage benefit is likely higher than $2,350/AF.

9.4.5.8 Public Noticing

Before any project initiates construction, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project

- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

Alternative Water Supplies

9.4.6 Project C1: Eastside Irrigation Water Supply Project

This project is a modified version of a project originally described in the 1991 Boyle Engineering Report Water Capital Facilities Plan for MCWRA, as Project #31. This project, titled the Eastside Irrigation Water Supply Project, supplies water to an existing agricultural area that currently relies on water pumped from an over-drafted subbasin. This project relies on the ability to place extraction wells in an area of the southern 180/400-Foot Aquifer Subbasin where the Salinas Valley Aquitard is thin or discontinuous, thereby allowing the Salinas River to recharge at least some of the more productive aquifer zones during the winter, then extracting that water for delivery in the summer. The extracted water will create space in the aquifer for storage during winter flows, which are more readily infiltrated due to the enhanced gradient from pumping activities. In addition, SVBGSA will develop user agreements with the landowners to gain access to the wells.

The water is pumped directly into the Eastside Subbasin and distributed or conveyed through joint-use facilities. This project consists of pumping 3,000 AF/yr. from the 180-Foot Aquifer in the 180/400-Foot Aquifer Subbasin and sending it through the same proposed distribution system for irrigation, or alternatively recharge. The distribution system includes booster pump stations and storage tanks.

A series of 3 new extraction wells will be installed along an approximately 1-mile segment of the Salinas River. These wells will only screen the 180-Foot Aquifer with total well depths not exceeding 350 feet below ground surface (bgs). Each well would have production rate of 1,000 gpm, extracting water during a typical 6-month irrigation season.

The water will be pumped from an existing irrigation well, or series of wells on the southwest side of the Salinas River, in a notable bend in the river (Figure 9-9). This water, once extracted, would create a similar volume of available storage space within the aquifer system during winter flows. On average, this aquifer storage volume would be recharged by percolating Salinas River flows during a typical winter high flow season. Assuming a 5-month recharge period, this would equate to an average aquifer recharge rate of about 10 cfs over the 1-mile drawdown zone.

The original project was sized with 2 alternatives: one for an 8,400-acre service area (18,700 AF/yr. for irrigation and 2,300 AF/yr. for recharge), and another for a 13,600-acre service area (30,280 AF/yr. for irrigation and 3,720 AF/yr. for recharge). This water was originally to be sourced from a new diversion on the Salinas River. However, this modified project, sized at 3,000 AF/yr. will serve approximately 1,200 acres. The division between irrigation-purposed water and recharge-purposed water will be determined during the project design phase. Soil will be tested wherever there is a risk of soil contaminants leaching into groundwater, and all recharged water will comply with regulatory standards.

Distribution system pipelines will vary in size. The original project required pipes sized from 60-inches to 15-inches in diameter for the 8,400-acre service area and from 72-inches to 15-inches for the 13,600-acre service area. The system was designed to provide users no less than 10 feet of pressure at each farm turnout. These pipe sizes would be adjusted for the reduced volumetric extraction and delivery of 3,000 AF/yr. Farm turnouts will typically be provided for each 80-acre parcel. These system pipelines have been sized to deliver an average of 6 gpm per acre. This project may be able to deliver approximately 10% of the irrigation water requirements. During the peak irrigation season, existing wells will be utilized to meet peak irrigation demands in excess of 6 gpm per acre.

The original project design facilities included regulating reservoirs; however, this modified project may benefit from steel storage tanks to prevent evaporation and require less space. These are not included in the currently scoped project, but could be added during project design.

Excess water not applied for irrigation purposes could also be routed to strategically placed recharge facilities such as recharge basins or injection wells. This additional recharge water will ultimately raise groundwater elevations from upgradient areas where runoff first meets permeable soils that are connected to the principal aquifer, throughout the Eastside Subbasin and all the way downgradient to the 180/400-Foot Aquifer Subbasin.

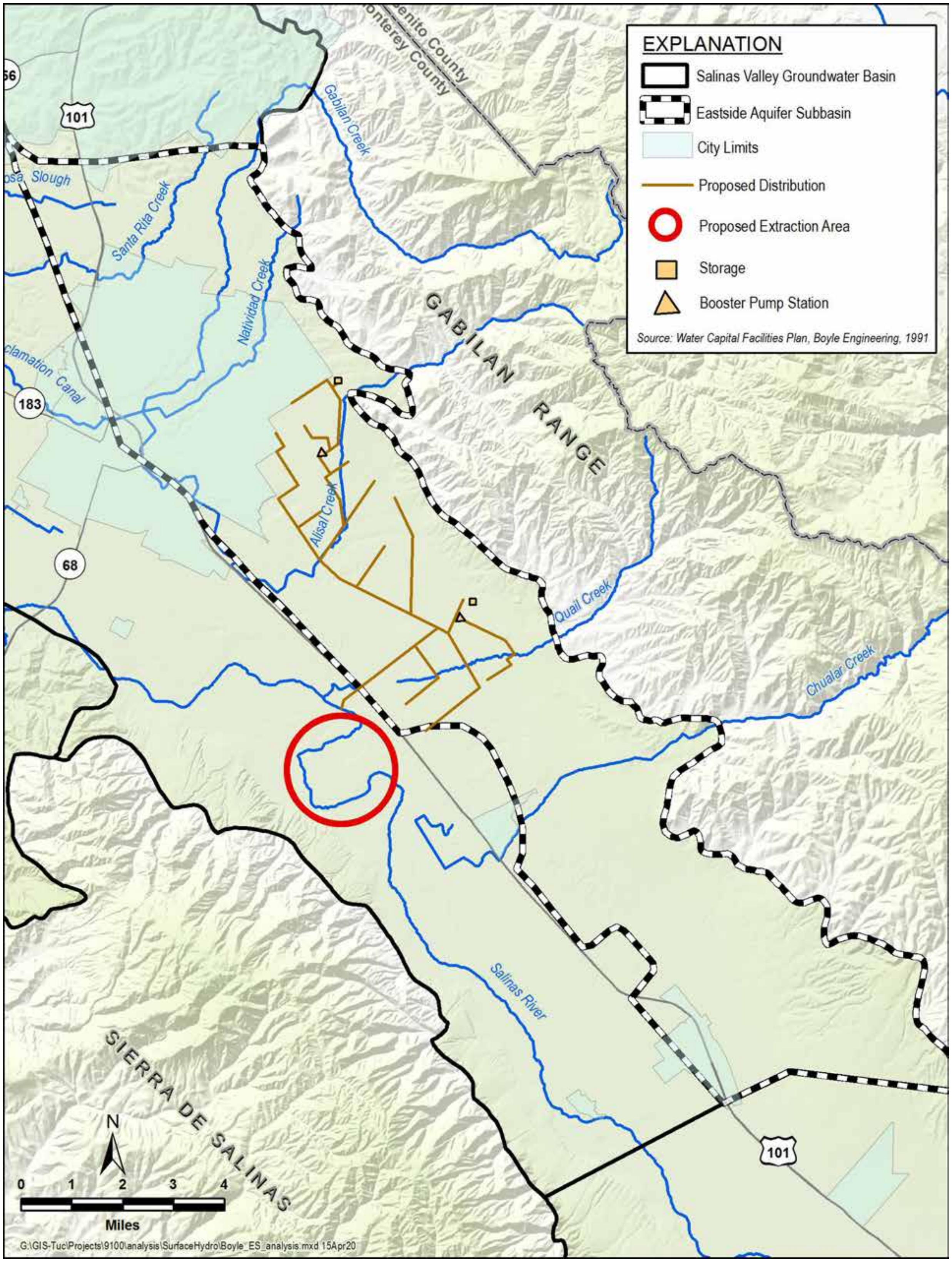

Figure 9-9. Proposed Distribution System, Modified From Original Project

Property will be needed for the extraction wells, pipe distribution, pump stations, and storage. Pipelines will likely also be placed in or along roadways.

The original project was proposed to take 3 years to complete from the time of authorization - 1 year for engineering and 2 years for construction. The modified project will likely take longer to complete accommodating for purchasing property, working through landowner access agreements, rights of way permissions, and water rights alterations.

Pumping water from one subbasin for use in another subbasin, while not dissimilar from surface water diversions along the Salinas River in various subbasins, will still require clarifying water rights for groundwater and recharge. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. This modified project would be developed in accordance with all applicable groundwater laws and respect all groundwater rights. More discussion of the legal authority for this project is described in section 9.1.1.1.7.

9.4.6.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** By using water from the 180-Foot Aquifer, it will have the effect of more water added to the principal aquifer. This water will be used in-lieu of pumping. If this water is routed to recharge facilities when it is available, this is adding water to the subsurface. Adding water into the principal aquifer will raise groundwater elevations over time.
- **Groundwater storage measurable objective.** Reducing pumping from the principal aquifer will ultimately have the effect of increasing groundwater in storage.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.6.2 Expected Benefits and Evaluation of Benefits

The primary benefit from this project is increased groundwater elevations from reduced subbasin pumping and in-lieu use of imported water.

Increased use of alternative water supplies will potentially increase groundwater elevations by reducing the amount of agricultural demand irrigation. This in-lieu use will yield dividends over a longer period of time as more growers use this water instead of groundwater in their subbasin, and subsequently use less groundwater for irrigation. Additionally, excess water from the 3,000 AF/yr. project could be put to use in recharge facilities, ultimately raising groundwater elevations from the “top-down” as recharged water flows laterally downward from the upper Eastside regions towards the 180/400-Foot Aquifer Subbasin and the Salinas River. Eventually, this would show up as rising groundwater elevations throughout the Subbasin. Raised groundwater elevations ultimately become increased groundwater storage. Additional analyses will be conducted to refine the benefits to groundwater storage for both the Eastside and 180/400-Foot Aquifer Subbasins should this project be implemented.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Various volumetric measurement methods will be installed along the distribution system as well as the recharge facilities to assist in calculating in-lieu use and increases to groundwater storage. Seawater intrusion will be measured using select RMS wells.

9.4.6.3 Circumstances for Implementation

The Eastside Irrigation Water Supply Project needs to be more fully scoped and evaluated prior to implementation. As this project is within the Salinas Valley Basin, this is not considered importing or exporting from the Basin. A number of land and access agreements will also be needed before the project can be implemented.

Ownership of land overlying percolating groundwater provides the landowner with an overlying groundwater right to beneficially use the water on the land. An overlying water right is not quantified but allows the water right holder to divert as much water as is reasonable to support beneficial uses on the overlying land. Overliers do not have the right to move water away from their land. Municipal or public extractions cannot be supported by overlying rights. Overlying and appropriative rights are subject to prescription, but SGMA limits prescriptive rights under limited circumstances. Effectively, no groundwater extractions between January 1, 2015, and the date a GSA is adopted, or an alternate plan is approved by DWR (whichever is sooner) may be used as evidence of, or to establish or defend against, any claim of prescription (California Water Code, §10720.5(a)). Now, the California Water Code provides GSAs the authority to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. (California Water Code § 10726.2 (b)). The GSA would need to either acquire the land or create a pumping allocations framework to accommodate intra-basin transport of groundwater for all overliers and beneficial users. Additionally, the easements for pipelines would need to be sought from the county or other property owner, and land acquired for storage and booster stations.

In addition to understanding more of the land and water rights to facilitate implementing this modified project, the GSA would also have to work an agreement with CalTrans to allow for the water to be transported across the highway. The GSA will also need to work with USACE and vested environmental groups on what will be required to cross the Salinas River with a pipeline.

9.4.6.4 Permitting and Regulatory Process

Surface water rights holders and groundwater pumpers both have correlative rights to the common water pool. As stated in the SVWC v. MCWRA Report of Referee (SWRCB, 2019):

The common source doctrine applies to groundwater and surface waters that are hydrologically connected and integrates the relative priorities of the rights without regard to whether the diversion is from surface or groundwater.

Groundwater pumping rights and riparian surface water rights are correlative under this finding. As such, this modified project will likely have many of the same applicable permitting and regulatory processes as a surface water diversion right, which would have been necessary under the original project scope.

MCWRA collects groundwater extraction information from all wells in the Salinas Valley Basin that have discharge pipes of 3 inches or greater in diameter. These data have been collected since 1993. Extraction is self-reported by well owners. MCWRA shall promptly submit any reports, data, or other information that may reasonably be required by the State Water Board.

All wells drilled will comply with the County's well permitting process. Permits for crossing the river will be sought from the USACE and comply with all applicable federal regulations. Permits to cross state highway 101 will be sought from CalTrans. All other state and local entities permit processes will be followed for this modified project.

9.4.6.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-10. It is anticipated that Phase I will take 2 years, likely more depending on the relationships with various agencies and regulatory bodies. Phases II and III will overlap with Phase I and take an additional 2 to 3 years. Phase VI, which is construction, will likely not be started until Phases I and II are complete with all buy-in and permits completed. Phase V, on-going maintenance, will continue past Year 4.

Task Description	Year 1	Year 2	Year 3	Year 4+
Phase I – Permitting, and water rights discussions				
Phase II - Planning and discussions with vested parties				
Phase III – Designs, public notices, and board approvals				
Phase IV - Construction				
Phase V - Ongoing monitoring and maintenance				

Figure 9-10. Implementation Schedule

9.4.6.6 Legal Authority

The SVBGSA will use the legal authority and partnerships for this modified project contained in existing distribution, irrigation, and partnership programs. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights.

The County also has the power to impose charges on a parcel or acreage basis under the County Service Area provisions of the Government Code (beginning with § 25210). These provisions give the County the authority to provide extended services within a specified area, which may be countywide, and to fix and collect charges for such extended services. Miscellaneous extended service for which county service areas can be established include “water service, including the acquisition, construction, operation, replacement, maintenance, and repair of water supply and distribution systems, including land, easements, rights-of-way, and water rights."

A county service area can be established by the Board of Supervisors on its own initiative. It is created by a notice and hearing process or by election. County service area charges are established by ordinance and may be collected on the tax roll in the same manner and time as ad valorem property taxes.

As stated in the SVWC v. MCWRA Report of Referee (SWRCB, 2019):

The common source doctrine applies to groundwater and surface waters that are hydrologically connected and integrates the relative priorities of the rights without regard to whether the diversion is from surface or groundwater.

Groundwater pumping rights and riparian surface water rights are correlative under this finding. Pumping allowances have not yet been established and are not water rights. One potential constraint on this project is clarifying water rights for recharge. Recharging excess water from this 3,000 AF/yr. project could be available for recharge if water rights law permits it.

9.4.6.7 Estimated Cost

Estimated capital cost for the original project with a 1,200-acre distribution for 3,000 AF/yr. and reservoirs in the system is estimated at $139,928,000. This assumes all the water is used as in-lieu recharge; however, part or all could be alternatively used for recharge. The annual energy, and O&M would be roughly $990,000. The amortized cost of water for this project is estimated at $3,980/AF.

9.4.6.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.7 Project C2: Salinas Scalping Plant

This project consists of building a scalping plant for the future growth area on the east side of Salinas. It would collect and treat wastewater for reuse on nearby agricultural fields, to be used for irrigation in lieu of groundwater extraction. This initial scoping includes 2 options: a 250,000 gallon per day (gpd) and a 500,000 gpd scalping plant. The capital cost and O&M are scoped for Cloacina facilities. Further scoping is needed to identify the collection and distribution system and add the associated costs of the systems to the project cost.

9.4.7.1 Relevant Measurable Objectives

The measurable objectives benefiting from outreach and education include:

- **Groundwater elevation measurable objective.** By recharging when recycled water is available, there will be more water added to the principal aquifer. Adding water into the principal aquifer will either raise groundwater elevations or reduce the rate of groundwater elevation decline over time. Furthermore, using recycled water instead of pumped groundwater passively increases the groundwater elevations by not diminishing them.
- **Groundwater storage measurable objective.** Reducing pumping from the principal aquifer will ultimately have the effect of increasing groundwater in storage.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective**. Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.7.2 Expected Benefits and Evaluation of Benefits

The primary benefit from this project is increased groundwater elevations and storage that results from reduced groundwater extraction. The 250,000 gpd and 500,000 gpd scalping plants would produce approximately 280 AF/yr. and 560 AF/yr. of recycled water for distribution, and therefore, up to that amount of reduced groundwater extraction assuming the timing of water delivery aligned with irrigation needs. The exact location of groundwater elevation impacts would depend on where current extraction is reduced, which would need to be determined during the project design phase.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Groundwater storage will be measured by pumping measurements and estimates. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

9.4.7.3 Circumstances for Implementation

The scalping plant needs to be designed, source water identified and legally secured, permits and CEQA completed, and recycled water recipients identified before it can be funded and implemented.

9.4.7.4 Permitting and Regulatory Process

Permits from the following government organizations that may be required for this project may include, but are not limited to:

- ***United States Fish and Wildlife Service (USFWS)*** **–** A Migratory Bird Treaty Act Permit (16 U.S. Code §703-711) may be required from the USFWS. Other federal agencies involved in the permitting process for this project may need to consult with USFWS in compliance with Section 7 of the Endangered Species Act. Interagency coordination is also required by the Fish and Wildlife Coordination Act (16 U.S. Code § 661-667e).
- ***State Water Resources Control Board (SWRCB)*** **–** A permit to operate a public water system is required from SWRCB's DDW. Construction that disturbs 1 acre or more of land and that discharges stormwater requires a General Construction Stormwater Permit (Water Quality Order No. 2009-0009-DWQ).
- ***California Department of Fish and Wildlife (CDFW)*** **–** Projects that may result in the take of a threatened or endangered species require an Incidental Take Permit (California Endangered Species Act Title 14, §783.2).
- ***California Department of Transportation (Caltrans)*** **–** Work that may obstruct a State highway requires an Encroachment Permit.
- ***California Public Utilities Commission (CPUC)*** **–** A Certificate of Public Convenience and Necessity (California Public Utilities Code §1001 *et seq.*) is required to show that the project will benefit society.
- ***Monterey County*** **–** This project will require a Use Permit (MCC Chapter 21.72 Title 21). A Grading Permit (Monterey County Code Chapter 16.08) is required if total disturbance on site equals or exceeds 100 cubic yards. An erosion control plan (Monterey County Code Chapter 16.12) is required if there is risk of accelerated (human-induced) erosion that could lead to degradation of water quality, loss of fish habitat, damage to property, loss of topsoil or vegetation cover, disruption of water supply, or increased danger from flooding. If the project encroaches onto any county-maintained road, an Encroachment Permit (Monterey County Code Chapter 14.04) is required. Removal of 3 or fewer trees can be handled by a standalone Tree Removal Permit (Monterey County Code Chapter 16.60). Removal of more than 3 trees should be included in a Use Permit.
- ***Monterey County Health Department*** – If there will be 55 gallons (liquid), 500 pounds (solid), or 200 cubic feet (compressed gas) of hazardous materials on site at any one time, a Hazardous Materials Business Plan, and a Hazardous Materials Inventory Statement (California Health and Safety Code Chapter 6.95) must be submitted to the Monterey County Health Department's Environmental Health Bureau.

- ***Monterey One Water*** – A Sewer Connection Permit is required to connect to the regional sewer system.
- ***Monterey Bay Air Resources District (MBARD)*** – If the project may release or control air pollutants, an Authority to Construct and Permit to Operate is required (MBARD Rule 200).
- ***Local jurisdictions*** – Permits may also be required by a local jurisdiction depending on location of scalping plant, including but not limited to land use permits, building permits, public health permits, public works permits, tree removal permits, road easements, and encroachment permits.

9.4.7.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-11.

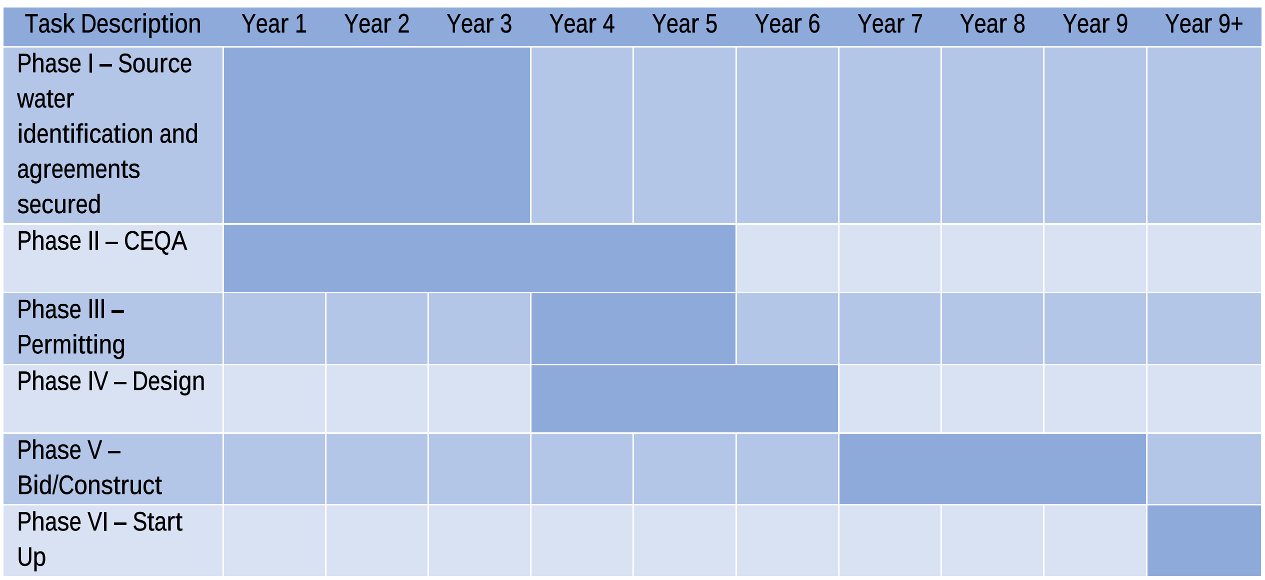

Figure 9-11. Implementation Schedule for Salinas Scalping Plant

9.4.7.6 Legal Authority

The SVBGSA will use the legal authority and partnerships for this modified project contained in existing distribution, irrigation, and partnership programs. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights.

The County also has the power to impose charges on a parcel or acreage basis under the County Service Area provisions of the Government Code (beginning with § 25210). These provisions give the County the authority to provide extended services within a specified area, which may be countywide, and to fix and collect charges for such extended services. Miscellaneous extended service for which county service areas can be established include "water service, including the acquisition, construction, operation, replacement, maintenance, and repair of water supply and distribution systems, including land, easements, rights-of-way, and water rights."

9.4.7.7 Estimated Cost

The total capital cost of a 500,000 gpd scalping plant is $14,183,000. Together with O&M and annualized over 25-year lifespan, the unit cost is $4,730/AF, as shown in Appendix 9A.

The total capital cost of a 250,000 gpd scalping plant is $9,839,000. Together with O&M and annualized over a 25-year lifespan, the unit cost is $6,480/AF, as shown in Appendix 9A.

These costs do not include the wastewater collection system or the distribution system for treated water to be delivered to agricultural fields.

9.4.7.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board and the MCWRA Board in publicly noticed meetings. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

The permitting and implementation of the diversion will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members as well as all permit and regulatory holding agencies such as DWR, CEQA, NOAA, USACE, and others. In addition to the public noticing detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

Regional Alternative Water Supplies

Two projects are regional in scope and will be implemented together with other subbasins. This includes the Regional Municipal Supply Project, which will desalinate brackish water from a seawater extraction barrier, and CSIP expansion. CSIP expansion could extend into the Eastside Subbasin; however, the majority of the expansion would be in the 180/400-Foot Aquifer Subbasin and the project would unlikely move forward in the Eastside independently.

9.4.8 Project D1: Regional Municipal Supply Project

This project is not a stand-alone project but rather a potential supplement to the seawater intrusion extraction barrier project. This project would construct a regional desalination plant to treat the brackish water extracted from the proposed seawater intrusion barrier in the 180/400-Foot Aquifer Subbasin (Priority Project 6 in Chapter 9 of that GSP). It would deliver water for direct potable use to municipal systems in the Eastside Subbasin and other subbasins within Salinas Valley. This project provides in lieu recharge to the groundwater system through reduced extraction by municipal systems. If the plant produced more water than could be used for direct potable use, excess water could be used for irrigation or reinjected into the 180-Foot or 400-Foot Aquifer. The water would be available year-round.

Further analysis and scoping are needed to determine the exact location of the desalination plant, end uses, and desalination technology. Depending on the desalination plant selected, the source water pipeline would consist of approximately 11 miles of source water pipeline to convey up to 22,000 gpm (32 mgd or 35,500 AF/yr.) of flow to the plant from the seawater intrusion extraction barrier. The pipeline would range from 18” to 36” in diameter. The plant would produce approximately 15,000 AF/yr. of potable water for use. The distribution of that water is yet to be determined. Rough estimates of piping and needed pump stations to provide water to the main municipal areas are included in the cost estimate and will be refined during GSP implementation.

9.4.8.1 Relevant Measurable Objectives

The measurable objectives benefiting from the Regional Municipal Supply Project include:

- **Groundwater elevation measurable objective.** By reducing groundwater extraction through in lieu recharge, there will be more water left in the principal aquifer. This will either raise groundwater elevations or reduce the rate of groundwater elevation decline over time.
- **Groundwater storage measurable objective.** Using desalinated water reduces groundwater extraction, which will either increase groundwater storage or reduce the rate of storage loss.

- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Providing water for in-lieu storage will reduce the pumping-induced gradient that drives seawater intrusion.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.

9.4.8.2 Expected Benefits and Evaluation of Benefits

The proposed plant would produce up to 15,000 AF/yr. of desalinated water for the Salinas Valley. A portion of that would go to Eastside Subbasin. This would reduce groundwater extraction by that amount, increase the Subbasin's groundwater storage (or lessen the decline), and reduce the risk of seawater intrusion. This will benefit all groundwater users in the Subbasin to some degree. If desalinated water is delivered to the City of Salinas, the pumping reductions and groundwater elevation benefits would occur in the locations of the City's municipal wells. Specific quantification of the groundwater benefit for the Eastside Subbasin is unable to be determined prior to determining the distribution of available desalinated water.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Groundwater storage will be monitored using groundwater pumping measurements and estimates. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells. A direct correlation between providing desalinated water to the Subbasin and changes in groundwater levels, subsidence, or seawater intrusion will depend in part on the suite of management actions and projects implemented concurrently in the Subbasin.

9.4.8.3 Circumstances for Implementation

This project is not a stand-alone project but is a potential supplement to the seawater intrusion extraction barrier project. This project will only be implemented if and when a brackish water extraction barrier is built to control seawater intrusion. A more detailed cost/benefit analysis will be completed before any work begins on this project. Further analysis and comparison of desalination technologies, stakeholder deliberations on the distribution of desalinated water, and identification of project sites still need to be completed. This project will only be implemented if it is cost effective and politically feasible when compared to other projects.

9.4.8.4 Permitting and Regulatory Process

Permits from the following government organizations that may be required for this project include:

- ***Monterey Bay National Marine Sanctuary (MBNMS)*** – All Regional Water Quality Control Board (RWQCB) 404 permits, Section 10 permits, and National Pollutant Discharge Elimination System (NPDES) permits must be reviewed by MBNMS.
- ***United States Fish and Wildlife Service (USFWS)*** – A Migratory Bird Treaty Act Permit (16 U.S. Code § 703-711) may be required from the USFWS. Other federal agencies involved in the permitting process for this project may need to consult with USFWS in compliance with Section 7 of the Endangered Species Act. Interagency coordination is also required by the Fish and Wildlife Coordination Act (16 U.S. Code § 661-667e).
- ***National Oceanic & Atmospheric Administration (NOAA)*** **–** Section 7 of the Endangered Species Act requires other federal agencies to consult with NOAA's NMFS if threatened or endangered species could be affected by this project. NMFS also monitors compliance with Section 305b of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S. Code § 1855b) which protects essential fish habitats.
- ***United States Army Corps of Engineers (USACE)*** **–** Under the Rivers and Harbor Act, a Section 10 permit (33 U.S. Code § 403) is required for the construction of any structure in or over any navigable water of the United States. Under the Clean Water Act, a Section 404 permit (33 U.S. Code § 1341) is required to discharge dredge or fill materials into waters of the United States.
- ***State Water Resources Control Board (SWRCB)*** **–** A permit to operate a public water system is required from SWRCB's DDW. Construction that disturbs 1 acre or more of land and that discharges stormwater requires a General Construction Stormwater Permit (Water Quality Order No. 2009-0009-DWQ). Certification to discharge dredged or fill material is required by Section 401 of the Clean Water Act and by the Porter-Cologne Water Quality Control Act (California Water Code § 13000 *et seq.*). Discharge of brine or other pollutants requires a NPDES permit under Section 402 of the Clean Water Act (33 U.S. Code § 1342).
- ***California Department of Fish and Wildlife (CDFW)*** **–** Projects that may result in the take of a threatened or endangered species require an Incidental Take Permit (California Endangered Species Act Title 14, §783.2). A Streambed Alteration Agreement (California Fish and Game Code Section 1602) is required if the project may substantially adversely affect fish and wildlife resources.

- ***California Coastal Commission (CCC)* –** Construction within the Coastal Zone requires a Coastal Development Permit (Public Resources Code 30000 *et seq.*). Under the Coastal Zone Management Act (16 U.S.C. § 1456), the CCC will ensure that federal authorized work is consistent with the enforceable policies of California's Coastal Management Program. Consistency between federal and state laws in coastal areas is also required by the Federal Consistency Regulations (15 Code of Federal Regulations, Part 930, Subpart D). The County may have initial jurisdiction to issue any required permit, but that would be appealable to the full Commission.
- ***California Department of Transportation (Caltrans)* –** Work that may obstruct a State highway requires an Encroachment Permit.
- ***California Department of Toxic Substances Control (DTSC)* –** If the project encroaches into the Fort Ord area, there will be hazardous waste management and disposal requirements concerning Soluble Threshold Limit Concentrations and Total Threshold Limit Concentrations (22 California Code of Regulations § 66261.24).
- ***California State Lands Commission (CSLC)* –** A New Land Use Lease is required for the subsurface slant wells located below mean high tide and an Amended Land Use Lease for use of the Monterey One Water outfall and diffuser (California Public Resources Code §1900).
- ***California Department of Parks and Recreation* –** If the project encroaches into Fort Ord Dunes State Park, an easement, right of entry, and/or lease negotiation is required. Federal agencies involved in this project are required to consult with the Department of Parks and Recreation's State Historic Preservation Officer in accordance with Section 106 of the National Historic Preservation Act (16 U.S. Code § 470).
- ***California Public Utilities Commission (CPUC)* –** A Certificate of Public Convenience and Necessity (California Public Utilities Code § 1001 *et seq.*) is required to show that the project will benefit society.
- ***Various Entities with Jurisdiction on the Former Fort Ord* –** If the project encroaches into the Fort Ord area, it must comply with any applicable land use regulations of the entities with jurisdiction on the former Fort Ord.
- ***Monterey County* –** If the project encroaches onto any county-maintained road, an Encroachment Permit (Monterey County Code Chapter 14.04) is required from the County. Removal of 3 or fewer trees can be handled by a standalone Tree Removal Permit (Monterey County Code Chapter 16.60). Removal of more than 3 trees should be included in a County Use Permit and/or Coastal Development Permit.
- ***Monterey County Health Department* –** If there will be 55 gallons (liquid), 500 pounds (solid), or 200 cubic feet (compressed gas) of hazardous materials on site at any one time, a Hazardous Materials Business Plan, and a Hazardous Materials Inventory Statement

(California Health and Safety Code Chapter 6.95) must be submitted to Monterey County Health Department's Environmental Health Bureau. Other required permits include a Well Construction Permit (Monterey County Code Chapter 15.08) and permits to construct and operate a desalination treatment facility (Monterey County Code Chapter 10.72).

- ***Monterey County Department of Planning and Building Services* –** The project will require a Coastal Development Permit, which may be submitted to Monterey County Department of Planning and Building Services. If the project will extend inland beyond the Coastal Zone, a Use Permit (MCC Chapter 21.72 Title 21) is also required. A Grading Permit (Monterey County Code Chapter 16.08) is required if total disturbance on site equals or exceeds 100 cubic yards. If the project encroaches on the Fort Ord area, an excavation permit is required for disturbances that equal or exceed 10 cubic yards (Monterey County Code Chapter 16.10). An erosion control plan (Monterey County Code Chapter 16.12) is required if there is risk of accelerated (human-induced) erosion that could lead to degradation of water quality, loss of fish habitat, damage to property, loss of topsoil or vegetation cover, disruption of water supply, or increased danger from flooding.
- ***Monterey One Water* –** A Sewer Connection Permit is required to connect to the regional sewer system.
- ***Monterey Bay Air Resources District (MBARD)* –** If the project may release or control air pollutants, an Authority to Construct and Permit to Operate is required (MBARD Rule 200).
- ***Monterey Peninsula Water Management District (MPWMD)*** – An expansion/extension permit is required to expand the current water system (MPWMD Ordinance 96).
- ***CalAm, CalWater, Alco, and other local water agencies* –** The project will require contracts with local water agencies that plan to buy and deliver the desalinated water.
- ***Transportation Agency for Monterey County (TAMC)*–** An easement for access to and use of the project site may need to be negotiated with TAMC.
- ***Seaside Groundwater Basin Watermaster* –** A permit may be needed to inject and/or extract groundwater.
- ***Local jurisdictions* –** Permits may also be required by a local jurisdiction depending on location of desalination plant, including but not limited to land use permits, building permits, public health permits, public works permits, tree removal permits, and encroachment permits.

9.4.8.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-12. This project would take approximately 11 years to implement, assuming the seawater intrusion barrier is already in place.

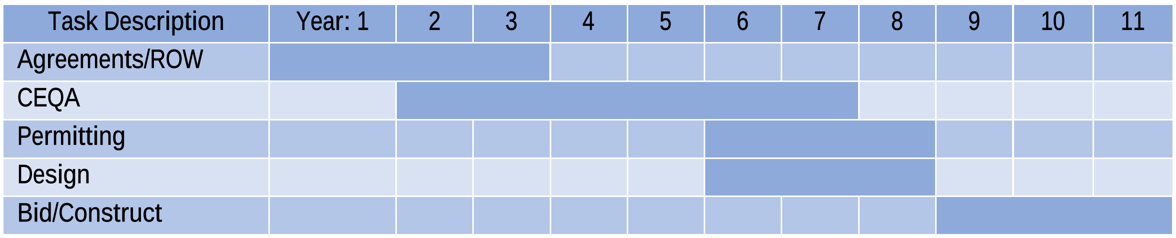

Figure 9-12. Implementation Schedule for Regional Municipal Supply Project

9.4.8.6 Legal Authority

Pursuant to California Water Code § 10726.2 (a) and (b), the SVBGSA has the right to acquire and hold real property, appropriate and acquire surface water or groundwater, acquire water rights, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement the project.

9.4.8.7 Estimated Cost

An initial estimate analyzed the cost to treat 15,000 AF/yr. and deliver that desalinated water to municipalities in the Eastside Subbasin, 180/400-Foot Aquifer Subbasin, and Monterey Subbasin. The estimated capital cost for the pipeline from the wells to the desalination plant and desalination plant is $309,387,000. The estimated capital cost for the distribution network ranges from $65,257,000 to $84,315,000 depending on how many communities receive water. Annual O&M are projected to cost about $13,192,000 to $13,389,000. If the total cost of the project is annualized over a 25-year term, and if production is 15,000 AF/yr., the unit cost for the desalination plant and distribution network ranges from $2,833 to $2,946/AF.

9.4.8.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken

  - A description of the proposed project
  - An estimated cost and schedule for the proposed project
  - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.9 Project D2: CSIP Expansion

This project will increase the size and reach of the CSIP distribution system beyond the current Zone 2B boundary, to provide recycled and diverted river water to additional lands for irrigation and agricultural use. It could expand CSIP into agricultural land in or adjacent to the Eastside Subbasin and could reduce the amount of groundwater pumped from the Subbasin.

Enlarging the system's service area will replace pumped groundwater with recycled or river water in the spring and fall and lessen dependence on existing groundwater wells. The existing CSIP supplies may not be sufficient to meet the summertime demand of the expanded CSIP area without an increase in water supply from the SRDF or another source. New water sources other than river water will require additional project costs. If additional water supply sources are available in the summer, the expanded service area could be supplied summer irrigation water. The CSIP Optimization Project (Priority Project 2 in the 180/400-Foot Aquifer Subbasin GSP) must be implemented prior to CSIP expansion due to system constraints.

Two potential CSIP expansion maps have been developed. MCWRA suggested an expansion of approximately 3,500-acre area, proposed in 2011. As proposed, this would not extend into the Eastside Subbasin; however, given the lack of a distinct hydraulic barrier between the 180/400-Foot Aquifer Subbasin and the Eastside Subbasin, expanding CSIP to land outside of the Eastside Subbasin may still have positive impacts on groundwater elevations within the Eastside Subbasin. The second expansion map identified approximately 8,500 acres that could be included in the expanded service area and was included in the *Cal-Am Coastal Water Project Final Environmental Impact Report* (ESA, 2009). The portion of this area that extends into the Eastside Subbasin is shown with purple hatching on Figure 9-13. This figure also shows land use and extraction wells over 3 inches in diameter that report pumping to MCWRA. As the land use data on Figure 9-13. shows, there is additional agricultural land in the southwest corner of the Eastside Subbasin that could potentially be included if CSIP were expanded into the Subbasin.

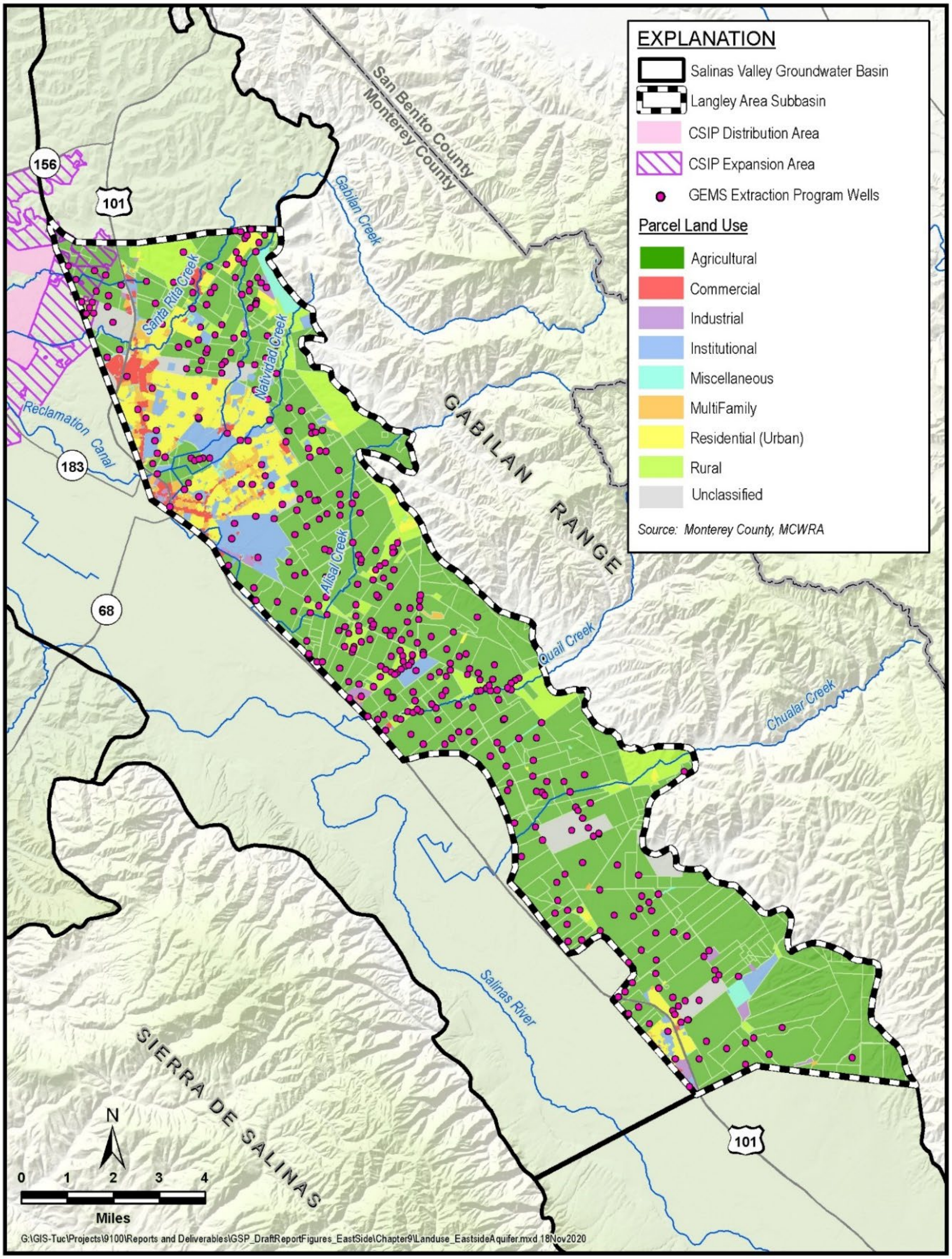

Figure 9-13. Land Use, CSIP Expansion, and GEMS Extraction Wells

9.4.9.1 Relevant Measurable Objectives

Relevant multi-subbasin measurable objectives benefiting from outreach and education include:

- **Groundwater elevation measurable objective.** By reducing extraction from the 180-Foot and 400-Foot Aquifers, it will have the effect of more water added to the principal aquifer in the Eastside Subbasin as this water will be used in lieu of pumping. Reducing extraction will raise groundwater elevations over time.
- **Groundwater storage measurable objective.** Reducing extraction from the principal aquifer will ultimately have the effect of increasing groundwater in storage.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within 2 miles of the Eastside Subbasin. Using recycled water in lieu of groundwater will increase groundwater storage and support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.9.2 Expected Benefits and Evaluation of Benefits

A 3,500-acre expansion of the CSIP program would be a 29% increase in service area. Assuming 3,500 acres of new farmland are annexed into the system, and with an assumed unit agricultural water demand of 2.8 AF/acre, the expanded area may present an additional demand of 9,900 AF/yr. to offset pumping. The primary benefits from CSIP expansion include the increase in use of recycled water and river diversion water supplies, thus reducing groundwater pumping in the 180/400-Foot Aquifer Subbasin. New water sources other than river water will require additional project costs. This increased demand could be supplied to the new service area during the winter, spring, and fall when excess supply is available to the CSIP system. If additional water supplies are available in the summer, the new service area could also be supplied in the summer. The expanded service area would lessen groundwater pumping in the 180/400-Foot Aquifer Subbasin by an amount equal to the quantity delivered: approximately 9,900 AF/yr. This project will benefit the Eastside Subbasin by reducing the impacts of pumping from the neighboring 180/400-Foot Aquifer Subbasin. Model results suggest that this project also reduces seawater intrusion by approximately 2,800 AF/yr. on average.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Groundwater storage will be monitored using groundwater pumping measurements and estimates.

Benefits have not been calculated for the 8,500-acre expansion. Specific benefits to the Eastside Subbasin will be quantified after there is a more defined plan for the expansion.

9.4.9.3 Circumstances for Implementation

This project is unlikely to move forward independent of it being implemented in the 180/400-Foot Aquifer Subbasin. If it does move forward, the potential benefits to and expansion into the Eastside Subbasin will be evaluated. This project can only be implemented after CSIP optimization, as described in the 180/400-Foot Aquifer Subbasin GSP. After that, source water needs to be identified and the expansion area confirmed through more refined analysis and stakeholder consultation.

For implementation, this project will need an engineer's report, project design, environmental and regulatory compliance (CEQA, EIR), an annexation policy for contiguous versus non-contiguous access lands and rights-of-way, an annexation policy for voluntary versus compulsory inclusion, funding (such as a 218 vote, grants, loans, and assessments), and a review of U.S. Bureau of Reclamation (USBR) loan documents (MCWRA, 2018b). Additionally, there will need to be a negotiation modification of current Salinas Valley Reclamation Plant and CSIP loan contracts to allow CSIP boundary expansion (MCWRA, 2018b). Throughout all these major steps, this expansion project will need to work closely with stakeholders to gain consensus (MCWRA, 2018b).

9.4.9.4 Permitting and Regulatory Process

This project will require a CEQA review process, which would likely result in either an EIR or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, any project that coordinates with federal facilities or agencies may require NEPA documentation.

There will be a number of local, county, and state permits, rights of way, and easements required depending on pipeline alignments, stream crossings, and project type. These will depend on the expansion plan, which will be developed during GSP implementation. Projects with wells will require a well construction permit from MCWRA.

Additional permits may be required depending on the source water used.

9.4.9.5 Implementation Schedule

If selected, the proposed implementation schedule is presented on Figure 9-14.

Task Description	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6+
Hydraulic Modeling						
Preliminary Design						
Agreements/ROW						
CEQA						
Permitting						
Design						
Bid/Construct						

Figure 9-14. Implementation Schedule for CSIP Optimization and Expansion Project

9.4.9.6 Legal Authority

The SVBGSA will use the legal authority and partnerships for this modified project contained in existing distribution, irrigation, and partnership programs. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights.

The MCWRA has the authority, pursuant to the Monterey County Water Resources Act, to levy benefit assessments to fund projects.

The County also has the power to impose charges on a parcel or acreage basis under the County Service Area provisions of the Government Code (beginning with Section 25210). These provisions give the County the authority to provide extended services within a specified area, which may be countywide, and to fix and collect charges for such extended services. Miscellaneous extended service for which county service areas can be established include "water service, including the acquisition, construction, operation, replacement, maintenance, and repair of water supply and distribution systems, including land, easements, rights-of-way, and water rights."

9.4.9.7 Estimated Cost

Capital cost for the 3,500-acre CSIP expansion project is estimated at $73,366,000. Annual O&M costs are approximately $480,000. The estimated projected yield for the project is 9,900 AF/yr. The amortized cost of water for this project is estimated at $630/AF.

Cost has not been estimated for 8,500 acres of CSIP expansion. The final size and location of CSIP expansion will be determined through additional hydraulic modeling and engineering that identifies the most cost-effective areas for expansion.

9.4.9.8 Public Noticing

Before SVBGSA initiates construction on this project, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board and the MCWRA Board in publicly noticed meetings. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

The permitting and implementation of the expansion will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members. In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

Demand Management

9.4.10 Management Action E1: Conservation and Agricultural BMPs

This would be a program to incentivize and/or assist with conservation and agricultural BMPs to reduce groundwater pumping. It may also improve groundwater quality. SVBGSA acknowledges that BMPs are being developed as part of Ag Order 4.0 and will work to complement and not replicate those efforts. Potential practices that will be part of a program include:

- **Evapotranspiration Data.** ET data indicate crops' theoretical water needs as determined by crop type and weather conditions. Some ET data sets are 100% automated, relying on satellite imagery and weather stations to provide affordable data for large areas of land. Other ET data sets are generated automatically, but then subjected to expert verification, resulting in higher quality data at higher cost. The incorporation of ET data with soil moisture sensors, soil nutrient data, and flow meter data can help inform more efficient irrigation practices. The GSA could support the development and utilization of these tools through securing funding or coordinating with existing local agricultural extension specialists who conduct research and provide technical assistance to growers.

- **Education And Outreach.** SVBGSA will support existing local agricultural extension specialists with their education and outreach on BMPs that would increase water conservation and decrease pumping. Efforts will promote irrigation practices to reduce water use. Efforts could also include supporting practices to increase water retention such as compost application and use of cover crops. These BMPs could also support compliance with Ag Order regulations applicable to groundwater. Effective implementation of BMPs would require buy-in from growers. SVBGSA will work with local agricultural extension specialists and growers to understand preferred BMPs and those that could yield the greatest water savings. SVBGSA could partner with existing organizations or technical assistance providers to help growers identify which BMPs they could pursue and analyze the potential savings from their implementation. Technical workshops and professional referrals can be utilized with partners to accomplish outreach effectively and efficiently with growers.

9.4.10.1 Relevant Measurable Objectives

The measurable objectives benefiting from outreach and education include:

- **Groundwater elevation measurable objective.** This measurable objective will benefit from BMPs that promote less pumping or greater recharge that result in higher groundwater levels.
- **Groundwater storage measurable objective.** Reducing pumping or adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage.
- **Land subsidence measurable objective.** This measurable objective will benefit from BMPs that reduce the pumping stress on the local aquifer and thereby reduce any potential for subsidence.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.10.2 Expected Benefits and Evaluation of Benefits

The primary benefit of implementing this management action is to provide the latest technologies and opportunities to modify agricultural practices that would allow farmers to reduce pumping needs but realize the same crop yields. This program could also be a mechanism for grant opportunities, funded through the SVBGSA to identify pilot programs and other innovative technological advancements that could provide an overall groundwater basin benefit.

Improving ET data allows for improved modeling and sets more accurate expectations for climate change impacts on crops. This in turn is translated into expected water demand for the crops. With more accurate data and information, pumpers can work with the SVBGSA to improve water extractions and potentially keep more water in the ground. This would result in protected groundwater elevations and storage. Furthermore, education and outreach activities can help inform farmers about cutting-edge technology that would help maximize irrigation efficiency. This would also improve groundwater elevations and storage. Benefits cannot be quantified until specific BMPs are identified and promoted.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

9.4.10.3 Circumstances for Implementation

The circumstance for implementation is for willing farmers to participate in an education and outreach program and to work with the SVBGSA to identify opportunities. No other triggers are necessary or required.

9.4.10.4 Permitting and Regulatory Process

No permitting or regulatory processes are necessary for an education and outreach program.

9.4.10.5 Implementation Schedule

If selected, the outreach and education program will commence and then be ongoing.

9.4.10.6 Legal Authority

No authority is needed to promote outreach and education.

9.4.10.7 Estimated Cost

The Conservation and Agricultural BMP activities would be conducted as an ongoing program funded annually. This would cost approximately $100,000 to promote opportunities for education seminars, grant writing tasks, demonstration projects, and other activities focused on BMPs in the agricultural industry.

9.4.10.8 Public Noticing

The SVBGSA will endeavor to have the broadest possible public noticing of educational and outreach activities to inform stakeholders, interested parties, landowners, and agricultural interests of conservation and agricultural BMPs.

9.4.11 Management Action E2: Fallowing, Fallow Bank, and Agricultural Land Retirement

To reduce groundwater extraction temporarily or permanently, this management action includes 3 actions that could be implemented on an as-needed basis to reduce irrigated land. These actions provide options for voluntary fallowing and land retirement that can be targeted to specific locations that have declining groundwater elevations or recharge potential, such as floodplains. Water quality and access to drinking water wells will also be considered when deciding where to incentivize fallowing or land retirement. The following could be included under an overarching program, even if implemented independently:

- **Rotational fallowing.** Participating growers fallow some percentage of land or fallow on a rotating basis. This could be modified to include partial fallowing, such as growing fewer crops per year instead of completely fallowing land.
- **Fallow bank.** Growers could contribute to a fallow bank whereby anybody fallowing land could draw against the bank to offset the lost income from fallowing. This could be combined with other fallowing plans. The specific design of a fallow bank will be developed during GSP implementation, including options such as exempting growers from rotational fallowing if they contribute a certain amount of money to the fallow bank.
- **Agricultural land retirement.** SVBGSA could develop a system for voluntary agricultural land retirement or pay to retire agricultural land, effectively reducing the amount of groundwater used in the Subbasin. Payment would likely be limited without pumping allocations. The benefit from this program depends on identifying willing participants.

This management action could work together with pumping allocations. If stakeholders develop pumping allocations into a water market, payments could be developed as a part of the market.

9.4.11.1 Relevant Measurable Objectives

The measurable objectives benefiting from fallowing, fallow, bank, or agricultural land retirement include:

- **Groundwater elevation measurable objective.** Depending on the location of fallowing or land retirement, this measurable objective will benefit from decreased pumping that will result in higher groundwater levels.
- **Groundwater storage measurable objective.** Depending on the location of fallowing or land retirement, reducing pumping from the principal aquifer will ultimately have the effect of increasing groundwater in storage.

- **Land subsidence measurable objective.** Depending on the location of fallowing or land retirement, this measurable objective will benefit from pumping allowances and controls that reduce the pumping stress on the local aquifer and thereby reduce any potential for subsidence.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Conserving groundwater will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.11.2 Expected Benefits and Evaluation of Benefits

The primary benefits expected for this management action is reduced Subbasin pumping. This management action is costed for saving 1,000 AF/yr.; however, it could be scaled to any size. The less water that is extracted from the principal aquifer, the more water is in storage. Depending on the location of fallowing and land retirement, benefits may include halting the decline of or raising groundwater elevations and avoiding subsidence in specific areas. Because it is unknown how many landowners will willingly enter the land retirement program, it is difficult to quantify the expected benefits at this time.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. A direct correlation between agricultural land retirement and changes in groundwater elevations is likely not possible because this is only one among many management actions and projects that may be implemented in the Subbasin. Groundwater storage will be monitored using groundwater pumping measurements and estimates. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

9.4.11.3 Circumstances for implementation

Agricultural land retirement relies on willing participants, be it for participation or land sale. No other triggers are necessary or required. The circumstance for implementation is for SVBGSA to identify the need for the management action and identify willing participants and secure their participation.

9.4.11.4 Permitting and Regulatory Process

While no permitting or regulatory processes are necessary for buying land or securing agreements with landowners for fallowing or land retirement, the SVBGSA will secure and record as appropriate, the necessary agreements or deed restrictions to implement the management action.

9.4.11.5 Legal Authority

California Water Code § 10726.2 provides GSAs the authority to purchase, among other things, land, water rights, and privileges.

9.4.11.6 Implementation Schedule

If selected, the process and GSA incentives for fallowing and/or land retirement will be developed over 2 years. The development of a fallow bank may take additional time. Although the program will be ongoing, it is reliant on willing participants and may be implemented intermittently or on an as-needed basis.

9.4.11.7 Estimated Cost

The cost for voluntary fallowing and land retirement depends on extent of fallowing and land retirement. These cost estimates are based on average rent and land value, and they do not capture the additional economic benefits associated with agriculture. The average cost of land and rent was derived from a source that had county-specific estimates. It is understandable that even within a county the cost of land acquisition is highly variable; however, this was the best available information on the average cost of land.

The costs of fallowing land sufficient to reach 1,000 AF/yr. water conserved are shown in Table 9-5, which could be scaled to the amount desired. Fallowed land would be planted with cover crops to maintain soil quality. Vegetables are the most common crop type in the Eastside Subbasin (MCWRA, 2019b). Since vegetables in the Eastside use 2.5 AF/acre/yr. (MCWRA, 2019b) and cover crops use only 0.3 AF/acre/yr. (RCDSCC, 2018), each acre of vegetables fallowed would save 2.2 AF/yr. Therefore, conserving 1,000 AF/yr. would require fallowing about 455 acres of vegetables. The average rent between the low and high estimates is $2,250/acre/yr. (ASFMRA, 2020) and the cost to plant and maintain cover crops is $300/acre/yr. (Highland Economics, 2017), which would result in a unit cost of $1,160/AF water conserved when fallowing.

Table 9-5. Estimated Cost of Fallowing and Agricultural Land Retirement[1]

Annual Fallowing	Low Estimate	High Estimate	Description
Annual rent (cost/acre)	$1,000	$3,500	Rent for row crops in Monterey County (ASFMRA, 2020)
Annual cover crop cost per acre	$300	$300	Cost for cover crops in nearby Pajaro Valley (Highland Economics, 2017)
Annual rent plus annual cover crop cost per acre	$1,300	$3,800	
Acres fallowed annually to conserve 1,000 AF/yr.	455 acres	455 acres	Based on vegetable water use in the Eastside (MCWRA, 2019b) and cover crop water usage (RCDSCC, 2018)
Annual cost to conserve 1,000 AF/yr. through fallowing	$591,500	$1,729,000	

Annual Fallowing	Low Estimate	High Estimate	Description
Unit cost/AF water conserved	$590	$1,730	
Agricultural Land Retirement	**Low Estimate**	**High Estimate**	**Description**
Land value per acre	$27,500	$75,000	Cost per acre row crops in Monterey County (ASFMRA, 2020)
Unit cost/AF water conserved	$1,140	$2,820	Using cover crop value as annual O&M, 6% interest, and annualized over 25 years

[1]Stakeholders confirmed that Eastside row crop rents are roughly between $2,000/acre/year to $3,200/acre/year, with most of the rents between $2,000 and $2,500.

9.4.11.8 Public Noticing

All appropriate documentation for any agricultural land retirement achieved through a land sale, agreement or deed restriction will be recorded with the County of Monterey Assessor – Clerk – Recorder's Office. All agricultural land retirement by any means through the GSA will be recorded and publicly accessible.

9.4.12 Management Action E3: Pumping Allocations and Controls

Pumping allocations are one approach to managing and controlling pumping. Given limited supply-side options in the Eastside Subbasin, pumping allocations provides a management action to proactively determine how extraction should be fairly divided and controlled if needed.

Pumping allocations divide up the sustainable yield among beneficial users. Pumping allocations are not water rights and cannot determine water rights. Instead, they are a way to determine each extractor's pro-rata share of groundwater extraction and regulate groundwater extraction. They can be used to:

- Underpin management actions that manage pumping
- Generate funding for projects and management actions
- Incentivize water conservation and/or recharge projects

Pumping allocations can take many forms if it is needed now or in the future. Allocations can be developed based on various criteria. After a Valley-wide workshop on pumping allocations, Subbasin committee members and other stakeholders completed a survey on their preferences for a pumping allocation structure. At the February and April 2021 Eastside Subbasin Planning Committee meetings, members discussed whether and what type of pumping allocation structure would be appropriate in the Eastside. Subbasin committee members agreed it is a potential option for demand management, and the criteria that form the basis for the Subbasin's allocations would be developed as part of the process to develop an allocation structure.

Including pumping allocations in the GSP shows that allocations are a potential management tool that can be developed, but it will not establish pumping allocations nor pumping controls. During the GSP implementation period, a full stakeholder engagement process and in-depth analysis needs to be undertaken to establish pumping allocations and additional data collected. Stakeholder engagement will include outreach to water systems, homeowners, and landowners so that those interested can participate in the development of the allocation structure.

Once the allocation structure is established, pumping controls could be put in place immediately or there could be a trigger after which they will be put in place, such as pumping beyond the sustainable yield. Designing a feasible and effective allocation structure requires good groundwater extraction data. Two implementation actions that can help are Well Registration (Implementation Action G1) and GEMS Expansion and Enhancement (Implementation Action G2).

Pumping allocations can be used as the basis for pumping fees, which can raise funds for projects and management actions. For example, a fee structure could be defined such that each extractor has a pumping allowance that is based on their allocation, and a penalty or disincentive fee is charged for extraction over that amount. If the sustainable yield is lower than current extraction, a transitional pumping allowance could be developed to transition from a groundwater user's actual historical pumping amounts (estimated or measured) to their allowance based on the sustainable yield. The purpose of this transitional allowance is to ensure that no pumper is required to immediately reduce their pumping, but rather pumpers have an opportunity to reduce their pumping over a set period. Transitional pumping allowances could then be phased out until total pumping allowances in each subbasin are less than or equal to the calculated sustainable yield.

9.4.12.1 Relevant Measurable Objectives

The measurable objectives benefiting from pumping allowance and controls include:

- **Groundwater elevation measurable objective.** This measurable objective will benefit from pumping allocations and controls that promote less pumping that will result in higher groundwater levels.
- **Groundwater storage measurable objective.** This measurable objective is based on the amount of groundwater in storage when groundwater elevations are held at their measurable objective. Therefore, pumping allocations and controls that reduce pumping contribute to increasing groundwater elevations. In turn, groundwater in storage will also increase and will help achieve long-term sustainable yield.
- **Land subsidence measurable objective.** This measurable objective will benefit from pumping allocations and controls that reduce the pumping stress on the local aquifer and thereby reduce any potential for subsidence.

- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Conserving groundwater will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.12.2 Expected Benefits and Evaluation of Benefits

The primary benefits expected for this management action is that it is another demand-side management tool and would enhance sustainable yield and groundwater elevations. Working within a groundwater budget allows the subbasin to meet its sustainable yield volume.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Groundwater storage will be monitored using groundwater extraction measurements and estimates. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

9.4.12.3 Circumstances for Implementation

SVBGSA will work with the Subbasin stakeholders to collect data needed to establish pumping allocations and undertake stakeholder outreach prior to establishing pumping allocations. As part of establishing pumping allocations, SVBGSA will determine whether to implement pumping controls immediately or to establish a trigger based on groundwater conditions, after which controls are implemented.

9.4.12.4 Permitting and Regulatory Process

The GSA Board of Directors will need to authorize the establishment of pumping allocations and controls. The development and implementation of pumping controls is a regulatory activity and would be embodied in a GSA regulation. The regulation could be established to provide for automatic implementation upon existence of specific criteria or to require the vote of the Board of Directors to implement.

9.4.12.5 Legal Authority

The California Water Code § 10726.4 (a) (2) provides GSAs the authorities to control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate. Imposition of pumping allocations and controls will require a supermajority plus vote of the SVBGSA Board of Directors.

9.4.12.6 Implementation Schedule

If selected, the proposed implementation schedule is shown in Figure 9-15. After the establishment of pumping allocations is initiated for the Eastside Subbasin, pumping controls will be implemented only when needed.

Task Description	Year 1	Year 2	Year 3	Year 4	Years 5+
Phase I – Data collection and stakeholder outreach					
Phase II – Establishment of allocation structure					
Phase III – Pumping controls, when needed					

Figure 9-15. Implementation Schedule for Pumping Management

9.4.12.7 Estimated Cost

Development of a pumping allocation structure and pumping controls is approximately $400,000. This includes outreach meetings to engage stakeholders, analysis of potential allocation structures, facilitation of stakeholder dialogues, refinement according to specific situations, and legal analysis. When pumping controls are enacted, there will be additional administrative costs associated with implementation.

9.4.12.8 Public Noticing

As part of the approval of the establishment of pumping allocations in the Eastside, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on it. The general steps in the public notice process will include the following:

- GSA staff will bring an assessment of the need for allocations to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed management action
    - An estimated cost and schedule for the proposed management action
    - Any alternatives to the proposed management action
- The SVBGSA Board will notify stakeholders in the area of the proposed project/management action and allow at least 30 days for public response.

- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve the implementation of the management action and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

Imposition of pumping allocations and controls may also require a CEQA review process and may require an EIR or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). All projects will follow the public noticing requirements per CEQA or NEPA.

Salinas River Projects and Management Actions

Three projects and management actions under consideration affect the Salinas River. Although the Salinas River is outside of the Eastside Subbasin, the projects could have some groundwater benefits for the Eastside. Benefits may be assessed during further modeling, project scoping, or benefit analyses as part of GSP implementation. These projects are unlikely to enable the Eastside to reach sustainability, but they are included here because they may reduce the need for other projects and management actions. These projects will likely be subject to new flow restrictions and reservoir operations when the Habitat Conservation Plan (HCP) is finalized.

The first project is the Multi-benefit Stream Channel Improvements project. This project includes sediment management, vegetation management, non-native vegetation removal, and floodplain enhancement and recharge, mainly along the Salinas River, but it could be extended to tributaries. Two management actions under consideration would alter reservoir releases for groundwater benefits and other purposes: drought reoperation and reservoir reoperation. These management actions rely on infrastructure owned by MCWRA and implementing either one of these is a cooperative effort between the 2 agencies. While this project and these management actions directly affect groundwater recharge along the Salinas River, they will likely have indirect groundwater benefits for the Eastside Subbasin. They will affect the entire Salinas River, and the analyses of these projects must consider the impact on all subbasins. This GSP is primarily concerned with project benefits that achieve groundwater sustainability. However, ancillary benefits and relative costs must also be addressed and carefully evaluated.

This GSP includes 2 reservoir reoperation management actions (which may be paired with projects such as the Interlake Tunnel, seasonal reservoir releases with aquifer storage and recovery, or other projects), based on the current assessment of each management action or project's ability to achieve groundwater sustainability along the Salinas River and that some portion of the management action or project augments groundwater in the Eastside Subbasin. However, each management action or project should be retained and further evaluated during GSP implementation. SVBGSA will work with MCWRA, NMFS, and other partners in the evaluation of these management actions and projects.

Stakeholders in the Salinas Valley are investigating opportunities for additional seasonal reservoir releases independent of the ASR system. Evaluation of this management action could be considered under the Reservoir Reoperation management action when it is more fully developed and will be assessed for its ability to both provide additional seasonal reservoir releases during dry years and provide sufficient water for summer releases to fulfill CSIP needs. A complete benefits assessment will be required to fully determine all groundwater balances and seasonal demands coupled with seasonal deliveries.

9.4.13 Management Action F1: Multi-benefit Stream Channel Improvements

Over the past half a century, the Salinas River has been impacted by the construction of the San Antonio and Nacimiento Dams and flood control levees intended to move water away from agricultural fields. These have changed natural river geomorphology, resulting in sediment build up and vegetation encroachment on the historically dynamic channels of the River. This alteration of natural floodplains and geomorphology has increased flood risk, decreased direct groundwater recharge, and contributed to increased ET through vegetation build-up. Targeted, geomorphically informed stream maintenance and floodplain enhancement can improve stream function both morphologically and biologically.

This project takes a 3-pronged approach to stream channel improvements. First, in designated maintenance channels, it removes dense vegetation and reduces the height of sediment bars that impede streamflow. Second, throughout the Salinas River watershed, the project removes the invasive species *Arundo donax* (arundo) and *Tamarix sp.* (tamarisk). Third, it enhances the recharge potential of floodplains along the Salians River in the Forebay and Upper Valley subbasins, which will indirectly benefit the Eastside Subbasin.

The 3-pronged approach presented here reduces water use by plants by removing dense native and non-native vegetation, provides vegetation free channel bottom areas for infiltration, stabilizes stream banks and earthen levees by reducing downstream velocities, and reduces flood risk. This program's activities also benefit native species, which use less water than invasive species (Cal-IPC, 2011). Vegetation and sediment removal allow native species to reestablish in areas where invasive species have become dominant. River maintenance activities enhance floodplains and provide additional open channel bed for increased infiltration. Infiltration through the streambed accounts for a significant portion of the groundwater budget.

Surface water flows, and notably flood flows, can be impacted by the density of vegetation and whether the vegetation is comprised of native or non-native species. Native riparian species allow for dynamic action that scours the riverbed and resorts sediment in a manner that encourages natural infiltration and conveyance of flood waters in the broader active flood terraces in the river. This wider use of the floodplain by flood waters slows velocities and distributes flood waters over a broader spatial area of the riverbed.

Stream channel vegetation removes water from the river through ET. Water loss through ET from invasive species such as arundo can take up between 3.1 and 23.2 AF/yr. per acre, whereas ET from native vegetation can take up to 4 AF/yr. per acre (Melton and Hang, 2021; Cal-IPC, 2011). This illustrates the difference in water consumption between vegetation types and how these water consumptions can have major impacts on water in the river. The Salinas River is characterized by a braided channel in some areas of the floodplain and a confined channel in other areas. Plants can take root in channel locations that adversely impact the flow of water, resulting in either a channelized river or in creating directional velocities that can cause localized damages including levee failure. Poorly functioning sedimentation can also negatively impact water flow in drought and flood conditions, as well as impede proper infiltration to the subsurface. Geomorphological processes are important to managing a natural riverbed and floodplain to enhance recharge, groundwater levels, and groundwater storage.

This program is not meant to restore the Salinas River to historical conditions, but rather to enhance geomorphological function through targeted maintenance sites for flood risk reduction and floodplain enhancement for increased recharge. The MCWRA has developed a science-based approach to river management that recognizes the value of critical habitat, environmental resources, cost to landowners, and coordination among stakeholders (MCWRA, 2016). A key feature of this modified management approach is providing protection for critical habitats and water quality (MCWRA, 2016). One of the important functions of a river is to provide habitat for native species. In a poorly functioning river, invasive species have more opportunities to crowd out native species and in turn, further degrade the river conditions. Therefore, this program will result in flood risk reduction, increased recharge, and a multitude of benefits that address critical functions of the Salinas River.

The main types of tasks included in this project are sediment management, vegetation maintenance, non-native vegetation removal, and floodplain enhancement and recharge.

- **Sediment Management.** Sediment management includes channel bed grading and sediment removal. Sediment grading and removal may occur exclusively, or after vegetation maintenance activities described above. Sediment removal and grading activities help reestablish proper gradients to allow for improved drainage downstream, encourage preferential flow into and through secondary channels, and minimize resistance to flow (until dunes form) (MCWRA, 2016). Sediment removal will follow best practices to protect native species while producing maximum benefit for flood reduction and groundwater recharge.
- **Vegetation Maintenance.** Vegetation, both native and non-native, will be removed within designated maintenance areas using a scraper, mower, bulldozer, excavator, truck, or similar equipment to remove the vegetation above the ground and then rip the roots out to further mobilize the channel bottom. Vegetation maintenance includes pruning up to 25% of canopy cover and removing dead mass. Maintenance activities will not include

disturbance of emergent wetland vegetation that provides suitable habitat for threatened California red-legged frogs or for the endangered tidewater gobies. In instances where native vegetation needs to be removed for site-specific conditions or tie- ins, these impacts can be compensated with replanting and revegetation in other areas as a form of mitigation offset for stream channel maintenance. Native trees will be planted during the rainy season to enhance their rate of success.

- **Non-Native Vegetation Removal.** Non-native vegetation removal primarily focuses on the arundo present in the region but may include tamarisk shrubs as well. Arundo is a grass that was introduced to the Americas in the 1800s for construction material and for erosion control purposes (Cal-IPC, 2011). In 2011, the California Invasive Plant Council determined that the Salinas Watershed had the second largest invasion with approximately 1,500 infested acres. While arundo thrives near water, such as wetlands and rivers, it grows in many habitats and soil types. It requires a substantial amount of water, previously estimated making it one of the thirstier plants in a given region and outpacing the water demands of native vegetation. To manage this invasive species, arundo biomass is typically sprayed, sometimes mowed or hand cut if needed, and then treated with multiple applications of herbicide over several years. Permits allow arundo removal in the entire riparian corridor, including along the low-flow channel.
- **Floodplain Enhancement and Recharge.** This work will be performed along the Salinas River and may benefit the subbasin indirectly. Floodplain enhancement restores areas along the River, creeks, and floodplains to slow and sink high flows and encourage groundwater recharge. Restored floodplain and riparian habitat can slow down the velocity of the River and creeks and encourage greater infiltration. Due to agricultural and urban encroachment, streams have become more highly channelized, and flow has increased in velocity, particularly during storm events. This flow has resulted in greater erosion and loss of functional floodplains and recharge capacity.

Program Components

This multi-benefit stream channel improvements program is implemented through 3 program components. These build off existing programs and permits to undertake the 4 main types of tasks. During GSP implementation, these components may be modified as needed to most efficiently accomplish the program goals.

Component 1: Stream Maintenance Program

The first component continues the Salinas River Stream Maintenance Program (SMP), which maintains the river corridor to reduce flood risk and minimize bank and levee erosion, while maintaining and improving ecological conditions for fish and wildlife consistent with other priorities for the Salinas River (MCWRA, 2016). It is a coordinated Stream Maintenance Program that includes MCWRA, the Resource Conservation District of Monterey County

(RCDMC), and the Salinas River Management Unit Association currently representing approximately 50 landowner members along the river corridor. Project benefits include increased water availability, flood risk reduction, reduced velocities during high flows to lessen bank and levee erosion, and enhanced infiltration by managing vegetation and sediment throughout the river and its tributaries.

The Salinas River Stream Maintenance Program occurs along the area of the Salinas in Monterey County. The 92-miles of the river in Monterey County is broken into 7 River Management Units from San Ardo in the south to Highway 1 in the north. The management activities are focused on designated maintenance areas in secondary channels of the Salinas River. These secondary channels are located outside of the primary low flow channel and are preferentially aligned with low-lying undeveloped areas that are active during times of higher flow (MCWRA, 2016). The SMP includes 3 main activities as part of stream maintenance: vegetation maintenance, non-native vegetation removal, and sediment management.

Component 2: Invasive Species Eradication

The second component supports and/or undertakes removal of arundo and tamarisk done by the RCDMC. RCDMC is the lead agency on an estimated 15 to 20-year effort to fully eradicate arundo from the Salinas River Watershed, working in a complementary manner with the SMP. This project focuses on removal of woody invasive species such as arundo, tamarisk, and tree tobacco (*Nicotiana glauca*) along the Salinas River, as well as retreatments needed to keep it from coming back. It includes 3 distinct phases: initial treatment, re-treatment, and ongoing monitoring and maintenance treatments. As of April 2021, estimated arundo under treatment was 850 acres. Original mapped acreage had expanded by 20%, leaving 900 arundo acres remaining to be treated. The initial treatment phase includes mechanical and/or chemical treatment in all areas of the river that have yet to be treated. The re-treatment phase includes re-treatment of the approximately 850 acres that have already had an initial treatment and re-treatment of the remaining 900 acres done in stages, with each area treated over a 3-to-5-year period following initial treatment. The final phase is the ongoing monitoring and maintenance treatment phase. This phase requires monitoring for regrowth of the invasive species or new invasive species and chemical treatment every 3 to 5 years.

Component 3: Floodplain Enhancement and Recharge

The third component complements the first 2 by enhancing and restoring floodplains in the Forebay and Upper Valley subbasins to enable high flows to be slowed and directed toward areas where it can infiltrate into the ground. This may benefit the Eastside Subbasin indirectly. For this component, SVBGSA will partner with the RWMG, CCWG, and other organizations that are already undertaking creek and floodplain restoration efforts and encourage inclusion of features that would enhance recharge.

Restored floodplain and riparian habitat along creeks can slow down the velocity of creeks and encourage greater infiltration. Due to agricultural and urban encroachment, streams have become more highly channelized, and flow has increased in velocity, particularly during storm events. This flow has resulted in greater erosion and loss of functional floodplains.

9.4.13.1 Relevant Measurable Objectives

Relevant multi-subbasin measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** Removing the invasive species, better managing streams, and directing high flows into restored floodplains will facilitate more water infiltrating and percolating into the subsurface to raise groundwater elevations. This has the effect of adding water to the principal aquifer. Adding water to the principal aquifer will ultimately increase groundwater elevations or decrease their decline.
- **Groundwater storage measurable objective.** Adding water to the groundwater system will ultimately have the effect of increasing groundwater in storage.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **ISW measurable objective.** By removing vegetation pathways for ET, less interconnected groundwater and less surface water will be depleted, leaving more water available in the river for flows as well as for connection to the groundwater system.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Increasing groundwater storage will support the natural hydraulic gradient that pushes back against the intruding seawater.

It is expected that there is some groundwater benefit to the Eastside Subbasin, and the specific benefits will be defined through further investigation.

9.4.13.2 Expected Benefits and Evaluation of Benefits

Benefits will be greatest along the Salinas River, where most of the work will be performed. The River runs through the Upper Valley, Forebay, and 180/400-Foot Aquifer subbasins. Those subbasins will benefit from increased groundwater recharge, flood risk reduction, and habitat restoration. Some benefits will also extend to Eastside Subbasin, which is not directly on the River; however, greater analysis is needed to define the extent of the benefits for the Eastside.

Removal of arundo on 900 acres along the Salinas River will decrease ET by 2,790 to 20,880 AF/yr. throughout the Salinas Valley. This will enhance recharge from the Salinas River and leave more water in the River to get down to the CSIP, where surface water is used in lieu of groundwater to help address seawater intrusion and declining groundwater elevations. With this reduction of non-productive water consumption, less water can be released from the reservoirs to get the same amount of water downstream, which increases the Valley's sustainable yield and drought resilience. It also results in indirect recharge as removal reduces groundwater use by the plants.

Component 3 of this project includes various floodplain enhancement features and restoration activities. Preliminary project scoping includes the development of 10 recharge basins along the Salinas River, each with a recharge capacity of about 100 AF/yr. However, greater analysis is needed to determine the exact number, size, and type of features. The combined benefit of the 10 recharge basins is expected to be 1,000 AF/yr. in increased recharge.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

Further investigation is needed to define and quantify the expected benefits to groundwater in the Eastside Subbasin.

9.4.13.3 Circumstances for Implementation

The SMP and invasive species eradication are ongoing projects with MCWRA, the RCDMC, and the Salinas River Management Unit Association. Program administration is provided by the RCDMC and the Salinas River Management Unit Association. Landowners currently pay for all maintenance activities in the maintenance channels and for associated biological monitoring and reporting. SVBGSA could support the program, become an administrative partner in the program with other program partners, or fund maintenance and monitoring activities.

Floodplain enhancement will be implemented if additional water is required to reach sustainability. A number of agreements and rights must be secured before individual projects are implemented. Primarily, a more formal cost/benefit analysis must be completed to determine how many site options are preferable. Water diversion rights may need to be secured to divert stormwater, which may take many years.

9.4.13.4 Permitting and Regulatory Process

For Components 1 and 2, the permitting process has already been initiated by MCWRA and RCDMC and permits are in place until 2025 for the program. Invasive species eradication will be continued under existing permitting. All participants in the SMP must enter into an agreement with MCWRA and comply with all terms, conditions, and requirements of the permits and Program Guidelines.

Component 3 may require a CEQA environmental review process and may require an EIR or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, permits from a variety of state and federal agencies may be necessary, and any project that coordinates with federal facilities or agencies may require NEPA documentation.

Permits for all 3 components are detailed below.

Component 1 Permits:

- ***U.S. Army Corps of Engineers (USACE)*** - The Department of the Army Regional General Permit (RGP) 20 for the Salinas River Stream Maintenance Program, Corps File No. 22309S, was executed on September 28, 2016, by the USACE. The RGP is authorized under Section 404 of the Clean Water Act (33 U.S.C. Section 1344) through November 15, 2021. The NMFS and the U.S. Fish and Wildlife Service (USFWS) concurred with the USACE determination that the project was not likely to adversely affect the following federally endangered or threatened species: the San Joaquin kit fox (*Vulpes macrotis mutica*), the California tiger salamander (*Ambystoma californiense*), the Monterey spineflower (*Chorizanthe pungens* var. *pungens*) , the yellow-billed cuckoo (*Coccyzus americanus*), or the South-Central California Coast (S-CCC) steelhead (*Oncorhynchus mykiss*). The USFWS issued a Biological Opinion on August 22, 2016, for the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and tidewater goby (*Eucyclogobius newberryi*) and its critical habitat and the federally threatened California red-legged frog (*Rana draytonii*).
- ***National Marine Fisheries Service (NMFS)*** - The RCDMC also has a letter of concurrence in which NMFS supports USACE's decision that the SMP "is not likely to adversely affect species listed as threatened or endangered or critical habitats designated under the Endangered Species Act."
- ***State of California Regional Water Quality Control Board*** - The Clean Water Act Section 401 Water Quality Certification for Discharge of Dredged and/or Fill Materials, Certification No. 32716WQ02, was approved on August 31, 2016, and is set to expire on November 30, 2025. The Central Coast Water Board staff will assess the implementation and effectiveness of the SMP after 5 years and consider modifications to this Certification for the second 5 years of the permit term.
- ***California Department of Fish & Wildlife (CDFW)*** - The SMP is authorized under a Routine Maintenance Agreement (RMA) 1600-2016-0016-R4, approved October 14,

2016, and held by the RCDMC. The RMA was amended and restated on June 16, 2017, and subsequently amended on April 10, 2018. The RMA covers all impacts under the program from the original date of approval through December 31, 2026.

- ***California Natural Resources Agency* –** An EIR was completed in compliance with the CEQA.

Component 2 Permits:

- ***California Department of Fish & Wildlife (CDFW)* –** The invasive species eradication is authorized under a RMA 1600-2012-0154-R4, approved April 11, 2014, and held by the RCDMC. The RMA was amended on September 30, 2014. It covers all impacts under the program from the original date of approval through April 10, 2026.
- ***Environmental Protection Agency (EPA)* –** NPDES permit CAG990005 allows the Salinas River Arundo Control Program to apply pesticides to waterways.
- In addition, the Salinas River Arundo Control Program filed a CEQA Mitigated Negative Declaration, received a technical assistance letter from NMFS, completed a U.S. Fish and Wildlife Service No Take Request, and received a technical assistance letter from U.S. Fish and Wildlife Service.

Component 3 Permits that may be required for floodplain enhancement include:

- ***United States Army Corps of Engineers (USACE)* –** A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***California Department of Fish and Wildlife (CDFW)* –** A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9* –**NEPA documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.
- ***National Marine Fisheries Service (NMFS)* –** A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***California Natural Resources Agency* –** Projects of a magnitude capable of having a demonstrable impact on the environment will require a CEQA environmental review process. Projects will require either an EIR, Negative Declaration, or a Mitigated Negative Declaration.

9.4.13.5 Implementation Schedule

If selected, the components of this program may be implemented on different schedules. The annual implementation schedule for Component 1 is outlined on Figure 9-16. About 40 new acres could be added to the program each year, taking about 10 years to add the remaining acres.

Annual maintenance needs to be continued indefinitely. For Component 2, up to 100 of the remaining 900 acres of uncontrolled arundo can begin treatment each year, as shown on Figure 9-17. For Component 3, it is contingent on the first 2 components, but may be initiated shortly after Component 2. This schedule is shown on Figure 9-18.

Task Description	Dec 1	Mar 31	Sep 1	Nov 30
Phase I – Annual RMU report, Work Plan, and noticing				
Phase II – Pre-maintenance surveys				
Phase III – Maintenance activities				

Figure 9-16. Annual Implementation Schedule for Stream Maintenance

	Year												
Task Description	1	2	3	4	5	6	7	8	9	10	11	12	13
Treat and retreat first 100 acres													
Treat and retreat second 100 acres													
Treat and retreat third 100 acres													
Treat and retreat fourth 100 acres													
Treat and retreat fifth 100 acres													
Treat and retreat sixth 100 acres													
Treat and retreat seventh 100 acres													
Treat and retreat eighth 100 acres													
Treat and retreat ninth 100 acres													

Figure 9-17. Implementation Schedule for Invasive Species Eradication

	Year				
Task Description	1	2	3	4	5
Studies/Preliminary Engineering Analysis					
Agreements/ROW					
CEQA					
Permitting					
Design					
Bid/Construct					

Figure 9-18. Implementation Schedule for Floodplain Enhancement and Recharge

9.4.13.6 Legal Authority

MCWRA has legal authority over the Component 1 SMP for program administration and permitting. Private landowners and local cities who conduct maintenance in the permitted work areas must agree to permit conditions and execute an agreement annually with each agency. Private landowners and local cities pay for all maintenance activities including heavy equipment work and biological monitoring and reporting.

For Component 2 invasive species removal, the RCDMC has legal authority for program administration and permitting. The RCDMC obtains Landowner Access Agreements with property owners or managers (tenants) to allow them to do the work or to allow the RCDMC to oversee landowner-conducted work.

For floodplain restoration activities, the SVBGSA has the right to divert and store water once it has access to the appropriate water rights. Pursuant to California Water Code § 10726.2 (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights.

9.4.13.7 Estimated Cost

Component 1 program permits have been completed and are operational through 2026. Renewal of the 401 Certification with the CCRWQCB will include a cost of $95,000 in the timeframe of 2024 to 2026. The annual administrative cost of Component 1 of this program is approximately $150,000. This cost does not include stream maintenance activities, required biological monitoring, and reporting, which are currently paid by program participants. These costs vary from year to year based on number of participants and work site conditions. This program could cover the costs of stream maintenance activities, biological monitoring, and/or reporting in order to reach higher participation rates from landowners and therefore increased project benefit. The cost for the vegetation management is approximately $1,200/acre for the first year and $700/acre for annual maintenance thereafter. This does not include the cost of sediment management, which can be costly. The cost estimate for stream maintenance activities, required biological monitoring, and reporting is included in Table 9-6, which may continue to be paid by participants, be funded by the GSA, or be funded through a different source. 254 acres have already received their first year of vegetation management.

Table 9-6. Cost Estimate of Vegetation Management

	Acres	First year of vegetation management ($1,200/acre)	Subsequent years of vegetation management ($700/acre)
Upper Valley	250	$300,000	$175,000
Forebay	263	$315,600	$184,100
180/400-Foot Aquifer Subbasin	137	$164,400	$95,900
Total	650	$780,000	$455,000

For Component 2, the estimated capital cost is estimated at between $14,536,943 and $18,898,026. Annual O&M costs are anticipated to be approximately $165,200. The indirect projected yield for the invasive species eradication project is estimated at between 3.1 AF/yr. and

23.2 AF/yr. per acre of invasive species removed. With the range of costs and range of project benefits, the amortized cost of water for this project is estimated to range between $60/AF and $600/AF. See Appendix 9A for cost estimate.

Component 3 includes the construction of 4 recharge basins, each with an expected benefit of 100 AF/yr. and a capital cost of $1,116,000 each, for a total of $4,464,000. Spread over 25 years and assuming a 6% discount rate, the total annualized cost is $93,300 per recharge basin, including annual maintenance. The unit cost is $930/AF. These costs were estimated assuming that only 1 recharge basin would be built, but there may be economies of scale that lower the cost if more are built. These costs are approximate; exact costs will depend on site specifics.

9.4.13.8 Public Noticing

Component 1 implementation and permitting requires annual notification of potential program participants and this notification is announced via direct mail to program participants as well as announced on MCWRA website. Program related annual reporting as required and is published on the MCWRA website.

Component 2 public noticing practices and requirements of the existing RCDMC invasive species eradication programs will be continued as part of this project. This includes reaching out to specific landowners and tenants in areas of potential work and completing annual permit reports that are posted to the RCDMC website.

Component 3 public noticing will be conducted prior to any project initiates construction to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notify stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project and notify the public if approved via an announcement on the SVBGSA website and mailing lists.

In addition to the process detailed above, all projects will follow the public noticing requirements per CEQA or NEPA.

9.4.14 Management Action F2: MCWRA Drought Reoperation

MCWRA formed a Drought Operations Technical Advisory Committee (D-TAC) to provide, when drought triggers occur, technical input and advice regarding the operations of Nacimiento and San Antonio Reservoirs. The D-TAC developed Standards and Guiding Principles to be used in the development of a proposed reservoir release schedule triggered under specific, seasonally defined conditions. This management action would result in decisions on reservoir operation and flow releases during a drought.

The proposed reservoir release operations schedule triggered under specific, seasonally defined conditions of drought will be developed based on the best available scientific knowledge, data, and understanding of the environmental biology, hydrology, and hydrogeology of the Salinas Valley; under the technical expertise of the members of the D-TAC. If adopted, the proposed reservoir release schedule will be implemented based on specific tools and templates made available to the D-TAC. These are discussed further in the Implementation Procedures. The proposed reservoir release schedule will acknowledge, address, and balance the water needs of various stakeholders for limited resources during a drought.

The D-TAC will use a MCWRA provided template when developing the release schedule. The specific actions will also be described in a narrative form to expound upon the actions taken for each month shown in the release schedule. Reservoir releases will be made under direction of the MCWRA Board of Directors or Board of Supervisors through the adoption of a reservoir release schedule or dry winter release priorities, to be executed by MCWRA staff. Appendix 9B outlines the D-TAC Standards, Guiding Principles, and Implementation Procedures. The recommendations of the D-TAC may change with the development and adoption of a Habitat Conservation Plan (HCP), but the D-TAC Standards, Guiding Principles, and Implementation procedures will remain in place unless modified by a HCP.

Summary Actions

The Standards and Guiding Principles Document and any recommended release schedule prepared by the D-TAC will first be received by the Reservoir Operations Advisory Committee. The Reservoir Operations Advisory Committee will meet to discuss recommended release schedules and will solicit information, data, and public comment regarding appropriate MCWRA operations during droughts. Following receipt of public input regarding any subsequent release schedule, the Reservoir Operations Advisory Committee will then prepare a written recommendation regarding reservoir operations which will be transmitted to the MCWRA Board of Directors for consideration and action. Any interested party that dissents from the Reservoir Operations Committee’s recommendation may submit separate written comments to the

MCWRA Board of Directors. The MCWRA Board of Directors will determine, in accordance with applicable law, whether MCWRA will adopt a release schedule, provided the MCWRA General Manager may, in his sole discretion, refer the question of whether MCWRA should implement a recommended release schedule to the MCWRA Board of Supervisors for final determination. In the event the MCWRA General Manager elects not to refer the question of implementation of a recommended release schedule to the MCWRA Board of Supervisors, the decision of the MCWRA Board of Directors regarding such questions shall constitute final agency action for all purposes. The MCWRA Board of Directors (or MCWRA Board of Supervisors, if applicable) will retain full discretion and authority to accept or reject, in whole or in part, the written recommendations of the Reservoir Operations Advisory Committee.

9.4.14.1 Relevant Measurable Objectives

Relevant multi-subbasin measurable objectives benefiting from this project include:

- **Groundwater elevation measurable objective.** Releasing additional water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Salinas Valley Basin, which will help prevent lowering of groundwater elevations overall.
- **Groundwater storage measurable objective.** Releasing additional water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Salinas Valley Basin, which will increase the amount of groundwater in storage overall.
- **Land subsidence measurable objective.** Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Conserving groundwater will support the natural hydraulic gradient that pushes back against the intruding seawater.

It is expected that there is some groundwater benefit to the Eastside Subbasin. Further investigation is needed to determine the extent to which this project benefits the Eastside measurable objectives.

9.4.14.2 Expected Benefits and Evaluation of Benefits

The D-TAC will help develop a release schedule aimed at mitigating negative effects from droughts, including from surface water flows and groundwater recharge. The proposed reservoir release schedule will be based on scientific data and will acknowledge, address, and balance the water needs of various stakeholders for limited resources during a drought. The proposed reservoir release schedule will maintain geographic equity, avoid adverse impacts to Valley-wide agricultural operations, and avoid, to the extent possible, consecutive years where only minimum releases are made from the reservoirs. Annual reservoir releases will help recharge the aquifers in the Salinas Basin, which will help prevent declines in groundwater elevations and storage during drought periods overall. Subsequently, although subsidence is not likely in this Subbasin, this will help reduce the risk of subsidence and prevent water quality degradation.

Further investigation is needed to define the expected benefits to groundwater in the Eastside Subbasin.

This GSP is unable to quantify the benefits at this time because the D-TAC decisions will be different each time it convenes. Drought conditions have not been triggered to cause the D-TAC to convene.

If and when D-TAC does convene, benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations will be measured with a network of wells that is monitored by MCWRA. Groundwater storage will be monitored using groundwater elevations as proxies. Land subsidence will be measured using InSAR data provided by DWR. Seawater intrusion will be measured using select RMS wells.

9.4.14.3 Circumstances for Implementation

The D-TAC is already established. Its convening will occur when conditions trigger it on an annual basis.

9.4.14.4 Permitting and Regulatory Process

This management action follows the ongoing permitting and regulatory process used by MCWRA for reservoir operations.

9.4.14.5 Implementation Schedule

The D-TAC is already established. Its convening will occur when conditions trigger it on an annual basis.

Annually, the D-TAC will meet any time a “drought trigger” occurs to develop a recommended release schedule for Nacimiento and San Antonio Reservoirs. MCWRA presents the annual reservoir release schedule at the October meeting of the MCWRA Reservoir Operations Advisory Committee. If the December 1 forecasted combined reservoir storage volume is below 220,000 AF and the San Antonio Reservoir forecasted storage is below 82,000 AF, the D-TAC release schedule process will begin. MCWRA will schedule a D-TAC meeting to occur no earlier than February 15 and the D-TAC will meet as needed through March 31. The release schedule will be developed for April through December of the current year. If significant inflow occurs during this period, then modifications to the release schedule will be made through existing MCWRA protocols. The D-TAC will develop a recommended release schedule consistent with its Standards and Guiding Principles. The D-TAC's Standards and Guiding Principles and any subsequent release schedule will be presented to the MCWRA Board of Directors and/or Board of Supervisors for consideration and decision.

9.4.14.6 Legal Authority

MCWRA, who owns and operates the reservoirs, is implementing the D-TAC. Since MCWRA is a member of the SVBGSA, it benefits 1 of the SVBGSA members. The SVBGSA will participate in and work in cooperation with MCWRA on the Drought TAC. No additional legal authority is needed.

9.4.14.7 Estimated Cost

This management action is already underway. MCWRA is already funding costs associated with facilitation of the D-TAC. SVBGSA costs include staff participation in the Drought TAC.

9.4.14.8 Public Noticing

As this management action is already underway, MCWRA has already completed initial public noticing. Public noticing will occur for the October Reservation Operations meeting that activates the D-TAC, and when the reservoir release schedule developed by the D-TAC goes to Reservation Operations and/or the Board of Directors for consideration.

9.4.15 Management Action F3: Reservoir Reoperation

This management action consists of SVBGSA collaborating with MCWRA and other interested parties to evaluate potential reoperation scenarios' impact on groundwater sustainability to help prevent undesirable results while also operating within the existing committed purposes of existing infrastructure, such as the Salinas Valley Water Project. This management action is reliant on a new source of dedicated funding. This management action is focused on reoperation of the Nacimiento and San Antonio Reservoirs that would prevent the curtailment of reservoir releases in consecutive year droughts.

This management action includes a feasibility study by working with MCWRA on existing models or developing new ones to simulate reservoir operations and groundwater-surface water interactions along the Salinas River. This management action would take under consideration the other beneficial users dependent on reservoir flows, such as steelhead trout and users in other subbasins.

This management action could be paired with potential capital projects that are within the sustainability horizon of the GSP. Both projects referenced below rely on infrastructure owned and operated by MCWRA and implementing either would require a cooperative effort between SVBGSA and MCWRA. These projects include:

1) **ILT and Spillway Modification -** The proposed Interlake Tunnel project consists of design, permitting, construction, and maintenance of a tunnel for diversion of water from the Nacimiento Reservoir to the San Antonio Reservoir. The San Antonio and Nacimiento Reservoirs have storage capacities of 335,000 and 377,900 AF, respectively; however, the Nacimiento River watershed produces nearly 3 times the average annual flow of the San Antonio River watershed. Consequently, more available storage capacity must be maintained in Nacimiento Reservoir to prevent downstream flooding during storm events than must be maintained in San Antonio Reservoir. Initial modeling shows the proposed Interlake Tunnel project would divert 49,400 AF/yr. of flood control water on average from Nacimiento Reservoir to San Antonio Reservoir, or 47,800 AF/yr. with the spillway modification (MCWRA, 2020). This would increase the total volume of water in storage by 39,000 AF/yr., or 54,300 AF/yr. with the spillway modification. The reservoir operating rules for this modeling reflect the current Nacimiento Dam Operations Policy (MCWRA, 2018c), and therefore reflect changes due to the project as compared to current reservoir operations, not considering any potential reductions in reservoir capacity that may be required if deferred maintenance does not occur. This project is intended to primarily increase water available for conservation releases to the Salinas River between April and October. Any additional conservation releases would be diverted at the SRDF for irrigation within the CSIP area. Without the spillway modification, model results show the additional conservation releases would result in approximately 30,500 AF/yr. of additional groundwater recharge from the Salinas River in the basin over the entire modeled hydrologic period. With the spillway modification, there would be approximately 32,000 AF/yr. of additional groundwater recharge (MCWRA, 2020).

2) **Seasonal Release with Aquifer Storage and Recovery (ASR) or Direct Delivery -** This project entails modifying reservoir releases for the MCWRA's Conservation Program and SRDF diversions to store at least a portion of these releases during alternate seasons in the 180-Foot and 400-Foot Aquifers. This seasonal storage would reduce or eliminate the need for Conservation Program dry season releases and initial modeling shows it would increase annual carryover in the reservoirs, allowing for more consistent alternate season releases. This alternate season release water would be diverted at the SRDF, treated, and recharged through ASR injection wells into an unimpaired part of the aquifer in the winter/spring season and later extracted during peak irrigation season demands for use through the CSIP system. ASR is a critical component of this project because it enables peak irrigation releases for CSIP to be shifted to winter/spring

releases; however, a benefits assessment will be done to assess differing levels of special benefits. As an alternative to direct injection for groundwater recharge, seasonal reservoir releases could be used for direct delivery for municipal supply within the Basin. Under direct delivery use, this water would act as in-lieu recharge by reducing the need for pumping from municipal wells, resulting in less groundwater demand when water is directly delivered. This project would require additional infrastructure.

3) **Other Projects –** Other projects that are proposed and discussed during GSP implementation.

This GSP is primarily concerned with project benefits that help reach groundwater sustainability. However, ancillary benefits and relative costs must also be addressed and carefully evaluated. These projects will affect the entire Salinas Valley, and the analyses of these projects must consider the impact on all subbasins. This GSP includes reservoir reoperation as a management action to help reach and maintain groundwater sustainability along the Salinas River and adjacent subbasins, and it is anticipated that some portion augments groundwater in the Eastside Subbasin. This management action will likely be subject to new flow restrictions and reservoir operations resulting from the planned HCP, and subject to any biological opinion or incidental take permit issued by NMFS, or other regulations issued by applicable regulatory agencies.

9.4.15.1 Relevant Measurable Objectives

Should reservoir reoperation move forward, the intended Eastside Subbasin GSP measurable objectives benefiting include:

- **Groundwater elevation measurable objective**. Releasing additional water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Eastside Subbasin through subsurface flow, which will help prevent lowering of groundwater elevations.
- **Groundwater storage measurable objective**. Releasing additional water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Eastside Subbasin through subsurface flow, which will increase the amount of groundwater in storage.
- **Land subsidence measurable objective**. Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Although subsidence is not a concern in this Subbasin, adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- **Seawater intrusion measurable objective.** Seawater intrusion is occurring in the adjacent 180/400-Foot Aquifer Subbasin where seawater has advanced inland to within a couple miles of the Eastside Subbasin. Releasing additional water from reservoirs should

help ensure annual groundwater recharge in the Eastside Subbasin through subsurface flow, which will support the natural hydraulic gradient that pushes back against the intruding seawater.

9.4.15.2 Expected Benefits and Evaluation of Benefits

Benefits that may arise from this management action would be the development of additional reservoir reoperation analysis. The effort may produce additional management alternatives to be applied during drought conditions. Modeling outputs could be publicly reviewed with partner agency Boards of Directors.

Should reservoir reoperation move forward, intended expected benefits for the Eastside Subbasin include increased groundwater elevations and storage. However, these intended expected benefits for the Eastside will need to be balanced with the needs of other affected subbasins.

Benefits will be measured using the monitoring networks described in Chapter 7. Groundwater elevations and groundwater storage will be measured with a network of wells that is monitored by MCWRA. Land subsidence will be measured using InSAR data provided by the Department of Water Resources.

9.4.15.3 Circumstances for Implementation

In order for this management action to move ahead MCWRA and SVBGSA would need to agree to coordinate on such an analysis and SVBGSA would lead the effort to source associated funding. Ultimately MCWRA would determine whether such an effort would be pursued under their role as owner and operator of the reservoirs.

9.4.15.4 Permitting and Regulatory Process

The initial phases of this management action include a feasibility study, which do not require permitting or meeting regulatory requirements. This will include an evaluation of the permitting and regulatory steps needed for potential reoperation.

Implementing the ultimate reoperation scenario will require coordination with permits from NMFS, the SWRCB, or other agencies that have authority over Salinas River flows.

9.4.15.5 Implementation Schedule

The feasibility study associated with this management action will be conducted within the first 5 years of the Eastside Aquifer GSP implementation.

9.4.15.6 Legal Authority

No legal authority is required to undertake the feasibility study. MCWRA, SVBGSA, NMFS, and other project partners will participate in the study. Implementing the ultimate reoperation scenario will be under the authority of MCWRA.

9.4.15.7 Estimated Cost

This management action is estimated to cost approximately $400,000 - $500,000.

9.4.15.8 Public Noticing

The work associated with this effort would be under the purview of MCWRA. SVBGSA would utilize publicly noticed meetings of the SVBGSA Board of Directors, Advisory Committee, Integrated Implementation Committee, and Subbasin Committees to update the public on such analysis and outcomes from model efforts.

9.5 Implementation Actions

Implementation actions include actions that contribute to groundwater management and GSP implementation but do not directly help the Subbasin reach or maintain sustainability. Included here for the Eastside Subbasin are well registration, GEMS expansion and enhancement, the dry well notification system, Water Quality Coordination Group, Land Use Jurisdiction Coordination Program and support protection of areas of high recharge.

9.5.1 Implementation Action G1: Well Registration

All groundwater production wells, including wells used by *de minimis* pumpers, will be required to be registered with the SVBGSA. Well registration is intended to establish a relatively accurate count of all the active wells in the Subbasin. This implementation action will help gain a better understanding of the wells in active use, verses those that have been decommissioned. Well registration will collect information on active wells, such as the type of well meter, depth of well, and screen interval depth. Well metering is intended to improve estimates of the amount of groundwater extracted from the Subbasin. A GSA may not require *de minimis* users (as defined) to meter or otherwise report annual extraction data. Other public agencies such as the County of MCWRA may have such authority. The details of the well registration program, and how it integrates with existing ordinances and requirements, will be developed during the first 2 years of GSP implementation.

9.5.2 Implementation Action G2: GEMS Expansion and Enhancement

SGMA requires GSAs to manage groundwater extractions within a basin's sustainable yield. Accurate extraction data is fundamental to this management. The MCWRA Groundwater Extraction Monitoring System (GEMS) collects groundwater extraction data from certain areas in the Salinas Valley. The system was enacted in 1993 under Ordinance 3663 and was later modified by Ordinances 3717 and 3718. The MCWRA provides the Salinas Valley Basin GSA (SVBGSA) annual GEMS data that can be used for groundwater management.

Most of the Eastside Subbasin's estimated groundwater extraction data is derived from MCWRA's GEMS Program, which is only implemented in Zones 2, 2A, and 2B. There are limited data on groundwater extraction within the Eastside Subbasin outside of MCWRA Zones 2, 2A and 2B.

SVBGSA will work with MCWRA to expand the existing GEMS Program to cover the entire Eastside Subbasin, which would capture all wells that have at least a 3-inch internal diameter discharge pipe. Program revisions will consider and not contradict related state regulations. Alternatively, SVBGSA could implement a new groundwater extraction reporting program that collects data outside of MCWRA Zones 2, 2A, and 2B. The groundwater extraction information will be used to report total annual extractions in the Subbasin and assess progress on the groundwater storage SMC as described in Chapter 8. Additional improvements to the existing MCWRA groundwater extraction reporting system may include some subset of the following:

- Developing a comprehensive database of extraction wells
- Expanding reporting requirements to all areas of the Salinas Valley Groundwater Basin
- Including all wells with a 2-inch discharge or greater
- Requiring automatically reporting flow meters
- Comparing flow meter data to remote sensing data to identify potential errors and irrigation inefficiencies.

9.5.3 Implementation Action G3: Dry Well Notification System

The GSA could develop or support the development of a program to assist well owners (domestic or state small and local small water systems) whose wells go dry due to declining groundwater elevations. The program could include a notification system whereby well owners can notify the GSA or relevant partner agency if their well goes dry, such as the Household Water Supply Shortage System, available at: https://mydrywatersupply.water.ca.gov/report/ (DWR, 2021). The information collected through this portal is intended to inform state and local agencies on drought impacts on household water supplies. It could also include referral to assistance with short-term supply solutions, technical assistance to assess why it went dry, and/or long-term supply solutions. For example, the GSA could set up a trigger system whereby it would convene a working group to assess the groundwater situation if the number of wells that go dry in a specific area cross a specified threshold. A smaller area trigger system would initiate action independent of monitoring related to the groundwater level SMC. The GSA could also support public outreach and education.

9.5.4 Implementation Action G4: Water Quality Coordination Group

The Water Quality Coordination Group will include the CCRWQCB, local agencies and organizations, water providers, domestic well owners, technical experts, and other stakeholders. The purpose of the Coordination Group is to coordinate amongst and between agencies that regulate water quality directly and the GSA, which has an indirect role to monitor water quality and ensure its management does not cause undesirable water quality results.

Numerous agencies at the local and State levels are involved in various aspects of water quality. The SWRCB and CCRWQCBs are the principal state agencies with primary responsibility for the coordination and control of water quality for the health, safety, and welfare of the people of the state pursuant to the Porter-Cologne Water Quality Control Act 1969 (California Water Code Division 7 Section 13001). There are many efforts to address water quality by the SWRCB. For example, at the State level, the Department of Drinking Water's Safe and Affordable Funding for Equity and Resilience (SAFER) program is designed to meet the goal of safe drinking water for all Californians. In addition, at the local level, the County of Monterey Health Department Drinking Water Protection Service is designed to regulate and monitor water systems and tests water quality for new building permits for systems with over 2 connections.

Locally based GSAs established pursuant to SGMA are required to develop and implement GSPs to avoid undesirable results (including an undesirable result related to water quality) and mitigate overdraft in the groundwater basin within 20 years. SVBGSA will coordinate with the appropriate water quality regulatory programs and agencies in the Subbasin to understand and develop a process for determining when groundwater management and extraction are resulting in degraded water quality in the Subbasin.

Both the State and Monterey County have committed to a Human Right to Safe Drinking Water. SGMA outlines a specific role for GSAs related to beneficial users of groundwater including drinking water, which is to manage groundwater according to the 6 sustainability indicators. The Coordination Group will help define the unique role for the GSAs, not related to specific sustainability metrics. Under this implementation action, the GSAs will play a convening role by developing and coordinating a Water Quality Coordination Group.

The Coordination Group will review water quality data, identify data gaps, and coordinate agency communication. The Coordination Group will convene at least annually to share groundwater quality conditions, as assessed for the GSP annual reports, and assesses whether groundwater management actions are resulting in unsustainable conditions. The goal of the Coordination Group will include documenting agencies' actions that address water quality concerns including outlining each agency's responsibilities. An annual update to the GSA BOD will be provided regarding Coordination Group efforts and convenings.

This Coordination Group will also serve to collaborate with agencies on local regulation that could affect groundwater contamination, such as county or city groundwater requirements that relate to regulation of septic systems, well drilling, capping and destruction, wellhead protection and storage and/or leaking of hazardous materials.

9.5.5 Implementation Action G5: Support Protection of Areas of High Recharge

The GSA could work with the county, RCDMC, and other land-use entities in the region to protect the areas of the Subbasin that have been identified as areas of higher recharge potential. These areas are typically identified using soils and soil classification maps but would need additional investigation and data to confirm. These areas could then be given protection priority status to prevent developments that would impede the infiltration and subsequent recharge of precipitation into the principal aquifer. These areas have historically been identified as the areas higher up in the alluvial fan complexes, as well as the areas in and near the streams emanating from the Gabilan Range. In addition, these areas, once identified and protected, would also need to be monitored for their efficacy and contributions to the groundwater.

9.5.6 Implementation Action G6: Deep Aquifers Study

The Deep Aquifers underlying portions of the Salinas Valley Basin are a critical groundwater resource that is highly valued but minimally understood. Over the decades, as seawater intrusion has advanced into the 180-Foot and 400-Foot Aquifers of the 180/400-Foot Aquifer Subbasin, agricultural landowners and drinking water providers have drilled wells deeper to access fresh water. The need for additional studies about the Deep Aquifers has been identified in the context of stopping seawater intrusion and effectively managing groundwater sustainability.

The 180/400-Foot Aquifer Subbasin GSP Section 9.3.6 Priority Management Action 5: Support and Strengthen Monterey County Restrictions on Additional Wells in the Deep Aquifers, calls for the SVBGSA to support the County extending Ordinance 5303 to prevent any new wells from being drilled into the Deep Aquifers until more information is known about the Deep Aquifers' sustainable yield. The plan was to complete the study of the Deep Aquifers over the subsequent years when funding became available. While the ordinance has expired, the plan for the study of the Deep Aquifers has developed.

To address seawater intrusion in the 180/400-Foot Aquifer, the SVBGSA created the Seawater Intrusion Working Group (SWIG). The SWIG membership comprises 9 agencies and municipalities and multiple stakeholders to develop consensus on the current understanding of seawater intrusion in the Subbasin and adjacent subbasins subject to seawater intrusion, identify data gaps, and develop a broad-based plan for controlling seawater intrusion. Working together with a Technical Advisory Committee (TAC), the SWIG identified key tasks that could be included in the Deep Aquifers Study. GSA staff began to meet with stakeholders and partner agencies to determine if there was a reasonable and equitable path forward for securing funding to initiate this study.

A Cooperative Funding Proposal has been developed for the Deep Aquifers Study. The Study will focus on describing the geology, hydrogeology, and extents of the Deep Aquifers; the Deep Aquifers water budgets and addressing the economic and administrative Constraints on extracting from the Deep Aquifers. The study will include guidance on management issues and also propose and initiate a Deep Aquifers Monitoring Program. The Study is expected to begin in 2022 and take 1 to 2 years to complete. The GSAs will incorporate findings of the Deep Aquifers Study into future GSP updates to ensure that the study and the development of future regulations will promote groundwater sustainability of the Deep Aquifers as defined in this GSP.

9.5.7 Implementation Action G7: Land Use Jurisdiction Coordination Program

The Land Use Jurisdiction Coordination Program outlines how the SVBGSA 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. The goal is to ensure that the GSA and Land Use Jurisdiction efforts are aligned. Examples of these activities include the application of the B-8 Zoning district by the County of Monterey in areas with water supply, water quality and other constraints on development, and the consideration of recharge potential for new developments. While the SVBGSA does not have land use authority, and the Land Use Jurisdictions retain all such authority, the Coordination Program also describes how local agencies should consider adopted GSPs when revising or adopting policies, such as adopting and amending general plans and approving land use entitlements, regulations, or criteria, or when issuing orders or determinations, where pertinent. The Coordination Program will be developed immediately upon implementation of this GSP.

9.6 Other Groundwater Management Activities

Although not specifically funded or managed by this GSP, a number of associated groundwater management activities will be promoted and encouraged by the GSAs as part of general good groundwater management practices. If any particular action is scoped further and shown to significantly improve groundwater conditions, SVBGSA may consider implementing it as a project or management action under this GSP.

9.6.1 Continue Urban and Rural Residential Conservation

Existing water conservation measures should be continued, and new water conservation measures promoted for residential users. Conservation measures may include the use of low flow toilet fixtures, or laundry-to-landscape greywater reuse systems. Conservation projects can reduce demand for groundwater pumping, thereby acting as in-lieu recharge.

9.6.2 Promote Stormwater Capture

Stormwater and dry weather runoff capture projects, including Low Impact Development (LID) standards for new or retrofitted construction, should be prioritized and implemented. The Storm Water Resource Plan outlines an implementation strategy to ensure valuable, high-priority projects with multiple benefits (Hunt *et al.*, 2019). While not easily quantified and therefore not included as projects in this document, stormwater capture projects may be worthwhile and benefit the basin.

9.6.3 Watershed Protection and Management

Watershed restoration and management can reduce stormwater runoff and improve stormwater recharge into the groundwater basin. While not easily quantified and therefore not included as projects in this document, watershed management activities may be worthwhile and benefit the basin.

9.6.4 Support Reuse and Recharge of Wastewater

Wastewater collection and treatment provides opportunities to use and reuse water in various ways. Each wastewater treatment facility has unique infrastructure with different plans for expansion or upgrades. Potential upgrades could result in greater reliability, improved water quality, the ability to reuse treated wastewater or increase water reuse yields, or increased recharge to groundwater. These upgrades may directly or indirectly affect groundwater conditions.

9.7 Mitigation of Overdraft

As shown in Chapter 6, the Eastside Subbasin has historically been in overdraft, and is projected to still be in overdraft throughout the GSP planning horizon unless projects and management actions bring extraction and the sustainable yield in line. The overdraft can be mitigated by reducing pumping or recharging the subbasin, either through direct or in-lieu means. The potential projects and management actions in this chapter are sufficient to mitigate existing overdraft, as presented in Table 9-7. These include potential demand management through pumping allocations to be used if other projects and management actions do not reach sustainability goals and mitigate overdraft. The projects and management actions selected will ensure that the chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

Table 9-7. Total Potential Water Available for Mitigating Overdraft

Project/ Management Action #	Name	Quantification of Project Benefits
A1	Managed Aquifer Recharge with Overland Flow	400 AF/yr. of water available for recharge*
A2	Floodplain Enhancement and Recharge	2,300 AF/yr. of water available for recharge. 1,000 AF/yr. increase in storage.
B1	11043 Diversion at Chualar	Annual average of 6,000 AF/yr. of excess streamflow for recharge, resulting in 4,600 AF/yr. increase in storage.
B2	11043 Diversion at Soledad	Annual average of 6,000 AF/yr. of excess for recharge, resulting in 4,600 AF/yr. increase in storage.
B3	Surface Water Diversion from Gabilan Creek	On average, 350 AF/yr. of excess streamflow is recharged*
C1	Eastside Irrigation Water Supply Project (or Somavia Road Project)	3,000 AF/yr. of imported water for in lieu use, or alternatively recharge*
C2	Salinas Scalping Plant	Recycling water for irrigation reduces groundwater extraction by 280 to 560 AF/yr.
D1	Regional Municipal Supply Project	Multi-subbasin benefit: 15,000 AF/yr. of imported desalinated water reduces groundwater extraction. Portion of this benefiting the Eastside Subbasin has yet to be determined.
D2	CSIP Optimization and Expansion	Multi-subbasin benefit for 3,500-acre expansion: 9,900 AF/yr. of recycled and river water reduces groundwater extraction. Portion benefitting the Eastside has yet to be determined.
E1	Conservation and Agricultural Best Management Practices (BMPs)	Unable to quantify benefits until specific BMPs are identified and promoted.
E2	Fallowing, Fallow Bank, and Agricultural Land Retirement	Range of potential project benefits.
E3	Pumping Allocations and Controls	Range of potential project benefits.
Project/ Management Action #	Name	Quantification of Project Benefits
SALINAS RIVER PROJECTS AND MANAGEMENT ACTIONS *(projects will likely have indirect benefits for the Eastside Subbasin that may reduce the need for other projects and management actions)*		
F1	Multi-benefit Stream channel improvements	Component 1 – Stream Maintenance Program: Multi-subbasin benefits not quantified Component 2 – Invasive Species Eradication: Multi-subbasin benefit of 2,790 to 20,880 AF/yr. of increased recharge Component 3 – Floodplain Enhancement and Recharge: Multi-subbasin benefit of 1,000 AF/yr. from 10 recharge basins*
F2	MCWRA Drought Reoperation	Unable to quantify benefits since drought operations have yet to be triggered.
F3	Reservoir Reoperation	Unable to quantify benefits until project is selected and feasibility study is completed

10 GROUNDWATER SUSTAINABILITY PLAN IMPLEMENTATION

This chapter describes how the GSP for the Eastside Subbasin will be implemented. The chapter serves as a roadmap for addressing all the activities needed for GSP implementation between 2022 and 2042 but focuses on the activities between 2022 and 2027.

Implementing this GSP will require the following formative activities, each of which is detailed in a subsequent subsection:

- Data, monitoring, and reporting
  - Annual monitoring and reporting
  - Updating the DMS
  - Improving monitoring networks
  - Addressing identified data gaps in the HCM
- Continuing communication and stakeholder engagement
- Refining and implementing projects and management actions
- Adapting management with the 5-year Update
- Developing a funding strategy

The implementation plan in this chapter is based on the best available data used to understand groundwater conditions in the Subbasin and the current assessment of projects and management actions described in Chapter 9. The Subbasin's conditions and the details of the projects and actions will likely evolve over time based on future data collection, model development, and input from Subbasin stakeholders.

10.1 Data, Monitoring, and Reporting

Beginning in the first year of GSP implementation, SGMA requires submittal of annual monitoring data and development of an annual report. This annual process tracks groundwater conditions with respect to the SMC established in Chapter 8. The SVBGSA will hire consultant(s), form agreements with agencies, and/or hire staff to implement the monitoring and reporting functions.

Monitoring of the 6 sustainability indicators will begin upon adoption of the GSP. Most of the monitoring networks described in Chapter 7 rely on existing monitoring programs. Only ISW needs the establishment of a new monitoring network. Data from the monitoring programs will be maintained in the DMS and evaluated annually to ensure progress is being made toward sustainability or to identify exceedances of minimum thresholds. SVBGSA will assess monitoring data to prepare annual reports and guide decisions on projects and management actions.

10.1.1 Annual Monitoring and Reporting

SGMA requires completion of annual reports to document Subbasin conditions relative to the SMC presented in Chapter 8. Starting on April 1, 2022, SVBGSA will submit annual reports for the Eastside Subbasin to DWR and make them publicly available. The purpose of the reports is to provide monitoring, groundwater extraction, and total water use data to DWR, compare monitoring data to the SMC, and adaptively manage actions and projects implemented to achieve sustainability.

The monitoring of the 6 sustainability indicators is described below. Chapter 7 outlines the data collected through the monitoring programs that will be used to complete annual reports. Where possible, SVBGSA will leverage data collection and analysis completed by MCWRA to avoid duplication of efforts.

10.1.1.1 Groundwater Levels

For groundwater level monitoring, SVBGSA relies on MCWRA’s collection of groundwater elevation data and analyzes it to meet SGMA requirements. MCWRA collects groundwater elevation monitoring data under the statewide CASGEM program and their annual, monthly, and August groundwater elevation monitoring programs. The CASGEM system will be replaced by the SGMA groundwater level monitoring program after GSP submission. The new monitoring system will include the 7 existing CASGEM wells and at least 28 additional wells that are already part of MCWRA’s monitoring programs. Groundwater monitoring will continue to be conducted by MCWRA, and they will make these data available to the SVBGSA. The GSA will use MCWRA’s annual August trough and fall contour maps and develop additional spring contour maps using groundwater elevation data collected from the groundwater level monitoring network and adjacent subbasins. The GSA will also prepare summary tables and figures, compare the data to SMC, and annually upload the data for DWR and to the DMS.

10.1.1.2 Seawater Intrusion

For seawater intrusion, SVBGSA depends on MCWRA’s collection and analysis of chloride data from their seawater intrusion monitoring wells. Seawater intrusion currently does not exist in the Eastside Subbasin, but its inland progression will be closely followed in the 2 existing monitoring wells in the Eastside Aquifer and the ones in the neighboring 180/400-Foot Aquifer Subbasin. MCWRA will annually produce seawater intrusion contours and make them available to SVBGSA. These contours will be used to compare to SMC.

10.1.1.3 Groundwater Quality

For groundwater quality, SVBGSA relies on state monitoring systems and analyzes it to meet SGMA requirements. SWRCB compiles groundwater quality monitoring data for DDW and ILRP wells in their GAMA groundwater information system. The GSA will annually download these data, analyze exceedances for the COCs, prepare summary tables, compare the data to SMC, and upload them to the DMS.

10.1.1.4 Land Subsidence

For land subsidence, SVBGSA relies on data provided by the State and analyzes it to meet SGMA requirements. DWR provides InSAR data that SVBGSA will use to assess land subsidence. InSAR data will be downloaded annually and are provided through DWR’s SGMA Data Viewer, if available, and used to create annual change in subsidence maps to compare to SMC in the annual report.

10.1.1.5 Interconnected Surface Water

No entity currently monitors ISW. The SVIHM did not identify any locations of ISW in the Subbasin; however, there is ISW just north of the Eastside Subbasin and there could potentially be ISW along Gabilan Creek in the Eastside Subbasin in the future. Therefore, the ISW network will be established as described in Chapter 7. Shallow groundwater elevations will be used as proxies for depletion rates; thus, shallow wells near the areas of ISW are needed. Monitoring wells will be paired with USGS stream gauges to evaluate groundwater gradient and effects of groundwater levels on surface water depletion. This will also help determine the extent of interconnection. The ISW monitoring wells will be incorporated into MCWRA’s existing monitoring network and MCWRA will make these data available to SVBGSA. Water level measurements will be made at least once a year at each ISW monitoring site during MCWRA’s annual fall groundwater monitoring event that occurs from mid-November to December. The GSA will annually prepare summary tables and figures and compare the data to SMC.

10.1.1.6 Groundwater Extraction

SVBGSA relies on MCWRA’s collection of groundwater extraction data and analyzes it to meet SGMA requirements. Through the Groundwater Extraction Monitoring System (GEMS), MCWRA collects groundwater pumping data for agricultural supply wells and public groundwater system wells that have discharge pipes larger than 3 inches within Zones 2, 2A and 2B. SVBGSA will work with MCWRA to update and enhance this program, as detailed in Section 10.1.3.1. The GSA will annually use these data to prepare summary tables and figures and compare the data to SMC. Due to the GEMS reporting period and submittal deadlines defined by Monterey County Ordinance No. 3717 and 3718, groundwater extraction reported in the annual reports will be lagged by 1 year.

10.1.2 Updating the Data Management System

The SVBGSA has developed a DMS that is used to store, review, and upload data collected from the monitoring programs outlined above, as described in Chapter 7. A web application reporting these data is available on the SVBGSA's website for stakeholders to view the data. The DMS will be updated as new information is collected for annual reports, developed as part of GSP implementation, and provided by stakeholders.

10.1.3 Improving Monitoring Networks

As discussed in Chapter 7, the existing seawater intrusion, groundwater quality, and subsidence monitoring networks already provide sufficient spatial coverage and do not need to be improved.

10.1.3.1 Groundwater Levels

The current groundwater level monitoring network has adequate coverage of the Eastside Subbasin. However, some of the wells in the groundwater level monitoring network are only sampled annually resulting in a data gap. Thus, SVBGSA will work with MCWRA to update monitoring protocols for these well to be sampled at least twice a year as is required by SGMA. Moreover, for wells in the monitoring network that lack well construction information, SVBGSA will try to address that data gap.

10.1.3.2 Interconnected Surface Water

Depletion of ISW is monitored through shallow wells adjacent to locations of ISW. Given that there is potential for future ISW along Gabilan Creek, a new well will be installed along the Gabilan Creek near the boundary with the Langley Subbasin. This new shallow well will help monitor the ISW identified on Gabilan Creek in the Langley Subbasin. It will be installed in the Eastside Subbasin so it can be paired with the USGS gauge on Gabilan Creek shown in Figure 7-6. The new shallow well will be added to MCWRA's monitoring program.

10.1.3.3 Groundwater Extraction

Accurate extraction data is necessary to meet the SGMA requirement of reporting annual groundwater extractions. The current GEMS area that includes Zones 2, 2A, and 2B provides sufficient coverage of the Eastside Subbasin (Figure 3-3), but SVBGSA and MCWRA will work together to potentially improve the existing GEMS Program as outlined in Chapter 9.

10.1.4 Address Identified Data Gaps in the Hydrogeologic Conceptual Model

Chapter 4 identified a few key data gaps related to the HCM. Filling these data gaps would allow the SVBGSA to improve the HCM and thus, the characterization of the Subbasin and the principal aquifer. The data gaps are related to aquifer properties for the Subbasin and the Salinas Valley, and both lithologic and hydrostratigraphic data for the southern half of the Subbasin.

To fill these key data gaps and meet GSP Regulations § 354.14, during early GSP implementation SVBGSA will implement:

- **Aquifer properties assessment.** The values and distribution of aquifer properties throughout the entire Subbasin have not been well characterized and documented. There are very few measured aquifer parameters in the Salinas Valley Groundwater Basin overall. Aquifer properties are important to understanding groundwater flow directions and magnitude within the aquifer. This informs the model with better data, which in turn leads to better model predictions. With better understanding of the aquifer and potential future conditions, SVBGSA and stakeholders will be better equipped to guide the management of water resources throughout the entire Subbasin. To develop better estimates of aquifer properties, the SVBGSA will identify up to 3 wells in the Eastside Subbasin for aquifer testing. Each well test will last a minimum of 8 hours and will be followed by a 4-hour monitored recovery period. Wells for testing will be identified using the following criteria:
  - Wells are owned by willing well owners
  - Wells have known well completion information
  - Wellheads are completed such that water elevations in wells can be monitored with data loggers
  - Wells are equipped with accurate flow meters
  - Wells have area for discharge of test water
  - Preferred wells will have nearby wells that can be monitored during the test.
  - **Lithologic and hydrostratigraphic data collection.** Lithologic data such as sediment composition and formation designation, as well as hydrologic data such as groundwater elevations and depth-specific water chemistry can be collected during drilling activities. Additionally, more hydrologic data can be collected during well development and well testing. These data will improve the understanding of the aquifer properties and potential groundwater-surface water relationships. Gathering more lithologic and hydrostratigraphic data will not only help characterize and map the lateral and vertical extent of the principal aquifer with greater resolution, but also the associated aquifer characteristics for improved understanding of groundwater flow. These data will inform SVBGSA and stakeholders for future development location decisions, injection or recharge project locations, as well as overall groundwater management directions to use the aquifer sustainably under all climatic and future development conditions. Many stakeholders have discussed the importance of data for their decisions throughout the

GSP development process; acquiring these data will improve all future GSP updates and subsequent implementation activities.

10.2 Communication and Engagement

The SVBGSA will routinely report information to the public about GSP implementation and progress towards sustainability and the need to use groundwater efficiently. The SVBGSA website will be maintained as a communication tool for posting data, reports, and meeting information. This website features a link to an interactive mapping function for viewing Salinas Valley Groundwater Basin-wide data that were used during GSP development.

- **GSP Implementation – Data, Monitoring, and Reporting**. During GSP implementation, SVBGSA will engage in technical collaboration with partner agencies and stakeholders on data collection and analysis. Correspondingly, it will report out on findings to stakeholders through a variety of engagement strategies and pathways, including but not limited to:
    - Annual report presentations to the Subbasin Committees, Advisory Committee and Board of Directors
    - FAQs
    - Online communications, including SVBGSA website and Facebook page and direct emails
    - Mailings to most-impacted water users and residents
    - Media coverage
    - Talks and presentations to interested stakeholders, agencies, and groups
        - This collaboration and outreach will be done on an annual basis as data are analyzed for the annual report. Additional outreach will occur more frequently depending on the data collection and analysis undertaken and its relevance for projects, management actions, and other implementation activities.
- **GSP Implementation – Projects and Management Actions.** SVBGSA will engage in outreach, communication, and engagement as part of its efforts to reach and maintain sustainability through undertaking projects and management actions. This will include engagement of stakeholders and other decision-making processes, such as the Eastside Subbasin Committee, the Integrated Implementation Committee, the Advisory Committee, and the Board of Directors. It will also involve outreach to interested and potentially affected stakeholders through engagement strategies such as:
    - FAQs
    - Online communications

- Mailings to most-impacted water users and residents
- Co-promotional opportunities with partner entities
- Talks and presentations to interested stakeholders, agencies, and groups

- **Engagement in Governance and Partnerships**. In addition to Subbasin-specific processes, SVBGSA will continue to pursue multiple means of engagement in governance and partnerships that directly or indirectly affect the Eastside Subbasin. These include:
  - Valley-wide – The Integrated Implementation Committee will consolidate the needs of all Salinas Valley subbasins and create an integrated approach to groundwater management throughout the Salinas Valley.
  - Other agencies –In close collaboration with MCWRA, SVBGSA will also work with other local, state, and federal agencies, to meet the Eastside Subbasin sustainability goals as detailed in this GSP. This includes working with the CCRWQCB, Monterey County Health Department, and other agencies on water quality, and the NMFS on protection of steelhead trout.
    - **General Outreach on Groundwater**. SVBGSA will further pursue outreach in order to ensure stakeholders and interested or affected users are aware of SVBGSA efforts, as well as promote broader awareness of groundwater conditions and management. It will do this through means such as:
  - Offer public informational sessions and subject-matter workshops and if possible, provide online access via Facebook Live or via Zoom
  - SVBGSA Web Map
  - FAQs
  - Online communications
  - Media coverage
  - Promote/Celebrate National Groundwater Week
  - Educational materials available through mailers or at public events

- **URCs.** SVBGSA acknowledges that URCs have little or no representation in water management and have often been disproportionately less represented in public policy decision making. SVBGSA will engage more constructively with URCs, including activities such as to:
  - Conduct workshops with specific partners on the importance of water and groundwater sustainability
  - Identify URCs concerns and needs for engagement, as well as URCs specific engagement strategies

- Plan listening sessions around GSA milestones
- Coordinate with partner organizations to develop a “resource hub” where people can go for support
- Identify community allies in groundwater engagement work and bring down barriers for participation
- Consider particular URCs impacts during routine GSA proceedings
- Convene a partnership group on domestic water, including URCs with partner entities

10.3 Road Map for Refining and Implementing Projects and Management Actions

The projects and management actions identified in Chapter 9 are sufficient for reaching sustainability in the Eastside Subbasin. They will be integrated with projects for the other Salinas Valley subbasins during GSP implementation. The projects and management actions described in this plan have been identified as beneficial for the Eastside Subbasin. The impacts of projects and management actions on other subbasins will be analyzed and taken into consideration as part of the project selection process. In addition, to consider the human right to water, SVBGSA will assess the potential impacts of projects and management actions on water quality in nearby domestic wells and other wells supplying drinking water systems, and it will establish additional monitoring as necessary to monitor for groundwater quality impacts. The SVBGSA Board of Directors will approve projects and management actions that are selected to move forward. These projects assume continued operation of current infrastructure. If conditions change, such as other projects being undertaken that are outside of this GSP, SVBGSA will adapt its approach to achieving and maintaining sustainability, including the projects and management actions considered.

This section outlines a road map to refining and implementing projects and management actions. It organizes the projects and management actions into the main steps SVBGSA will undertake with respect to Eastside projects and management actions and the contingency of certain actions.

1. Implementation Actions

Data collection and analysis are critical for the implementation of all GSPs. Even though MCWRA has collected information across most of the Eastside Subbasin, strengthening data collection is still important to better understand the necessity of projects and management actions. Along with the expansion of monitoring networks, including updating and enhancing GEMS to improve the collection of extraction data, SVBGSA will register wells to gain more information on active wells, especially *de minimis* users. In addition, it will begin standing up the Dry Well Notification System within the first 2 years of GSP implementation, which will assist well owners whose access is jeopardized through declining groundwater elevations. SVBGSA plans to undertake the development of these actions within the first 2 years after GSP submittal, and fully implement them through years 3 and 4 through actively reaching out to well owners, visiting and checking wells, and inputting data.

SVBGSA has already funded and begun implementing the Deep Aquifers Study. The Water Quality Coordination Group is also a critical implementation action to coordinate with other agencies that have responsibilities affecting domestic water quality and access. After undertaking preliminary planning work, SVBGSA plans to establish the Coordination Group in the first 2 years after implementation. In years 3 and 4, SVBGSA will also work to support protection of areas of high recharge. The final implementation actions in this GSP are to Support Protection of Areas of High Recharge and Land Use Jurisdiction Program. SVBGSA will begin initial conversations early in GSP implementation to identify the most appropriate strategy for accomplishing this implementation action.

2. Increased Direct Recharge

Two main projects that will increase recharge without significant diversion and infrastructure costs in the Eastside are Floodplain Enhancement and MAR of Overland Flow. SVBGSA will work with agencies and organizations already engaged in similar efforts.

During the first 2 years of GSP implementation, SVBGSA will work with partners to further scope opportunities for floodplain enhancement. CCWG has already identified potential locations, as shown in Chapter 9. SVBGSA will focus on features that increase groundwater recharge and will undertake or support partners' efforts to identify willing landowners, complete studies to analyze potential recharge capacity and preliminary engineering analyses, secure land access agreements, begin CEQA and permitting processes, and secure funding. It will also evaluate whether water diversion rights must be secured, which may take many years. This project is composed of several individual projects, which may be started together or individually. Cost/benefit analyses may help prioritize individual projects.

SVBGSA will evaluate opportunities for overland flow MAR projects in the Eastside within the first 2 years of implementation. It will identify general locations that have the highest recharge potential and reach out to landowners. Scoping will also look at the potential size of projects; smaller projects may still have aggregate benefits to the groundwater system. As part of encouraging these projects, SVBGSA may assist with feasibility studies, undertake potential site analyses with cone penetration tests (push tests), design recharge basins, and assist with securing funding. After the initial phase of pilot projects, SVBGSA may expand outreach and develop a more defined program in years 3 and 4. To implement recharge basins for MAR of overland flow at multiple sites, SVBGSA may evaluate and potentially pursue a programmatic permit to facilitate greater implementation of recharge projects. Whether water rights would need amending should be considered in site selection and considered in the project timeline. After implementation, monitoring and maintenance needs to be undertaken.

3. Surface Water Diversion, Alternative Supply, and Regional Municipal Supply Projects

There are 6 projects defined in Chapter 9 involving new water supplies for recharge or direct use in lieu of groundwater extraction that could help the Eastside Subbasin reach sustainability. Three projects – the 11043 Diversion at Chualar, 11043 Diversion at Soledad, and diversion from Gabilan Creek – are surface water diversions of high flows, which could capture these high flows for beneficial use, but are extremely variable year to year. The Eastside Irrigation Water Supply Project, Salinas Scalping Plant, and Regional Municipal Supply Project could provide more predictable alternative water supplies to be used in lieu of groundwater extraction. Chapter 9 outlines the estimated cost and benefit for each project; however, more detailed scoping and analysis needs to be undertaken.

During the first 2 years of GSP implementation, SVBGSA will undertake further scoping and analysis of benefits and feasibility to compare and select initial projects for implementation. SVBGSA will evaluate whether any water rights permits are needed and take that into consideration in project selection and planning. Since multiple projects may be needed to mitigate overdraft, with stakeholder input SVBGSA will determine which projects to move forward with first, which projects to implement if the first set of projects does not reach sustainability goals, and which projects are not prioritized for implementation. For several projects, after initial project selection, more detailed analyses of recharge locations and distribution systems needs to occur, including discussions with landowners. During years 3 and 4, for the initial projects SVBGSA selects to move forward with, it will secure access agreements, undertake permitting and CEQA, and develop funding mechanisms. After that point, SVBGSA will continue an iterative, ongoing process to evaluate the status of projects in the process of being implemented, groundwater conditions, and additional potential projects.

4. Salinas River Projects and CSIP Expansion

For the CSIP expansion and the projects along the Salinas River that could contribute to sustainability in the Eastside Subbasin, Eastside stakeholders will evaluate the potential benefit to the Eastside Subbasin when other subbasins move forward with the projects. Should any of the projects go forward, benefits analysis will be undertaken to determine the zones of benefit and assessments. For CSIP expansion, the Eastside may consider pushing for expansion into the Eastside Subbasin.

5. Decreased Demand

Demand management provides options if supply-side projects are not sufficient to reach sustainability. During the first 2 years of GSP implementation, the SVBGSA will evaluate the need for Conservation and Agricultural BMPs; Fallowing, Fallow Bank, and Agricultural Land Retirement; and Pumping Allocations and Controls. Pumping allocations take several years to establish and do not necessarily need to include pumping controls immediately. For example, pumping allocations could be coupled with thresholds that would trigger the need for pumping controls. Unless SVBGSA determines it is not needed, it will establish pumping allocations during years 3 and 4 of GSP implementation. The establishment of pumping allocations will involve robust stakeholder input to ensure appropriate planning timelines and landowner engagement. At that time, stakeholders could also evaluate potential funding mechanisms or incentives that could be developed as part of a pumping allocations program. Pumping allocations could be paired with and incentivize fallowing and agricultural land retirement. The relationship between the 2 projects will be evaluated as part of the development of pumping allocations and controls. If actions to promote agricultural BMPs are undertaken in other parts of the Salinas Valley, the cost to expand them to the Eastside Subbasin should be evaluated.

The implementation of all projects and management actions will be a dynamic, adaptive process. Refinement of the projects and actions will occur simultaneously with adjustment of the funding mechanism that supports the projects and actions. A start-up budget that covers required actions such as data, monitoring, and reporting could also cover pre-financing stages of project selection and design. Projects and management actions will be approved by the Board of Directors and will be implemented in a coordinated manner across the entire Salinas Valley.

10.4 Five-Year Update

SGMA requires the development of 5-year GSP assessment reports, starting in 2027. This 5-year update will assess whether the GSA is achieving the sustainability goal in the Subbasin. The assessment will include a description of significant new information that has been made available since GSP submittal, whether any new information warrants changes to any aspect of the plan, and how the GSP will be adapted accordingly.

The 5-year update will include updating the SVIHM and SVOM with newly collected data and updating model scenarios to reflect both the additional data and refinements in project design or assumptions. It will also include a reevaluation of climate change to ensure assumptions in the GSP are still valid.

SVBGSA will engage stakeholders in the development of the 5-year update. In contrast to the annual reports, which share monitoring data and progress related to the SMC, the 5-year update will involve a more systemic reevaluation of the SMC minimum thresholds and measurable results, as well as report on progress meeting the interim milestones.

10.5 Start-up Budget and Funding Strategy

10.5.1 SVBGSA Operational Fee

SVBGSA established a Valley-wide Operational Fee to fund the typical annual operational costs of its regulatory program authorized by SGMA, including regulatory activities of management groundwater to sustainability (such as GSP development), day-to-day administrative operations costs, and prudent reserves. The Operational Fee funds GSA operational costs, and therefore covers any tasks undertaken by staff, such as planning, technical review, partnership development, communication, stakeholder engagement, and support for the selection, development and implementation of projects and management actions. The fee is a regulatory fee with the purpose of ensuring that ground water use is managed sustainably so that adequate supplies remain for all users. The Operational Fee is also used as local cost share for grants.

The Operational Fee is based on the 2018 Regulatory Fee Study (Hansford Economic Consulting, 2019) commissioned by SVBGSA. The SVBGSA has the authority to charge fees, as set forth in the California Water Code § 10730, 10730.1, and 10730.2. The Operational Fee is a regulatory fee authorized under California Water Code § 10730 and is exempt from voter approval, as it is not a tax pursuant to California Constitution Article XIIIC (Proposition 26, Section 1(e)(3)). As the fee must be proportional and related to the benefits of the program, this study analyzed options and proposed a regulatory fee structure whereby agricultural beneficiaries are responsible for 90% of the cost and all other beneficiaries are responsible for 10% of the cost. The SVBGSA Board of Directors approved this fee on March 2019.

The Eastside Subbasin urban and agricultural groundwater are charged the Operational Fee by domestic connection or irrigated acreage by land use code. The Operational Fee funds Valley-wide activities, including initial GSP development; however, additional funding is needed for meeting future requirements, GSP implementation, and projects and management actions.

10.5.2 Start-up Budget

Table 10-1 summarizes the conceptual planning-level costs for the initial 5 years of GSP implementation for the Eastside Subbasin. This table does not include the Valley-wide costs for routine administrative operations and other Valley-wide costs funded through the SVBGSA operational fee outlined in 10.5.1. The Subbasin specific costs, shown on Table 10-1, include data collection and analysis beyond tasks already undertaken by other agencies. These tasks could be undertaken by staff, consultants, or partner agencies. The costs comprise of annual analysis and reporting of sustainability conditions; improvements to the monitoring networks, including installation of 1 new monitor well; and supplemental hydrogeologic investigations to address data gaps.

The start-up budget includes implementation actions envisioned to occur within the first 5 years of GSP implementation. It does not include funding for development or implementation of projects and management actions; however, does include some funding for refinement and selection of projects and management actions. When projects and management actions move forward with implementation, they will require additional funding for project feasibility and design studies, environmental permitting, and landowner outreach. These are initial estimates of costs and will likely change as more data become available.

These costs are independent of fees currently collected by MCWRA; no fees will be collected by SVBGSA that duplicate fees already being collected by MCWRA.

For components of this GSP being developed in coordination with other GSPs in the Salinas Valley, the establishment costs are split between subbasins, and initial implementation costs are estimated based on the direct costs to the Eastside Subbasin. These are initial estimates; however, the final cost and division between subbasins will be reviewed and revised as necessary prior to implementation and per approval of the SVBGSA Board.

Table 10-1. Eastside Aquifer Subbasin Specific Estimated Planning-Level Costs for First 5 Years of Implementation

Activity	Estimated Annual Cost	Total Cost for 5 Years or Lump Sum	Assumptions
Required Compliance Activities: Data, Monitoring, and Reporting		$588,000	
Annual Monitoring and Reporting	$50,000	$250,000	
Updating the Data Management System	$3,000	$15,000	Valley-wide cost split equally between subbasins; includes hosting fee and updating information
Improving Monitoring Networks		$97,000	
Development of GEMS expansion ordinance		$7,000	Valley-wide cost split equally between subbasins; includes hosting fee and updating information
Implementation of GEMS expansion		$50,000	Estimate for implementation in the Eastside
Install up to 1 shallow wells for monitoring ISW		$15,000	
Additional groundwater level monitoring	$5,000	$25,000	
Addressing Identified Data Gaps in the HCM – Aquifer Properties Assessments		$16,000	For 3 aquifer properties tests
Coordination with MCWRA		$10,000	Setting up a shared system; MCWRA time
Required 5-year Update		$200,000	
SVIHM and SVOM update (gathering data, getting it into model)		$9,000	
Reevaluate climate change		$2,000	Valley-wide cost split equally between subbasins; includes evaluating extent to which previous estimates of climate change are still valid
Update model scenarios		$14,000	
Stakeholder engagement		$50,000	
Analysis and report-writing		$125,000	
Refine and Implement Projects and Management Actions		$300,000	Depends on projects and management actions pursued; Could be grant or project match
Engineering feasibility studies and project design			
Permitting and environmental review			
Cost-benefit analyses			
Total		$888,000	

10.5.3 Funding for Projects and Management Actions

The start-up budget does not include funding for specific projects and management actions. Projects and management actions implemented by other agencies and organizations that contribute to groundwater sustainability will follow the funding strategies developed by those respective agencies and organizations. For projects funded by SVBGSA or funding SVBGSA raises to contribute to the implementation of projects, SVBGSA will evaluate the most appropriate funding mechanisms and engage stakeholders and the Board of Directors in this analysis. These include:

- **Grant funding**. SVBGSA will pursue grants to the extent possible to fund projects and management actions.
- **Contributions from local jurisdictions, partner agencies, organizations, and companies.** Where appropriate, SVBGSA will work with partners to solicit contributions to jointly implement a project or management action.
- **Benefit assessment (Proposition 218 vote)**. For projects with considerable capital cost or that benefit multiple subbasins, SVBGSA will consider holding a 218 vote to levy an assessment based upon the special benefits conferred from a specific project. Before doing so, SVBGSA will undertake an analysis to identify the special benefit of the conferred project, the cost of the benefit, the zone of benefit, and method of calculating the assessments to be levied. This requires a public hearing and is subject to a majority protest.
- **Fee.** Fees may be collected for a variety of purposes, such as funding a regulatory program or providing a product or service. Fees are not subject to a vote or protest proceeding, but they cannot exceed the cost of running the program or providing the product or service. Some regulatory programs need to be implemented via ordinance.
- **Fines and penalties.** With the establishment of an ordinance, SVBGSA has the authority to impose fines and penalties, such as may be associated with a regulatory program. Imposition of a fine or penalty must provide due process, usually a hearing after notice/citation and before assessment of the fine or penalty, and funds must be put back into the program.
    - **Special tax.** SVBGSA has the authority to levy a special tax for a specific purpose, such as a parcel tax or some sales tax components. This requires a two-thirds vote of the electorate.

SVBGSA acknowledges that the costs associated with projects and management actions will need to be funded through mechanisms such as these. It will work with funding agencies and local partners to do so.

10.6 Implementation Schedule and Adaptive Management

The SVBGSA oversees all or part of 6 subbasins in the Salinas Valley Groundwater Basin. Implementing the Eastside Subbasin GSP must be integrated with the implementation of the 5 other GSPs in the Salinas Valley. The implementation schedule reflects the significant integration and coordination needed to implement all 6 GSPs in a unified manner.

A general schedule showing the major tasks and estimated timeline during the first 5 years of GSP implementation is provided on Figure 10-1. This includes the 6 main sets of tasks and DWR's review and approval process. For projects and management actions, implementation will begin with evaluating and comparing projects and management actions to determine which to implement first. Projects and management actions will be revisited and adjusted as needed throughout GSP implementation. Implementation of this GSP will rely on best available science and will be continually updated as new data and analyses are available.

SVBGSA will adaptively manage groundwater and the implementation of the GSP. The work of SVBGSA and stakeholders to complete this GSP provides a solid base to guide groundwater management; however, certain conditions may provide the need to adapt and change management as envisioned in this plan. For example, if existing conditions change, such as a prolonged drought that affects groundwater conditions, or additional funding for specific projects becomes available, SVBGSA may adapt its management strategy. If that occurs, SVBGSA will work through an open and transparent process with stakeholders, partner agencies, and DWR to ensure it continues to meet regulatory requirements and reaches sustainability.

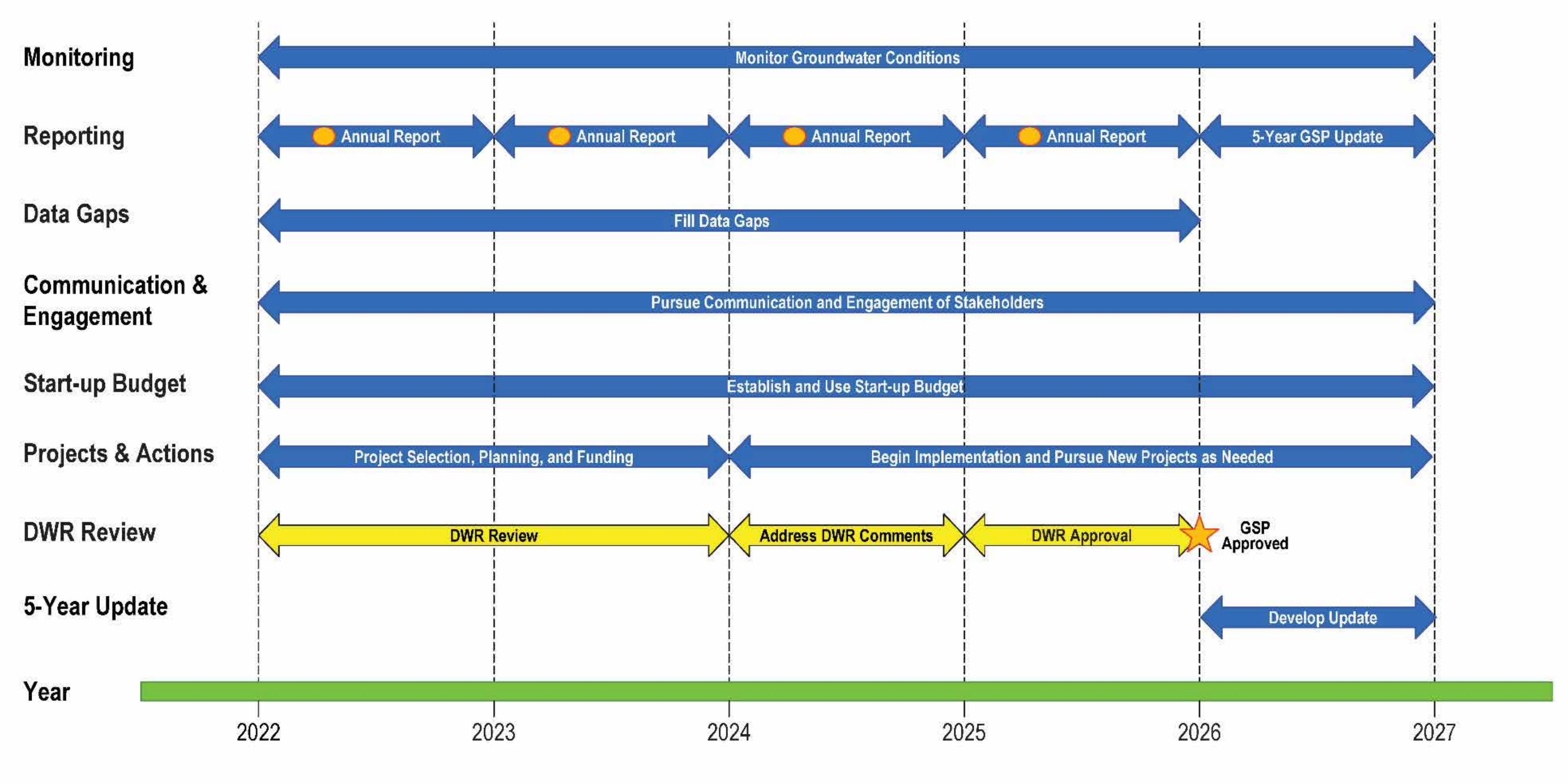

Figure 10-1. General Schedule of 5-Year Start-Up Plan

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